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CTORY

Fertilizer Research in the U.S.

- AGRONOMIC
- ECONOMIC
- MARKETING

Prepared in cooperation with
AGENCY FOR INTERNATIONAL DEVELOPMENT
NATIONAL FERTILIZER DEVELOPMENT CENTER
TENNESSEE VALLEY AUTHORITY, MUSCLE SHOALS, ALABAMA 35660
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DIRECTORY

Fertilizer Research in the U.S.

A GUIDE TO

Fertilizer research personnel and projects conducted in the United States by land-grant universities, commercial fertilizer companies, fertilizer industry trade associations, U.S. Department of Agriculture, and the National Fertilizer Development Center.

CROSS DISCIPLINES

Include agricultural economics - application equipment - distribution - farm management - field crops - forestry - fruit crops - horticulture - land reclamation - market research - microbiology - plant analysis - soil chemistry - soil and water conservation - transportation vegetable crops - waste utilization.

ABSTRACT

This DIRECTORY lists 1425 recent and current fertilizer projects concerned with agronomic, economic, and marketing research in the United States, Puerto Rico, and the Virgin Islands. The DIRECTORY provides the names and addresses of the project leaders, the titles of the projects, and at least three key words or phrases that describe each project. The objective is to provide a guide to professional workers at national, university, commercial, and other organizations that are developing new information about fertilizers. An analysis of the project listings shows the importance of environmental concerns, energy conservation, and enhanced fertilizer efficiency. Nitrogen was the nutrient element receiving most attention, with it being involved in 832 projects; 12 other nutrients also were investigated. Very few fertilizer projects are conducted in the economics (34 projects) and marketing (81 projects) areas. It is noted, however, that a broad range of disciplines is involved in fertilizer research: agricultural economics, application equipment, distribution, farm management, field crops, land reclamation, market research, microbiology, plant analysis, soil chemistry, soil and water conservation, transportation, vegetable crops, and waste utilization.

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Abbreviations

Al ..... Aluminum
B ..... Boron
Ca ..... Calcium
Cd ..... Cadmium
C ..... Carbon
Cl ..... Chlorine
Cr ..... Chromium
Cu ..... Copper
Fe ..... Iron
H ..... Hydrogen
K ..... Potassium
Mg ..... Magnesium
Mn ..... Manganese
Mo ..... Molybdenum
Na ..... Sodium
N ..... Nitrogen
NH_4 ..... Ammonium
Ni ..... Nickel
NO_3 ..... Nitrate
P ..... Phosphorus
Pb ..... Lead
Sr ..... Strontium
S ..... Sulfur
SO_4 ..... Sulfate
Zn ..... Zinc

DTPA ..... Diethylenediamine-triacetic acid
EDDH ..... Ethylenediamine-hydroxyphenylacetic acid
EDTA ..... Ethylenediamine-tetraacetic acid
HEDTA ..... Hydroxyethylenediamine-triacetic acid
HQ ..... Hydroquinone
Nitrapyrin (N-Serve) ..... 2-Chloro-6-(trichloro-methyl)pyridine
PBQ ..... p-Benzoquinone
Terrazole ..... 5-Ethoxy-3-trichloromethyl-1,2,4 thiadiazole

INTRODUCTION

The objective in preparing this DIRECTORY was to provide a guide to professional research workers at national, university, commercial, and other organizations and to the research that they are doing. It is intended that the DIRECTORY will serve as a working tool for mission directors of the U.S. Agency for International Development, for the International Fertilizer Development Center, and for others seeking the names and addresses of professional workers who have experience and can assist with research on specific fertilizer-related projects.

The individuals and organizations listed herein carry on continuing research programs with fertilizers. This research involves such diverse areas as conservation, crops, energy, engineering, economics, distribution, farm management, irrigation, marketing, microbiology, policy, pricing, product quality, soils, supply, and transportation. Only research conducted within the United States, Puerto Rico, and the Virgin Islands is included.

Professional people find it difficult to keep current with the vast flow of information originating from research projects concerned with fertilizers. Although the results of fertilizer investigations are published in the open literature, not all are seen by everyone who might make use of the information. This DIRECTORY provides a brief overview of the scope of these activities as organized into specific projects, identifies each researcher with his/her objectives, identifies organizations with research projects, and supplies a means of locating the individual research worker. For specific progress within individual projects, the reader is referred to such publications as: *Fertilizer Abstracts*, available at the National Fertilizer Development Center, Tennessee Valley Authority, Muscle Shoals, Alabama 35660; *Soils and Fertilizers*, published by the Commonwealth Agricultural Bureaux, Farnham Royal, Slough SL2 3BN, England; *Soil Science Society of America Journal* and the *Agronomy Journal*, published by the Soil Science Society of America and the American Society of Agronomy, 677 S. Segoe Road, Madison, Wisconsin 53711; and numerous other research journals.

Most of the projects were identified through the computerized Current Research Information System (CRIS) maintained by the United States Department of Agriculture. This system records about 24,000 agricultural and forestry projects. Projects were also identified from the computerized Smithsonian Science Information Exchange (SSIE). This system indexes more than 100,000 research projects currently active in 1,300

government agencies and private organizations. In addition, through The Fertilizer Institute, the Potash & Phosphate Institute, the National Fertilizer Solutions Association, The Sulphur Institute, and the National Fertilizer Development Center (TVA), projects conducted directly by them or by their member commercial firms within the United States were identified. Many provide extramural support to the research programs conducted by the agricultural universities. Such cooperation is indicated in the DIRECTORY. The authors gratefully acknowledge their assistance in providing the information.

Although considerable effort went into compiling the list of projects, some were undoubtedly overlooked; the authors regret any inconvenience this may cause. The computer systems can be searched for fertilizer projects by using such key words as fertilizers, soil fertility, liquid fertilizers, etc. The number of projects to be classified as to agronomic, economic, or marketing research depends primarily on one's definition of these terms.

Relatively few agronomic projects deal with research to evaluate fertilizer products. Many more projects focus on various aspects of fertilizer use such as crop production, methods of application, soil and plant testing, potential pollution from agricultural operations, soil chemistry, etc., in which fertilizer is one of many factors involved. Field plot, greenhouse, and laboratory studies are included.

Few economics and marketing research projects deal exclusively with fertilizer products, prices, promotion, distribution, and structure of the industry. More are concerned with farm management of inputs, transportation modes, area development, etc. Related research was included only if fertilizers could be identified as a specific part of the project.

Often research data are first published in the form of theses. Those selected for citation in the DIRECTORY were chosen from recent editions of the *Agronomy News* published by the American Society of Agronomy, Madison, Wisconsin.

The accompanying analysis of the projects provides an insight into the current fertilizer research interests within the United States. It includes the fertilizer products being studied and the crops on which they are being used. Also discussed are the studies related to the economics of farm fertilizer use and the role of fertilizers in land reclamation and waste management.

HOW TO USE THE DIRECTORY

Material in the DIRECTORY is organized into 53 sections—projects performed at the national level, those in each of the 50 States, and those in Puerto Rico and the Virgin Islands. Every project carries an identification code of two letters and three digits. The letters refer to the location (State) and the numbers to the order of listing within one location. Within each State section the projects are listed alphabetically under their parent institution; branch and substation research sites are interpolated among the parent institutions.

The DIRECTORY has as its main objective the bringing together of specific information about fertilizer research projects and the people who conduct these projects. Persons seeking current information about fertilizer projects or individuals specializing in research subjects of interest may use several approaches to find this information. The geographical (State) listing of projects is one aid. Two indexes have been designed as additional aids.

1. General Index Each research project has been key worded with three or more descriptive words or phrases. Each of these subject matter phrases or words has been entered in this index. To locate an individual with a subject matter knowledge, a seeker should select the fertilizer, crop, or other item of interest in this index, find the project numbers relating to it, and look in the project listings for the specific citation.

2. Research scientists Index This index arranges all the researchers in the book into a single alphabetical list and cites the codes of all projects with which each is associated.

Contents of Individual Listings: Each project listing includes six bits of information in the following order (see figure 1):

1. The name of the research organization or institution appears at the beginning of each of the 53 sections. **A**
2. A location or mailing address, including the zip code, is included as part of the organization entry. In some instances the address of the research worker may not be in the same city or even the same State in which the research institution is located. Where such cooperation between researchers and/or organizations is involved, the address of the supporting individual can be found on a separate page entitled "Addresses of Cooperators." **B**
3. Each project has an indentifying code composed of two letters and three numbers. The letters correspond to the standard two-letter State abbreviation or the section where the project is located. **C**
4. The project title is the title as it appeared on the computer printout or other source. **D**
5. The name or names of all individuals who serve as leaders of the specific project are recorded. **E**
6. Descriptive words or phrases used to index the project are used in lieu of an abstract. **F**

Figure 1. Information key

A and L Laboratory — A
Fort Wayne, Indiana 46802 — B

C

IN001 **To Evaluate the Yield Response of Corn and Soybeans to One Application of Boron**

J. Hohla (ALL), J. R. Turner (U.S. Borax)

Boron rate; corn

Purdue University
West Lafayette, Indiana 47907

IN002 **Land Use and Natural Resources in Eastern Indiana**

M. W. Alderfer — E

Fertilizer response; municipal sludge; method of application; N-Serve; corn, soybean

IN003 **Research with Strip Placement of Liquid Fertilizer Grades** — D

S. A. Barber (PU), N. van Buren (NFSA)

Liquid fertilizer response; placement

IN004 **Interaction of Potassium and Nitrogen Levels on Corn Production**

S. A. Barber (PU), C. P. Ellington (PPI)

Nitrogen, potassium rate; corn — F

ANALYSIS OF CURRENT RESEARCH PROJECTS

The great gains in U.S. agricultural productivity in the 1960-75 period were achieved as a result of multidisciplinary research. Soil fertility specialists coupled their fertilizer research with that of economists, plant geneticists, physiologists, pathologists, and agricultural engineers to solve specific crop production problems. Concurrently, marketing systems evolved to provide growers with lower cost, higher analysis fertilizers that were delivered to the field at the right time. All of this was accompanied by educational programs to ensure the farmer the most efficient use of his investment in an ever increasing number of specialized fertilizer products.

Today fertilizer research is even more sophisticated because it must include not only methods to increase plant growth, but also must deal with environmental concerns, energy conservation, water use, enhanced fertilizer efficiency, waste utilization, mine-spoil soil reclamation, and the quality of feeds and foods for consumption by animals and humans. It must study more efficient systems of production, distribution, and promotion of increasingly scarce fertilizer resources.

One measure of the present tempo of research and of the shifts that are occurring is a comparison of projects contained in the CRIS system in 1969 with those contained in this DIRECTORY. Table 1 indicates that three crops—citrus, range, and tobacco—were involved in fewer projects in 1979 than in 1969. Because the 1969 listings are most likely understated in comparison with the 1979 listings, the decrease in numbers probably is a true decrease. At the opposite end of the scale, regardless of whether evaluated by the percentage increase or the absolute increase in number of projects, there are about six crops that stand out as receiving more attention in 1979 than in 1969. There are corn, sorghum, small grains, soybeans, forages, and vegetables. The methods used in 1969 to categorize projects are not well-defined. It is assumed that the 468 projects listed in table 1 were mutually exclusive; that is, only one crop was listed for a project. This is not the case for the 1979 projects; every crop mentioned in a project summary is indexed in this DIRECTORY. Thus, the 1588 projects listed in table 1 exceed by 11 percent the total number of projects contained in this DIRECTORY.

Table 1. Number of fertilizer research projects for selected crops, 1969 versus 1979.

Crop	Number of projects 1969*	1979
Citrus	12	8
Corn	21	235
Cotton	21	49
Forages	90	340
Forestry	53	113
Fruits, nuts	35	80
Greenhouse	12	—
Ornamentals	11	31
Peanuts	2	15
Range	26	13
Rice	7	39
Small fruits grapes	9	43
Small grains	22	152
Sorghum	5	65
Soybeans	24	146
Sugarcane, beets	17	42
Tobacco	34	19
Turf	21	27
Vegetables, melons	64	171
Total	486	1588

*National Plant Food Institute. 1969. Soil Fertility—Fertilizer Research Summary; Project Information from USDA's Current Research Information System (CRIS). National Plant Food Institute, Washington, D.C.

At the same time that fertilizer researchers must be concerned with a broader range of associated problems, they also must cope with rising project support costs. In 1960 each scientist-year cost about $18,000. Today equal support has risen to about $100,000. Such financial stress could cause crop production research to be placed in a lower priority than formerly. Recognizing these problems, 27 commercial companies supported 160 projects with grants of dollars, laboratory services, and products valued at more than $1 million in 1978. Such industry-supported research closely augments programs underway with public funds in seeking solutions to local production problems. Many firms, in addition, conduct research at their own research centers.

The National Fertilizer Development Center (NFDC) of the Tennessee Valley Authority develops new fertilizer products and investigates their agronomic and economic value. Such technology is used by the Nation's fertilizer industry to help provide the farmer with better and lower cost fertilizers. Research and educational programs are conducted in cooperation with the agricultural universities and the commercial industries to speed the flow of technology from the laboratories to the farmer.

The DIRECTORY includes a listing of 1425 fertilizer research projects being conducted by 1493 research workers at 191 locations in the 50 states, Puerto Rico, and the Virgin Islands.

Economic Benefits: Fertilizer research undergirds nearly every phase of agricultural research in the United States. In-depth knowledge of fertilizers as a fundamental input allows agricultural productivity to continue to grow. Annual rates of return on agricultural research investments are of the order of 50 percent. Such benefits accrue because of the way the research system is organized. From its early beginning it was designed to solve problems, to debottleneck the next limiting factor of productivity, and to be customer (farmer) oriented. New technology remains the primary objective. In recent years an investment in research to answer scientific questions related to the production of new technology has become necessary. Such science-oriented research is profitable because it is directly linked with technology-oriented research.

Economic benefits from fertilizer research accrue because the research is spread across the Nation where it can be closely related to local farming needs. The scientists are exposed to the

problems of farmers, and the farmers and extension workers have easy access to the research workers. Communication among State legislatures, farm and agribusiness constituencies, and agricultural scientists is quite strong. The long history of public support for research continues. In 1975 State legislatures appropriated $282 million for agricultural research; this was two-thirds of all the monies spent on agricultural research in the United States. Their evaluation of the amount of money to appropriate was based on the performance of the agricultural experiment stations in their State. The monies were invested in accordance with the market values of the locally produced food, feed, and fiber products. Legislatures also have found that decentralization to substations within States has made research more productive.

Nutrients Studied: Of a total of 1425 projects cited in this study, 832 were concerned with nitrogen, 493 with phosphorus, 377 with potassium, 142 with micronutrients, and 131 with lime and/or calcium (table 2). Many of the projects contributing to the heavy research interest in nitrogen seek to improve the use efficiency of applied nitrogen fertilizer. The use of enzymology, isotopes, coatings, and new methods of application point to improved plant growth, conservation of energy and fuels, and prevention of potential adverse effects of nitrogen fertilizers on water quality.

Table 2. Nutrients used in fertilizer research projects

Nutrient used	Number of projects
Nitrogen	832
Phosphorus	493
Potassium	377
Sulfur	186
Micronutrients, total	142
Calcium (plus lime)	131
Zinc	83
Boron	52
Magnesium	52
Iron	38
Manganese	29
Copper	19
Molybdenum	9
Chlorine	6

Products Cited: The two fertilizer materials most frequently used in the projects were urea and ammonium nitrate as shown in table 3. The five leading fertilizer materials (table 3) were nitrogen materials.

Table 3. Fertilizer materials most often used in fertilizer research projects

Fertilizer material	Number of projects
Urea	118
Ammonium nitrate	104
Sulfur-coated urea	55
Ammonium sulfate	48
Anhydrous ammonia	39

Many of these are used for direct application; the amount of research involving these materials indicates the scientist's concern for improvements in their use. The

proportion of urea in the United States fertilizer nitrogen market continues to grow, approaching 2 million tons in 1978. In order to overcome a potential agronomic disadvantage and to provide controlled or timed release of urea-nitrogen, TVFDC has developed sulfur-coated urea. Others have attacked the problem by the incorporation of nitrification and urease inhibitors with nitrogen products, encapsulation, and small bag placement.

Environmental Concerns: Soils serve to biodegrade waste. With enhanced values placed on clean water, an increasingly wide variety of waste materials are applied to soils for purification. The nutrients within the wastes are conserved. Soil scientists have been called upon, especially, to provide methods for municipal waste utilization. While many of the projects could be related to environmental concerns, waste utilization was a major interest in 41 projects as shown in table 4. However, more precise control of the release of soluble, high analysis fertilizer materials for the long-term nutrition of plants appeared to be of paramount interest.

Table 4. Fertilizer research projects specifically related to environmental concerns

Project group	Number of projects
Controlled-release nutrients	93
Waste utilization	41
Heavy metals	37
Reduced tillage	31
Mine-spoil soil reclamation	17
Trickle irrigation	15

Plant Species: A classification of fertilizer research projects according to plant species is shown in tables 5 and 6. Field crops are involved in 1123 projects. Over 60 species of grain crops were being studied in 649 projects; corn led with 235 projects, followed by soybeans and wheat. Even so, expenditures of the State experiment stations and the USDA on research, as a function of gross product value, is less for grain crops than for speciality or horticultural crops. The 340 forage projects involve 31 grass and 12 forage-legume species. There were 10 speciality crops studied; cotton is studied most frequently with 49 projects, sugar beets follow with 29, tobacco with 17, and peanuts with 15 projects. Cotton is the only specialty crop to rank in the top 10 crops studied. It receives the largest research investment per dollar value of the product.

Table 5. Plant species used in fertilizer research projects

Plant group	Number of projects	Number of species
Field crops		
Grain	649	62
Forages, grass	225	31
Speciality	134	10
Forages, legumes	115	12
Horticultural crops		
Vegetable	155	40
Tree fruits	80	21
Small fruits	43	10
Ornamental	31	18
Melons	16	4
Forestry	113	37

Based on the market value of the products, more money is invested in fertilizer research on horticultural crops than on field crops. Perhaps this is due to the fact that they are grown on small acreages, must meet high quality standards for storage and distribution, and represent a large number of species.

Leading Crops: The ten crops most frequently used in fertilizer research projects are shown in table 6. While it could be expected that corn would be mentioned frequently, the number of research projects dealing with alfalfa, potato, and bermudagrass may come as a surprise.

Table 6. Crops most often involved in fertilizer research projects

Crop	Number of projects
Corn	235
Soybean	146
Wheat	112
Alfalfa	65
Grain sorghum	65
Potato	55
Bermudagrass	51
Cotton	49
Rice	39
Tomato	30

Economics and Marketing: Fertilizer distribution has been studied mostly with respect to transportation and storage (table 7). In many cases these projects are related to the feed and grain industry. Research interest arose from the decline of railroad service to many rural areas and the increased movement of products on the water network.

The economics of the various marketing systems has not received much attention in recent years. Of the 34 projects identified, 21 are concerned with the economics of fertilizer use on the farm.

Table 7. Fertilizer research projects concerned with economics and marketing

Project group	Number of projects
Marketing	
Distribution	
Storage	12
Transportation	12
Other	10
Market research	17
Retail	8
Other	22
Total	81
Economics	
Farm management	21
Public policy	8
Supply/demand forecast	5
Total	34

Location of Projects: The decentralization of projects and scientists is illustrated by the data in figure 2. The upper figure refers to the projects and the lower figure to the number of research workers. Florida leads with 88 projects, followed by Texas with 83, Kansas with 74, Louisiana with 56, and Georgia with 53.

There is a high correlation between the number of projects per State and the number of research workers per State. Figure 2 shows that the States with more than 50 fertilizer scientists are Florida, Texas, California, Kansas, and Louisiana.

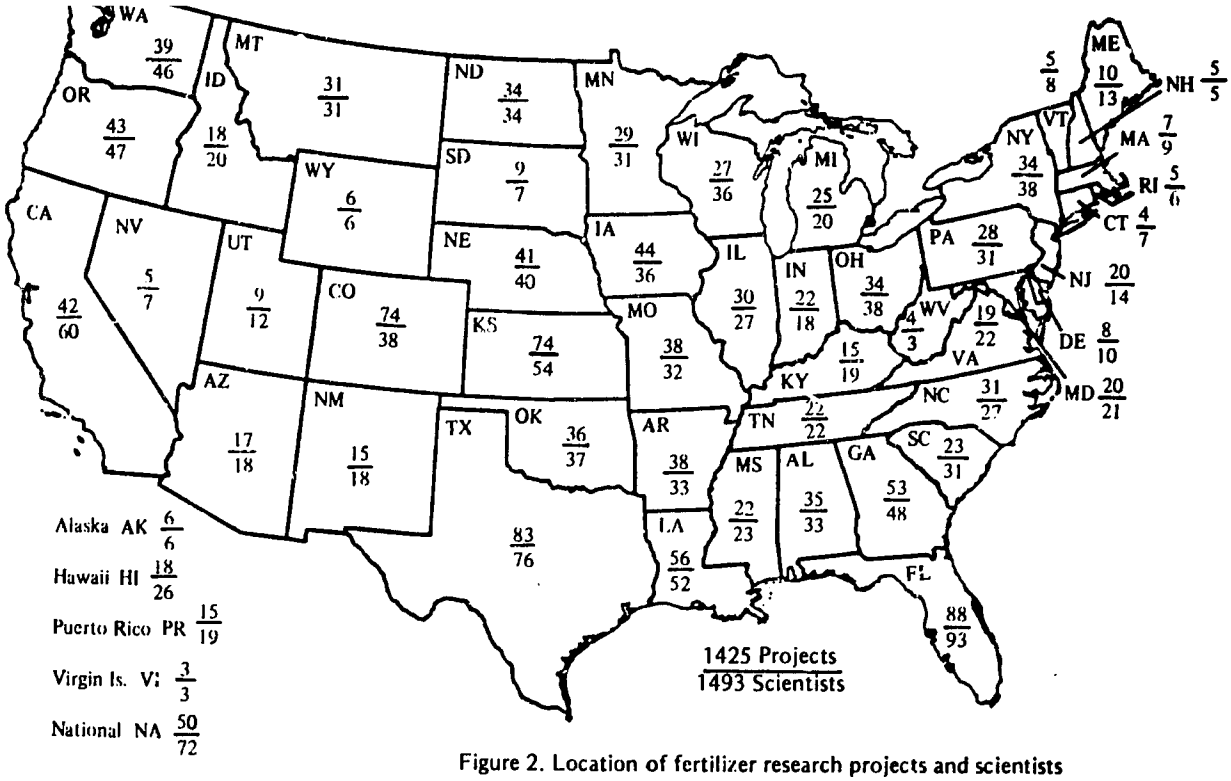

Figure 2. Location of fertilizer research projects and scientists

RESEARCH PROJECT LISTINGS

NATIONAL

International Fertilizer Development Center
Muscle Shoals, Alabama 35660

NA001 World Fertilizer Situation and Outlook 1978-1985

G. Harris (IFDC), E. Harre (NFDC-TVA)

Supply/demand analysis; forecasting; economics; data bank

NA002 Potential for Regional Cooperation in Fertilizer

O. Livingston, P. Stangel, T. Foster

Fertilizer industry; structure, distribution; market analysis; the ASEAN Group

National Fertilizer Development Center
Tennessee Valley Authority
Muscle Shoals, Alabama 35660

NA003 Yield and Protein Content of Rice

S. E. Allen

Urea, ammonium sulfate, ammonium nitrate rate; time and method of application; rice

NA004 Dissolution Studies with Sulfur-Coated Urea

S. E. Allen

Ammonium nitrate, sulfur-coated urea; controlled soil temperature; fescue

NA005 Crop Yield, Nitrate-Nitrogen and Total Nitrogen and Potassium Concentration Relationships

S. E. Allen

Sulfur-coated urea, ammonium nitrate, phosphorus, potassium rate; corn, fescue, chard, spinach, mustard

NA006 Leaching Losses from Soluble and Sulfur-Coated Urea and Potassium Chloride

S. E. Allen, H. G. Kennedy

Urea, ammonium nitrate, sulfur-coated urea, potassium chloride, sulfur-coated potassium chloride rate; grain sorghum, sudangrass

NA007 Fertilizer Needs on Soils High in Phosphorus and Potassium

O. P. Engelstad

Cooperators at: Riverside, California; Fort Collins, Colorado; Tifton, Georgia; West Lafayette, Indiana; East Lansing, Michigan; Waseca, Minnesota; Lincoln, Nebraska; Knoxville, Tennessee

Nitrogen, phosphorus, potassium rate; corn, cotton, soybean, alfalfa

NA008 Soil Temperature Effects on Cadmium and Zinc Uptake by Vegetables

P. M. Giordano, D. A. Mays, A. D. Behel

Sewage sludge; release of cadmium and zinc; vegetable

NA009 Response of Rice to Zinc

P. M. Giordano

Zinc sulfate, zinc EDTA, urea, ammonium sulfate response; time of application; rice

NA010 Response of Corn to Zinc

P. M. Giordano, J. J. Mortvedt

Zinc sulfate, zinc EDTA, zinc-citric acid, zinc lignon sulfonate, zinc-glucoheptanate, monoammonium phosphate, ammonium polyphosphate; dry and suspension; corn forage

NA011 Mobility of Heavy Metals in Sewage Sludge

P. M. Giordano, J. J. Mortvedt

Nitrogen, phosphorus, potassium, sewage sludge response; loss of zinc, cadmium, copper, nickle, lead, nitrate-nitrogen

NATIONAL

NA012 Development of Analytical Methods for Fertilizer Materials

F. J. Johnson

Macronutrient, micronutrient, heavy metal in fertilizer-related material

NA013 Reactions of Ammonium Ortho- and Polyphosphates in Soil

F. E. Khasawneh, I. Hashimoto, E. C. Sample

Monoammonium phosphate, diammonium phosphate, concentrated superphosphate, dicalcium phosphate, triammonium polyphosphate, ammonium polyphosphate, phosphonitrilic hexamide, phosphoryl triamide, rock phosphate rate; corn, fescue, grain sorghum

NA014 Factors Controlling Agronomic Effectiveness of Phosphate Rocks

F. E. Khasawneh, E. C. Sample

Rock phosphate rate, source; corn, cowpea

NA015 Foliar Fertilization of Soybeans

D. A. Mays

Urea, potassium polyphosphate, potassium sulfate rate; foliar application; soybean

NA016 Lime Incorporation and Fertilizer for Coastal Bermudagrass

D. A. Mays, E. M. Evans

Nitrogen, potassium rate; lime placement; bermudagrass

NA017 Soil Acidulation Effects on Heavy Metals

J. J. Mortvedt, P. M. Giordano

Zinc sulfate, municipal compost, sewage sludge, limestone scrubber sludge rate; uptake of cadmium, copper, nickel, zinc, lead; corn, snapbean

NA018 Response of Soybeans and Red Clover to Molybdenum

J. J. Mortvedt

Molybdenum, lime response; soil-test correlation; soybean, red clover

NA019 Heavy Metal Contaminates in Fertilizers

J. J. Mortvedt, P. M. Giordano

Rock phosphate, diammonium phosphate, cadmium, chromium, copper, nickel, lead, zinc rate; cadmium, phosphate source; corn forage

NA020 Crop Response to Heavy Metals in Zinc Sulfate, Compost, and Sewage Sludge-Treated Soils at Varying pH Levels

J. J. Mortvedt, P. M. Giordano, G. Osborn

Zinc sulfate, compost, sewage sludge; corn

NA021 Nutrient Effectiveness in Relation to Rates Applied for Pot Experiments

J. J. Mortvedt

Monoammonium phosphate, concentrated superphosphate, dicalcium phosphate, ammonium nitrate, sulfur-coated urea, oxamide, IBDU rate; corn

NA022 Sorghum Response to Iron Sources

J. J. Mortvedt

Iron sulfate, iron frit, iron chelate, Hamp-iron rate; soil and foliar application; grain sorghum

NA023 Corn Growth Rate-Nutrient Concentration Relationships

J C Noggle, C. M. Hunt

Nitrogen, phosphorus, potassium response; corn

NA024 Nitrate-Nitrogen and Total Nitrogen Concentration in Plants

J C Noggle, C. M. Hunt

Nitrogen, phosphorus, potassium rate; corn, fescue, spinach, mustard

NA025 Lime Rates and Placement for Cotton

J. M. Soileau

Lime rate, method of application; cotton

United States Department of Agriculture
Agricultural Research Service
Beltsville, Maryland 20705

NA026 Machinery for Planting and Applying Fertilizer to Vegetable Crops

R. F. Dudley

Nitrogen rate; method of placement; potato, barley

NA027 Revegetation of Surface Mined Areas

W. J. Armiger

Rock phosphate, lime, composted sewage; fescue, orchardgrass, clover, birdsfoot trefoil

NA028 Control or Prevention of Soil and Water Pollution from Fertilizers

H. M. Kunishi, A. W. Taylor

Fate of applied phosphorus; soil testing

NA029 Improvement of Nitrogen Utilization Efficiency in Agricultural Cropping Systems

J. O. Legg, J. J. Meisinger, G. Stanford

Fate of applied nitrogen, alfalfa, soybean

NA030 Machinery for Establishment and Maintenance of Pasture and Hay Land in the East

R. F. Dudley

Fertilizer placement; no-till; reed canarygrass

NA031 Control of Soil and Water Pollution from Fertilizers and Organic Wastes

J. O. Legg, J. J. Meisinger, G. Stanford

Fate of applied nitrogen; nonpoint source pollution

NA032 Management and Evaluation of Grasses for Turf

J. J. Murray; S. A. Ostazeski; J. B. Powell

Nitrogen, phosphorus, potassium, sewage sludge; bluegrass, fescue

NA033 Rice Protein Improvement

R. T. Smith, W. J. Wiser

Nitrogen rate; plant analysis; rice

NA034 Monocotyledonous Plants Found More Susceptable to Nutrient Imbalances than Dicotyledonous Plants

J. C. Brown, C. D. Foy (USDA-SWARS)

Phosphorus, iron, copper, boron, zinc response; genotype difference; oat, sorghum, tomato

NA035 Foliar Fertilization of Soybeans Increases Yields

USDA-SWARS

Urea; fate of applied nitrogen, ^{15}N, nitrogen, phosphorus, potassium, sulfur; foliar application; trickle irrigation; soybean

United States Department of Agriculture
Economic Research Service
Washington, D.C. 20250

NA036 Rail Car Coordination Among Cooperatives

R. Byrne, E. Miller

Railroad; transportation, cost

NA037 Basic Trends in Growth of Farmer Cooperatives

L. C. O'Day

Retail marketing; sales data; economics

NA038 Market Potentials for U.S. Farm Products in Domestic and Foreign Markets

P. B. Dwoskin

Market analysis; supply-demand; cost benefit; market development

NA039 Energy Use and Conservation in U.S. Agriculture

E. E. Gavett, R. T. Vanarsdall

Farm management; fertilizer cost; energy

NA040 Energy Use and Conservation in U.S. Agriculture

E. E. Gavett, R. T. Vanarsdall

Fertilizer; transportation and distribution cost; energy

NA041 Manufacturing and Marketing of Nitrogen Fertilizers in the United States

D. Paul, R. L. Kilmer

Fertilizer, nitrogen inorganic compound; manufacturing; marketing; spatial distribution; cargo transportation; storage

NA042 Economic Projections Program

L. C. Quance

Transportation; distribution; public policy; economics

NA043 Aggregate Supply, Resources Technology, and Factors Affecting Production

R. B. Reidinger

Fertilizer industry, supply, demand; economics

NA044 Manufactured Inputs in the Food and Fiber Sector

C. Vosloh, D. Paul, T. Eichers, R. D. Reinsel

Fertilizer industry; structure; retail marketing

United States Department of Agriculture
Soil, Water, and Air Research Service
Washington, D.C. 20250

NA045 Reclamation and Revegetation of Land Areas Disturbed by Man

R. F. Follett, A. R. Grable

Cooperators at: Fort Collins, Colorado; Blacksburg, Virginia; Morgantown, West Virginia; Cheyenne, Wyoming

Nitrogen response; shale and mine spoils; fate of applied nitrogen ^{15}N

NA046 Utilize, Manage, and Conserve Soil Fertility for Increased Production and Nutritional Quality of Plants and Animals

R. F. Follett, A. R. Grable

Cooperators at: Palmer, Alaska; Brawley, California; Fort Collins, Colorado; Byron, Georgia; Watkinsville, Georgia; Kimberly, Idaho; Beltsville, Maryland; Sidney, Montana; Manden, North Dakota; Bushland, Texas; Rio Piedras, Puerto Rico

Fertilizer response; plant; animal

United States Department of Agriculture
14th Street and Independence Avenue S.W.
Washington, D.C. 20250

NA047 Cost of Production: Firm Enterprise Data System and Annual Survey

J. B. Penn

Market analysis; farm management; production cost

NA048 Agricultural Situation in Eastern Europe

T. A. Vankai

Marketing; policy; supply-demand forecast; economics

NATIONAL

NA049 Agricultural Situation in Japan, Canada, Australia, New Zealand, Israel, and South Africa

O. Sabatini

Market analysis; product supply-demand; forecast, export

NA050 Appraisal of the Capability of the Transportation System to Meet Needs of Agriculture and Rural Areas

R. K. Hart

Fertilizer industry, supply; transportation, capacity, railroad, truck, rural highway; storage

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ALABAMA

Alabama Agricultural and Mechanical University
Normal, Alabama 35762

AL001 Developing Christmas Trees for Commercial Production in Alabama

G. F. Brown, Jr.

Fertilizer response; Christmas tree

AL002 Effect of Different Levels of N, P, and K on the Growth Characteristics, Yield, and Quality of Triticale

S. M. Elgawhary

Nitrogen, phosphorus, potassium rate; triticale, wheat, rye, barley

AL003 Species Suitability and Cultural Practices for Christmas Tree Production in North Alabama

H. W. Joyner

Fertilizer response; Christmas tree

AL004 Lime and Fertilizer Requirements and Nutrient Utilization by Triticale

L. M. Mugwira, M. Floyd

Fertilizer response; triticale

AL005 Performance of Controlled-Release Fertilizers on Horticultural Crops. (Ph.D. Thesis)

A. J. Patel (G. C. Sharma, Advisor)

Fertilizer (controlled release) response; horticultural crop

AL006 SCU As A Nitrogen Source for Ornamentals

G. C. Sharma (AAMU), D. A. Mays (NFDC-TVA)

Sulfur-coated urea; ornamental

AL007 SCU for Container-Grown Nursery Stock

G. C. Sharma (AAMU), D. A. Mays (NFDC-TVA)

Sulfur-coated urea; chrysanthemum

Auburn University
Auburn, Alabama 36830

AL008 Fluidized Bed Boiler Wastes for Peanut Production

F. Adams

Calcium sulfate, calcium oxide; particle size; peanut

AL009 Effects of Soil Acidity and Calcium on Soil Solutions and Yield of Crops

F. Adams

Nitrogen, phosphorus, potassium, sulfur, boron, lime response; soil test correlation; cotton, sorghum, potato, soybean, peanut

AL010 Availability of Residual and Fertilizer Phosphorus

A. C. Bennett, R. L. Haaland

Response to applied and residual phosphorus; nitrogen, phosphorus, and potassium rate; rye, ryegrass, clover

AL011 Dynamics of Algae Populations in Farm Fish Ponds

C. E. Boyd

Nitrogen, phosphorus, potassium rate; fish pond

AL012 Management of Aquatic Plants for Sport Fish Production in Ponds

C. E. Boyd

Nitrogen-phosphorus-potassium (combination), lime response; aquatic plant, fish pond

AL013 Nitrification Inhibitors

A. E. Hiltbold (AU), G. E. Richards (Olin)

Terrazole

AL014 Turfgrass Evaluation and Management

R. Dickens

Nitrogen, phosphorus, potassium, iron rate; centipedegrass

AL015 No-Till Corn Production as Affected by Fertilization

B. D. Doss, Z. F. Lund

Nitrogen, phosphorus, potassium rate; method of application; no-till; corn

AL016 Correction of Subsoil Acidity in Cotton Production on Coastal Plain Soils

W. T. Dumas, C. M. Stokes, F. A. Kummer

Ammonium sulfate, lime rate, placement; cotton

AL017 Soil Fertility and Fertilizer Requirements for Vegetable Crops

C. E. Evans, J. L. Turner

Nitrogen, phosphorus, potassium, lime response; time and method of application; irrigation; tomato, potato

AL018 Soil Fertility and Fertilizer Requirements for Vegetable Crops

C. E. Evans, J. L. Turner

Nitrogen, phosphorus, potassium, lime rate; irrigation; tomato; potato; pimento

AL019 Research on Tomatoes and Coastal Bermudagrass

C. E. Evans (AU), C. P. Ellington (PPI)

Fertilizer response; tomato, bermudagrass

AL020 Nitrogen, Phosphorus, Potassium for Double-Cropped Irish Potatoes and Soybeans

C. E. Evans (AU), C. P. Ellington (PPI)

Nitrogen, phosphorus, potassium response; potato, soybean

AL021 Nitrogen and Potassium on Coastal Bermudagrass and Soybeans

C. E. Evans (AU), C. P. Ellington (PPI)

Nitrogen, potassium response; bermudagrass, soybean

AL022 Nutrient Requirements of Vegetable Crops as Affected by Soil Fertility and Cultural Practices

C. E. Evans, W. A. Johnson

Ammonium nitrate, sodium nitrate, ammonium sulfate, ammonium carbonate, calcium nitrate, potassium nitrate response; tomato, potato, snapbean

AL023 Nitrogen Fertilization of Loblolly Pine

D. H. Gjerstad, H. S. Larsen

Nitrogen rate, source; loblolly pine

AL024 Enhancing Biological Dinitrogen Fixation in Soybeans and Other Legumes

A. E. Hiltbold

Nitrogen fertilizer, nitrogen fixation by *Rhizobium*; soybean, peanut

AL025 Growth and Nutrient Requirements of Selected Hardwoods

E. S. Lyle, Jr.

Fertilizer response; forestry-sweetgum

AL026 Effect of Boron and Soil pH on Yield of Corn and Soybeans

J. W. Odom (AU), J. R. Turner (U.S. Borax)

Baron response; corn, soybean

AL027 Nitrogen Requirements for Containerized Nursery Plants in Bark Growth Mixes

F. B. Perry, Jr.

Nitrogen source and rate; phosphorus, potassium response; soil test correlation; container-grown plant

AL028 Verticle Movement of Nitrates in Some Alabama Soils

C. E. Scarsbrook (AU), F. E. Khasawneh (NFDC-TVA)

Ammonium sulfate; fate of applied nitrogen, ^{15}N; millet

AL029 Factors Affecting Vertical Movement of Nitrates in Some Alabama Soils

C. E. Scarsbrook

Nitrate leaching, ^{15}N, pollution

AL030 Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality

C. E. Scarsbrook

Nitrogen, phosphorus rate; fate of applied nitrogen; pollution

AL031 Aquaculture

R. O. Smitherman, R. Allison, E. E. Prather

Fertilizer response; fish pond

AL032 Response Between Micronutrients in Soils and Uptake and Response by Plants

J. I. Wear

Calcium, boron, zinc, manganese; foliar application

AL033 Precommercial Treatment of Semi-Stagnated Natural Stands of Loblolly Pine

S. D. Whipple

Nitrogen rate; pine

AL034 Survival and Growth of Planted Hardwoods and Pine on Slopes

S. D. Whipple

Ammonium nitrate response; poplar, pine, sweetgum, sycamore

Tuskegee Institute
Tuskegee, Alabama 36088

AL035 Performance of Sweet Potato as Affected by Fertilization, Herbicidal, and Semi-Tillage Production Practices

P. K. Biswas

Nitrogen, phosphorus, potassium rate; sweet potato

ALASKA

University of Alaska
Fairbanks, Alaska 99701

AK001 Nutrient Cycles in Selected Interior of Alaska Forest Types

K. Van Cleve (College)

Ammonium nitrate, concentrated superphosphate, potassium chloride response; birch, spruce, aspen, poplar

AK002 Soil Fertilization and Lime Requirements for Crop Production on Alaskan Soils

W. M. Laughlin, P. F. Martin (Palmer)

Urea, ammonium nitrate, phospharus, potassium, sulfur rates; clover, bromegrass, native bluejoint, potato

AK003 Responses to Fertilization Observed for Grasses

W. M. Laughlin (Palmer), P. F. Martin, G. R. Smith

Ammonium nitrate, phosphorus, potassium, sulfur rate; bromegrass

AK004 Fertilizer Test and Demonstrations

W. M. Laughlin (Palmer), W. J. Sharratt (NFDC-TVA)

Sulfur-coated urea. urea, ammonium nitrate rate; sulfate of potash, phosphorus, potassium response; bromegrass

AK005 Revegetation and Correlated Physical and Biological Parameters on Denuded Lands Near Fairbanks. Phase II.

B. J. Neiland

Nitrogen-phasphorus-potassium rate; highway roadside

AK006 Small Grain Production in the Tanana Valley of Interior Alaska

F. J. Wooding

Fertilizer response; barley, oat, wheat

ARIZONA

University of Arizona
Tucson, Arizona 85721

AZ001 Nutrient Requirements of Agronomic Plants by Plant Tissue and Soil Analyses

J. L. Abbott, J. L. Stroehlein, T. C. Tucker

Sulfuric acid, ammonia; irrigation application; wheat, sugar beet

AZ002 Energy in Western Agriculture—Requirements, Adjustments, and Alternatives

M. A. Altobello, H. Ayer

Fertilizer market analysis

AZ003 Fate of Fertilizer Nitrogen in Soil-Plant Environments

H. L. Bohn, T. C. Tucker

Fate of applied N; small grain, cotton, lettuce

AZ004 Fertilizer Tests and Demonstrations

D. A. Bryant (UA), W. J. Sharratt (NFDC-TVA)

Sulfur-coated urea, ammonium nitrate rate; herbicide; range herbage

AZ005 Continuous Cropping Systems for More Efficient Use of Energy and Capital

M. D. Cannon

Fertilizer response; cotton

AZ006 Impact of Changes in World Food Supply-Demand Conditions Upon Selected Agricultural Factor Markets

R. W. Fox

Farm management; fertilizer demand analysis

AZ007 Irrigation Methods, Nutrient Requirements, and Cultural Practices for Irrigated Citrus on Sandy Soils

B. R. Gardner, R. L. Roth, J. Van Schilfgaarde

Nitrogen, phosphorus, micronutrient rate; trickle irrigation; citrus

AZ008 Nutrient Requirements of Horticultural Plants by Plant Tissue and Soil Analysis

B. R. Gardner, K. L. Stroehlein, T. C. Tucker

Phospharus rate; soil, plant test correlation; horticultural crop

AZ009 Soil, Water, and Plant Analysis as a Means of Improving Crop Production

T. W. McCreary

Nitrogen, phosphorus, soil testing correlation

AZ010 Sugar Beet Management under Irrigated Conditions

J. M. Nelson, D. Palzkill

Nitrogen, phosphorus, manure response

AZ011 Turfgrass Management

I. L. Pepper

Ammonium sulfate, urea, IBDU, urea formaldehyde, nitrogen rate; fate of applied nitrogen; bentgrass

AZ012 Physiological and Environmental Aspects of Vegetable Production in Arid Regions

W. D. Pew

Nitrogen, phosphorus rate; carrot, cantalope, lettuce, potato

AZ013 Effectiveness of Elemental Sulfur and Ammonium Polysulfide in the Reclamation of Saline-Alkali and Other High pH Soils

J. R. Stroehlein (UA), S. L. Tisdale (TSI)

Sulfur, ammonium polysulfide response; saline-alkali soil

AZ014 Fertilization of Range Soils and Range Plant Nutrition

J. R. Stroehlein

Nitrogen response; lovegrass, gramagrass

AZ015 Evaluation of Copper Refining Byproduct as a Fertilizer

J. L. Strolhlein (UA), G. R. Hagstrom (Duval)

Copper rate

AZ016 Use of Municipal Wastewater and Dried Sewage Sludge for Crop Plants

T. C. Tucker

Fertilizers, municipal wastewater response; irrigation method; alfalfa, barley, wheat, sorghum, cotton, bermudagrass

AZ017 Long-Term Agricultural Effects on Nitrogen in the Soil Environment

T. C. Tucker, F. Wiersma

Fate of applied N, dairy manure; saltation; bermudagrass, barley, sudangrass; pollution

ARKANSAS

University of Arkansas
Fayetteville, Arkansas 72701

AR001 Effect of Intensive Nitrogen and Potassium Fertilization on Growth and Persistence of Coastal Bermudagrass and on the Soil Chemical Environment. (Ph.D. Thesis)

R. A. Allured (L. F. Thompson, Advisor)

Nitrogen, potassium response; bermudagrass

AR002 Improving Prediction of Fertilizer Needs for Horticulture Crops

G. A. Bradley, R. C. Rom

Fertilizer rate; soil test correlation; squash, cucumber

AR003 Development of Automated Subirrigation System

B. B. Bruan; R. D. Mayo

Fertigation

AR004 Maximizing Soybean Yields in Double-Cropping Systems

F. C. Collins, C. E. Caviness, H. D. Scott

High-nitrogen starter fertilizer; tillage practice; disease; wheat-soybean interaction

AR005 Nitrogen Requirements for Containerized Nursery Plants in Bark Growth Mixes

A. E. Einert

Nitrogen rate, container-grown plant

AR006 Effect of Nitrogen and Phosphorus Fertilization on the Vegetative Regrowth of Arthur Wheat Subsequent to Chilling. (M.S. Thesis)

H. English (W. E. Sabbe, Advisor)

Nitrogen, phosphorus response; wheat

AR007 Chemistry of Submerged Rice Soils

J. T. Gilmour

Phosphorus, potassium response; flood water composition; rice

AR008 Microbial Nitrogen Fixation by the Rice Plant Root System

J. T. Gilmour, T. H. Johnston

Urea and bacterial nitrogen fixation compared; rice

AR009 Rice Straighthead Disease—A Chemical and Physiological Approach

J. T. Gilmour, B. R. Wells

Nitrogen fertilizer rate, metal chelate; rice

AR010 Removal of Chloride and Sulfate Salts of Potassium from Soil Via Winter Water Management

J. T. Gilmour (UA), C. P. Ellington (PPI)

Fate of applied potassium fertilizer

AR011 Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality

L. H. Hileman

Nitrogen-phosphorus-potassium combination; pulp effluent, refinery sludge rate; soybean, bermudagrass

AR012 Soybean Uptake of Nitrogen, Potassium, Magnesium, and Sulfur Fertilizer Applied With Irrigation at Different Growth Stages. (Ph.D. Thesis)

R. L. Hunter (W. E. Sabbe, Advisor)

Nitrogen, magnesium, potassium, sulfur response; irrigation; soybean

ARKANSAS

AR013 Evaluation of Coniferous Species for Christmas Tree Purposes

A. T. McDaniel

Fertilizer response; forestry-pine

AR014 Effect of Limestone, Nitrogen, and Potassium on Yield, Persistence, and Elemental Content of Coastal Bermudagrass Forage and the Chemistry of Soil Profile. (Ph.D. Thesis)

D. H. Nagel (L. F. Thompson, Advisor)

Nitrogen, potassium, lime response; bermudagrass

AR015 Yield and Elemental Content of Forage, and Soil Profile Chemistry, as Affected by Ammonium Nitrate, Muriate of Potash, Calcium Carbonate Additions to an Established Coastal Bermudagrass Sod. (M.S. Thesis)

D. H. Nagel (L. F. Thompson, Advisor)

Ammonium nitrate, potassium chloride, calcium carbonate response; bermudagrass

AR016 Nutrient Cycling and Productivity in Southern Pine

P. E. Pope, T. T. Ku

Nitrogen, phosphorus rate, humus recycling; forestry-southern pine

AR017 Effect of Zinc Treatment of Seed on Growth and Element Uptake by Rice Plants. (Ph.D. Thesis)

K. N. Reddy (L. F. Thompson, Advisor)

Zinc response; rice

AR018 Physiologic and Cultural Factors which Influence Production of Tree Fruits

R. C. Rom

Calcium nitrate, potassium nitrate, magnesium sulfate response; trickle irrigation; apple, peach

AR019 Plant Nutrition-Soil Fertility Relationship

W. E. Sabbe

Nitrogen, phosphorus, potassium, magnesium, sulfur response; soil test correlation; fescue, soybean

AR020 Sorption/Desorption of Phosphorus and Potassium in Selected Arkansas Soils

W. Sabbe (UA), C. P. Ellington (PPI)

Fate of applied phosphorus and potassium fertilizers

AR021 Soil Testing and Research

W. E. Sabbe, J. L. Keogh, R. Maples

Phosphorus, potassium, calcium, magnesium, sodium, iron, zinc, manganese, boron response; soil test correlation; soybean, cotton

AR022 Movement and Retention of Water and Solutes in Selected Southern Region Field Soils

H. D. Scott

Nutrient leaching; pollution; soybean

AR023 Effect of Boron Fertilization on the Establishment and Maintenance of Legumes in Pasture Mixtures in Arkansas

A. E. Spooner (UA), J. R. Turner (U. S. Borax)

Boron response; fescue/white clover, bermudagrass/white clover

AR024 Phosphorus Uptake by Kentucky 31 Fescue

A. E. Spooner (UA), G. E. Richards (Olin)

Phosphorus response; fescue

AR025 Evaluation of Forages Available in Arkansas and Their Utilization by Dairy Cattle

T. O. Stallcup, L. U. Daniels

Fertilizer response; method and timing of application; orchardgrass, white clover, rye, ryegrass; sorghum-sudangrass, bermudagrass; milk production

AR026 Diagnosis and Correction of Zinc Problems in Corn and Rice Production

L. F. Thompson

Zinc-coated seed; zinc oxide; rice

AR027 Diagnosis and Correction of Manganese and Molybdenum Problems in Legumes

L. F. Thompson

Manganese, molybdenum, lime; soybean

AR028 Rice as Influenced by Fertilizers, Soil Amendments, and Other Management Practices

B. R. Wells

Nitrogen rate, time of application, nitrification inhibitor; zinc, copper, arsenic; foliar application, rate

AR029 Nitrogen Sources for Grain Sorghum

S. L. Chapman (UA), J. A. Kovar (NFDC-TVA)

Sulfur-coated urea, urea; N-Serve response; grain sorghum

University of Arkansas
Monticello, Arkansas 71655

AR030 Fertilization of Sweetgum and Yellow Poplar Planted on an Old Field Silty Upland Site

T. T. Ku

Nitrogen-phosphorus-potassium rate; forestry: sweetgum, yellow poplar

University of Arkansas
Pine Bluff, Arkansas 71601

AR031 Ionic Balance and Growth of Soybeans

D. J. Albritton, M. S. Bhangoo, O. A. Porter

Nitrogen, phosphorus, potassium sulfate, calcium carbonate, magnesium oxide, potassium chloride rate; soybean

AR032 Response of Nodulating and Nonnodulating Lee Soybean Isolines to Applied Nitrogen

D. J. Albritton, M. S. Bhangoo

Nitrogen rate; soybean

AR033 Effect of Dry Sewage Sludge on Soil Properties, Chemical Composition, and Yield of Soybeans

D. J. Albritton, M. S. Bhangoo

Nitrogen, phosphorus, potassium rates compared to sewage sludge rates; sorghum

AR034 Irrigation Studies with Soybeans in Southeast Arkansas

M. S. Bhangoo, D. J. Albritton

Nitrogen rate; irrigation; soybean

AR035 Effect of Nitrogen Fertilizer on Soybeans in Relation to Insect Population of This Crop

J. G. Burleigh, D. J. Albritton, M. S. Bhangoo

Nitrogen rate; insect population; soybean

AR036 Effect of Cropping System, Tillage Practices, and Fertilizer Placement on Soybean Production

O. A. Porter, M. S. Bhangoo, D. J. Albritton

Nitrogen, phosphorus, potassium rate; time of application; soybean, wheat

AR037 Foliar Feeding of Soybeans

C. K. Woon (UA), J. A. Kovar (NFDC-TVA)

Ammonium polyphosphate, urea, sulfuric acid, potassium nitrate, Tween 80; time of foliar application; soybean

United States Department of Agriculture
Agricultural Research Service
Rice Branch Station
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Stuttgart, Arkansas 72160

AR038 Rice Breeding and Production

T. H. Johnston

Nitrogen rate; plant analysis; rice

CALIFORNIA

California State University
5241 North Maple Avenue
Fresno, California 93740

CA001 Cultural Practices for Growing Sesame in the San Joaquin Valley

B. Beard, B. H. Beard, G. L. Ritenaur

Nitrogen rate; sesame

CA002 Effect of Band-Applied, Acid-Forming Sulfur Compounds on Preavailability of Phosphorus and Certain Micronutrients in Alkaline Soils

J. R. Brownel (CSU), S. L. Tisdale (TSI)

Phosphorus, sulfur response; micronutrient

CA003 Phosphate Release in Calcareous Soils With Elemental Sulphur. (M.S. Thesis)

M. L. Robinson (J. Brownell, Advisor)

Phosphorus, sulfur response

CA004 Effect of Nitrogenous Fertilizer on the Growth of Douglas Fir and Redwood

E. W. Pierson, D. A. Thornburgh

Urea, slow-release nitrogen response; fir

United States Department of Agriculture
Agricultural Research Service
4151 Highway 86
Brawley, California 92227

CA005 Chemistry and Nutrient Availability and Movement in Soils of the Imperial Valley

C. F. Ehlig, B. D. Neej

Nitrogen, feed lot manure rate; fate of applied nitrogen; ryegrass

University of California
Berkley, California 94720

CA006 Nutrient Cycling in Northern California True Fir Forests

J. G. McColl

Urea rate; forestry-western fir

CA007 Assessment and Control of the Nutritional Status of Crop Plants

N. Terry

Fertilizer response; irrigation; field crop

CA008 Optimum Utilization of Sewage Sludge on Agricultural Land

J. E. Vlamis, D. E. Williams

Nitrogen, phosphorus, potassium, sulfur, sewage sludge response; barley

CA009 Nutritional Quality of Crops in Response to Organic and Inorganic Fertilization

J. Vlamis

Nitrogen, phosphorus, potassium, sulfur response; sugar beet

CALIFORNIA

University of California
Davis, California 95616

CA010 Transformations and Transport of Applied Ammonium Nitrogen in Flooded Rice Culture. (Ph.D. Thesis)

I. Bilal (D. W. Henderson, K. K. Tanji, Advisors)

Fate of applied nitrogen; rice

CA011 Nitrogen in the Environment

F. E. Broadbent, A. Carlton, D. Rolston

Nitrogen rate, fate; ^{15}N; field crop

CA012 Development of Soil and Plant Analysis for Assessing Nutrient Status

A. L. Brown, H. M. Reisenauer

Potassium, soil, plant test correlation; soil test for zinc, iron, manganese, copper; corn

CA013 Potassium Nutrition of Fruit Crops and Soil and Root Properties

R. M. Carlson

Phosphorus, potassium response; leaf analysis; prune

CA014 Impact of Changes in World Food Supply-Demand Conditions Upon Selected Agricultural Factor Markets

H. F. Carman, H. O. Carter, G. A. King

Fertilizer market analysis; structure; supply

CA015 Vine Nutrition: Mineral Deficiencies and Toxicities; Variety Differences, Water Relations

J. A. Cook, W. M. Kliewer, L. A. Lider

Nitrogen rate; boron and salt tolerance; grape

CA016 Cost of Production: Firm Enterprise Data System and Annual Survey

J. H. Cothern

Farm management; market data; policy

CA017 Physiological Bases for Crop Production in Pistachio (*Pistacia vera*)

J. C. Crane

Fertilizer response, foliar application; pistachio

CA018 The Improvement of Sugar Beet Production Practices

F. J. Hills

Ammonium sulfate; soil test correlation; powder mildew control; sugar beet

CA019 The Effect of Sulfur Fertilization on the Growth of Lambs

M. B. Jones, V. Renich

Sulfur response; range forage; lamb

CA020 Efficient Use of Fertilizers on Vegetable Crops

O. A. Lorenz

Ammonium sulfate, urea rate; phosphorus, potassium response; plant analysis; cantaloupe

CA021 Tracer Studies on Nitrogen Transformations in a Flooded Soil-Plant System. (Ph.D. Thesis)

I. J. Manuiat (F. E. Broadbent, Advisor)

Fate of applied nitrogen in soils

CA022 Nitrogen Transport in Soil Systems

M. A. Mari

Urea, ammonium nitrate; fate of applied nitrogen; soil system; model

CA023 Zinc Fertilization and the Effects of pH and Bicarbonate Ion Concentration on Zinc Absorption. (M.S. Thesis)

C. H. McKinney (D. S. Mikkelsen, Advisor)

Zinc response

CA024 Fertilizer Tests and Demonstration

R. D. Meyer, B. J. Hall (UCD), W. J. Sharratt (NFDC-TVA)

Ammonium nitrate, ammonium sulfate, urea, sulfur-coated nitrogen-phosphorus-potassium combination; trickle irrigation; peach, fir, range, tomato, cucumber, celery

CA025 Plant Nutrient Behavior in Submerged Soils

D. S. Mikkelsen

Urea, ammonium sulfate rate, fate in flooded soil; rice

CA026 Nitrogen Distribution in Soil, Water, and Plants as Related to an Irrigated, Diversified Agriculture

R. J. Miller

Nitrogen fertilizer, municipal, industrial, agricultural waste; fate of applied nutrient; trickle irrigation, nonpoint pollution

CA027 Nutrition of Dinitrogen-Fixing Plant Associations

D. N. Munns

Phosphorus, lime response; nitrogen fixation by *Rhizobium*; legume

CA028 Plant Growth, Nutrient Cycling, Year-Around Use of Forage by Beef Cow/Calf Herds in Foothills

C. A. Raguse

Nitrogen, phosphorus rate; irrigation; feed lot manure; range forage

CA029 Rice Fertilization Trials

R. S. Rauschkolb (UCD), W. J. Sharrratt (NFDC-TVA)

Urea-ammonium phosphate, concentrated superphosphate rate; rice

CA030 Soil Factors in Relation to Forage Quality

V. V. Rendig

Ammonium sulfate; 27-12-0; grass forage, cobalt tetany; corn-protein quality

CA031 Trickle Irrigation to Improve Crop Production and Water Management

D. E. Rolston, R. S. Rauschkolb, R. J. Miller

Nitrogen and phosphorus application via trickle, band, and furrow irrigation; control of salt and boron; tomato

CA032 Computer Modeling of Nitrogen Transformation and Transport in Cropped, Irrigated Lands

K. K. Tanji, D. R. Nielsen, J. W. Biggar

Fate of applied nitrogen rate; corn; pollution

CA033 Miscible Displacement and Transformation of Urea, NH_4^+, and NO_3^- in Soil Columns. (Ph.D. Thesis)

R. J. Wagenet (J. W. Biggar, Advisor)

Urea response; fate of applied nitrogen in soil

CA034 Soil Management of Agricultural and Urban Wastes

L. D. Whittig, F. E. Broadbent, E. L. Begg

Manure and crop residue; fate of nitrogen, copper, zinc, cadmium, lead; irrigation; eucalyptus

University of California
Riverside, California 92521

CA035 Nitrate Leaching and Potential for Pollution of Ground Water Versus Nitrogen Fertilizer Management

T. W. Embelton, W. W. Jones, L. H. Stolzy

Nitrogen rate; time and method of application; lemon, orange

CA036 Fertilizers and Leaf Analysis of Citrus

T. W. Embelton, W. W. Jones

Nitrogen rate; foliar spray; leaf analysis; orange, grapefruit

CA037 Factors Influencing Vegetable Crop Uniformity, Production, and Harvest Efficiency

H. Johnson, Jr., L. F. Lippert, F. H. Takatori

Fertilizer response; irrigation application; lettuce

CA038 Mineral Nutrition of Citrus, Avocado, and Other Subtropical Plants

C. K. Labanauskas

Nitrogen, phosphorus, potassium, zinc, magnesium, copper, iron response; leaf analysis; orange, avocado

CA040 Nitrogen Fertilizer Management of a Lemon Orchard as Related to Nitrate-Pollution Potential of Ground Water. (Ph.D. Thesis)

C. O. Pollares (T. W. Embelton, Advisor)

Nitrogen response; lemon

CA041 Recovery of ^{15}N Labeled Fertilizer and Plant Growth in Manure and Sludge-Amended Soil. (Ph.D. Thesis)

F. Pomares-Garcia (P. F. Pratt, Advisor)

Fate of applied nitrogen; ^{15}N; field crops

CA042 Fertilizer Needs on High Phosphorus Irrigated Soils

P. F. Pratt (UCR), O. P. Engelstad (NFDC-TVA)

Phosphorus rate; irrigation, sweet corn, wheat, alfalfa

COLORADO

Colorado State University
Fort Collins, Colorado 80523

CO001 Effect of Nitrogen and Moisture Regime on the Yield and Quality of White Wheat. (M.S. Thesis)

T. A. Atowe (W. R. Schmehl, Advisor)

Nitrogen response; wheat

CO002 Effects of Soil Fertility and Climate on Yield and Quality of Potatoes and on Nitrate Leaching

D. Barel

Ammonium nitrate, slow-release nitrogen source, nitrogen, phosphorus, zinc rate; placement; potato

CO003 Effects of Soil Fertility and Irrigation on Yield and Quality of Potatoes and Nitrate Leaching

D. Barel

Nitrogen placement; irrigation level and method; potato

CO004 Ecological Responses of Plants on Native Shortgrass Range and Abandoned Homestead Fields

R. A. Bowman, W. A. Laycock, M. C. Shoop

Nitrogen response; selectivity among native range species

CO005 Study of Production Management and Post-Harvest Handling of Colorado Commercial Vegetable Crops

J. E. Ells

Fertilizer rate; tomato, cucumber, bean, onion, sweet corn

COLORADO

CO006 Fertilizer Management for Quality Sugar Beet Production. (M.S. Thesis)

W. A. Gilbert (A. E. Ludwick, Advisor)

Fertilizer response; sugar beet

CO007 Redox Effects on Iron and Manganese Solubility

W. L. Lindsay (CSU), J. J. Mortvedt (NFDC-TVA)

Iron, manganese, copper, zinc, EDTA, and DTPA in soil

CO008 Evaluation of Potential Copper Deficient Soils of the Eastern Colorado High Plains

A. E. Ludwick, B. J. Proskovec (CSU), W. D. Graham (Farmland)

Copper response; soil

CO009 Sulfur Management for Corn Utilizing Commercial Center-Pivot Sprinkler Systems

A. E. Ludwick (CSU), S. L. Tisdale (TSI)

Sulfur response; irrigation; corn

CO010 Evaluation of Fertilizer Materials and Management Methods for Dryland Winter Wheat

A. E. Ludwick, R. Croissant (CSU), J. I. Bucy (NFDC-TVA), W. D. Graham (Farmland)

Ammonium nitrate, urea, nitrogen solution rate; phosphorus response; time and method of application; wheat

CO011 Fertilizer Needs on Soils High in Phosphorus and Potassium

A. E. Ludwick (CSU), O. P. Engelstad (NFDC-TVA)

Fertilizer rate; irrigation; alfalfa

CO012 Phosphorus Fertilization to Enhance Legume Establishment in Marginal Production Situations

A. E. Ludwick (CSU), C. P. Ellington (PPI)

Phosphorus response; legume

CO013 Vegetable Production Problems at High Altitude

F. D. Moore III

Slow-release nitrogen rate; nitrapyrin, trickle irrigation; lettuce

CO014 Soil Fertility Maintenance with Fertilizers, Crop Residues, and Animal Wastes

S. R. Olsen, L. K. Porter

Nitrogen, phosphorus response; mineralization;saline soil testing; field crop

CO015 Economic and Social Impact of Adjustment in Use of Chemicals in Agriculture

R. D. Rehnberg

Fertilizer market research; law; regulation

CO016 Management of Plant Nutrients in Field Crop Production

J. O. Reuss, A. E. Ludwick, E. J. Langin

Urea-ammonium phosphate, urea, sulfur-coated urea, ammonium nitrate rate, zinc, copper spray; soil test correlation; sugar beet, corn

CO017 Effects of Fe EDDHA, Co-op Fe, and Urea Ke-Min on Iron Chlorosis and Growth of Bearing July Elberta Peach Trees

E. A. Rogers, H. Eddleman (CSU), W. D. Graham (Farmland)

Iron source; peach tree

CO018 Nitrogen Fertilizer Requirements of Dryland Winter Wheat

A. E. Ludwick, J. E. Goris (CSU), W. D. Graham (Farmland)

Nitrogen rate; protein analysis; wheat

CO019 Fruit Nutritional Investigations

E. A. Rogers

Ammonium sulfate; zinc, iron rate; source; peach, apple

CO020 Forage Production, Soil Fertility, and Water Management at High Elevations

E. G. Seimer; C. B. Rumburg

Nitrogen, phosphorus rate; time of application; orchardgrass, bromegrass, foxtail, timothy, reed canarygrass, fescue, alfalfa, milkvetch

CO021 Effect of Commercial Fertilizers, Crop Residues, and Irrigation Practices on Potato Growth

J. G. Walker

Nitrogen rate, plocement; irrigation, potato

CO022 Effect of Nitrogen and Phosphorus on Sesame. (Ph.D. Thesis)

Y. Woldemariam (W. R. Schmehl, Advisor)

Nitrogen, phosphorus; sesame

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Agricultural Research Service
P.O. Box K
Akron, Colorado 80720

CO023 Manage Center Pivot Sprinkler Irrigation Systems to Maximize Use of Water and Nutrients for Crop Production

R. H. Mickelson, D. E. Smika

Nitrogen; transformation; irrigation; corn

CO024 Crop Residue Management Practices for Maximizing Crop Production and Conservation of Soil and Water

B. W. Greb, D. E. Smika

Anhydrous ammonia response; mulch; millet

United States Department of Agriculture
Agricultural Research Service
P.O. Box E
Fort Collins, Colorado 80523

CO025 Control of Soil, Water, and Air Pollution from Fertilizer and Soil Nutrients

A. R. Batchelder, L. K. Porter, G. L. Hutchinson

Ammonium sulfate, manure rate; fate of applied nitrogen; antibiotic; irrigation; ^{15}N, field crop

CO026 Rhizophere Processes Affect Nitrogen and Phosphorus Availability

H. W. Hunt, C. V. Cole, D. A. Klein, D. C. Coleman

Fate of nitrogen, phosphorus in soil

CO027 Assessment and Prevention of Excessive Nutrient Enrichment of Surface and Ground Water by Fertilizers

S. R. Olsen, F. G. Viets, Jr.

Fate of applied ammonia; leaf uptake; corn, alfalfa

CO028 Management of Soil Fertility, Water, and Vegetation on Disturbed Lands

S. R. Olsen, H. R. Gardner

Fate of applied nitrogen; ^{15}N, salinity; mine spoil; legume

CO029 Lysimeters Installed for Strip Mine

J. D. Reeder, W. A. Berg

Fate of applied nitrogen

CONNECTICUT

University of Connecticut
Storrs, Connecticut 06268

CT001 Fertilizing Nursery Stock

H. C. DeRoo

Fate of applied nitrogen; gypsum; tomato; turfgrass

CT002 Role of Major and Minor Elements in the Fertilization of Potatoes

A. Hawkins

Urea; ammoniated superphosphate, potassium sulfate, potassium chloride rate; method and time of application; potato

CT003 Inspection of Fertilizers

H. Kocaba, S. Squires, W. Glowa

Fertilizer industry; product quality

CT004 Managing Denitrification to Minimize Losses of Nitrate to Ground Water

J. L. Starr, H. C. DeRoo, C. R. Frink

Inorganic nitrogen versus organic nitrogen fertilizer rate; pollution

DELAWARE

Delaware State College
Dover, Delaware, 19901

DE001 Response of Soybean Varieties to Nitrogen Fertilization Phase II

K. W. Bell, E. R. Jones, U. S. Washington, Jr.

Urea, phosphorus, potassium rate; foliar application; soybean

University of Delaware
Georgetown, Delaware 19947

DE002 Nitrification Inhibitors

F. J. Webb

Urea, Terrazole; fate of applied nitrogen

University of Delaware
Newark, Delaware 19711

DE003 Soybean Pod and Leaf Metabolic Activity and Seed Yield and Quality with Potassium Fertilization. (M.S. Thesis)

A. K. Andrews (L. V. Svec, Advisor)

Potassium response; soybean

DE004 Cover Crops, Nitrogen Sources, Irrigation, and Tillage Systems for Production of Field Corn

W. H. Mitchell, M. R. Teel

Urea, ammonium nitrate, diammonium phosphate, ammonium sulfate; method of application; irrigation; no-till; corn

DE005 No-Tillage and Minimum Tillage Crop Production Systems

E. N. Scarborough, T. H. Williams

Anhydrous ammonia, ammonium nitrate rate; no-till;corn, soybean

DE006 Potassium Influence on Soybean Resistance to Fungus

L. V. Svec

Potassium response; soybean

DE007 Mineral Relations in Corn as Influenced by Nitrogen, Potassium, and Lime

M. R. Teel (Newark), H. Plate (Agway)

Nitrogen, potassium, lime response; corn

DELAWARE

DE008 Effect of Boron Fertilization on Field Corn

M. R. Teel, W. Mitchell

Boron rate; irrigation; corn

FLORIDA

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FL001 Macroelement Nutrition of Certain Floricultural Crops

C. A. Conover, R. W. Henley, R. T. Poole

Slow-release nitrogen, urea-formaldehyde, Osmocote; nitrogen, phosphorus, potassium, lime response; container-grown ornamental

FL002 Macro- and Microelement Nutrition of Ornamental, Horticulture, and Turf Plants

C. A. Conover; R. T. Poole

Fertilizer response; horticultural crop; turf

University of Florida
Agricultural Research and Education Center
Belle Glade, Florida 33430

FL003 Vegetable Nutrition on Organic Soils

H. W. Burdine

Liquid 10-34-0; nitrogen, phosphorus, potassium rate; soil-test correlation; placement; organic soil; lettuce, carrot

FL004 Calcium Silicate Slag

G. L. Gascho (UF), G. A. Slappey (NFDC-TVA)

Calcium silicate slag response; sugarcane

FL005 Pasture Grass and Legume Variety Evaluation under Varied Fertilization and Management Practices

R. J. Allen, G. H. Snyder

Superphosphate, lime rate; sorghum, tropical legume

FL006 Nutrition and Associated Cultural Practices for Sugarcane

G. J. Gascho, P. M. Lyrene

Sulfur-coated urea, calcium silicate; sugarcane

FL007 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

H. Y. Ozako

Fertilizer rate; irrigation; snap bean, pepper

FL008 Fertilization of Roselawn St. Augustine Grass Pastures on the Organic Soils of South Florida

F. M. Pate, R. J. Allen, Jr., J. R. Crockett

Phosphorus, potassium rate; time of application; St. Augustine grass

FL009 Methods of Fertilizing Vegetables

G. H. Snyder

Ammonium nitrate, fluid application; sewage sludge response; radish, pepper

FL010 Fertilization of Turfgrasses

G. H. Snyder

Urea, urea formaldehyde, IBDU, ammonium nitrate; fertigation; turfgrass

FL011 Drainage Water Composition from Organic and Adjacent Mineral Soils of the Everglades and Apopka Area

G. H. Snyder

Ammonium nitrate; fate of applied nitrogen; bermudagrass

University of Florida
Agricultural Research and Education Center
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Bradenton, Florida 33505

FL012 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

C. M. Geraldson

Fertilizer response; trickle irrigation; tomato, pepper

FL013 Macro- and Microelement Nutrition of Ornamental, Horticulture, and Turf Plants

B. K. Harbaugh, W. E. Waters

Slow-release fertilizer; horticultural, turf plant

FL014 Macroelement Nutrition of Certain Floricultural Crops

B. K. Harbaugh, G. J. Wilfret

Slow-release nitrogen, phosphorus, potassium fertilizer; liquid application; chrysanthemum, poinsettia

FL015 Rhizosphere Ecology as Related to Plant Health and Vigor

J. P. Jones, S. S. Woltz

Lime, nitrogen rate; plant pathology

University of Florida
Agricultural Research Center
Dover, Florida 33527

FL016 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

E. E. Albregts

Urea, Osmocote, sludge compared; nitrogen, phosphorus, potassium rate; method of placement and timing of application; strawberry

University of Florida
Agricultural Research Center
Fort Pierce, Florida 33450

FL017 Mineral Nutrition and Water Management of Fruit Crops

D. V. Calvert

Iron disulfide rate; foliar spray; citrus

FL018 Methods of Fertilizing Vegetables

N. C. Hayslip, H. Y. Ozaki

Fertilizer response; mulch; onion

FL019 Pasture Grass and Legume Variety Evaluation Under Varied Fertilization and Management Practices

A. E. Kretschmer

Nitrogen, potassium rate; limpograss, bermudagrass, digitgrass

FL020 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

H. Y. Ozaki

Fertilizer rate, liquid fertilizer, trickle irrigation; pepper, bean

University of Florida
Gainesville, Florida 32611

FL021 Mineral Nutrition and Water Management of Fruit Crops

J. F. Bartholic, D. W. Buchanan, T. E. Crocker

Nitrogen, phosphorus, potassium rate; application method; orange, peach

FL022 Water and Soil Management for Citrus Production on Poorly-Drained Soils

J. F. Bartholic, R. Bill, L. H. Allen

Fertilizer response; citrus

FL023 Pasture Grass and Legume Variety Evaluation under Varied Fertilization and Management Practices

W. G. Blue

Phosphorus, potassium, lime, copper rate; beggarweed

FL024 Fate of Fertilizer Nitrogen Applied to a Well-Established Grass Sod on a Florida Spodosol

W. G. Blue (UF), G. A. Slappey (NFDC-TVA)

Fate of applied nitrogen; warm-season grass

FL025 Soil Fertility in Forage Production

W. G. Blue

Potassium carbonate, potassium phosphate, potassium chloride, lime; forage

FL026 Development of Soil-Testing Methods and Correlation of Soil and Plant Analytical Data

H. L. Breland, J. B. Sartain, T. L. Yuan

Phosphorus, potassium, lime soil-test method; laboratory study

FL027 Fertilization of Turfgrasses

E. O. Burt, J. B. Sartain, G. H. Snyder

Potassium frit, greensand, potassium carbonate, potassium sulfate, calcium potassium phosphate; nitrogen, phosphorus, potassium, magnesium rate; bermudagrass, ryegrass

FL028 Pollution in Runoff from Nonpoint Sources

K. L. Campbell

Nitrogen, phosphorus rate; nonpoint source pollution, forest

FL029 Maintenance of Soil Fertility Under Permanent Pastures

C. L. Dantzman

Nitrogen, phosphorus, potassium, sulfur, sodium, micronutrient, lime rate; pangola, digitgrass, clover

FL030 Long-Range Effects of Pasture Management on the Fertility of Flatwoods Soils

C. L. Dantzman; E. M. Hodges

Lime rate, quality; placement; clover-grass

FL031 Simulation of Nitrogen Movement and Transformations in the Root Zone

J. M. Davidson, D. A. Graetz

Fate of applied nitrogen; soil model

FL032 Fertilizer and Nutrition of Southern Pine

R. F. Fisher, W. L. Pritchett, W. H. Smith

Urea, ammonium sulfate, phosphorus, potassium rate; pine

FL033 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

J.G.A. Fiskell, D. A. Graetz

Sulfur-coated urea, IBDU, urea, ammonium sulfate rate; time of application; pepper

FLORIDA

FL034 Trickle Fertilization of Tomatoes

J.G.A. Fiskell, S. J. Locascio, H. G. Meyers, D. A. Graetz (UF), G. A. Slappey (NFDC-TVA)

Slow-release nitrogen, soluble nitrogen source; tomato

FL035 Water and Soil Management for Citrus Production on Poorly-Drained Soils

J.G.A. Fiskell, L. C. Hammond, R. S. Mansell

Nitrogen, phosphorus, potassium rate; fate of applied phosphorus; citrus

FL036 Diagnosis and Correction of Zinc Problems in Corn and Rice Production

N. Gammon, Jr., W. K. Robertson

Zinc sulfate rate; corn, rice

FL037 Macroelement Nutrition of Certain Horticultural Crops

N. Gammon, Jr.

Nitrogen source, slow release; rose

FL038 Nitrogen for Vegetables Grown in Poorly Drained Sandy Soils

D. A. Graetz (UF), R. D. Hauck (NFDC-TVA)

Ammonium sulfate; method and time of application; ^{15}N; bell pepper

FL039 Vegetable Nutrition on Organic Soils

C. B. Hall

Nitrogen, phosphorus, potassium response; carrot, lettuce

FL040 Growth and Quality of Woody Ornamental Nursery Stock

C. R. Johnson, D. B. McConnell

Urea-formaldehyde, Osmocote; nitrogen-phosphorus-potassium combination rate; container-grown rhododendron, camellia, yew

FL041 Macroelement Nutrition of Certain Floricultural Crops

J. N. Joiner, S. E. McFadden, T. J. Sheehan

Nitrogen-phosphorus-potassium combination rate; Osmocote; floricultural plant

FL042 Management Practices for Efficient Uses of Fertilizers and Moisture in Corn Production

F. LeGrand, V. N. Schroder

Nitrogen, potassium rate; sandy soil; corn; irrigation

FL043 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

S. J. Locascio

Nitrogen, phosphorus, potassium, calcium, magnesium rate; nitrification; N-Serve; trickle irrigation; potato, corn

FL044 Fertilizer Requirements of Watermelons

S. J. Locascio

Sulfur-coated urea, urea, nitrogen, phosphorus, potassium, lime rate; watermelon

FL045 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

J. M. Myers

Fertilizer rate; method and time of application; trickle irrigation; potato, tomato, pepper, strawberry, watermelon

FL046 Methods of Fertilizing Vegetables

V. F. Nettles

Liquid fertilizer

FL047 Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality

A. R. Overman, J. S. Rogers

Nitrogen, phosphorus, manure response; nonpoint source pollution

FL048 Ecology of Field and Forage Crops

G. M. Prine; O. C. Ruelke

Liquid fertilizer spray

FL049 Phosphate Fertilizers for Pines on Acid Sandy Soils

W. L. Pritchett, W. S. Garbett (UF), G. W. Bengtson (NFDC-TVA)

Nitrogen, phosphorus, Sul-Po-Mag rate; sand, slash, loblolly pine

FL050 Forest Fertilization and Nutrition

W. L. Pritchett (UF), C. P. Ellington (PPI)

Fertilizer response; forestry

FL051 Lime and Phosphorus Requirements for Acid, Flatwoods Soils

R. D. Rhue, T. L. Yuan, W. K. Robertson (UF), G. A. Slappey (NFDC-TVA)

Orthophosphate, polyphosphate, lime response; field crop

FL052 Fertility Studies with Corn and Soybeans

W. K. Robertson (UF), G. A. Slappey (NFDC-TVA)

Ammonium nitrate, urea, N-Serve response; corn; foliar nitrogen-phosphorus-potassium-sulfur combination; soybean

FL053 Phosphorus and Potassium Studies with Soybeans

J. B. Sartain, R. B. Forbes

Phosphorus, potassium, response; soybean

FL054 Potassium and Magnesium on Soybeans, Soybean Fertilization

J. B. Sartain, R. B. Forbes (UF), C. P. Ellington (PPI)

Potassium, magnesium response; soybean

FL055 Influence of Intensity and Timing of Potassium Applications on Yield of Sweet Corn, Soybeans, and Cabbage Grown in a Multiple Cropping System

J. B. Sartain, R. B. Forbes (UF), C. P. Ellington (PPI)

Potassium response; time of application; sweet corn, soybean, cabbage

FL056 Comparison of Different Nitrogen Sources on Tifway and Tifgreen Bermudagrasses

J. B. Sartain (UF), G. L. Slappey (NFDC-TVA)

Sulfur-coated, slow-release nitrogen, inorganic nitrogen sources response; bermudagrass

FL057 Nitrogen Fixation by Associative Grass-Bacteria Systems

R. L. Smith, S. C. Schank, K. H. Quesenberry

Nitrogen fixation by unknown bacteria; subtropical and tropical grass

University of Florida
Agricultural Research Center
Hastings, Florida 32045

FL058 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

D. R. Hensel

Fertilizer response; potato

FL059 Methods of Fertilizing Vegetables

D. R. Hensel

Nitrogen, phosphorus, potassium rate, method of application; lettuce

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Agricultural Research and Education Center
18905 SW 280 Street
Homestead, Florida 33030

FL060 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

H. H. Bryan, P. G. Orth

Nitrogen, phosphorus, potassium rate; sulfur-coated urea, Osmocote; trickle irrigation; potato, tomato

FL061 Effects of Fertilization Practices Upon Limes in Florida

C. W. Campbell, P. G. Orth, T. W. Yound

Nitrogen, phosphorus, potassium, magnesium rate; magnesium source; lime

FL062 Avocado Culture Studies

S. E. Malo, T. W. Young

Iron-EDDHA, Iron-EDTA; nitrogen rate, sources; phosphorus, potassium response; avocado

FL063 Fertilization of Fruit Trees on Shallow, Rocky, Calcareous Soil with Slow-Release Fertilizer

P. G. Orth (UF), G. A. Slappey (NFDC-TVA)

Sulfur-coated urea, Osmocote, sulfur-coated nitrogen with potassium; release rate; avocado

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Immokalee, Florida 33934

FL064 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

P. H. Everett

Sulfur-coated urea, Osmocote, ammonium nitrate; potassium sulfate, potassium nitrate; method of application; pepper, tomato

FL065 Variety Development, Cultural Practices, and Mechanical Harvesting Systems for Fresh Market Tomatoes

P. H. Everett

Nitrogen, phosphorus, potassium rate; tomato

FL066 Sulfur-Coated Urea Studies with Bell Peppers Grown with Full-Bed Polyethylene Mulch

P. H. Everett (UF), G. A. Slappey (NFDC-TVA)

Sulfur-coated urea; bell pepper, tomato

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FL067 Soil and Water Management in Agronomic Crop Production

M. C. Lutrick

Sulfur-coated potassium sulfate, nitrogen, phosphorus, potassium, zinc, boron, lime rate; lime response; irrigation; corn, sorghum, soybean, peanut

FL068 Development of Soil-Testing Methods and Correlation of Soil and Plant Analytical Data

M. C. Lutrick

Phosphorus, potassium, lime; soil-test correlation; soybean

FLORIDA

FL069 Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality

M. C. Lutrick, J. E. Bertrand

Nitrogen, phosphorus, and zinc in soils where liquid organic wastes applied; yield reduction of corn and grain sorghum

University of Florida
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P.O. Box 1088
Lake Alfred, Florida 33850

FL070 Development of Soil-Testing Methods and Correlation of Soil and Plant Analytical Data

C. A. Anderson

Soil-test correlation for phosphorus, potassium, calcium, magnesium; orange; plant analysis

FL071 Comparison of Sulfur-Coated Urea and Ammonium Nitrate as Sources of Nitrogen for Citrus

R.C.J. Koo, D.P.H. Tucker (UF), G. L. Slappey (NFDC-TVA)

Sulfur-coated urea, ammonium nitrate; citrus

FL072 Pruning and Spacing of Fruit Crops

R. L. Reese, D.P.H. Tucker

Nitrogen, potassium rate; pineapple, orange, lemon

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Agricultural Research Center
P.O. Box 388
Leesburg, Florida 32748

FL073 Fertilizer Requirements for Watermelons

G. W. Elmstrom

Sulfur-coated urea, potassium chloride rate, timing, placement; watermelon

FL074 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

G. W. Elmstrom

Nitrogen, phosphorus, potassium, lime rate; method and time of application; watermelon

FL075 Mineral Nutrition and Water Management of Fruit Crops

J. A. Mortensen

Nitrogen, phosphorus, potassium rate; grape

University of Florida
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P.O. Box 657
Live Oak, Florida 32060

FL076 Effect of Cultural Management on Black Shank and on Quality and Quantity of Flue-Cured Tobacco

J. T. Johnson

Nitrogen rate; tobacco

FL077 Soil and Water Management in Agronomic Crop Production

J. T. Johnson

Nitrogen, phosphorus, lime rate; corn

FL078 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

J. T. Johnson

Nitrogen, phosphorus rate; method and time of application; vegetable crop

FL079 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

J. T. Johnson

Nitrogen, phosphorus, lime rate; corn

FL080 Conservation of Water Through Modification of Physical and Chemical Properties of Soils

J. T. Johnson

Nitrogen rate, time of application; irrigation; corn

University of Florida
Agricultural Research Center
Ona, Florida 33865

FL081 Water and Soil Management for Citrus Production on Poorly-Drained Soils

D. V. Calvert

Fate of applied nitrogen, phosphorus; irrigation; citrus

FL082 Soil Fertility in Forage Production

C. L. Dantzman

Fertilizer, lime response; forage

FL083 Evaluation of Introduced and Native Plant Species for Pasture, Forage, and Other Uses

E. M. Hodges, R. S. Kalmbacher, E. M. Mislevy

Nitrogen rate; stargrass

University of Florida
Agricultural Research and Education Center
P.O. Box 470
Quincy, Florida 32351

FL084 Fertilizer Placement, Composition, and Timing on Nutrition, Quality, and Yield of Cigar-Wrapper Tobacco

J. L. Baker, F. M. Rhoads

Sodium phosphate, ammonium polyphosphate; method of application; tobacco

FL085 Soil Fertility Requirements for 300-Bushel Corn

R. M. Rhoads

Fertilizer response; irrigation; corn

FL086 Pasture Grass and Legume Variety Evaluation under Varied Fertilization and Management Practices

R. L. Stanley, Jr.

Nitrogen rate; ryegrass, clover

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Agricultural Research and Education Center
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FL087 Maximizing Efficiency of Fertilizer and Water Use for Vegetables

J. M. White, L. R. Sinclair, R. B. Forbes

Nitrogen, phosphorus, potassium rate; cabbage, corn

Florida Agricultural and Mechanical University
Agricultural Research and Education Center
Tallahassee, Florida 32307

FL088 Value of Tidal Marshes in Relation to Estuarine Ecosystem, and Evaluation of Freshwater Wetlands

C. L. Coultas, C. B. Subrahmanyam

Nitrogen-phosphorus-potassium combination fertilizer; dredge spoil; marsh

GEORGIA

Fort Valley State College
Fort Valley, Georgia 31030

GA001 Corn Response to Magnesium and Boron Fertilization under Different Lime and Magnesium Regimes

M. C. Blount, E. McKenzie

Magnesium sulfate, sodium tetraborate rate; nitrogen, phosphorus, potassium response; corn

GA002 Higher Soybean Yields from Organic Fertilizers: A Causal Analysis

B. Singh

Ammonium nitrate, cattle manure rate; nodulated and nonnodulated soybean

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Piedmont Conservation Research Center
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Watkinsville, Georgia 30677

GA003 Soil Fertility Maintenance with Fertilizers, Crop Residues, and Animal Wastes

S. R. Wilkinson

Nitrogen rate; grass tetany; fescue, bermudagrass

University of Georgia
Athens, Georgia 30602

GA004 Forage Production Systems

E. R. Beaty, R. H. Brown, G. Calvert

Fertilizer rate; forage crop

GA005 Effect of Boron Fertilization on Corn in Georgia

P. J. Bergeaux, H. Gurley (UG), J. R. Turner (U. S. Borax)

Boron rate; corn

GA006 Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality

F. C. Boswell

Ammonium sulfate; N-Serve; sewage sludge; corn, fescue

GA007 Inorganic Elements in and Applied to Soils and Their Utilization by Plants

F. C. Boswell

Ammonium nitrate rate; corn, sorghum

GA008 Turfgrass Management

R. E. Burns

Fertilizer response, sewage sludge; bermudagrass, bluegrass

GA009 Irrigation of Peach Trees for Soil Moisture and Nutrient Management

J. L. Chesness, G. A. Couvillon

Fertilizer response; method of application-trickle irrigation

GA010 Cultural and Propagation Studies with Selected Coniferous Species for Christmas Trees

T. S. Davis

Slow-release fertilizer; Christmas tree

GA011 Propagation and Evaluation of Ornamental Trees for Use in Georgia

T. S. Davis

Slow-release fertilizer; fertilizer response; container-grown ornamental

GA012 Silviculture of Pine and Hardwood Stands in Georgia

C. H. Fitzgerald

Fertilizer response; forestry:pine

GEORGIA

GA013 Source Preference for Nitrogen Applied as Nitrogen Solutions Through Irrigation Waters

J. Jones, Jr., H. A. Mills (UG), N. van Buren (NFSA)

Nitrogen solution; irrigation

GA014 Improvement of Nitrogen Fixation by Soybeans

J. E. Giddens, D. A. Ashley

Nitrogen-phosphorus-potassium-sulfur combinations, urea; nitrogen-fixation by *Rhizobium*; soybean

GA015 Enhancing Biological Dinitrogen Fixation in Soybeans and Other Legumes

J. E. Giddens

Nitrogen fixation by *Rhizobium*; soybean

GA016 Mineral Content of Fresh and Processed Vegetables, Fruits, and Pecans

J. B. Jones, H. A. Mills

Phosphorus, potassium rate; plant analysis; soil-test correlation; corn, pea, bean

GA017 Influence of Sodium Nitrate and Ammonium Sulfate on Translocation of ^{14}C-Labelled Photosynthate into Soybean Nodules. (Ph.D. Thesis)

M. Latimore, Jr. (J. E. Giddens, Advisor)

Nitrogen source; soybean

GA018 Management of Grain Sorghum and Corn as Feed Grain in the Southeastern United States

J. H. Massey

Nitrogen, phosphorus, potassium, lime rate; corn, grain sorghum

GA019 Liquid and Solid Fertilizers for Coastal Bermudagrass

H. D. Morris

Liquid (32%) nitrogen solution, sulfur-coated urea, urea, phosphoric acid; potassium response; bermudagrass

GA020 Factors Affecting Zinc Availability in Georgia Soils

H. D. Morris

Zinc sulfate, zinc chelate, zinc oxide, polyphosphate response; corn

GA021 Bulk Distributor for Multicomponent Application of Agricultural Chemicals and Seed

C. E. Rice, S. E. Law

Bulk handling; dry blending; application; seed

GA022 Symbiotic Relationship in Ornamental Plants and Their Role in Improved Management Practices

R. W. Roncaddri

Nitrogen, phosphorus, potassium rate; mycorrhiza; poinsettia

GA023 Effect of Calcium, Magnesium, and Cultural Treatment on Peach Orchard Soils

E. F. Savage

Ammonium nitrate, sulfur, lime, magnesium; method of application; peach

GA024 Diagnostic Leaf and Soil Norms for Crops in Relation to Remedial Fertilizer Practices

M. E. Sumner (UG), C. P. Ellington (PPI)

Fertilizer response; field crop

GA025 Production as Related to Container Size and Nutrient Level of Indoor Foliage Plants

J. H. Tinga

Fertilizer response; container-grown ornamental

GA026 Fertility Requirements for Crops in Minimum-Tillage Multiple-Cropping Systems

J. T. Touchton

Nitrogen, phosphorus response; minimum tillage; soybean, wheat, sorghum

GA027 Soybean Response to Manganese Fertilization on Flatland Soils

Unknown (UG), W. E. Siegers (Goldkist)

Manganese rate; soybean

University of Georgia
Agricultural Experiment Station
Experiment, Georgia 30212

GA028 Diagnosis and Correction of Zinc Problems in Corn and Rice Production

O. E. Anderson, R. L. Carter

Zinc sulfate rate; corn

GA029 Propagation and Evaluation of Ornamental Trees for Use in Georgia

T. S. Davis

Liquid fertilizer; ornamental

GA030 Nutritional Study of Middle Georgia's Apple Orchards

S. S. Miller

Nitrogen rate; source; calcium spray; apple

GA031 Rate, Time, and Method of Phosphorus, Potassium Fertilization in Multiple Cropping

J. T. Touchton (UG), C. P. Ellington (PPI)

Phosphorus, potassium response; time and method of application; multiple cropping

University of Georgia
Georgia Coastal Plain Experiment Station
Tifton, Georgia 31794

GA032 Plant Populations and Fertility Studies on Rabbiteye Blueberries

M. E. Austin

Nitrogen-phosphorus-potassium combination rate; blueberry

GA033 Relation Between Fertilizer Rates, Plant Density, and Irrigation on Blueberries

M. E. Austin

Nitrogen, phosphorus, potassium fertilizer rate; irrigation; blueberry

GA034 Cotton Variety and Fertilizer Tests

S. H. Baker

Fertilizer response; cotton

GA035 Cultural and Physiological Requirements in Production of Fresh-Market Vegetables

K. Batal

Fertilizer response; vegetable

GA036 Nutrition Studies of Shade-Grown Tobacco

E. J. Gibson

Urea rate; potassium response; tobacco

GA037 Effect of Soil Moisture, Fertility Level, and Plant Density on Collards

S. J. Kays

Nitrogen rate; collard

GA038 Cultural Alterations of Potherbs

S. J. Kays

Nitrogen, potassium, time of application; vegetable

GA039 Characterization of Soil-Plant-Water Relations of the Southeastern Coastal Plain

T. C. Keisling

Sulfur-coated urea, calcium; irrigation; corn, peanut

GA040 Tomato and Pepper Investigations

C. A. Jaworski

Fertigation; tomato, pepper

GA041 System Approach for Production of Solanaceous Fruits Using Film Mulches

C. A. Jaworski, S. C. Phatak

Calcium nitrate, potassium nitrate, potassium; applied via trickle irrigation; tomato, pepper, bean, cucumber, squash

GA042 Factors Affecting Cost and Per Acre Beef Gains With a Cow-Calf Program

W. C. McCormick

Nitrogen rate; bermudagrass, bahiagrass

GA043 Cultural and Nutritional Studies in Tobacco

J. D. Miles, H. G. Cutler

Fertilizer response; suspension fertilizer; tobacco

GA044 Nutritional Studies of Flue-Cured Tobacco

J. D. Miles

Nitrogen, phosphorus, potassium fertilizer rate; source; tobacco

GA045 Cultural and Fertility Studies on Soybeans

M. B. Parker

Nitrogen, phosphorus, potassium, micronutrient response; soybean

GA046 Evaluation of the Need for Sulfur on Georgia Crops

M. B. Parker (UG), S. L. Tisdale (TSI)

Sulfur response; field crop

GA047 Cultural and Fertility Studies on Soybeans

M. B. Parker

Copper, manganese, zinc response; soybean

GA048 Fertilizer Needs on Soils High in Phosphorus and Potassium

M. E. Walker (UG), O. P. Engelstad (NFDC-TVA)

Fertilizer rate; corn

GA049 Peanut Nutritional and Disease Interaction Effects on Yield and Quality

M. E. Walker

Folian (12-6-6-.5S), magnesium, potassium, calcium response; peanut

GA050 Effect of Nitrogen on Growth, Yield, and Fiber Qualities of Atlas and Coker 413 Cotton

M. E. Walker

Nitrogen rate; phosphorus, potassium response; cotton

GA051 Corn Variety and Fertilizer Tests

M. E. Walker

Nitrogen source; fertilizer response; soil-test correlation; corn

GA052 Peanut Variety and Fertilizer Tests

M. E. Walker

Gypsum, chelate calcium; Magical, calcium chloride, potassium response; peanut

United States Department of Agriculture
Agricultural Research Service
Forage and Range Research Branch
Tifton, Georgia 31794

GEORGIA

GA053 Breeding and Pathology of Subterranean and Other Clovers for Pastures in the Southeast

I. Forbes, Jr., H. D. Wells

Phosphorus, potassium, boron, molybdenum rate; subterranean clover

Waters Agricultural Laboratory
and Consulting Company
Camilla, Georgia

GA054 Need for Boron Fertilization on Corn, Peanuts, Coastal Bermudagrass Under Maximum Efficient Production

S. Hickey (WALCO), J. R. Turner (U.S. Borax)

Boron rate; corn, soybean, peanut, bermudagrass

HAWAII

University of Hawaii
Honolulu, Hawaii 96822

HI001 Influence of Phosphate Fertilization on Zinc Absorption by Soils and the Labile Zinc Pool. (Ph.D. Thesis)

M. S. Arain (R. L. Fox, Advisor)

Phosphorus, zinc in soil

HI002 Mineral Nutrition of Papaya

M. Awada, C. R. Long, R. H. Suehisa

Phosphorus, potassium, calcium, magnesium rate; papaya

HI003 Culture, Management, and Production of Guava

R. M. Bullock, P. J. Ito, G. T. Shigeura

Fertilizer rate; guava

HI004 Culture and Management of Coffee and Alternate Crops for Improved Harvesting and Production

R. M. Bullock, H. Y. Nakasone, G. T. Shigeura

Nitrogen rate; time of application; coffee

HI005 Use of Phosphate Sorption Curves for Determining Immediate and Recurring Phosphate Fertilizer Requirements

R. L. Fox, R. K. Nishimoto

Phosphorus rate; fate of applied phosphorus; soil testing; onion, potato, corn

HI006 Effect of Soil Amendments on Crop Yield and Soil and Plant Nutrients

R. L. Fox, J. A. Silva

Calcium silicate, calcium carbonate, phosphorus, potassium, response; corn

HI007 Solute Movement in Soils with Trickle Irrigation: Computer Simulation and Testing of Models

R. E. Green

Urea rate; trickle irrigation; modeling; sugarcane

HI008 Culture and Management of Dendrobiums and Other Orchids for Cut Flowers

T. Higaki, J. Kunisaki, J. A. Silva

Osmocote, Foliar 63; foliar application; orchid

HI009 Nature of Terminal Dieback and Chlorosis in Macadamia

R. Jones, G. T. Shigeura, G. Uehara

Calcium hydroxide, phosphorus rate; macadamia

HI010 Efficient Use of Nitrogen Fertilizer under a Variety of Management Systems

Y. Kanehird

Nitrogen rate; sudangrass, spinach, amaranth

HI011 Cultural Studies of Greenhouse and Field Vegetable Production

B. A. Kratky, R. K. Nishimoto, I. P. Wu

Nitrogen, phosphorus, potassium combination; rate; tomato, onion, bush bean, lettuce

HI012 Stand Establishment of Small-Seeded Vegetable Crops

B. A. Kratky, J. Wang

Fertilizer response; irrigation; seedling vigor, vegetable

HI013 Evaluation of Grasses and Their Management for Turf in the Tropics

C. Murdoch

Sulfur-coated urea, IBDU, sewage sludge, urea formaldehyde; bermudagrass

HI014 Fertilization and Culture of Hawaii Tree Crops

Y. N. Tamimi

Fertilizer response; tree

HI015 Pasture Improvement in Hawaii

Y. N. Tamimi, J. R. Thompson, A. S. Whitney

Nitrogen, phosphorus, potassium rate; legume, grass

HI016 Management Practices Necessary for Efficient Production of Feed Grains in Hawaii

J. R. Thompson, Y. N. Tamimi

Nitrogen, phosphorus rate; alfalfa, corn

HI017 Culture and Management of Bananas

R. M. Warner, R. L. Fox, R. M. Bullock

Nitrogen, potassium rate; interaction; banana

HI018 Effect of Removing Pineapple Trash on Soil Fertility

W. G. Sanford

Fertilizer response; residue; pineapple

IDAHO

United States Department of Agriculture
Snake River Conservation Research Center
Route 1, Box 186
Kimberly, Idaho 83341

ID001 Soil Fertility Practices for Sustained High Crop Quality and Yield and Resource Conservation

G. E. Leggett, J. N. Carter, D. T. Westermann

Nitrogen fixation by *Rhizobium*; bean

ID002 Phosphorus Soil Test Levels Identified

D. T. Westermann, G. E. Leggett, J. N. Carter

Phosphorus rate; soil test correlation; sugar beet, corn, wheat, potato, borley, bean

University of Idaho
Research and Extension Center
Aberdeen, Idaho 83210

ID003 Maximizing Potato Production and Quality on Various Soil Types in Southeastern Idaho

R. E. McDole

Potassium rate; nitrogen, phosphorus response; foliar application; potato

University of Idaho
Moscow, Idaho 83843

ID004 Control and Bio-Mechanisms of Control for Soil-Borne Pathogens of Potato

J. R. Davis

Nitrogen rate; foliar wilt; potato

ID005 Nitrogen in the Environment

D. W. Fitzsimmons, G. C. Lewis, D. V. Naylor

Fate of applied nitrogen; sugar beet, onion

ID006 Sulfur Fertilization on Yields and Quality of Winter Wheat

R. W. Harder

Ammonium sulfate, gypsum, chip-sulfur; nitrogen rate; winter wheat

ID007 Calibration of Soil Tests with Crop Response

R. D. Johnson, J. P. Jones

Nitrogen, phosphorus, potassium response; soil-test correlation; wheat

ID008 Fertilizer Tests and Demonstration

J. P. Jones (UI), C. B. Kresge (NFDC-TVA)

Urea, ammonium nitrate rate; phosphorus, sulfur response; spring wheat

ID009 Oxidation of Several Forms of Agricultural-Grade Elemental Sulfur under Controlled Conditions

J. P. Jones (UI), S. L. Tisdale (TSI)

Fate of applied elemental sulfur

ID010 Phosphate Sorption Curves for Soils High in Residual Phosphorus

J. P. Jones (UI), F. E. Khasawneh (NFDC-TVA)

Fate of applied phosphate

ID011 Zinc Nutrition of Fruit Trees in Idaho

W. L. Kochan

Zinc sulfate; foliar spray

ID012 Tree Growth and Response to Soil and Foliar Nutrient Levels and Environmental Factors

H. Loewenstein, F. H. Pitkin, D. C. Scanlin

Soil versus foliar applied nutrient; forest tree

ID013 Forest Fertilization: Its Influence on Stands of Douglas Fir and Grand Fir in Idaho

H. Loewenstein, F. H. Pitkin, D. C. Scanlin

Urea response; fir

ID014 Fertilization of Dryland and Irrigated Wheat in the Upper Snake River Area

H. C. McKay

Nitrogen, phosphorus, sulfur rate; placement; wheat

ID015 Intensive Culture of Forests of Red Cedar, Western Hemlock, and Grand Fir Habitat Types

A. A. Moslemi

Fertilizer response; forestry: cedar, hemlock, fir

ID016 Regulation, Early Detection, and Prediction of Winter Wheat Quality

G. A. Murray

Ammonium sulfate, phosphorus rate; N-Serve; time of application; wheat

University of Idaho
Research and Extension Center
Parma, Idaho 83605

ID017 Efficiency of Sulfur-Coated Urea and Urea for Mint Production

B. D. Brown (UI), C. B. Kresge (NFDC-TVA)

Sulfur-coated urea, urea rate; mint

IDAHO

University of Idaho
Research and Extension Center
Sandpoint, Idaho 83864

ID018 Yield and Quality of Oats in Relation to Crop Rotation and Management

J. A. Benson, G. A. Murray

Potassium, foliar sprays of manganese, zinc rate; oat

ILLINOIS

University of Illinois
Urbana-Champaign
Urbana, Illinois 61801

IL001 Losses of Fertilizer Nitrogen by Denitrification and Leaching

C. W. Boast, L. T. Kurtz

Fate of applied nitrogen; calcium nitrate, ^{15}N

IL002 Crop and Soil Management

L. V. Boone, L. F. Welch

Nitrogen, phosphorus, potassium rate; foliar application; corn, soybean

IL003 Corn Growth with Ammonium Versus Nitrate Absorbed from a Soil Medium. (Ph.D. Thesis)

D. W. Dibb (L. F. Welch, Advisor)

Nitrogen source; corn

HL004 Mineral Stress and Woody Ornamental Plant Growth

M. A. Dirr

Nitrogen rate, source; sodium and salinity; turfgrass, ornamental

IL005 Leaf Phosphorus Fractions and Growth of Loblolly Pine

A. R. Gilmore

Nitrogen, phosphorus rate; soil-test correlation; forestry:pine

IL006 Forage Production and Utilization Systems as a Base for Livestock Production

D. W. Graffis, J. A. Jackobs, D. A. Miller

Phosphorus, potassium rate; alfalfa

IL007 Phosphorus and Potassium Needs for Alfalfa

D. W. Graffis (UI), C. P. Ellington (PPI)

Potassium, phosphorus response; alfalfa

IL008 Nitrogen Relationships and Mineral Nutrition in Soybean Growth

J. E. Harper

Urea, nitrate, ammonium response; nitrogen-fixation by *Rhizobium*; foliar application urea, phosphorus, potassium, sulfur; soybean

IL009 Impact of Changing Transportation Systems on Local Grain and Farm Supply Firms

L. D. Hill

Fertilizer transportation and distribution; railroad; storage; cost

IL010 Soybean (*Glycine max* L.) Growth and Nitrogen Fixation with Varying Levels of Inorganic Nitrogen. (Ph.D. Thesis)

G. J. Hinegardner (L. F. Welch, Advisor)

Nitrogen rate; soybean

IL011 Need for Sulfur Fertilizers in Illinois Agriculture

R. G. Hoeft (UI), S. L. Tisdale (TSI)

Sulfur response; field crop

IL012 Efficiency of Nutrient Uptake and Utilization by Plants

R. G. Hoeft

Anhydrous ammonia; nitrification; N-Serve; corn

IL013 Effect of Applications of Sulfate of Potash-Magnesia to Corn Growing on Sandy Soils

R. Hoeft (UI), G. R. Hagstrom (Duval)

Sulfur, potassium, magnesium response; corn

IL014 Corn Yields as Affected by Fall versus Spring Applied Ammonia and Potassium Level

R. G. Hoeft, L. F. Welch (UI), C. P. Ellington (PPI)

Anhydrous ammonia, potassium chloride rate; corn

IL015 Chemical Properties and Nutrient Release Characteristics of Controlled-Release Fertilizers

T. D. Hughes

IBDU, urea formaldehyde; particle size; laboratory study

IL016 Dynamics of Soil Microbiology and Fertility During Secondary Succession

G. L. Rolfe

Nitrogen, phosphorus response; mycorrhiza; soil testing

IL017 Effect of Zinc on Corn and Soybean Yields. (Ph.D. Thesis)

L. G. Schmidt (L. F. Welch, Advisor)

Zinc response; corn, soybean

IL018 Nitrogen Metabolism and Translocation in Perennial Fruit Trees

P. W. Spencer, J. S. Titus

Urea; foliar application; apple

IL019 Corn Yield, Nutrient Uptake by Corn, Nitrification and N-Serve Degradation in Soil as Affected by Applied N-Serve and Nitrogen. (Ph.D. Thesis)

J. T. Touchton (L. F. Welch, Advisor)

Nitrogen response; nitrification; N-Serve; corn

IL020 Effect of Potassium and Magnesium on Plant Composition and Yield of Corn

W. M. Walker (UI), C. P. Ellington (PPI)

Potassium, magnesium response; corn

IL021 Agronomic-Economic Investigations of Fertilizer Use

L. F. Welch, J. T. Scott

Economic return; optimum farm management practice

IL022 Nitrogen as an Environmental Quality Factor—Management Techniques for Manipulating and Controlling

L. F. Welch

Anhydrous ammonia, potassium rate; nitrification inhibitor; corn

IL023 Losses of Nitrogen Fertilizers to Drainage Waters and by Denitrification

L. F. Welch, L. T. Kurtz, J. Johnson, R. L. Jones

Fate of applied nitrogen; ^{15}N; nitrification inhibitor

IL024 Calibration of Chemical Soil Tests

L. F. Welch

Phosphorus, potassium rate; placement; soil-test correlation; corn

IL025 Foliar Fertilization of Agronomic Crops

L. F. Welch, C. M. Brown

Urea, ammonium nitrate, potassium polyphosphate, potassium sulfate; foliar application; oat, wheat, soybean

IL026 Losses of Nitrogen Fertilizers to Drainage Waters and by Denitrification

L. F. Welch (UI), V. J. Kilmer, R. D. Hauck (NFDC-TVA)

Nitrate; fate of applied nitrogen; ^{15}N; corn

Southern Illinois University
School of Agriculture
Carbondale, Illinois 62901

IL027 Nitrification Inhibitors

E. C. Varsa (SIU), V. L. Sheldon (WIU), G. E. Richards (Olin)

Urea, Terrazole; fate of applied nitrogen; corn

Western Illinois University
Macomb, Illinois 61455

IL028 Effect of Phosphorus and Magnesium Fertilizer Rates on Soybean Oil Composition

V. L. Sheldon

Phosphorus, magnesium rate; variety, soybean oil composition

IL029 Fertilizer Marketing Systems in Agricultural Development

V. L. Sheldon

Marketing organization; personnel development; promotion; distribution

IL030 Microbiological Nitrogen Transformations in Soil Systems

V. L. Sheldon

Urea, ammonium sulfate, fungicide, bacteriocide; nitrogen transformation

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INDIANA

A and L Laboratory
Fort Wayne, Indiana 46802

IN001 To Evaluate the Yield Response of Corn and Soybeans to One Application of Boron

J. Hohla (ALL), J. R. Turner (U.S. Borax)

Boron rate; corn

Purdue University
West Lafayette, Indiana 47907

IN002 Land Use and Natural Resources in Eastern Indiana

N. W. Alderfer

Fertilizer response; municipal sludge; method of application; N-Serve; corn, soybean

IN003 Research with Strip Placement of Liquid Fertilizer Grades

S. A. Barber (PU), N. van Buren (NFSA)

Liquid fertilizer response; placement

IN004 Interaction of Potassium and Nitrogen Levels on Corn Production

S. A. Barber (PU), C. P. Ellington (PPI)

Nitrogen, potassium rate; corn

INDIANA

IN005 Absorption by Plant Roots as Affected by Soil and Plant Factors

S. A. Barber (PU), F. E. Khasawneh, O. P. Engelstad (NFDC-TVA)

Phosphorus uptake; corn

IN006 An Evaluation of Mechanism by Which Soil Temperature Affects Potassium Uptake by Corn Plants. (M.S. Thesis)

P. C. Ching (S. A. Barber, Advisor)

Potassium response; corn

IN007 Turfgrass Improvement

W. H. Daniel

Slow-release nitrogen, response; roadside turf, athletic field; bluegrass

IN008 Applications of Iron-Sulfur to Turf

W. H. Daniel (PU), G. R. Hagstrom (Duval)

Iron response; turf, pin oak

IN009 Optimum Plant Size

W. D. Downey

Fertilizer retail marketing cost; bulk and fluid fertilizer; distribution

IN010 Anhydrous Ammonia Addition to Corn Silage

K. S. Hendrix (PU) R. M. Mitteness (USS Agri-Chemicals)

Anhydrous ammonia, nonprotein nitrogen, natural protein source; corn silage

IN011 Forage Quality and Utilization

V. L. Lechtenbergh

Nitrogen rate; plant analysis; fescue

IN012 Impact of Regulatory Policies on U. S. Agriculture

M. A. Martin

Fertilizer market analysis; public policy

IN013 Market Analysis of Farm Supplies and Services

A. J. Minden

Fertilizer industry; retail; organization; market structure; supply/demand forecast

IN014 Nitrogen Transformations in Soil

D. W. Nelson

Anhydrous ammonia, sewage sludge, nitrapyrin, Terrazole, urea, ammonium sulfate; corn

IN015 Nutrition and Growth Regulation of Crop Production

A. J. Ohlrogge

Nitrogen, phosphorus, potassium, micronutrients rate; placement; corn

IN016 Energy Effects in Crop-Environment Interactions

R. M. Peart

Farm management; economics of crop drying

IN017 Utilization and Disposal of Municipal, Industrial, and Agricultural Processing Wastes on Land

L. E. Sommer

Municipal sewage sludge; fate of applied nitrogen, sulfur; soybean

IN018 Culture and Fertilization of Soybeans

R. K. Stivers

Nitrogen rate; lime, cement rate; corn, soybean

IN019 Production of Superior Maize

C. Y. Tsai

Nitrogen rate; grain analysis; corn

IN020 Nutrient Uptake in Horticultural Crops

G. E. Wilcox

Ammonium nitrate, ammonium sulfate, calcium chloride, calcium carbonate, calcium nitrate; urea; nitrogen, phosphorus, potassium, magnesium rate; placement; zinc, manganese, boron response; bean

IN021 Nutrient Uptake in Horticultural Crops

G. E. Wilcox (PU), C. P. Ellington (PPI)

Fertilizer response; horticultural crop

Purdue University
Agricultural Experiment Station
Wanatah, Indiana 46390

IN022 Use of Agricultural Resources in Northwest Indiana

M. A. Mohler

Fertilizer placement; nitrification inhibitor; foliar fertilization; calcium/magnesium rate; corn, wheat, soybean

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IOWA

Iowa State University
Ames, Iowa 50011

IA001 Effect of Fertilizer Nitrogen, Plant Population, and Variety on Yield of Continuous Corn on a Grundy Soil. (M.S. Thesis)

P. Baherle (R. D. Voss, Advisor)

Nitrogen response; corn

IA002 Volatilization of Sulfur from Soil and Animal Manure. (Ph.D. Thesis)

W. L. Banwart (J. M. Bremner, Advisor)

Fate of applied sulfur; manure from soil

IA003 Foliar Application of Phosphorus Compounds. (Ph.D. Thesis)

D. Barel (C. A. Black, Advisor)

Phosphorus source; foliar application; field crop

IA004 Evaluation of Alternative Rural Freight Transportation Storage and Distribution Systems

C. P. Baumel

Transportation; distribution; public policy; railroad

IA005 Alternative Systems for Transporting Agricultural Outputs to Market and Inputs to Production Areas

C. P. Baumel

Fertilizer transportation and distribution; railroad

IA006 Transportation and Distribution Systems for Moving Grain and Fertilizer Through Deepwater Ports

C. P. Baumel

Fertilizer transportation; storage; capacity; port

IA007 Impact of Changing Transportation Systems on Local Grain and Farm Supply Firms

C. P. Baumel, W. H. Thompson, R. N. Wisner

Fertilizer transportation; distribution; supply; storage; cost

IA008 Soil and Fertilizer Phosphorus: Availability to Plants and Equilibrium

C. A. Black, W. H. Pierre, M. A. Tabatabai

Fate of polyphosphate, pyrophosphate, and organic phosphate in soil

IA009 Influence of Potassium Fertilization and Plant Population Upon the Performance of Several Corn Hybrids. (Ph.D. Thesis)

R. W. Bohling (J. R. Webb, Advisor)

Potassium response; corn

IA010 Forms and Transformations of Nitrogen and Sulfur in Soils

J. M. Bremner

Urea, N-Serve, ARC; sulfur; fate of applied nitrogen

A011 Nutrient Enrichment of Waters by Soils and Sediments

J. M. Bremner, J. J. Hanway, M. A. Tabatabai

Fate of applied nitrogen, phosphorus; ^{15}N; nonpoint pollution

IA012 Nitrogen and Sulfur Transformations in Soils Related to Fertilizer and Pollution Problems

J. M. Bremner

Fate of applied nitrogen and sulfur; soil absorption of polluting gases: NO, NO_2, SO_2, and H_2S

IA013 Pesticide Effects on Nitrogen Transformations in Soil

J. M. Bremner (ISU), R. D. Hauck (NFDC-TVA)

Urea, fate of applied nitrogen in soil

IA014 Linear Models to Facilitate the Merchandising Operations of Agricultural Marketing Firms

P. Doak

Fertilizer transportation; distribution; storage; market organization

IA015 Corn Yielding Capacity of Iowa Soils

L. C. Dumenil

Fertilizer response; soil-test correlation; corn

IA016 Influence of Source, Rate, and Time of Application of Nitrogen on Yield and Chemical Composition of Tall Fescue and Bromegrass. (M.S. Thesis)

M. Fernandez (J. R. Webb, Advisor)

Nitrogen rate, source, time of application; bromegrass, fescue

IA017 Foliar Fertilization of Soybeans During the Seed Filling Period. (Ph.D. Thesis)

R. L. Garcia (J. J. Hanway, Advisor)

Fertilizer response; foliar application; soybean

IA018 Influence of Nitrogen Application and Cutting Management on Yield, Quality, and Stand Maintenance of Two Warm-Season Grasses

J. R. George, R. Riedl (ISU), W. D. Graham (Farmland)

Nitrogen response; switchgrass, bluestem

IA019 Soil Fertility-Bromegrass Stand, Corn, Soybeans

J. R. George (ISU), C. P. Ellington (PPI)

Fertilizer response; bromegrass, corn, soybean

IA020 Mineral Nutrition and Fertilization Practices for Soybeans

J. J. Hanway, L. Dumenil, J. Webb

Urea, nitrogen, phosphorus, potassium, sulfur response; foliar fertilization; soybean

IA021 Establishment of Several Crop Rotations on Restored Soils at a Coal Surface Mine

S. J. Henning, L. C. Dumenil

Fertilizer rate; field crop rotation, mine spoil reclamation

IA022 Yields of Corn and Soybeans and the Depth of Nitrate Removal from the Soil as Influenced by Applied and Residual Nitrogen. (Ph.D. Thesis)

V. D. Jolley (J. R. Webb, Advisor)

Fate of applied nitrogen; corn, soybean

IA023 Foliar Fertilization of Corn During Grain-Filling Period. (Ph.D. Thesis)

C. S. Kargbo (J. J. Hanway, Advisor)

Fertilizer response; foliar application; corn

IA024 Turfgrass Cultural Practices and Improvement

W. E. Knoop, D. G. Grove

Fertilizer source, rate; turfgrass

IA025 Causes, Consequences, and Economic Control of Crop Chemical Pollution

J. A. Miranowski

Manure; nonpoint source pollution

IA026 Retardation of Urea Hydrolysis in Soils. (M.S. Thesis)

R. L. Mulvaney (J. M. Bremner, Advisor)

Urea; fate of urea in soil

IA027 Mineral Nutrition of Soybeans and Agronomic Production Functions

J. T. Pesek, J. R. Webb

Nitrogen, phosphorus, potassium rate; placement; soybean

IA028 Effect of Mineral Elements on Yield and Composition of Crops and on Soil Conditions

W. H. Pierre, J. J. Pesek, J. R. Webb

Nitrogen, phosphorus, potassium response; zinc, iron sulfate; corn

IA029 Foliar Feeding and Leaf Metabolism of Soybeans

R. Shibles (ISU), S. E. Allen (NFDC-TVA)

Urea, nitrogen, phosphorus, potassium, sulfur response; soybean

IA030 Foliar Fertilization of Oats (*Avena sativa* L.) During the Grain Filling Period. (M.S. Thesis)

J. O. Subah (J. J. Hanway, Advisor)

Fertilizer response; oat

IA031 Factors Affecting Sulfur Transformations in Soils

M. A. Tabatabai (ISU), S. L. Tisdale (TSI)

Sulfur reaction in soil

IA032 Environmental Accumulation of Nutrients as Affected by Soil and Crop Management

M. A. Tabatabai

Phosphorus; soil testing; laboratory study

IA033 Cultural and Localized Problems of Vegetable Crop Production

H. G. Taber, L. E. Peterson

Nitrogen, zinc rate; irrigation application; corn, potato

IA034 Potassium Build-Up and Residual Effects in Corn-Soybeans Rotation

J. R. Webb (ISU), C. P. Ellington (PPI)

Potassium rate; corn, soybean

IA035 Effect of Rates and Sources of Potassium on Corn Growth

J. R. Webb (ISU), C. P. Ellington (PPI)

Potassium rate; source; corn

IA036 Effect of Fertilization Practices on Crop Production and Soil Nutrient Levels

R. Webb, W. H. Pierre, R. D. Voss

Nitrogen, phosphorus, potassium, lime response; field crop

IA037 Multiple Cropping and the Family Farm in Iowa

D. K. Whigham, G. O. Benson

Nitrogen, phosphorus, potassium, lime response; corn, soybean

IA038 Relative Response of Corn and Soybeans to Nitrogen, Phosphorus, and Potassium Fertilization as Measured by Plant Chemical Composition and Grain Yields. (Ph.D. Thesis)

J. L. Young (J. R. Webb, Advisor)

Nitrogen, phosphorus, potassium response; corn, soybean

IA039 Urease Activity in Soils

M. I. Zantua, J. M. Bremner (ISU), R. D. Hauck (NFDC-TVA)

Urea transformation; potassium azide, p-benzoquione, hydroquinone

Iowa State University
Agronomy Department
Muscatine Island, Iowa 52761

IA040 Method of Magnesium Application for Sweet Corn

H. G. Taber (ISU), G. R. Hagstrom (Duval)

Magnesium response; method of application; sweet corn

Land O Lakes
Agricultural Services
2827 Eighth Avenue South
Fort Dodge, Iowa 50501

IA041 Rotation-Fertility Level Study

J. Carlson

Nitrogen, phosphorus, potassium rate; continuous corn, corn-soybean, corn-corn-soybean, corn-grain sorghum-soybean rotation

IA042 Foliar Fertilizer Trials

J. Carlson

Nitrogen, phosphorus, potassium, sulfur rate; foliar application; ISU-2, ISU-3, Folian, Seaborn Plus F, TRI-40, Foliade, Bayfolan, TIBA, Bayfolan + penetrator, Foliade + multi-blend chelate; soybean

IA043 Profit Potential

J. Carlson

Nitrogen, phosphorus, potassium, lime; soil test correlation; corn, soybean, wheat, alfalfa; crop rotation

IA044 N-Serve Trials

J. Carlson

Anhydrous ammonia rate; time of application; N-Serve; corn

KANSAS

Kansas State University
Branch Agricultural Experiment Station
Colby, Kansas 67701

KS001 Sugar Beet Fertilizer and Water Use Investigation

E. E. Banbury, D. G. Bordovsky, J. L. Tuma

Nitrogen rate; irrigation; sugar beet

KS002 Sugar Beet Fertilizer and Water Use

D. G. Peterson, H. D. Sunderman

Nitrogen rate; sugar beet; sugar content

KS003 Dryland Soil Management

J. L. Tuma

Nitrogen, phosphorus rate; irrigation; corn, sorghum, popcorn

Kansas State University
Branch Agricultural Experiment Station
Garden City, Kansas 67846

KS004 Soil Management Investigations on Irrigated Land

G. M. Herron, P. E. Penas

Nitrogen, phosphorus, potassium response; irrigation; corn, sorghum, sugar beet

KS005 Nutrient Deficiencies on Land in Southwest Kansas

G. M. Herron

Nitrogen, phosphorus, zinc, boron; wheat, corn, sorghum

KS006 Management of Soil in Dryland Regions

C. A. Thompson

Anhydrous ammonia; no-till; time of application; wheat, sorghum

Kansas State University
Manhattan, Kansas 66506

KS007 Sandyland Experiment Field

J. D. Ball, G. Teneyck

Nitrogen, phosphorus, potassium, sulfur, magnesium response; corn, sorghum

KS008 Varietal Response and Effects of Different Sources of Zinc on Soybean Growth and Yield. (M.S. Thesis)

A. B. Bells (E. L. Mader, Advisor)

Zinc response; soybean

KS009 Impact of Rising Energy Costs on Kansas Rural Development Especially as It Affects Livestock-Meat Industry

A. W. Biere

Farm management; fertilizer cost; market analysis

KS010 Turfgrass Investigations

R. N. Carrow, R. A. Keen

Micronutrient response; bluegrass, ryegrass, fescue

KS011 Cornbelt Experiment Field

M. M. Claassen

Nitrogen rate; wheat

KS012 Influence of Soil, Fertilizer, and Climatic Factors on Forage Quality Indices of Grass Tetany

R. Ellis, Jr., D. L. Grunes

Calcium nitrate, anhydrous ammonia, rate; potassium, magnesium response; grass tetany; forage

KS013 Effect of Rates and Methods of Zinc Application on Utilization by Plants

R. Ellis, Jr., D. A. Whitney

Phosphorus, zinc rate; soil test correlation; irrigation; corn

KA014 Phosphorus-Zinc Interactions in Plants

R. Ellis, Jr., G. M. Paulson, L. S. Murphy

Zinc; fluid application

KANSAS

KS015 Comparisons of Ammonium Ortho- and Polyphosphates Under Field Conditions

R. Ellis, Jr., D. A. Whitney

Ammonium orthophosphate, ammonium polyphosphate, urea-ammonium polyphosphate, sodium tripolyphosphate method of application; corn, wheat, sorghum

KS016 Comparisons of Chelated and Inorganic Sources of Zinc Applied in Fluid Fertilizers

P. J. Gallagher

Zinc EDTA, zinc oxide, zinc sulfate, zinc-ammonia response; fluid fertilizer; method of application; corn

KS017 Evaluation of Industrial Waste Streams as Fertilizer Materials

P. J. Gallagher, C. L. Harms

Ammonium sulfate, ammonium polyphosphate, cyanuric acid (32% nitrogen); wheat, soybean, corn

KS018 Reactions of Ammonium Pyrophosphates with High Calcium Irrigation Waters. (Ph.D. Thesis)

P. J. Gallagher (L. S. Murphy, Advisor)

Ammonium polyphosphate; irrigation; soil reaction

KS019 Soil-Site, Nutrient, and Multiple Cropping of Important Kansas Hardwoods

W. A. Geyer

Ammonium nitrate, phosphorus; time of application; ecology; walnut

KS020 Cucurbit Varieties and Cultural Practices

C. V. Hall

Fertilizer response; watermelon, muskmelon

KS021 Response of Plants and Cattle on Bluestem Pasture to Management and Nutrition Practices

L. H. Harbers, C. E. Owensby, E. F. Smith

Nitrogen rate; bluestem pasture

KS022 Magnesium Effects on Wheat Forage Components Involved in the Tetany Syndrome. (Ph.D. Thesis)

C. L. Harms (L. S. Murphy, Advisor)

Magnesium response; wheat forage

KS023 Kansas River Valley Irrigation Experimental Field

N. E. Humburg, L. D. Maddux

Sulfur-coated urea, cyanuric acid; phosphorus-zinc rate; method of application; irrigation; corn, soybean

KS024 Effect of Knife Spacing on Wheat Yield and Phosphorus Uptake Using the Dual Nitrogen-Phosphorus Technique

D. Kissel (KSU), J. C. Kramer (NFDC-TVA)

Ammonium-ammonium polyphosphate, nitrogen, phosphate rate; band placement spacing; wheat

KS025 Effectiveness of Dual Applications of Nitrogen and Phosphorus for Wheat, Corn, and Grain Sorghum

D. Kissel (KSU), J. C. Kramer (NFDC-TVA)

Anhydrous ammonia, ammonium polyphosphate, Terrazole, N-Serve; urea, ammonia, urea-ammonium nitrate, orthophosphate, polyphosphate response; method of application; corn, wheat, grain sorghum

KS026 Efficiency of Nitrogen Solution-Liquid Ammonium Polyphosphate Application to Cool Season Grasses

D. Kissel (KSU), J. C. Kramer (NFDC-TVA)

Ammonium polyphosphate response; grass

KS027 Bermudagrass Adaption for Southeastern Kansas

D. Kissel (KSU), J. C. Kramer (NFDC-TVA)

Ammonium nitrate, urea response; time of application; bermudagrass

KS028 Phosphate Sources for Corn and Grain Sorghum in Greeley County

D. Kissel (KSU), J. C. Kramer (NFDC-TVA)

Urea-ammoinum polyphosphate, ammonium polyphosphate, ammonium orthophosphate, potassium polyphosphate rate; irrigation; corn

KS029 Effect of Placement and Rate of MAP, DAP, UAPP on Wheat Seedling Emergence and Final Yield

D. Kissel (KSU), J. C. Kramer (NFDC-TVA)

Monoammonium phosphate, diammonium phosphate, urea-ammonium polyphosphate response; wheat

KS030 Evaluation of N-Serve in Winter Wheat Production

D. Kissel

Nitrapyrin, anhydrous ammonia, urea-ammonium nitrate solution; corn, sorghum, wheat

KS031 Nitrogen Sources on Cool Season Grasses

D. Kissel (KSU), G. E. Richards (Olin)

Urea, nitrogen source; Terrazole; grass

KS032 Compatibility of Fluid Lime with UAN, Liquid APP, and Herbicides

D. Kissel (KSU), N. van Buren (NFSA)

Fluid lime, urea-ammonium nitrate, ammonium polyphosphate response

KS033 Fertilizer Investigations

D. Kissel

Anhydrous ammonia, liquid nitrogen rate; magnesium EDTA, magnesium sulfate, magnesium chloride placement; soybean, wheat

KS034 N-P Placement and Tillage Study

D. Kissel (KSU), R. M. Mitteness (USS Agri-Chemicals)

Nitrogen-phosphorus combination; placement; field crop

KS035 East Central Kansas Experimental Field

C. W. Knight

Nitrogen, phosphorus rate; no-till; corn, soybean, bromegrass

KS036 Comparative Performance of Nitrogen Sources for Smooth Bromegrass (*Bromus inermis* L.) and Tall Fescue (*Festueo arundinacea* Schreb). (Ph.D. Thesis)

R. E. Lamond (L. S. Murphy, Advisor)

Nitrogen source; bromegrass, fescue

KS037 Feasibility and Performance of Liquid Fertilizers in Reduced Tillage Systems

R. E. Lamond, K. W. Kelly, R. J. Johnson (KSU), N. van Buren (NSFA)

Fluid fertilizer response; reduced tillage

KS038 Southwest Kansas Experimental Field

M. C. Lundquist

Fertilizer response; N-Serve; wheat, oat

KS039 South Central Experimental Field

W. A. Moore

Fertilizer response; gypsum on alkali soil; wheat, sorghum

KS040 Variations in Phosphorus Accumulation and Polyphosphate Hydrolysis by Selected Maize Families (*Zea mays* L.). (M.S. Thesis)

M. Mossala (L. S. Murphy, Advisor)

Polyphosphate response; corn

KS041 Nitrogen Recovery from Fertilizers

L. S. Murphy, R. V. Olson, D. A. Whitney

Ammonium sulfate rate; fate of applied nitrogen; ^{15}N; corn

KS042 Improving Fertilizer Efficiency

L. S. Murphy

Ammonia, ammonium polyphosphate, liquid 10-34-0; wheat, grain sorghum, corn

KS043 Tillage Implement Applications of Ammonia-Liquid Fertilizer Combinations

L. S. Murphy

Urea-ammonium nitrate solution, anhydrous ammonia, liquid ammonium polyphosphate rate; method of application, no-till; corn, sorghum

KS044 Efficiency of Nitrogen Utilization

L. S. Murphy

Urea-ammonium nitrate, ammonia; time of application; wheat, corn

KS045 Sulfur Nutrition of Kansas Crops

L. S. Murphy, G. M. Paulsen

Sulfur rate, source; irrigation; alfalfa, grain sorghum, soybean

KS046 Fertilization Practices for No-Till Corn and Grain Sorghum

L. S. Murphy (KSU), W. D. Graham (Farmland)

Nitrogen and phosphorus rate; application method; irrigation; corn, grain sorghum

KS047 Corn Silage, Wheat, Grain Sorghum, and Alfalfa Fertilization

L. S. Murphy (KSU), C. P. Ellington (PPI)

Fertilizer response; corn, wheat, grain sorghum, alfalfa

KS048 Potassium, Nitrogen Interactions in Grain Sorghum

L. S. Murphy, D. A. Whitney (KSU), C. P. Ellington (PPI)

Potassium, nitrogen response; grain sorghum

KS049 Feasibility and Performance Study of Limestone Suspensions

L. S. Murphy (KSU), N. van Buren (NFSA)

Lime response; fluid application

KS050 Nitrogen Recovery from Fertilizers

R. V. Olson, D. A. Whitney

Ammonium sulfate; ^{15}N; fate of applied nitrogen; wheat

KS051 Economic Application of Agronomic Production Data

F. Orazem
Farm management; fertilizer cost; market analysis

KS052 Pasture Evaluation Under Grazing

C. E. Owensby

Nitrogen rate; big bluestem

KS053 Physiology of Crop Plants

G. M. Paulsen

Nitrogen response; wheat, corn

KS054 Response of Normal and High-Protein Wheat to Phosphorus and Potassium Nutrition

G. M. Paulsen (KSU), C. P. Ellington (PPI)

Phosphorus and potassium response; wheat

KANSAS

KS055 North Central Experiment Fields

R. J. Raney, J. Scharplaz

Nitrogen rate; sorghum

KS056 Irrigation Experimental Field

R. J. Raney

Nitrogen, phosphorus rate; irrigation timing; corn, soybean

KS057 Evaluation of Seven Materials as Sources of Zinc for Soybeans (*Glycine max* L.). (Ph.D. Thesis)

E. A. Salako (E. L. Mader, Advisor)

Zinc source; soybean

KS058 Comparative Performance of Polyphosphate Fertilizers for Three Row Crops. (Ph.D. Thesis)

S. J. Schield (L. S. Murphy, Advisor)

Polyphosphate fertilizer response; field crop

KS059 Study of the Potential Movement of Fertilizers, Central Oklahoma

L. W. Schruben

Fertilizer transportation mode; market analysis

KS060 Study Movement of Wheat Over Central Oklahoma and Fertilizers Over Mid-Arkansas Basin

L. W. Schruben

Fertilizer transportation; shipment, storage

KS061 Appraisal of the Capability of the Transportation System to Meet Needs of Agriculture and Rural Areas

L. O. Sorenson

Fertilizer industry; transportation and storage; transportation mode

KS062 Impact of Changing Transportation Systems on Local Grain and Farm Supply Firms

L. O. Sorenson, J. H. McCoy

Fertilizer industry; transportation and distribution; railroad; storage

KS063 Test-Demonstration Farms in the Fertilizer Program

J. T. Weidert

Nitrogen, phosphorus, potassium suspension fertilizer; wheat seeding

KS064 Environmental Accumulation of Nutrients as Affected by Soil and Crop Management

D. A. Whitney

Fate of applied nitrogen; nonpoint pollution

KS065 Developing Soil Tests

D. A. Whitney

Magnesium rate; irrigation; corn

KS066 Potassium and Phosphorus Fertilization on Kansas Crops

D. A. Whitney (KSU), C. P. Ellington (PPI)

Potassium, phosphorus response; soil-test correlation; field crop

KS067 Effects of Potassium on Stem Lodging and Grain Yield in Corn and Grain Sorghum

D. A. Whitney

Nitrogen, potassium rate; corn, grain sorghum

KS068 Sulfur Level and Nitrogen/Sulfur Ratio of Irrigated Corn Grown in Kansas

D. A. Whitney (KSU), S. L. Tisdale (TSI)

Sulfur response; corn

KS069 Efficiency of Nitrogen Fertilizers for Cool Season Grasses

D. A. Whitney

Urea, urea-ammonium nitrate solution; ammonium nitrate; sulfur-coated urea, urea-ammonium sulfate; time of application; bromegrass

KS070 Southeast Kansas Experimental Field

J. Winzer

Nitrogen response; pecan

Kansas State University
Southeast Kansas Experiment Station
Mound Valley, Kansas 67354

KS071 Soil Studies in Relation to Yield and Quality of Crops at Mound Valley

F. W. Boren, K. W. Kelley

Anhydrous ammonia, polyphosphate, nitrogen, phosphorus, potassium rate; wheat, sorghum

KS072 Selected Forages for Hay and Pasture in Southeastern Kansas

F. W. Boren, L. J. Chyba, S. C. Fransen

Nitrogen, phosphorus, potassium response; sainfoin, bromegrass, fescue, wheatgrass, orchardgrass

KS073 Evaluation of Calcium Nitrate Fertilizer Relative to the Grass Tetany Problem in Southeast Kansas

K. W. Kelley, S. C. Fransen, R. W. Ibbetson

Calcium nitrate, urea; grass tetany; bromegrass

Kansas State University
Branch Agricultural Experiment Station
Tribune, Kansas 67879

KS074 Soil Management in West Central Kansas

P. J. Gallagher, R. E. Gwin, Jr.

Nitrogen, phosphorus, potassium rate; irrigation; corn, wheat, grain sorghum

KENTUCKY

Berea College
Berea, Kentucky 40403

KY001 Reclamation of Surface-Mined Areas (Surface-Mined Area Rehabilitation)

W. R. Curtis

Fertilizer, lime; mulch; mine spoil; fly ash

University of Kentucky
Lexington, Kentucky 40506

KY002 Reclamation of Surface Mined Coal Spoils

R. I. Barnhisel

Phosphorus, lime response; mine spoil reclamation; bermudagrass

KY003 Evaluation of Chemical Changes and Forage Response as a Result of Lime and Phosphorus Treatments on Orphan Surface-Mined Coal Spoils. (M.S. Thesis)

G. Akin (R. I. Barnhisel, Advisor)

Phosphorus, lime response; spoil bank; forage

KY004 Influence of Cultural Management Systems on Nicotine Content in Burley Tobacco

W. O. Atkinson, J. Calvert, W. O. Sims

Nitrogen rate; no-till; tobacco

KY005 Nitrogen from Winter-Annual Legume Cover Crops for No-Till Corn

R. L. Blevins, W. W. Frye, R. E. Phillips

Nitrogen rate; cover crop; corn; no-till

KY006 Effect of Varying Ratios of Cl, SO_4, and N on Chemical Components of Tobacco

J. F. Chaplin, J. L. Sims

Urea, ammonium nitrate, calcium nitrate, sulfate, chloride rate; lime, molybdenum response; tobacco

KY007 Response of Common Bermudagrass to Nitrogen, Lime, Potassium, and Phosphorus Treatments and Their Effect on the Chemistry of Acid Surface-Mined Coal Spoils in Western Kentucky. (M.S. Thesis)

M. W. Ebelhar (R. I. Barnhisel, Advisor)

Nitrogen, phosphorus, potassium, lime response; mine spoil soil; bermudagrass

KY008 Nitrogen, Potassium, and Calcium Nutrition Effects on Ion and Dry Matter Accumulation in Rice (*Oryza sativa* L.). (Ph.D. Thesis)

P. Krasaesindhu (J. Sims, Advisor)

Nitrogen, phosphrous, calcium response; rice

KY009 Utilization by Corn and Transformation of Fertilizer Nitrogen in Selected Soils of Western Kentucky

D. E. Peaslee

Fate of applied nitrogen; ^{15}N; corn

KY010 Relation Between Soil Properties and the Loss of Fertilizer Nitrogen

D. E. Peaslee, R. E. Phillips, G. W. Thomas

Fate of applied nitrogen; corn

KY011 Diagnosis and Correction of Zinc Problems in Corn and Rice Production

D. E. Peaslee

Zinc sulfate rate; corn, rice

KY012 Diagnosis and Correction of Manganese and Molybdenum

D. E. Peaslee

Manganese, molybdenum response; soil-test correlation; soybean, forage legume

KY013 Effect of Nitrogen Fertilizer Source and N-Serve on Corn Yields and Nitrate Status in Soil. (Ph.D. Thesis)

P. Ratnapradipa (J. Ellis, Advisor)

Nitrogen source; N-Serve; corn

KY014 Nitrogen Uptake and Growth of Rice as Affected by Nitrogen Source, Rate, and Age of Plant. (Ph.D. Thesis)

N. Sookhakick (John Ellis, Advisor)

Nitrogen rate, source; rice

KY015 Effect of Time and Rate of Potassium Fertilization on Yield of Double Crop Soybeans

K. L. Wells (UK), C. P. Ellington (PPI)

Potassium rate; time of application, soybean

LOUISIANA

Louisiana State University
Baton Rouge, Louisiana 70893

LA001 Effect of Nitrogen and Potassium Fertilizers and Soil Type on Yield Components and Nutrient Uptake of Four Sugarcane Varieties. (Ph.D. Thesis)

I. B. Abdol (L. E. Golden, Advisor)

Nitrogen, potassium response; sugarcane

LOUISIANA

LA002 Turfgrass Investigations

E. P. Barrios, C. S. Blackwell, R. J. Constantin

Ammonium nitrate, urea-formaldehyde, Milorganite rate; time of application; phosphorus, potassium rate; bermudagrass

LA003 Rose Investigations

C. S. Blackwell, E. N. Orourke, R. J. Stadtherr

Slow-release fertilizer; mulch; rose

LA004 Grain Research

D. J. Boquet, S. A. Phillips

Nitrogen, phosphorus, potassium rate; foliar, broadcast application; soybean

LA005 Citrus Research

R. T. Brown

Nitrogen, phosphorus, potassium response; citrus

LA006 Development, Production, and Marketing of Christmas Trees

P. Y. Burns, S. C. Hu

Fertilizer response; Christmas tree

LA007 Influence of Mineralogy of Southern Soils on Certain Chemical and Physical Reactions

A. G. Caldwell

Potassium mineral; soil testing

LA008 Cotton Research

W. D. Caldwell, D. R. Melville

Nitrogen rate, source; alfalfa, cotton, vetch

LA009 Development of New Processing Techniques and Methods of Quality Evaluation of Louisiana Fruits and Vegetables

R. J. Constantin, H. L. Hammett, T. P. Hernandez

Nitrogen, phosphorus, potassium response; sweet potato, okra, Irish potato, mustard, bean, shallot, fig, pea, blueberry

LA010 Increasing Nitrogen Fixation in Soybeans

E. P. Dunigan

Sulfur-coated urea, urea, ammonium nitrate rate; phosphorus, potassium rate; nitrogen fixation by *Rhizobium*; soybean

LA011 Soil Fertility Studies with Horticultural Crops

R. J. Constantin, H. L. Hammett, L. G. Jones

Nitrogen, phosphorus, potassium rate; placement; sweet potato, okra, corn, squash, pea, pecan, eggplant

LA012 Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality

E. P. Dunigan

Nitrogen, phosphorus, potassium rate; sewage sludge response; ryegrass

LA013 Evaluation and Management of New Species, Varieties, and Strains of Forage and Pasture Crops

E. P. Dunigan, C. L. Mondar, Jr., D. L. Robinson

Nitrogen response; ryegrass, clover

LA014 Enhancing Biological Dinitrogen Fixation in Soybeans and Other Legumes

E. P. Dunigan

Nitrogen rate, nitrogen fixation by *Rhizobium*; soybean

LA015 Soil Fertility and Nutrition Studies with Sugarcane in Louisiana

L. E. Goldon

Nitrogen, potassium response; sugarcane

LA016 Effects of Fertilizers on the Yield of Cotton, Corn, Soybeans, and Small Grains

J. G. Marshall, J. E. Sedberry

Nitrogen, phosphorus, potassium rate; cotton, corn, soybean

LA017 Equipment for Handling Ammonia

M. M. Mayeux

Anhydrous ammonia

LA018 Physical, Chemical, and Processing Parameters of New and Improved Varieties of Rice

W. F. McKnight

Nitrogen response; plant analysis; rice

LA019 Yield and Quality of Forage Crops and Soil Chemical Properties as Influenced by Nitrogen, Phosphorus, Potassium, and Sulfur Fertilizers

C. L. Mondart, Jr., D. L. Robinson

Ammonium nitrate, nitrogen, phosphorus, potassium, sulfur rate; ryegrass, bermudagrass

LA020 Transformation and Loss of Nitrogen in Flooded Soil

W. H. Patrick, Jr. (LSU), R. D. Hauck (NFDC-TVA)

Ammonium sulfate, urea; ^{15}N; fate of applied nitrogen; rice

LA021 Gaseous Nitrogen Losses from Poorly Drained Soils

W. H. Patrick, Jr. (LSU), R. D. Hauck (NFDC-TVA)

Urea, ammonium sulfate; ^{15}N; placement, time of application; rice

LA022 Plant Nutrient Behavior in Flooded Soils

W. H. Patrick, Jr.

Ammonium sulfate rate; ^{15}N; phosphorus response; rice

LA023 Fertilizer and Lime Needs for the Production of Soybeans, Cotton, and Grain Sorghum

W. J. Peevy

Phosphorus, lime response; soybean, cotton, sorghum

LA024 Cotton Research

S. A. Phillips

Phosphorus, potassium rate; cotton

LA025 Sulfur-Coated Urea on Rice

P.S.C. Reddy (LSU), J. A. Kovar (NFDC-TVA)

Sulfur-coated urea, urea plus nitrification inhibitor; rice

LA026 Foliar Application on Soybeans

P.S.C. Reddy (LSU), J. A. Kovar (NFDC-TVA)

Potassium polyphosphate, urea-polyphosphate; foliar application; soybean

LA027 Effects of Cultural Practices on Yield and Other Plant Characteristics of Sugarcane

R. Ricaud

Nitrogen, phosphorus, potassium rate; sugarcane

LA028 Yield and Quality of Forage Crops and Soil Chemical Properties as Influenced by Nitrogen, Phosphorus, Potassium, and Sulfur Fertilizers

D. L. Robinson (LSU), C. P. Ellington (PPI)

Nitrogen, phosphorus, potassium, and sulfur response; forage

LA029 Potash Research on Forage Crops

D. L. Robinson

Potassium response; forage

LA030 Plant Populations and Row Spacings with Selected Corn Hybrids and Soybean Varieties Grown in Rotation

D. L. Robinson, C. Williams

Nitrogen, phosphorus, potassium rate; corn, soybean

LA031 Resource and Managerial Requirements for Agribusinesses—Selected Agricultural Marketing and Processing

E. P. Roy

Personnel; enterprise management; fertilizer marketing

LA032 Resource Requirements for Various Plant Sizes in Agricultural Marketing and Supply Industries

E. P. Roy, H. D. Traylor

Retail marketing; structure of supply, distribution system

LA033 Diagnosis and Correction of Zinc Problems in Corn and Rice Production

J. E. Sedberry, Jr.

Zinc sulfate rate; corn, rice, soybean

LA034 Transportation and Distribution Systems for Moving Grain and Fertilizer Through Deepwater Ports

H. D. Traylor, W. Gauthier

Fertilizer transportation mode; storage; capacity; port

Louisiana State University
Red River Valley Experiment Station
Bossier City, Louisiana 71111

LA035 Cotton Soil Fertility and Management Research

D. R. Melville

Nitrogen rate; foliar application; cotton

LA036 Cotton Soil Fertility and Management Research

D. R. Melville

Fertilizer response; source; time of application; cotton

Louisiana State University
North Louisiana Agricultural Experiment Station
Calhoun, Louisiana 71225

LA037 Vegetable Research

A. C. Miller, J. C. Taylor, R. S. Woodward

Fertilizer response; sweet corn, potato, bean, squash, pea, tomato

LA038 Fruit Research

J. C. Taylor, R. S. Woodward

Fertilizer, trace element, lime response; peach

Louisiana State University
Rice Experiment Station
Crowley, Louisiana 70526

LA039 Use of Plant Analysis as a Guide to Midseason Nitrogen Fertilization of Rice

D. B. Mengel, F. E. Wilson, Jr.

Nitrogen rate; time of application; leaf analysis; rice

LA040 Determination of Nitrogen Fertilizer Requirements of New Rice

D. B. Mengel

Nitrogen rate; rice

LOUISIANA

Louisiana State University
Southeast Louisiana Experiment Station
Franklinton, Louisiana 70438

LA041 Effects of Applied Plant Nutrients on the Yield and Quality of Forage Crops

M. Allen, R. H. Brupbacher, A. T. Harrell

Nitrogen, lime rate; sulfur, phosphorus, potassium response; ryegrass, sorghum

LA042 Effects of Applied Plant Nutrients on the Yield and Quality of Forage Crops

M. Allen, R. H. Brupbacher, A. T. Harrell

Nitrogen, phosphorus, potassium, lime rate; ryegrass, clover

Louisiana State University
Fruit and Truck Experiment Station
Hammond, Louisiana 70401

LA043 Ornamental Research

W. L. Brown, B. W. Wascom

Nitrogen, potassium, trace element response; container-grown ornamental

LA044 Development of New Vegetable Production Techniques and Cultural Practices for Southeast Louisiana

J. E. Bush III, W. A. Poillion, B. W. Wascom

Fertilizer rate; vegetable crop

LA045 Strawberry Research for Southeast Louisiana

J. E. Bush III, W. A. Poillion, B. W. Wascom

Nitrogen, phosphorus, potassium rate; mulch; strawberry

LA046 Ornamental Plant Production Research

W. L. Brown, B. W. Wascom

Fertilizer response; slow-release fertilizer; container-grown azalea

LA047 Fruit Research

W. A. Poillion, B. W. Wascom

Nitrogen, phosphorus, potassium rate; strawberry, blueberry, blackberry, pecan, fig

Louisiana State University
North Louisiana Hill Farm Experiment Station
Route 1, Box 10
Homer, Lousiana 71040

LA048 Effects of Rates and Methods of Applying Potassium on Coastal Bermudagrass

M. M. Eichhorn, Jr. (LSU), C. P. Ellington (PPI)

Potassium rate, method of application; bermudagrass

LA049 Pasture, Forage, and Grain Crops Research

M. M. Eichhorn, Jr.

Potassium response; bermudagrass

Louisiana State University
Northeast Agricultural Experiment Station
Saint Joseph, Louisiana 71366

LA050 Influence of Applied Nitrogen on Yield and Other Characteristics of Cotton, Corn, and Grain Sorghum

D. J. Boquet, S. A. Phillips, R. L. Rogers

Nitrogen rate; nitrogen carry-over; cotton, corn, sorghum

Louisiana State University
Agricultural Experiment Station
Rosepine, Louisiana 70659

LA051 Pasture and Forage Crops—Variety Trials, Fertilizer Tests of Warm and Cool Season Forage Crops

J. C. Carpenter, Jr., H. E. Harris

Nitrogen rate; bahiagrass; sorghum, sudan, millet, bermudagrass; wheat, triticale, oat, rye

LA052 Small Plot Evaluations of New Forage Varieties

J. C. Carpenter, Jr., H. E. Harris, C. L. Mondart, Jr.

Urea, ammonium nitrate; nitrogen rate; bermudagrass, clover

LA053 Pasture and Forage Crops—Variety Trials, Fertilizer Tests of Warm and Cool Season Forage Crops

J. C. Carpenter, Jr., H. E. Harris

Phosphorus, potassium rate; wheat, triticale, wheatgrass, oat, rye, ryegrass

LA054 A Comparison of a Winter and Summer Grazing Program for Finishing Calves Following Weaning

J. C. Carpenter, Jr., J. I. Feazel, H. E. Harris

Ammonium nitrate rate; rye, ryegrass, clover

Louisiana Technical University
Southern Forest Experiment Station
Ruston, Louisiana 71270

LA055 Intensive Culture of Southern Pines

E. Shoulders

Fertilizer response; southern pine

Southern University A & M
Southern Branch Post Office
Baton Rouge, Louisiana 70813

LA086 Role of Nutrient Management and Soil Factors in Increasing Soybean Yields

M. Price, P. C. Reddy

Nitrogen, phosphorus, potassium, calcium, magnesium rate; soybean

MAINE

University of Maine
Agricultural Experiment Station
Orono, Maine 04473

ME001 Effect of Forest Fertilization on the Soil, Water Quality, and Red Spruce (*Pica rubens* L.). (Ph.D. Thesis)

T. B. Saviello (R. A. Struchtemeyer, Advisor)

Fertilizer response; spruce

ME002 Influence of Soil Acidity on the Fertility of Maine Soils

R. C. Glenn, V. Holyoke

Urea, ammonium nitrate rate; phosphorus, potassium, magnesium, lime response; soil-test correlation; timothy, oat, potato

ME003 Weed Control and Pruning of Lowbush Blueberries (*Vaccinium* spp.)

A. A. Ismail

Nitrogen rate; lowbush blueberry

ME004 Development of Blueberry Varieties Adapted to Maine

A. A. Ismail, P. R. Hepler

Fertilizer response; blueberry

ME005 Soil Solution-Plant Relationships with Special Reference to Nutrient Balance in Potatoes

E. G. Lotse

Monocalcium phosphate, lime rate; potato

ME006 Culture and Economic Feasibility of Buckwheat in Northern Maine

H. J. Murphy, D. G. Stiles

Nitrogen, phosphorus, potassium rate; buckwheat

ME007 Fertilization of and Weed Control in Potatoes

H. J. Murphy

Urea-phosphate, nitrogen, phosphorus, potassium, gypsum, lime rate; potato

ME008 Nitrates in Soil, Water, and Plants

R. V. Rourke, F. R. Stafford

Fate of applied nitrogen; potato

ME009 Effect of Fertilization and Environmental Factors on Growth and Nutrition of Forest Trees

R. K. Shepard

Nitrogen, phosphorus, potassium response; spruce, fir

ME010 Soil-Tree Relationship

R. A. Struchtemeyer

Nitrogen, phosphorus, potassium rate; spruce, pine, poplar

MARYLAND

University of Maryland
College Park, Maryland 20742

MD001 Nitrates in Soil, Water, and Plants

F. Abbruscato, J. H. Axley, J. Legg

Ammonium nitrate, urea; large pellet urea; wheat, corn

MD002 Coatings of Urea and the Influence of Urea on Wheat and Barley Yields. (M.S. Thesis)

F. A. Abbruscato (J. H. Axley, Advisor)

Urea source; barley, wheat

MD003 Assessment of Non-Point Source Loadings from Selected Agricultural Activities

J. H. Axley, J. E. Ayars, R. F. Davis

Fertilizer response; no-till alfalfa-corn; nonpoint source loadings from selected agricultural activities

MD004 Tobacco Breeding, Testing, and Quality Evaluations of Maryland Tobacco

M. K. Aycock, Jr., J. H. Hoyert, Jr., C. L. Mulchi

Nitrogen rate; tobacco

MD005 Physiological Relationships of Tobacco to Environmental Cultural and Genetic Factors

M. K. Aycock, Jr., J. H. Hoyert, Jr., C. L. Mulchi

Ammonium sulfate, ammonium nitrate, calcium nitrate, calcium chloride, phosphorus, potassium rate; tobacco

MD006 Determine the Effect of Boron Fertilization on Soybeans in Maryland

V. A. Bandel

Solubor rate; foliar application; soybean

MD007 Leaching of Nitrate-Nitrogen from Several Fertilizer Sources Applied to Soils of Various Textures

V. A. Bandel

Ammonium nitrate, sodium nitrate, urea, sulfur-coated urea, broiler litter rate; corn, wheat, oat, barley

MARYLAND

MD008 Nitrogen Fertilization of No-Tillage and Conventional Tillage Corn

V. A. Bandel

Ammonium nitrate, ammonium sulfate, prilled and granular urea, nitrogen solution (30% nitrogen), broiler litter; application method; no-till; corn

MD009 Response of Conventional Tillage Corn to Different Nitrogen Sources and Rates, Phosphate Rates, and Potassium Rates

V. A. Bandel (UM), H. J. Bauer (NFDC-TVA)

Ammonium nitrate, prilled urea, granular urea, urea ammonium nitrate (30%) solution, phosphate, potash rate; method of application; corn

MD010 Effect of No-Tillage on Nitrogen, Phosphorus, Potassium Requirements and Placement

V. A. Bandel (UM), H. Plate (Agway)

Nitrogen, phosphorus, potassium response; placement; corn

MD011 Response of Alfalfa to Fertility, Irrigation, and Cutting Management

N. A. Clark

Fertilizer rate; alfalfa

MD012 Comparison of Sorghum, Sunflower, and Corn Silage as Feed for Dairy Cattle

N. A. Clark

Nitrogen-phosphorus-potassium combination rate; sorghum, corn, sunflower silage

MD013 Irrigation and Nutrition Trials on Grafted Spur Type "Delicious" on M9 Root Stock

R. C. Funt (UM), H. Plate (Agway)

Fertilizer response; apple

MD014 Cultural - Management Studies - Woody Plants

F. R. Gouin, C. B. Link

Nitrogen, phosphorus, potassium fertilizer response, ammonium phosphate; container-grown ornamental

MD015 Centrifugal Fertilizer Distributor Design for Controlled Distribution Patterns

J. W. Hummel

Fertilizer application equipment

MD016 Comparison of Sulfur-Coated Urea and Other Nitrogen Sources on Corn and Small Grains. (Ph.D. Thesis)

C. E. Rivard

Urea, nitrogen response; corn, small grain

MD017 Genetic Differences in Potassium Response and Nitrogen Fixation in Soybeans

J. A. Schillinger, C. Sloger

Potassium response; soybean

MD018 Residual Effect of Thirteen Cropping Systems on Corn and Soybean Yields and Soil Aggregation

E. Strickling

Nitrogen fertilizer response; corn, soybean, bluegrass, orchardgrass, wheat

MD019 Influence of Soil Organic Nitrogen on Soybean Yield and Yield Parameters

D. C. Wolf

Urea, ammonium nitrate, sewage sludge rate; time of application; corn, soybean

University of Maryland
Eastern Shore
Princess Ann, Maryland 21853

MD020 Using Winter Legume Cover Crops to Minimize Leaching and to Increase Yields and Net Income

J. Jardine, H. Staats

Nitrogen rate; no-till; corn; cover crop

MASSACHUSETTS

University of Massachusetts
Amherst, Massachusetts 01002

MA001 Relationships of Mineral Nutrition to Physiological Disorders of Apples

J. H. Baker, M. Drake, W. J. Lord

Nitrogen, potassium, lime, boron rate; method of application; apple

MA002 Growth of Vegetable Crops in Nutritional Regimes Caused by Soil Acidity

J. H. Baker, J. D. MacKenzie, D. N. Maynard

Calcium level, tomato

MA003 Toxic Metal, Nitrate, and Pathogen Management on Sludge-Treated Agricultural Land

A. V. Barker

Paper and cloth sludge, nitrapyrin; corn, tomato, radish

MA004 Plant and Nutritional Variables Associated with Ammonium Assimilation in Plants

A. V. Barker

Ammonium sulfate, potassium nitrate, Milorganite, nitrapyrin response; cucumber, radish

MA005 Nitrates in Soil, Water, and Plants

A. V. Barker, D. N. Maynard, D. M. Vietor

Ammonium sulfate, potassium nitrate, Milorganite, nitrapyrin, Hexon, Truban response; spinach

MA006 Mineral Nutrient Deficiency Effect on Apple Storage Loss

Mack Drake (UM), H. Plate (Agway)

Fertilizer response; apple

MA007 Effects of Phosphorus, Potassium, and Calcium Compounds on the Growth and Zinc Accumulation in Radish Grown in Zinc-Treated Soils. (M.S. Thesis)

M. P. Masianica (A. V. Barker, Advisor)

Potassium, phosphorus, zinc, and calcium response; radish

MICHIGAN

Michigan State University
East Lansing, Michigan 48824

MI001 Soil Types of the Upper Peninsula

D. R. Christenson

Fertilizer response; alfalfa, potato, birdsfoot trefoil, oat, wheat

MI002 Analysis of Tactical Decisions as it Affects the Growth, Adjustment, and Economic Position of Michigan

S. B. Harsh

Farm management; enterprise analysis; fertilizer cost

MI003 Appraising the Resource Value of Waste Materials to Develop Greater Utilization on Agricultural Soil

L. W. Jacobs

Paper-making waste, sewage sludge, heavy metal; corn

MI004 Plant Nutrition—Fruit Composition and Quality

A. L. Kenworthy

Fertilizer response; trickle irrigation application; apple, cherry, peach, plum

MI005 Micronutrient Status of Michigan Soils

B. D. Knezek

Boron, zinc, nitrogen, magnesium source; method of application; sugar beet

MI006 Nitrification Inhibitors

H. S. Potter, D. D. Warnche (MSU), G. E. Richards (Olin)

Urea; Terrazole response; fate of applied nitrogen

MI007 Soil Management Investigations for Sod Production and Turf

P. E. Rieke

Urea, ammonium nitrate, sulfur-coated urea, Milorganite, IBDU, nitrogen rate; urea-formaldehyde response; bentgrass, bluegrass

MI008 Influence of Continuous Cropping of Corn on Soil Conditions and Yields

L. S. Robertson

Nitrogen rate; source; corn

MI009 Influence of Applied Nitrogen on Nitrate Distribution in Soil Profiles and Nitrogen Uptake by Corn. (Ph.D. Thesis)

R. P. Schneider

Nitrogen response; corn

MI010 Ecological Factors Influencing Tree Productivity

G. Schneider

Fertilizer response; walnut, tulip poplar

MI011 Implications of Behavioral Research and Theory to Agricultural Marketing

J. D. Shaffer

Fertilizer marketing system; organization

MI012 Physiology, Establishment, Management, and Nutritional Value of Forages

M. B. Tesar

Ammonium nitrate, urea rate; bromegrass, orchardgrass, reed canarygrass, fescue

MI013 Maximum Yield of Alfalfa

M. B. Tesar

Fertilizer response; alfalfa

MI014 Plant Nutrients and Their Interaction

M. L. Vitosh

Anhydrous ammonia, nitrogen, phosphorus, potassium, sulfur rate; N-Serve; irrigation; corn, potato

MI015 Fertilizer Needs on Soils High in Phosphorus and Potassium

M. L. Vitosh (MSU), O. P. Engelstad (NFDC-TVA)

Phosphorus, potassium rate; corn, grain, forage

MI016 Effect of Boron, Manganese, and Fertilizer on Yield, Quality, and Nutrition of Sugar Beets (*Beta vulgaris* L.). (Ph.D. Thesis)

R. D. Voth (D. Christenson, Advisor)

Boron, manganese, fertilizer response; sugar beet

MICHIGAN

MI017 Organic Soil Investigations

D. D. Warncke

Anhydrous ammonia, Terrazole-coated urea, sulfur-coated urea rate; sweet corn, lettuce

MI018 Soil Problems Encountered in Growing Plants in Greenhouses

D. D. Warncke

Nitrogen, phosphorus, potassium response; greenhouse soil

MI019 Agro-Chemicals Soil Amendments, Cultural Practices for Forest Quality Improvement

D. P. White

Fertilizer response; walnut

MI020 Nitrogen Availability—Soil and Fertilizer Sources

A. R. Wolcott

Fate of applied nitrogen; soil-test correlation; sugar beet

Michigan Technological University
School of Forestry and Wood Products
Houghton, Michigan 49931

MI021 Red Pine Fertilization

J. A. Johnson

Fertilizer response, liquid fertilizer; forestry:red pine

MI022 Fertilization of Sugar Maple in Managed Uneven-Aged Northern Hardwoods

S. G. Shetron

Nitrogen, phosphorus, potassium rate; forestry:pine and maple

MI023 Vegetative Stabilization of Mine Mill Wastes

S. G. Shetron

Fertilizer response; ecology; mine spoil reclamation; grass-legume forage

MI024 Insect Resistance of Trees as Affected by Forest Fertilization

N. F. Sloan

Fertilizer response; forestry, insect

MI025 Red Pine Fertilization

J. A. Taylor

Liquid fertilizer; forestry:red pine

MINNESOTA

United States Department of Agriculture
North Central Soil Conservation
Research Laboratory
Morris, Minnesota 56267

MN001 Effect of Fertility and Irrigation Practices on the Quality of Ground Water under Sandy Soils

A. S. Dylla, D. R. Timmons

Nitrogen solution, ammonium nitrate rate; method of application; irrigation; corn

MN002 Relation of Agricultural Practices and Natural Vegetation to Nutrient Content of Waters

R. F. Holt, D. R. Timmons, R. A. Young

Fate of applied nitrogen and phosphorus; erosion; forest, native prairie, corn

University of Minnesota
St. Paul, Minnesota 55101

MN003 Develop and Evaluate Forest Management Practices for Northern Minnesota Forests

B. A. Brown, R. A. Jenson, Z. A. Zasada

Nitrogen, phosphorus, potassium fertilizer; forestry: pine; Christmas tree

MN004 Performance of Soil Applied $FeSO_4 \cdot xH_2O$ Materials as Sources of Iron for Soybeans

A. C. Caldwell (UM), G. R. Hagstrom (Duval)

Iron response; soybean

MN005 Soil and Soil-Plant Relationships of Chemical Elements in Important Soil Types

A. C. Caldwell

Phosphate, ammonium polyphosphate, monoammonium phosphate, sulfur, borax, manganese sulfate, nitrogen rate; irrigation; time of application; corn

MN006 Fertilizer Use Efficiency and the Balance of Essential Plant Nutrients and Other Chemical Elements

A. C. Caldwell, W. W. Nelson

Urea, ammonium nitrate, sulfur rate; time of application; irrigation; ^{15}N; corn

MN007 Nitrogen in Soil and Tile Drainage Under Corn

A. C. Caldwell (UM), R. D. Hauck (NFDC-TVA)

Nitrogen response; corn

MN008 Nitrogen Recovery by Corn (*Zea mays* L.) from ^{15}N Labeled Urea Applied in the Fall and Spring. (Ph.D. Thesis)

A. Castro-Merino (A. C. Caldwell, Advisor)

Urea response; time of application; ^{15}N; corn

MN009 Adequacy and Cost Effectiveness of Bulk Commodity Transportation Systems

R. P. Dahl, K. W. Easter, J. E. Fruin

Fertilizer transportation mode; storage; logistics

MN010 Manufactured Inputs in the Food and Fiber Sector

D. C. Dahl

Fertilizer industry; retail marketing structure

MN011 Swine Waste Management

L. T. Frobish, L. E. Hanson

Fertilizer, swine waste response; corn

MN012 Environmental Accumulation of Nutrients as Affected by Soil and Crop Management

R. G. Gast

Fate of applied nitrogen, phosphorus; nonpoint pollution

MN013 N-P and Treatment of Corn Silage

R. D. Goodrich, J. C. Mieske (UM), R. M. Mitteness (USS Agri-Chemicals)

Nitrogen, phosphorus, nonprotein nitrogen material; corn silage

MN014 Soil Fertility and Chemistry Aspects of Wild Rice Production

J. Grava

Nitrogen, phosphorus, potassium rate; wild rice

MN015 Grass Seed Production as Related to Soil Fertility and Management

J. Grava

Nitrogen rate; time of application; bluegrass, timothy, orchardgrass

MN016 Effect of Flooding, Fertilization, Thinning, and Harvesting Methods on Paddy Wild Rice Production

J. Grava, W. E. Larson

Nitrogen, phosphorus, potassium rate; method of application; wild rice

MN017 Nutrient Needs and Efficient Use of Fertilizer by Soybeans

G. E. Ham (UM), W. D. Graham (Farmland)

Foliar fertilization; soybean

MN018 Soybean Yield Improvement with Foliar Fertilizer —Including Boron

G. E. Ham (UM), J. R. Turner (U.S. Borax)

Solubor, boron rate; foliar application; soybean

MN019 Soil Factors Influencing Soybean Seed Yield With Emphasis on Improved Nodulation

G. E. Ham, W. P. Martin

Ammonium sulfate, calcium nitrate, ammonium chloride, urea, phosphorus, potassium, sulfur rate; foliar application; soybean

MN020 Improved Nitrogen Fixation of Soybeans

G. E. Ham, J. W. Lambert

Nitrogen fertilizer; nitrogen fixation by *Rhizobium*; soybean

MN021 Improved Soybean Inoculation Procedures

G. E. Ham

Nitrogen fixation by *Rhizobium*; soybean

MN022 Quantitative Analyses of Agricultural Prices and Policies

J. P. Houck

Fertilizer industry; marketing analysis; cost

MN023 Nitrification Inhibitors

G. L. Malzer (UM), G. E. Richards (Olin)

Urea, Terrazole; fate of applied nitrogen

MN024 Soil Fertility Investigations—Experiments with Fertilizers and Soil Amendments

G. L. Malzer, W. W. Nelson, G. W. Randall

Ammonium nitrate, urea, rate; nitrification inhibition; time of application; corn, small grain

MN025 Minnesota's Corn Yield Potential

G. L. Malzer (UM), C. P. Ellington (PPI)

Fertilizer response; corn

MN026 Fertilizer Needs on Soils High in Phosphorus and Potassium

G. W. Randall (UM), O. P. Engelstad (NFDC-TVA)

Phosphorus, potassium rate; corn, grain, and forage

MN027 Residual Effects of Fertilizer and Soybean Response

G. W. Randall, G. J. Overdahl (UM), C. P. Ellington (PPI)

Fertilizer response; soybean

MN028 Enhancement of Competition from a Cooperative Presence in the Fertilizer Industry

D. L. Vogelsang, D. C. Dahl, R. G. Walsh

Fertilizer industry; structure; efficiency

MN029 Nutrient Requirements of Selected Forest Tree Species in Northern Minnesota

E. H. White

Nitrogen, phosphorus, potassium rate; spruce, pine

MISSISSIPPI

Alcorn A & M College
Lorman, Mississippi 39096

MISSISSIPPI

MS001 Fruit and Vegetable Production Studies for Low-Income Rural Dwellers in Southwest Mississippi

J. P. Overcash, T. Suresh

Nitrogen, phosphorus, potassium rate; pepper, strawberry, cabbage, bean, tomato, pea, sweet potato, watermelon, corn, muskmelon

Mississippi State University
of Applied Arts and Sciences
Truck Crop Branch Experiment Station
Crystal Springs, Mississippi 39059

MS002 Varietal and Certain Other Cultural Studies for Selective Vegetable Crops

J. A. Campbell, B. E. Waggoner, S. L. Windham

Nitrogen, phosphorus, potassium, boron, molybdenum, zinc response; method and time of application; tomato, watermelon, pepper

Mississippi State University
of Applied Arts and Sciences
Mississippi State, Mississippi 39762

MS003 Grain Sorghum Culture and Fertilization

T. S. Brooks, L. M. Gourley, J. D. Lancaster

Nitrogen, phosphorus, potassium rate; sorghum

MS004 Turf Culture in Mississippi

G. E. Coats, A. Laiche, C. Y. Ward

Nitrogen rate; bluegrass, ryegrass, bermudagrass, St. Augustine grass, centipedegrass, bahiagrass

MS005 Soil Fertility and Harvest Management Requirements of Forage and Pasture Crops

N. C. Edwards, C. W. Thurman, V. H. Watson

Nitrogen rate; bermudagrass, dallisgrass

MS006 Subsoil Characteristics That Influence Crop Production and Subsoil Quality

R. C. Glenn

Nitrogen, phosphorus, potassium rate; corn, sorghum

MS007 Potassium Soil-Test Calibration for Cotton. (M.S. Thesis)

H. H. Hsu (J. D. Lancaster, Advisor)

Potassium response; soil-test correlation; cotton

MS008 Cotton Fertilization and Soil-Test Calibration

W. F. Jones, J. D. Lancaster

Potassium, soil-test correlation; leaf analysis; cotton

MS009 Diagnosis and Correction of Zinc Problems in Corn and Rice Production

J. D. Lancaster

Zinc sulfate rate; corn

MS010 Determine the Effect of Boron Fertilization on Soybeans in Mississippi

J. D. Lancaster (MSU), J. R. Turner (U.S. Borax)

Solubor, boron response; soybean

MS011 Development and Calibration of Chemical Methods for Diagnosing Mineral Deficiencies in Mississippi

J. D. Lancaster, B. C. Murphy

Nitrogen, phosphorus, zinc, potassium response; soil-test correlation; sorghum, soybean

MS012 Soil Fertility and Fertilizer Requirements of Cool-Season Grass-Legume Mixtures

J. D. Lancaster, H. J. Savoy, Jr.

Phosphorus, potassium rate; clover, ryegrass

MS013 Erosion Control Studies—Tennessee-Tombigbee Waterway

C. A. Trammell, Jr., C. Y. Ward

Fertilizer response; erosion control; grass

MS014 Grouping the Soils of Mississippi for Economic Decision Making

J. E. Waldrop, H. B. Vanderford

Fertilizer market analysis system

Mississippi State University
South Mississippi Branch Experiment Station
Poplarville, Mississippi 39470

MS015 The Effect of Nitrogen and Sulfur Fertilization on Yield and Quality of Winter Grazing Crops in South Mississippi

C. H. Hovermale (MSU), S. L. Tisdale (TSI)

Nitrogen, sulfur response; forage crop

Mississippi State University
of Applied Arts and Sciences
Delta Branch Experiment Station
Stoneville, Mississippi 38776

MS016 Soil Management of Even-Aged Southern Hardwood Stands

B. G. Blackmon

Ammonium nitrate rate; time of application; nitrogen, phosphorus, potassium rate; sweetgum, oak, yellow poplar, cottonwood

MS017 Developing Improved Machinery for Delta Field Crops

F. E. Fulgham, E. B. Williamson, O. B. Wooten

Nitrogen rate; cotton

MS018 Cultural Practices Affecting Rice Production in Mississippi

H. R. Hurst, T. C. Miller, W. O. Thom

Fertilizer rate, source; time of application; rice

MS019 Nitrogen for Cotton and Corn Production in the Yazoo-Mississippi Delta

W. I. Spurgeon

Nitrogen rate; time of application; corn, cotton

MS020 Fertility Studies for Crop Production in the Yazoo-Mississippi Delta

W. I. Spurgeon, W. O. Thom

Fertilizer response; field crop

United States Department of Agriculture
Agricultural Research Service
P.O. Box 5248
Mississippi State, Mississippi 39762

MS021 Sediment Properties that Affect Agricultural Chemical Transport and Channel Stability

L. L. McDowell

Fate of applied nitrogen, phosphorus; nonpoint source pollution; cotton

MS022 Residue and Multi-Cropping Systems for Soil and Water Conservation

J. O. Sanford, D. L. Myhre

Nitrogen rate; wheat, sorghum, corn

MISSOURI

Farmland Industries, Inc.
P.O. Box 7305
Kansas City, Missouri 64116

MO001 Phosphate Sludge Utilization

J. L. Inglis

Phosphate sludge response

MO002 Topdressing Winter Wheat-Variety Responses

A. C. Zech

Nitrogen response; wheat

MO003 Pasture Fertilization

A. C. Zech

Fertilizer response; pasture

MO004 Agronomic Effects of Refinery Water Treatment Sludge

A. C. Zech

Fertilizer response; field crop

Lincoln University
Jefferson City, Missouri 65101

MO005 Foliar Fertilization on the Yield and Composition of Soybean Varieties

I. R. Chowdhury, K. B. Paul

Nitrogen, phosphorus, potassium, sulfur rate; foliar fertilization; soybean

Olin
Agricultural Division
1177 North Warson Road
Saint Louis, Missouri 63132

MO006 Cause of Early Season Chlorosis of Corn on Sandy Soils of Northeast Nebraska

G. E. Richards

Corn; fertilizer response

MO007 Available Sulfur in Heavily Cropped Soils of Missouri

G. E. Richards

Sulfur in Missouri soils

MO008 Handling Fertilizer in Bulk for Band Application

G. E. Richards

Ammonium phosphate fertilizer; method of application; corn, wheat

MO009 Phosphorus Status of Soils in Northern United States

G. E. Richards

Phosphorus; soil analysis; market research

United States Department of Agriculture
Agricultural Research Service
207 Business Loop 70 East
Columbia, Missouri 65201

MO010 Behavior and Movement of Agricultural Chemicals in Deep Loess Soils

R. E. Burwell, R. G. Spomer

Fate of applied nitrogen, phosphorus; watershed; movement; no-till

MO011 Movement of Chemicals from Cropland as Affected by Agronomic Practices for Claypan Soils

R. E. Burwell, H. G. Heinemann

Fate of applied nitrogen, phosphorus; no-till; corn

MO012 Movement and Yield of Nutrients from Agricultural Watersheds

H. G. Heinemann

Fate of applied nitrogen, phosphorus; corn

MISSOURI

University of Missouri
Columbia, Missouri 65201

MO013 Optimum Use of Macro- and Micronutrients in Cropping Systems in the Northern Region of the Cotton Belt

J. R. Brown, G. Colliver, J. A. Roth

Nitrogen, phosphorus, potassium, micronutrient response; cotton

MO014 Evaluation of Alternative Rural Freight Transportation Storage and Distribution Systems

D. E. Moser, R. Rudel

Fertilizer industry; distribution; transportation

MO015 Evaluation of Alternative Transportation Systems and Policies for Rural Missouri

D. E. Moser

Fertilizer transportation mode; freight; cost

MO016 Intermodal Transportation and Distribution Systems for Moving Grain and Fertilizer

D. E. Moser, R. Rudel, M. W. Woolverton

Fertilizer industry; transportation planning; cost

MO017 Effect of Nitrapyrin Nitrogen Stabilizer on Wheat Growth. (M.S. Thesis)

S. N. Al-Nieme (G. W. Colliver, Advisor)

Nitrogen, nitrapyrin response; wheat

MO018 Soil Fertility and Plant Nutrition

J. R. Brown

Nitrogen, phosphorus, potassium, sulfur, zinc, lime, time of application; soil-test correlation; corn, cotton, soybean, fescue

MO019 Magnesium Nutrition of Field Crops

J. R. Brown (UM), G. R. Hagstrom (Duval)

Magnesium response; field crop

MO020 Banded Fertilizer for Corn

G. W. Colliver (UM), G. E. Richards (Olin)

Fertilizer response; method and time of application; corn

MO021 Soil Fertility/Fertilization Management for Grain Crops

G. W. Colliver

Nitrogen, phosphorus, potassium rate; time and method of application; no-till; soil-test correlation; corn, wheat, sorghum

MO022 Effect of Foliar Fertilization on Corn and Soybeans (Including Boron)

G. W. Colliver (UM), J. R. Turner (U.S. Borax)

Nitrogen, phosphorus, potassium, sulfur, boron response; soybean, corn

MO023 Sulfur-Nitrogen Material Evaluation

G. W. Colliver (UM), J. C. Kramer (NFDC-TVA)

Sulfur-coated urea response; cotton, sorghum, soybean

MO024 Maximum Corn Yield

G. W. Colliver (UM), C. P. Ellington (PPI)

Nitrogen, phosphorus, potassium, lime response; corn

MO025 Potassium and Phosphorus Effects on Two Varieties of Soybeans on a Low Fertility Cyst Nematode Infested Soil

G. W. Colliver, J. G. Shannon (UM), C. P. Ellington (PPI)

Potassium, phosphorus rate, source; soybean

MO026 Nitrogen-Potassium Corn Research

G. W. Colliver (UM), C. P. Ellington (PPI)

Nitrogen, potassium rate; corn

MO027 Micro-Secondary Nutrients Project

G. W. Colliver (UM), C. P. Ellington (PPI)

Micro-, secondary nutrient response

MO028 Winter Wheat Response to Nitrogen, Phosphorus, and Potassium in a Subhumid Region. (M.S. Thesis)

F. A. Dawood (E. M. Kroth, Advisor)

Nitrogen, phosphorus, potassium response; corn

MO029 Response of Turfgrass Genotypes to Temperature and Other Environmental and Management Factors

J. H. Dunn

Nitrogen rate; bermudagrass, zoysia

MO030 Need for Sulfur in Missouri Agriculture

R. G. Hanson (UM), S. L. Tisdale (TSI)

Sulfur response; field crop

MO031 Forage Utilization for Cow-Calf Production

V. E. Jacobs, A. G. Matches, J. A. Stricker

Nitrogen rate; fescue, ladino clover, pasture

MO032 Macronutrient Management of Forage Crops

E. M. Kroth

Rock phosphate, anhydrous ammonia, lime, potassium response; forage crop

MO033 Supplying Nutrient Needs of Reed Canarygrass and Tall Fescue by Topdressing

E. M. Kroth, L. Meinke (UM), W. D. Graham (Farmland)

Nitrogen, phosphorus rate; reed canarygrass, tall fescue

MO034 Trace Element Analysis of Missouri Agricultural Materials

E. E. Pickett

Iron, manganese, boron, cobalt, molybdenum, copper, zinc, nitrogen, sulfur, magnesium in fertilizer material

MO035 Improving Biological Efficiency of Greenhouse Flower Crops

M. N. Rogers

Nitrogen, phosphorus, potassium, calcium nitrate, potassium nitrate, lime response; foliar application of trace element; rose

MO036 Fertilizers and Sediments as Water Pollutants

G. E. Smith

Fate of applied nitrogen, phosphorus; nonpoint pollution

MO037 Crop Production Technology

C. M. Woodruff

Anhydrous ammonia as a herbicide; no-till; corn, soybean, millet; winter cover crop

Washington University
Lindell Skinker Boulevard
Saint Louis, Missouri 63130

MO038 A Comparison of the Production, Economic Returns, and Energy-Intensiveness of Corn Belt Farms that Do and Do Not Use Inorganic Fertilizers and Pesticides

W. Lockerertz, R. Klepper, B. Commoner, M. Gertler, S. Fast

Ammonia response; cost/benefit analysis; corn

MONTANA

Montana State University
Bozeman, Montana 59717

MT001 Effects of Kind and Rate of Fertilizer and Application Time on Lysine in Winter Wheat. (Ph.D. Thesis)

M. Akmal (C. F. McGuire, Advisor)

Fertilizer response; wheat

MT002 Sainfoin: Nodulation and Nitrogen Fixation

R. L. Ditterline, K. D. Hapner, P. D. Skaar

Nitrogen fixation by *Rhizobium*; sainfoin

MT003 Drill Application of Ammonium Phosphate Fertilizers with the Seed of Irrigated Barley on Calcareous Soils. (Ph.D. Thesis)

J. D. Franklin (N. W. Christensen and C. Smith, Advisors)

Ammonium phosphate; drill application; barley

MT004 Agricultural Factor Markets and Buyer-Seller Procurement Strategies

R. C. Greer

Fertilizer retail firm; operating efficiency; farm management

MT005 Winter Wheat Quality Relative to Fertilization with Sulfate, Chloride, Phosphate, and Nitrogen

V. A. Haby (MSU), C. P. Ellington (PPI)

Nitrogen, phosphate, sulfate, chloride response; wheat

MT006 Effect of Nitrogen Source and Time of Application on Sugar Beets in South Central Montana

V. A. Haby (MSU), R. M. Mitteness (USS Agri-Chemicals)

Nitrogen source; time of application; sugar beet

MT007 Grazing Systems and Range Improvement Effects on Soil Water and Animal Production from Rangeland

H.A.R. Houlton, D. E. Ryerson

Nitrogen, phosphorus rate; rangeland, grass, alfalfa

MT008 Sulfur Fertilization

P. O. Kresge (MSU), H. A. Kittams (NFDC-TVA)

Ammonium nitrate sulfate, ammonium sulfate-phosphate, potassium sulfate, gypsum, sulfur-coated urea, sulfur rate; small grain

MT009 Genotype-Environment Interactions Related to End-Product Uses in Small Grains

C. F. McGuire

Nitrogen, phosphorus, potassium rate; method and time of application; grain protein quality; barley

MT010 Nitrogen in the Environment

J. R. Sims

Nitrogen rate; soil analysis; wheat

MT011 Correlation of Soil Properties and Climatic Factors with Plant Response to Applied Fertilizers

J. R. Sims

Ammonium nitrate, urea rate; wheat

MT012 Statewide Fertilizer and Related Soil Management Research Program

E. O. Skogley

Urea, nitrogen, phosphorus, potassium rate; wheat, barley, corn, sugar beet, potato

MONTANA

MT013 Statewide Fertilizer and Related Soil Management Research

E. O. Skogley

Phosphorus, potassium rate; alfalfa

MT014 Influence of Fertilizers on Forage Yield and Stand Longevity of Alfalfa and Sainfoin

E. O. Skogley (MSU), C. P. Ellington (PPI)

Fertilizer response; alfalfa, sainfoin

MT015 Effects of Fertilizer on Small Grain

E. O. Skogley (MSU), C. P. Ellington (PPI)

Fertilizer response; small grain

MT016 Economic Analyses of Agronomic Data

M. S. Stauber, Jr.

Farm management; fertilizer cost

MT017 Nitrogen-Phosphorus Fertilizer Evaluations on Small Grain

R. Wilson, P. O. Kresge, R. Goulak (MSU), H. A. Kittams (NFDC-TVA)

Urea-phosphate, nitrogen rate; small grain

MT018 Forest Fertilization

R. Wilson, E. O. Skogley (MSU), H. A. Kittams (NFDC-TVA)

Urea, sulfur-coated urea, concentrated superphosphate rate; forestry

Montana State University
Western Agricultural Research Center
Corvallis, Montana 59828

MT019 Relationships Between Soils, Plants, and Animal Nutrition in the Bitter Root Valley of Montana

D. R. Graham

Nitrogen, phosphorus, sulfur, potassium, boron, iron, zinc, copper, manganese, molybdenum, lime response; method and time of application; alfalfa, grass

Montana State University
Southern Agricultural Research Center
Huntley, Montana 59037

MT020 Soils

D. E. Baldridge

Liquid 10-34-0; nitrogen, phosphorus, potassium, sulfur, zinc rate; wheat, sugar beet

MT021 Winter Wheat Quality as Affected by Fertilization with Nitrogen, Phosphorus, Sulfur, and Chloride

V. A. Haby (MSU), S. L. Tisdale (TSI)

Nitrogen, phosphorus, sulfur, and chloride response; wheat

MT022 Soil Fertility, Plant Nutrition, and Fertilizer Use

V. A. Haby

Anhydrous ammonia, ammonium nitrate, phosphorus, potassium, zinc, urea rate; time of application; banded versus broadcast; corn, sugar beet

Montana State University
Northwestern Agricultural Research Center
Route 4
Kalispell, Montana 59901

MT023 Development of Sod-Seeding Methods for Establishment of Small Seeded Grasses and Legumes

L. E. Welty

Fertilizer response; method of application; minimum tillage; forage grass. legume

MT024 Miscellaneous Crops Investigations

L. E. Welty

Fertilizer market analysis; nitrogen and phosphorus; new crop

Montana State University
Livestock and Range Research Center
Route 1, Box 3
Miles City, Montana 59301

MT025 Increasing Beef Production from the Range Resource Through Nutrition and Management Systems

R. A. Bellows, R. E. Short, L. W. Varner

Nitrogen, phosphorus rate; wheatgrass, wild rye; beef production

MT026 Defining and Meeting the Nutrient Requirements of Range Livestock

R. J. Kartchner

Nitrogen rate; native range, forage, alfalfa

Montana State University
Central Agricultural Research Center
Moccasin, Montana 59462

MT027 Fertilizer for the Production of Small Grains and Forages

A. L. Dubbs

Ammonium nitrate, urea, phosphorus, potassium rate; no-till; barley, wheat

Montana State University
Eastern Agricultural Research Center
Sidney, Montana 59270

MT028 Improvement of Soil Fertility for Sugar Beet Production

A. D. Halvorson, G. P. Hartman

Nitrogen, phosphorus, manure rate; sugar beet

United States Department of Agriculture
Agricultural Research Service
Northern Plains Soil and Water Research Center
P.O. Box 1109
Sidney, Montana 59270

MT029 Dryland Cultivation Systems to Reduce Tillage, Control Erosion, and Increase Production

A. L. Black, F. H. Siddoway

Nitrogen, phosphorus rate; crop residue; barley, wheat

MT030 Soil Management Practices

A. L. Black, A. D. Halvorson, J. R. Wight

Nitrogen rate; phosphorus response; wheat

MT031 Accountability of Residual Applied Phosphorus

A. L. Black, F. H. Siddoway

Ammonium nitrate, urea, phosphorus rate; time of application; forage

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NEBRASKA

University of Nebraska
Lincoln, Nebraska 68503

NE001 Impact of Changing Transportation System on Local Grain and Farm Supply Firms

D. G. Anderson

Fertilizer industry; retail outlet location; market research; transportation; railroad car supply

NE002 Influence of Applied Nitrogen and Moisture on Total Nutrient Uptake and on Root Activity of Soybeans as Measured by ^{32}P. (Ph.D. Thesis)

B. A. Al-Ithawl (R. A. Olson, Advisor)

Nitrogen response; ^{32}P; soybean

NE003 Impact of Changes in World Food Supply-Demand Upon Selected Agricultural Markets

D. G. Anderson

Distribution; cost; railroad; fertilizer industry; structure

NE004 Effective Sprinkler Irrigation Application of Anhydrous Ammonia

B. R. Bock (UN), W. D. Graham (Farmland)

Ammonia; fate of applied nitrogen when acidulated

NE005 Fundamental Studies on Root Diseases of Plants

M. G. Boosalis, L. D. Dunkle, B. L. Doupnik

Anhydrous ammonia, N-Serve

NE006 Desiccation of Sorghum with Nitrogen Solutions and Herbicides to Facilitate Earlier Harvest

O. C. Burnside, D. R. Gigax (UN), W. D. Graham (Farmland)

Glyphosphate, Paraquat, and 28% UAN solution compared; sorghum

NE007 Utilization and Disposal of Waste Products and Pollutants in Soil

L. Chesnin

Nitrogen rate; feedlot manure; irrigation; corn

NE008 Soil Management Investigations Toward Improving the Productivity of Irrigated Soils

E. J. Deibert, R. A. Olson

Nitrogen, phosphorus, potassium, sulfur, lime rate; method of application; sorghum, soybean, wheat, corn

NE009 Soybean Utilization of ^{15}N Fertilizer Under Varied Levels of Soil Moisture, pH, and Residual Nitrogen. (Ph.D. Thesis)

E. J. Deibert (R. A. Olson, Advisor)

Fate of applied nitrogen; ^{15}N; soybean

NE010 Nitrogen Utilization by Corn with Residue-Management Systems

J. W. Doran, J. S. Schepers

Anhydrous ammonia, urea rate; no-till; method of application; corn

NE011 Chemistry and Microbiology of Runoff, Soil Profile, and Ground Water from Feedlots and Waste-Disposal

J. R. Ellis, T. M. McCalla, J. S. Schepers

Feedlot waste; method of application; nonpoint pollution; alfalfa, corn

NE012 Application of Information on Water-Soil-Plant Relations to Use and Conservation of Water

P. E. Fischbach, J. R. Gilley, B. R. Somerhalder

Nitrogen rate; irrigation; corn

NE013 Cultural, Ecological, and Physiological Studies with Various Agronomic Crops

A. D. Flowerday

Anhydrous ammonia, nitrapyrin; corn

NE014 Irrigated Row Crop Production Systems in South Central Nebraska

K. D. Frank, P. Miller, R. Mulliner

Anhydrous ammonia, nitrogen, phosphorus, lime response; irrigation; corn, sorghum, soybean

NEBRASKA

NE015 Economic Effects of Alternative Farm Enterprises in Wheat Producing Areas of Nebraska

G. A. Helmers, W. F. Lagrone

Farm management; fertilizer market analysis

NE016 Nitrogen Solutions and Fertilizer Nitrogen Use Efficiency in a Dryland Minimum Tillage (Eco-Fallow) System

G. Hergert (UN), N. van Buren (NFSA)

Nitrogen solution; minimum tillage

NE017 Adaptation, Improvement, and Management of Turfgrasses and Other Ground Covers for Nebraska

E. J. Kinbacher, R. C. Shearman

Sulfur-coated urea, Osmocote, ammonium nitrate, urea-formaldehyde, methylene urea, IBDU response; bluegrass

NE018 Assessment and Control of Pollution of Surface and Ground Water by Fertilizers

T. M. McCalla, G. L. Schuman

Fate of applied nitrogen, phosphorus; corn

NE019 Assessment and Control of Non-Point Pollution of Surface and Ground Waters by Agriculture

L. N. Mielke, T. M. McCalla, J. S. Schepers

Fate of nitrogen, phosphorus, potassium; irrigation system; nonpoint source pollution

NE020 Management and Production of Forage Crops and Range

W. J. Moline

Nitrogen rate; alfalfa, orchardgrass, milkvetch; plant analysis

NE021 Environmental Accumulation of Nutrients as Affected by Soil and Crop Management

R. A. Olson

Fate of applied nitrogen; ^{15}N; pollution; irrigation; corn

NE022 Nitrogen Balance in the Soil-Plant System Under Irrigation

R. A. Olsen (UN), R. D. Hauck (NFDC-TVA)

Fate of applied nitrogen; corn

NE023 Fertilizer Needs on Soils High in Phosphorus and Potassium

R. A. Olson (UN), O. P. Engelstad (NFDC-TVA)

Phosphorus, potassium rate; irrigation; corn, wheat

NE024 Managing Nitrogen Fertilizer for Increased Efficiency of Use and for Reducing Loss as Potential Pollutant

R. A. Olson (UN), W. D. Graham (Farmland)

Nitrogen utilization; time of application; corn

NE025 Improving Nitrogen Efficiency for Irrigated Corn

R. A. Olsen (UN), R. D. Hauck (NFDC-TVA)

Nitrogen response; corn

NE026 Subsoil Chemical Properties in Relation to Nutrient Requirements of Field Crops

G. A. Peterson

Fate of applied nitrogen; sugar beet

NE027 Potassium Fertilization for Irrigated Alfalfa on Sandy Soils of Nebraska

G. W. Rehm (UN), C. P. Ellington (PPI)

Potassium response; irrigation; alfalfa

NE028 Effect of Zinc Sources Combined with Orthophosphate or Polyphosphate in Suspension Fertilizer on Corn Production

G. W. Rehm (UN), N. van Buren (NFSA)

Zinc source; fluid phosphatic fertilizer response; corn

NE029 Influence of Salt Content of Fertilizer and Placement Distance from Seed on Emergence and Yield of Corn

G. W. Rehm (UN), N. van Buren (NFSA)

Fertilizer response; band placement; corn

NE030 Fertilizer Needs for Wheat in Nebraska

G. W. Rehm (UN), H. A. Kittams (NFDC-TVA)

Ammonium nitrate, urea, urea-ammonium nitrate, ammonia rate; phosphate rate; liquid 10-34-0, 19-46-0 response; wheat

NE031 Improving Grain Sorghum, Wheat, and Forage Crop Production Through Improved Soil Fertilizer Practice

D. H. Sander

Ammonium nitrate, urea, sulfur-coated urea rate; method and time of application; wheat

NE032 Cost of Production: Firm Enterprise Data System and Annual Survey

M. Turner

Farm management; market data

NE033 Systems Analysis of the Economics of Grain Marketing

M. Turner, P. W. Lytle

Fertilizer distribution system; storage; marketing management

NE034 Soil Fertility Investigations Related to Corn and Soybean and to Irrigated Production of These Crops

R. A. Wiese

Ammonium polyphosphate, zinc EDTA, zinc-ammonia complex, zinc nitrate, zinc sulfate, zinc oxide rate; band application; plant analysis; corn, soybean

NE035 Effect of Row and Broadcast Rates of Iron-Sulfur in Reducing Chlorosis in Soybeans

R. A. Weise (UN), G. R. Hagstrom (Duval)

Iron response; method of application; soybean

University of Nebraska
North Platte Branch Experiment Station
North Platte, Nebraska 69101

NE036 Agricultural Production Systems for the Nebraska Sandhills

R. G. White

Anhydrous ammonia, nitrogen, phosphorus, potassium fertilizer; irrigation; bromegrass, corn, native range

University of Nebraska
Panhandle Agricultural Experiment Station
Scottsbluff, Nebraska 69361

NE037 Effects of High Rates of Phosphate Fertilization on the Production of Corn

F. N. Anderson

Ammonium polyphosphate; zinc, iron response; corn

NE038 Fertilizers for Sugar Beet Production

F. N. Anderson

Fertilizer response, soil-test correlation; sugar beet

NE039 Fertilizer and Manure Application for Production of Continuous Corn

F. N. Anderson

Zinc rate; corn

NE040 Small Grain Investigation

L. A. Daigger, L. A. Nelson

Nitrogen rate; irrigation; placement; wheat

NE041 Soil Fertility Investigations in the Nebraska Panhandle

L. A. Daigger

Nitrogen rate; source; wheat

NEVADA

University of Nevada
Reno, Nevada 89507

NV001 Relationship Between Soil-Test Values and Crop Response

C. T. Ching, E. H. Jensen, W. W. Miller

Soil-test correlation; alfalfa; plant analysis

NV002 Phosphorus for Alfalfa

D. Gilbert (UN), W. J. Sharratt (NFDC-TVA)

Metal ammonium phosphate response; alfalfa

NV003 Grass Seed Production in Irrigated High Desert Valleys

E. H. Jensen, M. J. Sharp, R. A. Young

Nitrogen response; irrigation; bluegrass, bromegrass, orchardgrass, wheatgrass, fescue

NV004 Nitrogen Sources for Turf

R. Meyer (UN), W. J. Sharratt (NFDC-TVA)

Ureaform, IBDU, sulfur-coated urea, Wondergreen (33% N), ammonium sulfate, 16-20-0 response; turf

NV005 Nitrogen in the Environment

R. A. Young

Nitrogen rate, source; bluegrass, turf

NEW HAMPSHIRE

University of New Hampshire
Durham, New Hampshire 03824

NH001 Impact of the Changes in Marketing Channels on the New Hampshire Agricultural Sector

R. A. Andrews, G. E. Frick

Fertilizer distribution; market structure

NH002 Evaluation of Needs of Micronutrients in Orchards

E. L. Bergman (UNH), H. Plate (Agway)

Fertilizer response; vegetable

NH003 Effect of Starter Fertilizers on Early Development and Yield of Field and Vegetable Crops

G. O. Estes (UNH), H. Plate (Agway)

Band placement; field crop, vegetable crop

NH004 Potassium Effects on Physiological Characteristics Alfalfa and Merion Bluegrass

G. O. Estes, D. W. Koch (UNH), C. P. Ellington (PPI)

Potassium response; alfalfa, bluegrass

NH005 Ecology and Management of Northern Hardwoods

S. Filip

Fertilizer, lime response; birch, beech, maple

NEW JERSEY

Rutgers, The State University of New Jersey
New Brunswick, New Jersey 08903

NJ001 Biodegradation of Oil Slicks in the Marine Environment

R. Bartha

Paraffinized urea, octylphosphate; oil slick

NJ002 Rural Land Use Policy in an Urbanizing Environment

D. A. Derr, L. Small

Market analysis; public policy

NJ003 Tundra Soil-Nutrient-Stream Interaction

L. A. Douglas

Fate of applied nutrient; tundra

NJ004 Blueberry Propagation

P. Eck

Urea, blood, Osmocote-complete, nitrogen-phosphorus-potassium combination response; blueberry

NJ005 Soil and Nutrition Requirements of the Cranberry

P. Eck

Nitrogen, sulfur rate; cranberry

NJ006 Investigations of the Nutritional Requirements of the Highbush Blueberry

P. Eck

Potassium sulfate, nitrogen, magnesium rate; blueberry

NJ007 Turfgrass Nutrition

R. E. Engel

Slow-release fertilizer; nitrogen rate; turfgrass

NJ008 Chemicals Related to Turfgrass Production

R. E. Engel

Nitrogen, phosphorus, potassium fertilizer; lime; bluegrass, bentgrass

NJ009 Soil and Plant Analysis for Diagnosing Soil Deficiencies and Plant Needs

R. L. Flannery

Fertilizer, lime response; soil and leaf testing correlation; apple, grape, corn, soybean, tomato, cabbage, potato, inkberry, holly, azalea, romeda, oak, walnut, pine, poinsettia

NJ010 Fertilization of Container-Grown Plants of American Holly

R. L. Flannery, E. R. Orton, Jr.

Nitrogen, phosphorus, potassium fertilizers, Ureaform; Osmocote; time of application; container-grown holly

NJ011 Long Term Fertility Study with a Corn and Soybean Rotation

R. L. Flannery (RU), C. P. Ellington (PPI)

Fertilizer response; corn, soybean

NJ012 Influence of Cover Crops, Tillage Systems, and Fertilization on the Yield and Nutrient Uptake of Corn

R. L. Flannery (RU), C. P. Ellington (PPI)

Nitrogen, potassium response; no-till; vetch, rye, corn

NJ013 Fertilization of Barley and Soybeans in a Double Cropping System

R. L. Flannery (RU), C. P. Ellington (PPI)

Fertilizer response; barley, soybean

NJ014 Correlation of Boron Fertilizer Applications with Yield on an Orchard Grass-Ladino Clover Mixture, Boron Soil Test Levels and Boron Content of Forage Produced

R. L. Flannery (RU), J. R. Turner (U.S. Borax)

Boron rate; orchard grass-ladino clover

NJ015 Culture and Management of Winter and Spring Small Grains

S. Lund

Nitrogen response; time of application; oat, wheat, barley

NJ016 Comparison of Dilute Acid and Two Other Extractants for Determining Minerals in New Jersey Soils

D. K. Markus

Manganese, zinc, copper, iron rate; soil-test correlation; soybean

NJ017 Testing for Macronutrients in Artificial Soil Mixtures

D. K. Markus

Slow-release fertilizer; soil testing; peat, bark, compost; tomato

NJ018 Ecology of Selected Submersed Aquatic Weeds

D. Riemer

Nitrogen, phosphorus, potassium response; pond

NJ019 Silage Investigations

M. A. Sprague, J. Zublena

Nitrogen rate; silage; orchardgrass, alfalfa

NJ020 Nitrates in Soil, Water, and Plants

S. J. Toth

Fate of applied nitrogen; pollution

NEW MEXICO

New Mexico State University
Southeast Branch Agricultural Experiment Station
Artesia, New Mexico 88210

NM001 Minor Element Application on Hybrid Grain Sorghum Grown in Lea County, New Mexico

J. S. Arledge

Iron, zinc, magnesium, copper, boron rate; soil-test correlation; grain sorghum

NM002 Research Development for Crops in the Pecos Valley of New Mexico

J. S. Arledge, C. E. Barnes

Fertilizer response; cotton, wheat

New Mexico State University
San Juan Branch Station
Box 1018
Farmington, New Mexico 7401

NM003 Rangeland Fertilization

G. Donart (NMSU), Y. C. Smith (NFDC-TVA)

Sulfur-coated urea 10, sulfur-coated urea 30; range

NM004 Cultural Practices of Agronomic Crops in Northwestern New Mexico

E. J. Gregory

Fertilizer response; barley, wheat

NM005 Nitrogen, Phosphorus, and Potassium Fertilization and Various Soil Amendments of Grain and Forage Crops

E. J. Gregory, A. E. Stewart

Nitrogen, phosphorus, potassium, iron, zinc, boron rate; field crop

NM006 Vegetable Management Research in Northwestern New Mexico

J. M. Jordan

Nitrogen, phosphorus, potassium rate; gypsum; humate; onion, pepper, potato, irrigation

New Mexico State University
Las Cruces, New Mexico 88001

NM007 Influence of Microbial Antagonists on *Verticillium albo-atrum*

J. A. Booth

Ammonium nitrate, ammonium sulfate, zinc, iron rate; wilt; cotton

NM008 Response to Sulfur Dioxide by Economic Plants in New Mexico

J. A. Booth, G. O. Throneberry

Sulfur dioxide rate; pecan, cotton, alfalfa, chile pepper

NM009 Improving New Mexico Agribusiness Performance

M. L. Cook, T. S. Clevenger

Marketing system; organization; structure

NM010 Cattle and Plant Responses on Blue Grama Rangeland Fertilized with Nitrogen

G. B. Donart, S. L. Hatch

Nitrogen rates; blue grama

NM011 Management Practices of Blue Grama-Pinyon-Juniper Rangeland in New Mexico

G. B. Donart, A. B. Nelson

Nitrogen rate; blue grama rangeland

NM012 Fertilization, Growth, and Deer Use of Browse in Pinyon-Juniper Woodland

V. W. Howard, Jr.

Nitrogen rate; oak, juniper

NM013 Factors Affecting the Mineral Content and Nutrient Value of Alfalfa

D. W. Kellogg, B. D. McCaslin, B. A. Melton

Phosphorus rate; calcium/phosphorus ratio

NM014 Production and Fertilization of Alfalfa and Cotton in Southern New Mexico

B. D. McCaslin

Nitrogen, phosphorus, potassium rate; zinc and iron response; alfalfa, cotton

NM015 Rootstocks, Pruning, Growth Regulators, and Soil Management in Relation to Pecan Production

R. M. Nakayama, D. T. Sullivan, G. O. Throneberry

Nitrogen, phosphorus rate; slow-release nitrogen; pecan

NEW YORK

NEW YORK

NY001 Research in Environmental Studies

R. C. Loehr

Fertilizer, loss

NY002 Mineral Nutrition of Greenhouse Floriculture Crops

J. W. Boodley, J. G. Seeley

Nitrogen, manganese, potassium, boron, sewage sludge response; container-grown rose, chrysanthemum, poinsettia

NY003 Maintenance of Soil Fertility and Environmental Quality

D. R. Bouldin, D. J. Lathwell, W. S. Reid

Ammonium nitrate, urea, nitrogen solution rate; band and broadcast application; field crop

NY004 Agricultural Contributions to Nutrients in Water

D. R. Bouldin, D. J. Lathwell, P. J. Zwerman

Fate of applied nitrogen, phosphorus, manure; nonpoint source pollution

NY005 Soil Management Factors in Vegetable Production

C. Chu, P. A. Schippers, G. W. Selleck

Anhydrous ammonia, urea, lime, boron, zinc, nitrogen, potassium rate; time of application; potato

NY006 Use and Impact of Agricultural Chemicals—208 Area Wide Waste Treatment Plan Nassau—Suffolk (N.Y.)

D. H. Fricke, G. Levine, K. S. Porter

Fertilizer use; nonpoint source pollution

NY007 Fertilizer for Vegetables—Cavity Spot of Carrots

J. M. Gerber, W. C. Kelly

Calcium, boron response; carrot

NY008 Nutrition of Woody Ornamental Plants

G. L. Good

Nitrogen, phosphorus, potassium; liquid versus slow-release nitrogen; container-grown viburnum

NY009 Environmental Effects on the Concentration and Nutritional Value of Essential Minerals in Plants

D. L. Grunes

Magnesium sulfate rate; growth chamber; spinach, collard

NY010 Factors Affecting the Nutritional Quality of Plants

D. L. Grunes, J. Kubota, R. M. Welch

Ammonium sulfate, calcium nitrate; grass tetany; bromegrass

NY011 Foliar Nutrition of Horticultural Plants for Improved Production and Reduced Nutrient Runoff

E. S. Jackson, D. W. Reed, H. B. Tukey, Jr.

Foliar application of phosphorus and potassium

NY012 Nitrogen Response Fertilization of Small Grains

W. R. Knapp (CU), H. Plate (Agway)

Nitrogen response of small grains

NY013 Response of Small Grains to Environmental Conditions and Cultural Manipulations

W. R. Knapp, W. S. Reid

Nitrogen, phosphorus response; winter hardiness; wheat, barley

NY014 Response of Small Grains to Phosphorus Fertilization

W. R. Knapp (CU), C. P. Ellington (PPI)

Phosphorus response; small grain

NY015 Leaf and Soil Analysis in the Diagnosis of Fertilizer Problems in Fruit Plants

S. S. Kwong, G. H. Oberly

Nitrogen response; apple

NY016 Irrigation and Fertilizer Management for Economical Crop Production and Pollution Control

G. Levine, R. W. Schottman

Nitrogen rate, source; time of application; potato, turf; pollution

NY017 Mineral Nutrition and Physiological Responses of Tree Fruits

G. H. Oberly

Fertilizer response; pear

NY018 Response of Collards (*Brassica oleracea* var. Acephala) to Several Soil Nitrogen Levels Following Poultry Manure and Fertilizer Nitrogen Application. (Ph.D. Thesis)

T. O. Oloya (T. W. Scott, Advisor)

Nitrogen rate; manure response; collard

NY019 Nitrogen Utilization from Crop Residues

N. H. Peck (CU), H. Plate (Agway)

Nitrogen response; vegetable

NY020 Lime for Minimum Tillage Establishment of Forages

W. S. Reid (CU), H. Plate (Agway)

Lime; alfalfa

NY021 Thermophilic Aerobic Sewage Sludge Disposal: A Source of Plant Nutrients for Crop Growth

T. W. Scott

Nitrogen rate, sewage sludge, heavy metal; corn, soybean

NY022 Nitrogen Utilization from Crop Residues

T. W. Scott

Nitrogen rate; forage and grain legume, corn

NY023 Nitrogen Utilization from Crop Residues

T. W. Scott (CU), H. Plate (Agway)

Nitrogen response; corn

NY024 Effect of Lime on Production and Persistence of Red Clover

R. Seany, W. S. Reid (CU), H. Plate (Agway)

Lime response; red clover

NY025 Soil Management Factors in Potatoes

G. W. Selleck

Nitrogen, phosphorus, potassium fertilizer; methods of application; potato

NY026 Nitrogen Fertilization of Potatoes and Turf for Quality Ground Water

G. W. Selleck

Nitrogen rate, timing, fate; potato; turf

NY027 Effects of Soil Fertility on Forest Ecology and Growth

E. L. Stone

Nitrogen, potassium response; old pine plantation

New York State Experiment Station
Geneva, New York 14456

NY028 Effect of Processing and Storage on the Quality Foods Grown on Various Levels of Inorganic Nitrogen

C. Y. Lee, R. S. Shallenberger

Nitrogen rate; table beet

NY029 Nitrates in Soil, Water, and Plants

C. Y. Lee, N. H. Peck, R. W. Robinson

Ammonium nitrate, urea, superphosphate, diammonium phosphate, potassium chloride rate; band placement; sweet corn

NY030 Seedling Response to Segregation of Fertilizer Particles

N. Peck (CU), G. E. Richards (Olin)

Fertilizer response; field crop

NY031 Efficiency of Production of Vegetable Crops

N. H. Peck

Residual effects of concentrated superphosphate and muriate of potash; vegetable

State University of New York
Graduate School
Syracuse, New York 13210

NY032 Tree Nutrition—Sugar Maple

A. L. Leaf

Fertilizer response; forestry; container-grown crop, sugar maple

NY033 Tree Nutrition and Forest Fertilization

A. L. Leaf

Fertilizer response; forestry; irrigation

Syracuse University
Adirondack Ecological Center
Syracuse, New York 13210

NY034 Analysis of Management Alternatives for Adirondack Forests

R. H. Borcke, G. R. Mattfeld, W. C. Tierson

Fertilizer response; forestry:birch, maple, ash, beech

NORTH CAROLINA

North Carolina State University
Raleigh, North Carolina 27607

NC001 Fertilizer Application Systems and New Fertilizers

J. V. Baird

Nitric phosphate, ammonium polyphosphate; suspension, liquid, dry blend rate; corn, soybean

NC002 Nitrification Inhibitors

J. V. Baird (NCSU), G. E. Richards (Olin)

Terrazole; fate of applied nitrogen

NC003 Determine the Effects of Foliar Boron Fertilization on Soybeans in North Carolina

J. V. Baird (NCSU), J. R. Turner (U.S. Borax)

Boron response; soybean

NC004 Nitrogen Requirements for Containerized Nursery Plants in Bark Growth Mixes

T. E. Bilderback

Nitrogen rate, source; container-grown plant

NC005 Study Lethal Quality of Liquid Nitrogen Fertilizer on Animal Parasite Larvae on Pasture Grass

J. Burns, L. Goode, D. J. Moncol

Sulfur-coated urea; nitrogen response, liquid versus dry; fescue, bermudagrass; sheep parasite

NORTH CAROLINA

NC006 Yield Potentials of Intercropped Food Production Systems as Related to Nitrogen Fertilization

G. R. Burns, R. E. McCollum

Nitrogen rate; monocrop versus intercrop culture; corn, soybean; sweet potato

NC007 Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality

B. L. Carlile

Dairy cattle, swine waste; fate of applied nitrogen, phosphorus; fescue pasture

NC008 Soybean Production as Influenced by Soil Management

D. K. Cassel, E. J. Kamprath

Sulfur, potassium, and lime response; corn, soybean

NC009 Diagnosis and Correction of Zinc Problems in Corn and Rice Production

F. R. Cox

Zinc sulfate rate; soil-, plant-test correlation; corn, rice

NC010 Effect of Potassium on Yield and Quality of Strawberries

G. A. Cummings (NCSU), C. P. Ellington (PPI)

Potassium response; strawberry

NC011 Mobility of Phosphorus in High Organic Matter Sandy Soils and Utilization of Phosphorus by Blueberries

G. A. Cummings (NCSU), C. P. Ellington (PPI)

Phosphorus response; blueberry

NC012 Nutrition and Soil Management Studies on Muscadine Grapes and Rabbiteye Blueberry

G. A. Cummings

Nitrogen, phosphorus, potassium, boron rate; grape, blueberry

NC013 Efficient Production of Quality Tree Seedlings

C. B. Davey

Fertilizer response; mycorrhiza; forestry:fir, pine

NC014 Fescue-Bermuda Pasture Management for Beef Cattle

L. Goode

Nitrogen rate; fescue, bermudagrass

NC015 Effects of Fertilization on Susceptibility of Loblolly Pine to the Southern Pine Beetle

L. W. Haines

Nitrogen response; forestry:pine

NC016 Greenhouse Vegetable Production

S. F. Jenkins, G. G. Kennedy, C. H. Miller

Fertilizer response; vegetable crop; greenhouse

NC017 Fertilization of Corn

G. L. Jones (NCSU), C. P. Ellington (PPI)

Fertilizer response; corn

NC018 Increasing Nitrogen Use Efficiency of Corn by Plant Selection and Management

E. J. Kamprath

Urea, anhydrous ammonia rate; nitrapyrin; corn

NC019 Evaluation of Fertilization and Nematode Control in Corn Production

E. G. Krenzer, Jr. (NCSU), C. P. Ellington (PPI)

Fertilizer response; corn

NC020 Soil Fertility and Management of High Organic Soils in Eastern North Carolina

J. P. Lilly

Nitrogen, phosphorus, potassium, lime rate; high organic soil; corn, soybean, sorghum, wheat

NC021 Cultural Principles Related to Production Vegetables

C. H. Miller

Fertilizer response; vegetable crop

NC022 Principles and Practices for Flue-Cured Tobacco Fertilization in the Sandhills of North Carolina

G. S. Miner

Nitrogen, potassium, manganese rate; placement; tobacco

NC023 Plant Bed and Field Management of Tobacco for Mechanized Production

G. S. Miner

Urea, nitrogen, phosphorus, potassium fertilizer; solid versus liquid; time of application; tobacco

NC024 Maximizing Alfalfa Yield in North Carolina

J. P. Mueller, E. L. Kimbrough (NCSU), C. P. Ellington (PPI)

Fertilizer response; alfalfa

NC025 Foliar Analysis Standards and Improved Nutritional Evaluation Procedures for Florists' Crops

P. V. Nelson

Magnesium-ammonium phosphate, ammonium fertilizer response; foliar spray; azalea, poinsettia

NC026 Relationships Among Soil-Test Values, Plant Tissue Nutrient Content, and Crop Response to Fertilizers

J. J. Nicholaides

Phosphorus, potassium rate; soil-test correlation; sweet potato

NC027 Burley Tobacco Production, Breeding, Disease, and Quality Investigations

G. F. Peedin

Lime response; tobacco

NC028 Nitrogen and Phosphorus Studies on Commercial Vegetables in Western North Carolina

J. E. Shelton

Nitrogen, phosphorus, soil-test correlation; vegetable crop

NC029 Fertilizer Requirement for Field and Container Grown Ornamental Plants and Christmas Trees

J. E. Shelton

Nitrogen, phosphorus, potassium, sulfur, lime rate, source; ornamental, Christmas tree

NC030 Cotton Quality Improvement Committee

Unknown

Fertilizer response; cotton

NC031 Fertility Requirements of Adapted Forage Plants

W. [illegible] Woodhouse, Jr.

Sulfur, phosphorus, nitrogen, lime rate; forage

NORTH DAKOTA

North Dakota State University
of Agriculture and Applied Science
State University Station
Fargo, North Dakota 58102

ND001 Water and Fertilizer Nitrogen Effects on Soybean Development and Growth. (M.S. Thesis)

W. L. Albus (A. Bauer, Advisor)

Nitrogen response; soybean

ND002 Fertilizer Nitrogen Rate—Spring Wheat Variety Interaction in Relation to Soil Environment

O. J. Banasik, A. Bauer

Nitrogen rate; wheat

ND003 Zinc Deficiency in Zinc-Sensitive Crops

A. Bauer

Zinc, phosphorus rate; corn

ND004 Effect of Irrigation and Fertilizer Nitrogen on Soybeans on Well-Drained Loamy Soils

A. Bauer, D. A. Whited

Nitrogen rate; irrigation; soybean

ND005 Fertilizer and Water Management of Irrigated Crops

J. W. Bauder, E. J. Diebert, J. C. Zubriski

Fertilizer rate, time of application; irrigation; corn, alfalfa, sunflower, wheat, sugar beet, potato

ND006 Nutrient Enrichment of Waters by Soils and Sediments

J. W. Bauder, J. T. Moraghan

Nitrogen, phosphorus, potassium response; ^{15}N; pollution; alfalfa

ND007 Effects of Fertilizers and Plant Populations Upon Yield and Quality of Sunflowers

J. W. Bauder, J. C. Zubriski

Ammonium nitrate, ammonium sulfate, urea rate; sunflower oil

ND008 Intensive Soil and Water Management for Versatile Cropping

L. J. Brum, R. P. Schneider, F. J. Sobolik

Fertilizer response; small grain, alfalfa

ND009 Sugar Beet Storage Losses Due to Agronomic Practices and Decay

W. M. Bugbee, D. F. Cole

Nitrogen, phosphorus response; sugar beet

ND010 Application of Phosphorus for Small Grains in North Dakota Soils

W. C. Dahnke, L. J. Swenson

Phosphorus rate; soil-test correlation; millet

ND011 Fertilizer Soil Testing

W. C. Dahnke, L. J. Swenson

Phosphorus; fate of applied nitrogen; soil-test correlation; sugar beet

ND012 Soil-Test Values and Alfalfa Response to Fertilizer

W. C. Dahnke, L. J. Swenson

Phosphorus rate, soil plant response; alfalfa

ND013 Soil-Test Values and Potato Response to Fertilizer

W. C. Dahnke, D. C. Nelson, L. J. Swenson

Nitrogen, phosphorus, potassium; method and time of application; potato

ND014 Plant Analysis for Appraising Nutrient Status

W. C. Dahnke, J. T. Moraghan, J. C. Zubriski

Ammonium nitrate, urea, ammonium sulfate, nitrogen, phosphorus, potassium rate; time of application; wheat, corn, sugar beet, barley, potato, alfalfa, sunflower

NORTH DAKOTA

ND015 Market Structure Analysis of Farm Input Retailing Industries

G. W. Erlandson, D. E. Anderson, D. W. Cobia

Fertilizer industry; structure; sales volume

ND016 Response of Sugar Beets to Phosphorus Fertilization. (Ph.D. Thesis)

J. D. Etchevers (John Moraghan, Advisor)

Phosphorus response; sugar beet

ND017 Effect of Plant Density and Fertility Treatment on Uptake of Nitrogen, Phosphorus, and Potassium by Sunflower. (M.S. Thesis)

A. A. Faulkner (Joseph Zubriski, Advisor)

Nitrogen, phosphorus, potassium response; sunflower

ND018 Micronutrients and Plant Growth

T. P. Freeman, J. T. Moraghan, D. A. Whitehead

Iron, zinc response; flax, soybean

ND019 Effect of Nitrogen Fertilizer on Corn Yield and Nitrogen Uptake by Plants Under Three Water Levels. (M.S. Thesis)

M. Gebresalassie (Joseph Zubriski, Advisor)

Nitrogen response; corn

ND020 Rangeland Improvement in North Dakota

H. Goetz, W. C. Whitman

Nitrogen, phosphorus, potassium rate; native grass, interseeded alfalfa, bromegrass, wheatgrass, blue grama

ND021 Forage Production and Management in North Dakota

D. W. Meyer

Nitrogen response; bromegrass, alfalfa

ND022 Wheat Protein Fractions and Baking Quality

C. E. McDonald

Nitrogen response; wheat and flour

ND023 Effect of Nitrogen and Phosphorus Fertilizer on Performance of Corn

J. T. Moraghan, J. C. Zubriski

Nitrogen, phosphorus rate; source; method of application; irrigation; corn

ND024 Effects of Management on Sugar Beet Production

J. T. Moraghan, P. J. Tiedeman

Nitrogen, phosphorus rate; zinc, iron response; N-Serve; sugar beet, flax

ND025 Pasture Management for Spring Grazing in Western North Dakota

P. E. Nyren

Nitrogen, phosphorus rate; wheatgrass, native grass

ND026 Nitrogen Source Comparisons on Small Grains

R. P. Schneider (NDSU), H. L. Meredith (NFDC-TVA)

Anhydrous ammonia, ammonium nitrate, urea rates; N-Serve; time of application; small grain

North Dakota State University
of Agriculture and Applied Science
State University Station
Langdon, North Dakota 58249

ND027 Soil Fertility and Management

R. E. Nowatski

Ammonium nitrate, urea rate; barley, mustard, wheat

North Dakota State University
of Agriculture and Applied Science
State University Station
Williston, North Dakota 58801

ND028 Soil and Fertility Management

B. Hoag, P. Stahlman

Anhydrous ammonia, urea, ammonium nitrate; time of application; wheat

United States Department of Agriculture
P.O. Box 459
Mandan, North Dakota 58554

ND029 Nitrogen Fertilization Increases Survival of Main Stem Tillers of Wheat

J. Alessi, J. F. Power

Sulfur-coated urea, ammonium nitrate response; time of application; corn, native range, wheat

ND030 Nitrogen Fertilizer Sources for Northern Great Plains Crops, Ranges, and Grasslands

J. Alessi, J. F. Power

Ammonium nitrate, sulfur-coated urea, urea formaldehyde response; silverberry, snowberry, choke cherry; native species

ND031 Residual Effects of Fertilizer Application to Northern Great Plains Soils

J. Alessi, J. F. Power, G. A. Reichman

Ammonium nitrate, phosphorus rate; alfalfa, wheat

ND032 Fate of Fertilizer Nitrogen Applied to Range and Grassland Soils in the Northern Great Plains

J. Alessi, J. F. Power

Ammonium nitrate rate; wheat

ND033 Investigations of Plant Nutrient Deficiencies and Toxicities in Northern Great Plains Soils

J. Alessi, J. F. Power

Sulfur-coated urea, urea formaldehyde, ammonium nitrate, nitrogen solutions; phosphorus, potassium response; fertigation; bromegrass, alfalfa

ND034 Evaluation of Fertilizer Management Practices for Dryland and Irrigated Soils of the Northern Great Plains

J. F. Power, G. A. Reichman

Ammonium nitrate, nitrogen, phosphorus rate; placement; wheatgrass

OHIO

Ohio State University
Eastern Ohio Research Development Center
Caldwell, Ohio 43724

OH001 Reclamation of Stripmined Land in Ohio

P. Sutton

Nitrogen, phosphorus, potassium rate; sewage sludge; fly ash; cement dust; mine-spoil soil; corn

Ohio State University
Columbus, Ohio 43210

OH002 Culture of Burley Tobacco

T. G. Arscott, D. J. Hoff, J. D. Wells

Phosphorus, potassium rate; tobacco

OH003 Influence of Nitrogen, Phosphorus, and Potassium on the Yield and Nutrient Composition of Corn and Soybean Grain. (Ph.D. Thesis)

M. M. Baig (D. J. Hoff, Advisor)

Nitrogen, phosphorus, potassium response; corn, soybean

OH004 The Effect of Nitrogen, Phosphorus, and Potassium on the Quality and Chemical Composition of Merion Kentucky Bluegrass and Penncross Creeping Bentgrass. (Ph.D. Thesis)

N. E. Christians (D. P. Martin, Advisor)

Nitrogen, phosphorus, potassium response; bluegrass, bentgrass

OH005 Economic Analysis of the Control of Water Pollution in Agricultural Production

D. L. Foster

Manure; sewage; nonpoint pollution

OH006 Container Production of Nursery Stock

T. A. Fretz, E. M. Smith, T. D. Sydnor

Nitrogen source and rate; fluid application; container-grown ornamental

OH007 Nitrification Inhibitors

D. Johnson (OSU), G. E. Richards (Olin)

Urea, Terrazole; fate of applied nitrogen

OH008 Nitrogen Efficiency in Soils as Affected by Denitrification

J. W. Johnson

Nitrogen solution (28%), anhydrous ammonia, calcium nitrate, urea; N-Serve; corn

OH009 Effect of Potassium on Corn Yields and Stalk Quality for Silt Loam Soils in Ohio

J. W. Johnson (OSU), C. P. Ellington (PPI)

Potassium response; corn

OH010 Cultural Practices for Maximum Corn Production

J. W. Johnson, L. N. Shephard (OSU), A. Hock (Landmark)

Nitrogen, phosphorus, potassium rate; soil-test correlation; corn

OH011 Transportation Model of the Grain and Fertilizer Sector of Northwest Ohio

D. W. Larson

Transportation mode; public policy; marketing planning

OH012 Properties of Plant Roots Affecting Nutrient Absorption

E. O. McLean

Phosphorus, calcium, nitrogen response; alfalfa, soybean

OH013 Turf Culture in Ohio

R. W. Miller, M. H. Niehaus

Nitrogen response; bluegrass, ryegrass

OH014 Enhancing Biological Dinitrogen Fixation in Soybeans and Other Legumes

R. H. Miller

Nitrogen fixation by *Rhizobium*; soybean

OH015 Phosphorus Fertilization of Early Planted Soybeans

Gordon Ryder (OSU), G. E. Richards (Olin)

Phosphorus response; soybean

OH016 Optimum Nutritional Levels for Woody Ornamental Plants

E. M. Smith

Iron and manganese implants on oak, pine, magnolia, and sweet gum; nitrogen rate on ornamentals; foliar analysis

Ohio Agricultural Research
and Development Center
Wooster, Ohio 44691

OHIO

OH017 Effect of Potassium Supply on Efficiency of Nitrogen Fixation and on Assimilate Distribution During Regrowth of Alfalfa

A. L. Barta (OSU), C. P. Ellington (PPI)

Potassium response; alfalfa

OH018 Improvement of Cultural Techniques and Production Efficiencies for the Greenhouse Tomato

W. L. Bauerle

Fertilizer response; tomatoes

OH019 Mineral Nutrition of Selected Deciduous Fruit Crops

G. A. Cahoon

Ammonium nitrate, Borate 65, Granumag (87% MgO), magnesium sulfate rate; peach and grape

OH020 Cadmium in Soils and Plants

F. Haghiri

Calcium, potassium rate; soybean

OH021 Crop Uptake of Nitrogen and Losses by Leaching, Runoff, and Denitrification

F. Haghiri (OSU), R. D. Hauck (NFDC-TVA)

Ammonium sulfate; fate of applied nitrogen; ^{15}N; corn, alfalfa, grass

OH022 Removal of Nitrogen Fertilizers by Runoff, Leaching Water, Plant Uptake, and Denitrification

F. Haghiri

Fate of applied nitrogen; no-till; pollution; corn

OH023 Development and Evaluation of Systems for Intensive Production of Stone Fruits

F. O. Hartman; R. G. Hill, Jr.

Fertilizer response; cherry, peach, plum

OH024 Soil Fertility and Management

B. Hoag, P. Stahlman

Anhydrous ammonia, urea, ammonium nitrate

OH025 Relating Crop Yield to Crop and Soil Nutrient Element Status

J. W. Johnson, E. O. McLean

Nitrogen, phosphorus, potassium rate; soil-test correlation; corn, soybean, wheat

OH026 Improved Soil-Test Interpretations as Bases for More Efficient Lime and Fertilizer Usage

J. W. Johnson, E. O. McLean, J. F. Trierweiler

Phosphorus, potassium rate, soil-test correlation; field crop

OH027 Fertilizer Use on Sugar Beets

M. E. Krotetz, W. H. Schmidt

Urea, ammonium nitrate, ammonium sulfate, monoammonium phosphate, diammonium phosphate, concentrated superphosphate rate; blends with sources of manganese; sugar beet

OH028 Evaluation of Alternative Rural Freight Transportation Storage and Distribution Systems

D. W. Larson

Transportation requirement; storage; distribution system; forecasting; public policy

OH029 Environmental Accumulation of Nutrients as Affected by Soil and Crop Management

T. J. Logan

Phosphorus response; no-till; pollution; soybean

OH030 Increasing Efficiencies of Floral Crop Production

H. A. Poole

Fertilizer response; fly ash, bark amendment; asparagus, ornamental; greenhouse management

OH031 No-Till Grain Crop Production on Land Reclaimed Following Stripmining

B. B. Triplett, Jr., P. Sutton

Mine spoil soil, no-till; corn

OH032 Forest Soils and Mineral Nutrition of Ohio Trees

J. P. Vimmerstedt

Ammonium nitrate, superphosphate, lime, potassium rate; yellow poplar

OH033 Physiology of the Formation of Wood in Oak and Pine

F. W. Whitmore

Phosphorus, calcium response; locust, oak

United States Department of Agriculture
Agricultural Research Service
Coshocton, Ohio 43812

OH034 Relation of Agricultural Practice to Water Quality in North Appalachian Region

W. M. Edwards, L. B. Owens, W. R. Harmon

Fate of applied nitrogen; ^{15}N; corn

OKLAHOMA

Langston University
Langston, Oklahoma 73050

OK001 Accumulation of Nitrate in Soil and Water, Phase II

A. Allen

Calcium nitrate; fate of applied nitrogen

Oklahoma State University
of Agriculture and Applied Science
Stillwater, Oklahoma 74074

OK002 Economic Analysis of Agricultural Pesticides and Fertilizers on Environmental Quality

D. D. Badger

Fertilizer market analysis; legislation; tax; cost

OK003 Application of Cold Liquid Ammonia to Wheat Straw and Its Effect for Cattle Feed

D. G. Batchelder (OSU), R. W. Mitteness (USS Agri-Chemicals)

Anhydrous ammonia; wheat straw; cattle feed

OK004 Effect of Nitrogen Sources, Rates, and Application Methods on Bermudagrass Production. (Ph.D. Thesis)

L. G. Bohl (B. B. Tucker, Advisor)

Nitrogen rate; source; time of application; bermudagrass

OK005 Plant Response to Sulfur Application on a Sulfur Deficient Soil. (Ph.D. Thesis)

T. E. Bremer (B. B. Tucker, Advisor)

Sulfur response; field crop

OK006 Greenhouse Vegetable Production

B. B. Burk, R. E. Campbell, B. D. McCraw

Liquid nutrient

OK007 Double Cropping Small Grain (Wheat), Followed by Soybeans, Grain Sorghum, and/or Mungbeans

R. J. Crabtree, D. D. Kletke

Fertilizer response; tillage method; aerial seeding; wheat, soybean

OK008 Multiple Cropping Systems for Wheat Grain and Forage

L. I. Croy, W. E. McMurphy

Nitrogen rate; phosphorus, potassium response; wheat, bermudagrass

OK009 Studies on Soil, Plant, and Animal Interrelationships in Cattle Grazing Wheat Pasture

L. I. Croy, F. P. Horn, R. R. Johnson

Nitrogen, potassium rate; wheat; animal physiology

OK010 Importance of Agricultural Commodity Exports to the Economy of Oklahoma

H. E. Drummond

Fertilizer market analysis; public policy

OK011 Improving Native Bluestem Ranges with Low-Cost Grazing, Burning, and Fertilization

V. R. Eidman, J. Powell, R. Totusek

Fertilizer response; bluestem

OK012 Bermudagrass Studies

J. Enis (OSU), J. A. Kovar (NFDC-TVA)

Sulfur-coated urea; nitrification inhibitor; bermudagrass

OK013 Evaluating and Improving Range Forage Quality

F. Gray, J. Powell, J. F. Stritzke

Fertilizer response; range forage

OK014 Nitrification Inhibitors

D. W. Huffine (OSU), G. E. Richards (Olin)

Urea, Terrazole response; grass

OK015 Planning Rural Transportation Systems

M. A. Johnson

Retail transportation and distribution policy; cost; railroad

OK016 Fertilizer Placement Studies on Wheat

M. B. Kirkham (OSU), J. A. Kovar (NFDC-TVA)

Urea-ammonium phosphate response; method of application; wheat

OK017 Nitrogen Treatments, Row Spacing, and Plant Population Effects on Cotton Yields, Plant, and Fiber Characteristics. (Ph.D. Thesis)

S. E. Koli (L. G. Morrill, Advisor)

Nitrogen response; cotton

OK018 Cost of Production: Firm Enterprise Data System and Annual Survey

R. D. Krenz, J. M. Casey

Farm management; fertilizer cost; farm commodity sector analysis

OK019 Iron Chlorosis Investigations in Small Grains and Grain Sorghum in Western Oklahoma

L. G. Morrill, B. B. Tucker

Response to iron; small grain, grain sorghum

OK020 Soil Fertility and Management for Cotton, Peanut, and Soybean Production

L. G. Morrill, B. B. Tucker

Nitrogen, phosphorus, potassium, iron, zinc, copper, manganese, lime rate; peanut, soybean, cotton

OK021 Interaction of Soil Chemical and Physical Factors with Fertilizers That Determine Crop Response

L. G. Morrill

Nitrogen, phosphorus response; wheat

OKLAHOMA

OK022 Phosphate Retention and Removal from Soils and Interactions

L. G. Morrill

Phosphorus fixation in relation to soil properties; soil testing

OK023 Greenhouse Flower Crop Production

R. N. Payne

Nitrogen, phosphorus, potassium rate; container-grown plant; chrysanthemum, umbrella plant

OK024 Research for Diagnosing Nutrient Deficiencies and Predicting Fertilizer Needs

B. B. Tucker

Nitrogen, phosphorus, potassium response; soil-test correlation; wheat, sorghum, cotton

OK025 Forage Fertilization Research

B. B. Tucker, R. L. Westerman

Boron, phosphorus, potassium response; soil-test correlation; bermudagrass, fescue

OK026 Use of Fertilizers on Grain Crops (Small Grain, Sorghum, Corn)

B. B. Tucker

Urea, anhydrous ammonia, phosphorus, potassium, sulfur, manganese, magnesium, zinc, iron rate; N-Serve, Terrazole; corn, sorghum

OK027 Use of Fertilizers on Special Crops

B. B. Tucker

Nitrogen, phosphorus, potassium rate; placement and timing of application; cowpea, mungbean

OK028 Efficient Fertilizer Use for Forage Production (Grasses, Legumes, and Grass-Legumes)

B. B. Tucker, R. L. Westerman

Fertilizer rate; forage grass, legume

OK029 Correcting Iron Deficiencies in Grain Sorghum and Wheat

B. B. Tucker (OSU), W. D. Graham (Farmland)

Fluid polyphosphate, iron; grain sorghum, wheat

OK030 Determining Nitrogen, Phosphorus, Potassium Needs for Several Crops in Oklahoma

R. L. Westerman (OSU), C. P. Ellington (PPI)

Nitrogen, phosphorus, potassium response; field crop

OK031 Effect of Soil Application of Iron-Sulfur on the Growth of Grain Sorghum

R. L. Westerman (OSU), G. R. Hagstrom (Duval)

Iron response; grain sorghum

OK032 Root Initiation in Ornamental Plants

C. E. Whitcomb

Slow-release fertilizer rate, Osmocote; nitrogen-phosphorus-potassium combination, IBDU; container-grown pine, ornamental

OK033 Factors Affecting the Propagation, Production, Establishment, and Maintenance of Urban Trees

C. E. Whitcomb

Sulfur, iron, manganese, fertilizer response; urban forestry

United States Department of Agriculture
Agricultural Research Service
P.O. Box 400
Chickasha, Oklahoma 73018

OK034 Rainfall-Runoff Relationship from Unit Source Watersheds

P. B. Allen, A. D. Nicks, R. R. Schoof

Nitrogen, phosphorus, potassium response; range

OK035 Transport and Loss of Water-Borne Pollutants from Agricultural Watersheds

M. H. Frere, J. W. Naney, A. D. Nicks

Fate of applied nitrogen and phosphorus; nonpoint pollution; cotton, wheat, range

United States Department of Agriculture
Agricultural Research Service
Route 2, Box 322A
Durant, Oklahoma 74701

OK036 Movement of Plant Nutrients into Ground and Surface Waters

R. G. Menzel

Fate of applied nitrogen; native grass

OREGON

Oregon State University
North Willamette Experiment Station
Aurora, Oregon 97002

OR001 Small Fruit Culture in the North Willamette Area

L. W. Martin

Fertilizer response; trickle versus sprinkler irrigation; blackberry, raspberry, boysenberry

OR002 Cultural and Physiological Studies with Ornamental Plants

R. L. Ticknor

Ureaform, Osmocote rate; azalea, rhododendron

Oregon State University
Squaw Butte Experiment Station
Burns, Oregon 97720

OR003 Improvement of Southeastern Oregon Ranges Through Reseeding and Management

C. Britton, R. L. Phillips, F. A. Sneva

Nitrogen, sulfur rate; range forage

Oregon State University
Corvallis, Oregon 97331

OR004 Varietal Differences in Response of Winter Wheat Varieties to Nitrogen Fertilizer and Environment. (M.S. Thesis)

T. R. Ambler (T. L. Jackson, Advisor)

Nitrogen response; wheat

OR005 Range Management and Improvement

T. E. Bedell

Phosphorus, potassium, sulfur rate; minimum tillage; range grass

OR006 Analysis and Evaluation of Silvicultural and Forest Protection Activities Using Optimization

J. D. Brodie

Forest fertilization; thinning; economic impact

OR007 Economics of Agricultural Production Relationships

W. G. Brown

Fertilizer industry; farm management; market analysis

OR008 S-Urea Transformation, Movement, and Effect on Plant Growth Under Different Soil Conditions

L. Boersma, M. D. Dawson, V. V. Volk

Sulfur-coated urea rate; fate of applied nitrogen; fescue

OR009 Dryland Cereal Production Research

F. E. Bolton

Nitrogen response; small grain

OR010 Potato Fertility—Fertilizer Applications, Soil, and Plant Chemical Analyses and Yield

G. Carter, T. L. Jackson, M. Johnson

Zinc, manganese, lime response; potato; plant analysis

OR011 Nutrition of Horticultural Crops

M. H. Chaplin

Nitrogen, potassium response; foliar applied boron; prune, filbert

OR012 Physiology, Pathology, and Culture of Ornamental Plants in the Pacific Northwest

D. L. Coyier, R. G. Linderman, J. R. Potter

Fertilizer response; fungi growth; lily

OR013 SCU and Soluble Nitrogen for Winter Grasses

M. D. Dawson (OSU), D. A. Mays (NFDC-TVA)

Sulfur-coated urea; urea rate; grass

OR014 Development, Improvement, and Calibration of Soil Tests

E. H. Gardner

Nitrogen, sulfur, lime; soil-test correlation, wheat

OR015 Investigation of Factors Which Affect Sulfur Uptake by Forages

E. H. Gardner

Sulfur, molybdenum response; popcorn, clover

OR016 Effect of Nitrogen Fertilization on Peppermint Oil Quality and Content. (Ph.D. Thesis)

S. M. Hee (T. L. Jackson, Advisor)

Nitrogen response; peppermint

OR017 Effect of Phosphorus and Sulfur Fertilization on the Yield and Quality of Subclover Forage

T. J. Jackson

Phosphorus, sulfur response; clover

OR018 Effects of Potassium Chloride and Nitrogen Sources on Severity of "Take All" Root Rot of Wheat

T. L. Jackson, R. L. Powelson (OSU), C. P. Ellington (PPI)

Nitrogen, potassium, chloride response; source; wheat

OR019 Micronutrients for Small Grains on Muck Soils

T. L. Jackson (OSU), P. M. Giordano (NFDC-TVA)

Micronutrient response; small grain

OR020 Relationship Between Fertilizers, Lime Response, Soil Analyses, and Chemical Composition of Crops

T. L. Jackson

Nitrogen, potassium, phosphorus, sulfur, lime, molybdenum, boron rate; wheat, barley, subterranean clover

OR021 Effects of Fertilizer and Lime Treatments on Yield and Chemical Composition of Vegetable Crops

T. L. Jackson, D. P. Moore

Nitrogen, phosphorus, potassium, boron, lime rate; table beet, onion

OREGON

OR022 Effects of Phosphorus and Lime on Yield, Phosphorus Concentration, and Severity of "Take All" Root Rot

T. L. Jackson, E. P. Winters (OSU), C. P. Ellington (PPI)

Phosphorus, lime response; wheat

OR023 Nitrogen Release from Granules of Sulfur-Coated Urea. (Ph.D. Thesis)

W. N. Jarrell

Sulfur-coated urea

OR024 Effect of Nitrogen, Manganese, and Copper Treatments on Nutrient Uptake by Barley, Oats, Wheat, and Triticale. (Ph.D. Thesis)

M. Kalayci (T. L. Jackson, Advisor)

Nitrogen, manganese, copper response; barley, oat, wheat, triticale

OR025 Effect of Soil Acidity and Lime Placement on Root Growth and Yield of Winter Wheat and Alfalfa. (Ph.D. Thesis)

M. D. Kauffman (E. H. Gardner, Advisor)

Lime response; placement; wheat, alfalfa

OR026 Factors Affecting Nitrogen Nutrition of Western Hemlock

D. P. Lavender

Nitrogen rate, mycorrhiza; hemlock

OR027 Optimizing Vegetable Crop Production

H. J. Mack

Nitrogen, manure response; table beet, snap bean

OR028 Some Effects of Sulfur Fertilization on the Nutrient Value of Subclover-Grass Forage. (Ph.D. Thesis)

M. J. McCarthy (E. H. Gardner, Advisor)

Sulfur response; subclover-grass forage

OR029 Soil-Plant Nutritional Relationships

D. P. Moore

Calcium, magnesium, potassium, sodium response; wheat

OR030 Guidelines for Water Quality Control Relating to Use of Silvicultural Chemicals

M. Newton, J. A. Norgren

Fertilizer response; pollution; forestry

OR031 Behavior of Chemicals Introduced into the Forest Environment and Their Impact on the Ecosystem

L. A. Norris

Urea; fate of fertilizer nitrogen; forest floor

OR032 Urea Release from Sulfur-Coated Urea and Nitrogen Utilization by Tall Fescue. (Ph.D. Thesis)

G. S. Pettygrove (V. V. Volk, Advisor)

Sulfur-coated urea response; fescue

OR033 Pollination and Fruit Set in Tree Fruits and Nuts

M. M. Thompson

Boron response; plum, filbert

OR034 Forest Soil Fertility

C. T. Youngberg

Nitrogen, phosphorus, potassium, sulfur, calcium response; pine

Oregon State University
Malheur Experiment Station
Ontario, Oregon 97914

OR035 Improving Vegetable and Fruit Crop Production Practices in the Vale-Owyhee Irrigated Area

E. N. Hoffman, C. E. Stanger

Nitrogen rate; onion

United States Department of Agriculture
Columbia Basin Research Center
Pendleton, Oregon 97801

OR036 Water Relation and Growth of Nonirrigated White Wheat as Affected by Nitrogen and Sulfur Fertilization

R. R. Allmaras, R. E. Ramig, P. E. Rasmussen

Nitrogen, sulfur rate; wheat

OR037 Improvement of Agronomic Crop Production

T. P. Davidson

Nitrogen rate; time of application; alfalfa, potato; gypsum

OR038 Management Practices of Irrigated Crops in Northeast Oregon

T. P. Davidson, F. V. Pumphrey

Nitrogen rate; wheat

OR039 Nitrogen and Sulfur Fertility and Fertilization in the Drylands of the Pacific Northwest

P. E. Rasmussen

Nitrogen, sulfur rate; wheat

OR040 Tillage and Cultural Practices on Dry Farm Soils

C. R. Rohde

Nitrogen, sulfur rate; tillage; field crop

United States Forest Service
Pacific Northwest Forest
and Range Experiment Station
Portland, Oregon 97208

OR041 Economics of Forest Land Management in the Pacific Northwest

R. Fight

Farm management; market research

Oregon State University
Eastern Oregon Agriculture Research Center
Union, Oregon 97883

OR042 Adaptability and Management of Agronomic Crops in Northeast Oregon

R. L. Phillips, F. V. Pumphrey

Fertilizer response; fescue, bluegrass

OR043 Improvement Practices for Foothill Ranges in Northeast Oregon

R. L. Phillips, M. Vavra

Nitrogen, phosphorus response; forage

PENNSYLVANIA

Pennsylvania State University
University Park, Pennsylvania 16802

PA001 Equipment and Methods for Applying Liquid Ammonia to the Soil

P. M. Anderson, W. L. Kjelgaard

Anhydrous ammonia; cold-flow application

PA002 Soil Chemistry Related to the Availability of Phosphorus and Potassium

D. E. Baker

Phosphorus, potassium, mineral; soil testing

PA003 Diagnosis and Correction of Zinc Problems in Corn and Rice Production

D. E. Baker

Zinc sulfate rate; corn, rice

PA004 Plant Analysis in Diagnosing the Nutrient-Element Status of Horticultural Crops

E. L. Bergman, C. S. Smith

Calcium, magnesium, potassium rate; soil-test correlation; sweet corn

PA005 Nutrient Requirements of Vegetable Crops

E. L. Bergman, C. B. Smith

Urea, concentrated superphosphate, potassium chloride rate; placement; bean

PA006 Effect of Fertility Practices on Cover Crop Establishment

E. L. Bergman (PSU), H. Plate (Agway)

Fertilizer response; vegetable

PA007 Effect of Fertilizers and Soil Fertility on the Growth and Metabolism of Turfgrasses

J. M. Duich, D. V. Waddington, T. L. Watschke

IBDU, sulfur-coated urea, Ureaform, urea, pulp mill sludge; bentgrass, bluegrass

PA008 Effect of Fertilizers and Soil Fertility on Turfgrasses

J. M. Duich, D. V. Waddington, T. L. Watschke

Sulfur-coated urea, Ureaform, activated sewage sludge, IBDU, nitrogen, phosphorus, potassium, magnesium, sulfur rate; time of application; turfgrass

PA009 Soil Modification for Turfgrass Establishment and Maintenance

J. M. Duich, D. V. Waddington

Nitrogen, phosphorus, potassium fertilizer; soil-test correlation; golf green turf

PA010 Crop Fertilization for Pennsylvania Soils

R. H. Fox

Ammonium nitrate, ammonium sulfate, urea, nitrogen solution rate; no-till; corn

PA011 Effect of Soil Temperature, Moisture Content, Calcium Content, Texture, and pH on the Toxocity of Urea and DAP to Germinating Corn

R. H. Fox (PSU), G. H. Richards (Olin)

Urea, diammonium phosphate response; corn

PA012 Nitrogen Volatilization Losses from Non-Incorporated Urea and Nitan

R. H. Fox (PSU), H. Plate (Agway)

Urea and Nitan response; corn

PA013 Soil, Plant, Water, Nutrient Relationships

C. F. Gross, G. A. Jung

Nitrogen, phosphorus, magnesium response; alfalfa, orchardgrass

PA014 Environmental and Generic Factors Associated with Development of the Genus *Vitis*

C. W. Haeseler, C. B. Smith

Fertilizer response; grape

PA015 Chemistry and Mobility of Herbicides and Soil Fertility Management in No-till Systems

J. K. Hall, N. L. Hartwig, L. D. Hoffman

Phosphorus, lime rate; placement; no-till; corn

PENNSYLVANIA

PA016 Nutrition of Pomological Crops

A. H. Hatch, C. M. Ritter

Fertilizer response; time of application; apple, peach

PA017 Soil Plant Analysis Study

W. W. Hinish (PSU), H. Plate (Agway)

Fertilizer response; soil-test correlation; alfalfa

PA018 Long-Term Effects of Variations in Soil and Crop Management Systems

D. L. Hoffman, J. L. Starling

Fertilizer, lime rate; corn, alfalfa, soybean, oat, wheat

PA019 Long-Time Effects of Variations in Soil and Crop Management Systems

A. S. Hunter

Nitrogen, phosphorus, potassium, lime rate; corn, soybean, wheat, legume-grass hay

PA020 Effect of Magnesium and Sulfur Fertilizers on Forage Yield and Nutritive Value

G. A. Jung, R. L. Reid

Magnesium, sulfur response; hay

PA021 Soil-Plant Relationships in Potassium Fertilization of Alfalfa

L. Lanyon, R. Stringer (PSU), C. P. Ellington (PPI)

Potassium response; alfalfa

PA022 Soil-Plant Relationship in Potassium Fertilization of Alfalfa

L. Lanyon (PSU), H. Plate (Agway)

Potassium response; alfalfa

PA023 Preservation and Nutritive Value of Forages and Grains

T. A. Long, J. B. Washko, L. L. Wilson

Anhydrous ammonia response; corn silage

PA024 Productivity and Quality of Fertilizer Perennial Forages

L. F. Marriott

Phosphorus, potassium, magnesium, micronutrient response; crownvetch

PA025 Effect of Lime on Nutrient Uptake of Vegetable Crops

C. B. Smith (PSU), H. Plate (Agway)

Lime response; vegetable crop

PA026 Turfgrass Fertilization with Controlled-Release Fertilizers

D. V. Waddington (PSU), H. Plate (Agway)

Control-release fertilization; turf

PA027 SCU as a Slow-Release Fertilizer for Kentucky Bluegrass Turf

D. V. Waddington, J. M. Duich (PSU), S. E. Allen (NFDC-TVA)

Sulfur-coated urea response; bluegrass

State Department of Environment Resources
Environmental Protection Agency
Harrisburg, Pennsylvania 17120

PA028 Demonstrate and Evaluate Reclamation, Stabilization, and Erosion Control of Strip Mined Land for Agricultural Use Using Municipal Sewage Sludge

W. Sopper, W. C. Bucciarelli, J. P. Snyder, W. D. Lacour, L. T. Kardos

Sewage sludge; pollution; market analysis

PUERTO RICO

University of Puerto Rico Mayaguez
Rio Piedras, Puerto Rico 00708

PR001 Soil and Water Management and Conservation

F. Abruna, R. Caro, J. Vicente

Nitrogen, phosphorus, potassium, calcium, magnesium; rice, wild yam, tanier, plantain

PR002 Fertilizer Requirements of Sugarcane

S. Alers-Alers, G. Samuels

Nitrogen-phosphorus-potassium combination rate; sugarcane

PR003 Influence of Nitrogen Nutrition on Artificial Flowering of Pineapple

H. R. Cibes, E. Gonzalez-Tejera

Nitrogen rate; flower induction; pineapple

PR004 Fertilizer Requirements of Vegetable Crops in Puerto Rico

L. M. Cruz-Perez

Nitrogen, phosphorus, potassium rate; phosphorus placement; nitrogen time of application; pumpkin, watermelon

PR005 Fertilizer Trials for Vegetable Crops in Puerto Rico

L. M. Cruz-Perez

Nitrogen, phosphorus, potassium, lime, micronutrient; cabbage, pepper, bean, cantaloupe, cucumber, watermelon

PR006 Rum Distillery Slops as a Nutrient Source for Crops

R. Del-Valle, R. Perez-Escolar, J. Zapata

Fertilizer response; sugarcane, corn, sweet potato

PR007 Improvement, Agronomic Practices for Pineapple Production in Puerto Rico

E. Gonzalez-Tejera, C. T. Ramirez

Fertilizer response; pineapple

PR008 Optimum Economic Amounts of Fertilizers for Pineapple Variety

E. Gonzalez-Tejera, H. Gandia-Diaz, B. G. Capo

Farm management; market analysis; cost/benefit ratio

PR009 Nutrient Requirements for Intensively Managed Cropping Systems

H. Irizarry

Nitrogen, lime response; plantain, tanier, sudan-sorghum, stargrass, rice, yam

PR010 Soil Fertility Requirements for Efficient Production of Food Crops on Infertile Soils of Tropics

M. A. Lugolopez

Nitrogen, phosphorus, lime source; time and method of application; trickle irrigation; corn, soybean, winged bean

PR011 Spacing Studies with Commercial Varieties of Pineapple in Puerto Rico

C. T. Ramirez

Nitrogen, potassium rate; pineapple

PR012 Field Testing of Vegetable Varieties

M. Rico-Ballester

Nitrogen, phosphorus, potassium rate; bean, cantaloupe, cabbage

PR013 Evaluation of Turfgrasses and Improvement of Sod Production Techniques

S. J. Rodriguez

Nitrogen, phosphorus, potassium, lime rate; centipedegrass

PR014 Liming is the Main Soil Factor Limiting Crop Production in the Humid Tropics

J. Rodriguez, F. Abruna

Lime response; sugarcane, tobacco, corn, bean, soybean, sorghum, rice, plantain, tanier, yam, grass

PR015 Fertilizer Studies with Plantains and Bananas

G. Samuels

Nitrogen, phosphorus, potassium, magnesium rate banana, plantain

RHODE ISLAND

University of Rhode Island
Kingston, Rhode Island 02881

RI001 Phosphate Fixation in Oxidized Soils

G. T. Felbeck, Jr.

Slow-release, organic-phosphate fertilizer; sweet corn

RI002 Mineral Nutrition of Turfgrass

R. J. Hull, C. R. Skogley

Nitrogen, phosphorus, potassium rate; disease response; bluegrass

RI003 Response of Selected Herbaceous Plants to Various Fertilizer Rates and Formulations

W. E. Larmie, R. J. Shaw

Fertilizer rate, liquid fertilizer; ornamental

RI004 Yield of Nutrients from Agricultural Land to Water Sources

M. Salomon

Urea, phosphorus, potassium fertilizer; fate of applied nitrogen, phosphorus, potassium; turf

RI005 Greenhouse Research

R. J. Shaw

Nitrogen, phosphorus, potassium response; carnation, chrysanthemum, poinsettia

SOUTH CAROLINA

Clemson University
Clemson, South Carolina 29631

SC001 Evaluation of Vegetable Varieties and Cultural Practices

R. A. Baumgardner, D. O. Ezell, T. L. Jones

Nitrogen rate; banded versus broadcast application; tomato, potato

SC002 Regeneration of Selected Hardwood Species in the South Carolina Piedmont

M. H. Dodd, D. H. Van Lear

Nitrogen, phosphorus response; forestry:yellow poplar, sweetgum

SC003 Short Season Cotton Production as Affected by Variety, Row Spacing, Nitrogen Rate, and Harvest Methods

T. H. Garner, L. H. Harvey

Nitrogen rate; cotton

SC004 Evaluation of New Fertilizers as Sources of Plant Nutrients for South Carolina Crops

W. D. Graham, B. C. Morton, C. L. Parks

Urea-ammonium sulfate, urea-ammonium phosphate, ammonium nitrate sulfate, granular urea rate; time of application; corn, cotton, small grain, fescue, bermudagrass

SOUTH CAROLINA

SC005 Effects of Added Calcium, Magnesium, and Potassium on Two Coastal Plain Paleudults on the Magnesium Uptake by Corn (*Zea mays* L.). (M.S. Thesis)

J. W. Hane (J. R. Woodruff, Advisor)

Calcium, magnesium, potassium response; corn

SC006 Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality

J. J. Janzen, V. L. Quisenberry

Nitrogen, diary waste-water, chloride; fate of applied nitrogen; pollution

SC007 Sulfur Supply of Air, Rainwater, and Soil as Related to Agronomic and Horticultural Crop Needs

U. S. Jones, W. L. Ogle, N. R. Page

Sulfur rate; source; cotton

SC008 Improvement of Turfgrass Varieties and Cultural Practices

A. R. Maxur, H. D. Skipper

IBDU, Milorganite, ammonium nitrate, urea formaldehyde, sulfur-coated urea; turfgrass

SC009 Cultural Management of Centipedegrass

L. C. Miller

Nitrogen rate; phosphorus, potassium response; centipedegrass

SC010 Effects of Legume Interplanting on Growth and Yield of Loblolly Pine on Poor Sites of the Piedmont

L. E. Nix; D. H. Van Lear

Nitrogen response; forestry, pine

SC011 Thinning, Burning, and Fertilization Experiments with Coastal Plain Southern Pines

J. R. Saucier, D. H. Van Lear

Fertilizer response; pine

SC012 Mineral Nutrition of Peaches and Grapes

H. J. Sefick, E. T. Sims, Jr., B. J. Skelton

Fertilizer response, grape, peach

SC013 Nitrogen Requirements for Containerized Nursery Plants in Bark Growth Mixes

D. F. Wagner

Ammonium nitrate, calcium nitrate rate; container-grown ornamental, azalea, holly

SC014 Container Growing Media and Nutrient Sources

D. F. Wagner

Urea formaldehyde, sulfur-coated urea, resin-coated urea, IBDU, nitrogen, phosphorus, potassium; bark, moss, sand; container-grown boxwood, juniper, holly, barberry

SC015 Evaluation of the Micronutrient Status of Soils and Plant Response to Added Micronutrients

J. R. Woodruff

Boron, zinc, manganese response; corn, soybean

SC016 Diagnosis and Correction of Boron and Manganese Problems in Crop Production

J. R. Woodruff

Boron, manganese, sulfur rate; soybean

SC017 Diagnosis and Correction of Zinc Problems in Corn and Rice Production

J. R. Woodruff

Zinc, nitrogen rate; soil-test correlation; corn, rice

SC018 Determine the Need for Boron Fertilization on Corn and Soybeans in South Carolina

J. R. Woodruff, C. L. Parks

Boron response; corn, soybean

SC019 Irrigation and Fertilization on Upland Forest

T. E. Wooten

Fertilizer response; pine, hardwood

United States Department of Agriculture
Agricultural Research Service
P.O. Box 3039
Florence, South Carolina 29501

SC020 Subsurface Conduit System to Automatically Control Root-Zone Soil Matric Potential for Row Crops

J. L. Fouss, C. J. Phene

Nitrogen, phosphorus, potassium, magnesium rate; irrigation; method of application; potato

SC021 Modifying Physical Properties of Soils with Compact Layers to Improve Crop Production

R. B. Campbell, D. C. Reicosky

Nitrogen response; deep tillage; irrigation; cotton

Clemson University
Pee Dee Experiment Station
P.O. Box 271
Florence, South Carolina 29503

SC022 Tobacco Production

R. E. Currin, J. B. Pitner

Fertilizer response; tobacco

SC023 Improvements of Flue-Cured Tobacco by Development of More Adequate Fertilization, and Cropping System

R. E. Currin, Z. T. Ford

Fertilizer response; tobacco

SOUTH DAKOTA

South Dakota State University
Brookings, South Dakota 57007

SD001 Fertilizer Evaluations

P. L. Carson (SDSU), H. A. Kittams (NFDC-TVA)

Anhydrous ammonia, urea, ammonium nitrate, ammonium sulfate, sulfur, concentrated superphosphate, liquid 10-34-0, 35-17-0, 28-28-0, potassium rate; placement; oat, wheat, barley, flax, alfalfa, corn

SD002 Soil Testing and Soil Fertility Program That Will Increase the Productivity of South Dakota Soils

P. L. Carson

Urea rate; fertilizer response; micronutrient; soil testing; corn, alfalfa, small grain

SD003 Potassium for Corn in South Dakota

P. L. Carson (SDSU), C. P. Ellington (PPI)

Potassium response; field crop

SD004 Investigations of Range Improvement and Crop Production in Western South Dakota

J. R. Johnson

Nitrogen, phosphorus, potassium rate; irrigation; alfalfa, wheat

SD005 Anhydrous Ammonia Addition to Forages, Grains, and Other Feedstuffs

G. L. Kuhl (SDSU), R. M. Mitteness (USS Agri-Chemicals)

Anhydrous ammonia; addition to plant material; beef cattle feed

SD006 Impact of Changing Transportation Systems on Grain and Farm Supply Marketing Firms

W. F. Payne

Fertilizer transportation and distribution; storage; cost

SD007 Improving Vegetable Production in South Dakota

P. Prashar

Nitrogen rate; time of application; trickle irrigation; pepper, muskmellon, potato

SD008 Cultural Practices for Improving the Efficiency and Stability of Crop Production in South Dakota

F. E. Shubeck

Fertilizer response; N-Serve; corn, soybeans, sorghum

SD009 Environmental Accumulation of Nutrients as Affected by Soil and Crop Management

E. M. White

Ammonium-nitrogen, nitrate-nitrogen, phosphate-phosphorus, potassium; loss from plant, canopy and soil; corn, oat, soybean

TENNESSEE

Tennessee State University
School of Agriculture
Nashville, Tennessee 37203

TN001 Study of Possible Pesticide Pollution from Agricultural Sources

D. R. Duseja

Fertilizer, manure rate; soybean

University of Tennessee
Plateau Experiment Station
Crossville, Tennessee 38555

TN002 Field Crops and Soils Research

R. D. Freeland, L. F. Seatz

Potassium response; soybean

University of Tennessee
Tobacco Experiment Station
Greenville, Tennessee 37743

TN003 Field Crops and Soils Research

D. D. Howard, L. F. Seatz

Fertilizer rate; barley, wheat, oat, corn, soybean

TN004 Soil and Crop Management System for Burley Tobacco

B. C. Nichols

Nitrogen, phosphorus, potassium, lime response; tobacco

University of Tennessee
P.O. Box 1071
Knoxville, Tennessee 37901

TN005 Etiology and Prevention of Hypomagnesemia in Ruminants

M. C. Bell, J. B. McLaren

Fertilizer response; magnesium; grass tetany; fescue

TN006 Fertilizer and Irrigation Effects on Tree Growth

E. R. Buckner

Fertilizer response; poplar, sweetgum, pine

TN007 Forest Tree Fertilization

E. R. Buckner

Nitrogen, phosphorus rate; pine

TENNESSEE

TN008 Cultural and Mechanical Management and Evaluation of Turfgrasses

L. M. Callahan

Slow-release fertilizer rate; bermudagrass, bentgrass

TN009 Vegetable Crop Production

D. L. Coffey, H. D. Swingle

Nitrogen, phosphorus, potassium; cabbage, tomato, corn, bean, pea, cucumber, squash

TN010 Forage Crop Management

H. A. Fribourg

Nitrogen rate; bermudagrass, fescue

TN011 Determine the Effect of Boron Fertilization on Yield of Soybeans in Tennessee

J. Jared, G. Lessman

Boron response; alfalfa, corn, cotton, apple, soybean, vegetable

TN012 Diagnosis and Correction of Zinc Problems in Corn and Rice Production

G. M. Lessman

Zinc sulfate rate; sludge; corn

TN013 Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality

G. M. Lessman

Ammonium nitrate, sewage sludge, dairy manure response; fate of applied nitrogen; corn

TN014 Corn Yields and Nutrient Concentrations in Plants, Soils, and Soil Solutions as Affected by Levels of Dairy Manure, Sewage Sludge, and Ammonium Nitrate. (Ph.D. Thesis)

J. L. Magness (G. M. Lessman, Advisor)

Ammonium nitrate, manure, sewage sludge rate; corn

TN015 Management of Pastures for Beef Cow Herds

J. B. McLaren

Nitrogen rate; fescue, clover, lespedeza

TN016 Evaluation of Pasture Mixtures and Pasture Management Practices for Beef Production

J. B. McLaren

Nitrogen response; bermudagrass, fescue, orchardgrass, clover, lespedeza

TN017 Soil and Plant Nutrient Status and Environmental Factors in Relation to Crop Yields

T. H. Morgan, Jr., J. R. Overton, W. L. Parks

Potassium and phosphorus fixation; nitrogen rate; method of application; soil-test correlation; corn, cotton

TN018 Fertilizer Needs on Soils High in Phosphorus and Potassium

W. L. Parks (UT), O. P. Engelstad (NFDC-TVA)

Phosphorus, potassium rate; corn, cotton, soybean

TN019 Nitrogen and Phosphorus Nutrition of White Ash (*Froxinus americana* L.). (Ph.D. Thesis)

G. W. Smalley (M. E. Springer, Advisor)

Nitrogen, phosphorus response; white ash

TN020 Field Crop and Soils Research

L. M. Safley, L. F. Seatz

Fertilizer response; corn, soybean, tobacco

University of Tennessee
Milan Field Station
Milan, Tennessee 38358

TN021 Field Crops and Soils Research

T. McCutchen, L. F. Seatz

Nitrogen, phosphorus, potassium, sulfur, lime, molybdenum response; foliar application; corn, cotton, soybean

University of Tennessee
Middle Tennessee Experiment Station
Spring Hill, Tennessee 37174

TN022 Field Crops and Soils Research

J. W. High, Jr., T. H. Morgan, Jr.

Nitrogen rate; fertilizer response; clover, corn, wheat

TEXAS

Lengyel's Agricultural Consulting Service
Uvalde, Texas 78801

TX001 Determine the Need for Boron Fertilization on Cotton in Texas

E. K. Chandler, A. Lengyel (LACS), J. R. Turner (U. S. Borax)

Boron response; cotton

Stephen F. Austin State University
Nacogdoches, Texas 75961

TX002 Effect of Calphos on Growth and Development of Loblolly Pine Seedlings

M. V. Bilan

Colloidal potash, 60% muriate of potash, ammanium sulfate; effect on growth and survival of pine

Texas A & M University
Amarillo Agriculture Research
and Extension Center
Bushland, Texas 79012

TX003 Evaluation of Iron-Sulfur for Use on Turf

D. J. Undersander (TAMU), G. R. Hagstrom (Duval)

Iron response; turf grasses

Texas A & M University
Agriculture Research Station
Angleton, Texas 77515

TX004 Rice Pasture Rotations for the Texas Rice Belt

G. W. Evers

Nitrogen rate; rice, bahiagrass, dallisgrass, ryegrass

TX005 New Fertilizer Evaluations

M. Riewe (TAMU), Y. C. Smith (NFDC-TVA)

Sulfur-coated urea response; ryegrass

Texas A & M University
Agriculture Research and Extension Center
Beaumont, Texas 77706

TX006 Rice Research in the Western Division of the Texas Rice Belt

J. P. Craigmiles, J. W. Stansel

Nitrogen, phosphorus, potassium rate; rice

TX007 Fertilizer Requirements for Rice

N. S. Evatt

Nitrogen, phosphorus, potassium rate; soil-test correlation; rice

TX008 Soils and Plant Nutrition in the Texas Rice Belt

F. T. Turner

Urea rate; method and timing of application; rice, soybean

Texas A & M University
College Station, Texas 77843

TX009 Fertilizer Requirements for Cotton

W. B. Anderson, A. B. Onken, H. D. Sunderman

Nitrogen, phosphorus, potassium response; cotton

TX010 Introduction, Evaluation, and Multiplication of New Plants

W. B. Anderson

Phosphorus, potassium, lime; soil test calibration; wheat, cotton, forage grass

TX011 Fertilizer Requirements for Small Grains

W. B. Anderson

Nitrogen, phosphorus, potassium rate; small grain

TX012 Fertilizer and Interrelated Responses of Grain Sorghum

W. B. Anderson

Nitrogen, phosphorus, potassium, zinc, iron rate; sorghum

TX013 Response of Crops to Micro and Secondary Elements

W. B. Anderson

Sulfuric acid and micronutrient response; sugarcane, sorghum, corn, peanut, rice, clover, pecan, flax

TX014 Effects of Iron and Manganese in Culture Solution on Their Concentrations in Roots and Shoots of Rice Plants (*Oryza sativa* L.) Grown Under Anaerobic Conditions. (M.S. Thesis)

R. E. Bacha (L. R. Hossner, Advisor)

Iron, manganese response; rice

TX015 Nitrate Movement in Soils and Nitrogen Uptake Efficiency as Affected by Nitrogen Source, Time of Application, and a Nitrification Inhibitor. (Ph.D. Thesis)

K. P. Banks (A. R. Swoboda, Advisor)

Fate of applied nitrogen in soil

TX016 Effects of Fertilization on Productivity of Farm Ponds

W. J. Clark, J. M. Inglis, R. L. Noble

Fertilizer response; farm ponds

TX017 Enhanced Production of Ornamental Plants by Improved Growing Media and Growth Regulator Applications

E. R. Emino

Slow-release fertilizer, sludge, gin trash, mushroom compost, coconut dust; ornamental

TX018 Ammonia Volatilization from Surface Application of Ammonium Sulfate to Carbonate Systems. (M.S. Thesis)

S. E. Feagley (L. R. Hossner, Advisor)

Ammonium sulfate application to soil

TX019 Movement and Efficiency of Applied Phosphorus to Rice (*Oryza sativa* L.) in Flooded Soil. (Ph.D. Thesis)

B. L. Folsom (L. R. Hossner, Advisor)

Phosphorus response; rice

TX020 Salt Index of Potassium Phosphate Fertilizers and Its Relation to Germination and Early Plant Growth of Field Crops. (Ph.D. Thesis)

J. A. Freeour (L. R. Hossner, Advisor)

Potassium phosphate; field crop

TEXAS

TX021 Field Measurements of Ammonia Volatilization from Surface Applications of Nitrogenous Fertilizers to a Calcareous Soil. (M.S. Thesis)

W. L. Hargrove (A. R. Swoboda, D. Kissel, Advisors)

Fate of applied nitrogen; ammonia volatilization

TX022 Effect of Cultural Practices on Citrus

R. A. Hensz, R. F. Leyden

Nitrogen rate; time of application, citrus

TX023 Soil Nitrogen and Associated Plant Relationships

B. W. Hipp

Fate of applied nitrogen; citrus, tomato, broccoli

TX024 Soil Phosphorus Equilibria and Utilization in Diverse Texas Soils

L. R. Hossner

Phosphorus fixation; soil testing; laboratory study

TX025 Crop Response to Fertilizers on the Northern High Plains

R. M. Jones, A. F. Onken, H. D. Sunderman

Nitrogen, phosphorus rate; sorghum

TX026 Nitrogen Balance and Efficiency of Applied Fertilizer Nitrogen in Blackland Prairie Soils

D. E. Kissel, C. W. Richardson, J. T. Ritchie

Ammonium sulfate, urea-ammonium nitrate solution; fate of applied nitrogen; bermudagrass

TX027 Availability of Soil Organic Phosphorus and Fertilizer Phosphorus Applied to Coastal Bermudagrass (*Cynadon dactyhn* L.) on Houston Black Clay. (M.S. Thesis)

J. Y. Krautman (L. R. Hossner, Advisor)

Phosphorus response; bermudagrass

TX028 Growth Regulators, Cultural Practices and Fertility of West Texas Vegetable Crops

W. N. Lipe, J. C. Miller, A. B. Onken

Nitrogen rate; time of application; foliar spray; potato

TX029 Fertilizer Use, Salt Hazard, and Germination and Development of Vegetables in West Texas

W. N. Lipe

Nitrogen, phosphorus rate; potato

TX030 Influence of Sulfur Fertilizers on Forage Production

J. E. Matocha

Sulfur-coated urea, gypsum, elemental sulfur, urea, nitrogen-phosphorus-potassium combination, magnesium rate; bermudagrass

TX031 Intensive Culture of Hardwoods

R. G. Merrifield

Fertilizer response; irrigation; forestry:cottonwood

TX032 Effects of Phosphorus and Potassium on Coastal Bermudagrass Production

J. N. Pratt (TAMU), C. P. Ellington (PPI)

Phosphorus, potassium response; bermudagrass

TX033 A Comparison of Ammonia Applied with the Cold-Flo Method as Compared with Other Nitrogen Materials

J. N. Pratt (TAMU), R. M. Mitteness (USS Agri-Chemicals)

Ammonia, ammonium nitrate, ammonium sulfate rate; bermudagrass

TX034 Nitrate Concentration in Cotton (*Gossypium hirsutum* L.) Petioles as Influenced by Cultivar, Row Spacing, and Nitrogen Application Rate on the Texas High Plains. (Ph.D. Thesis)

H. D. Sunderman (L. R. Hossner, Advisor)

Nitrogen rate; plant correlation; cotton

TX035 Forage Production as Affected by Applied Nutrients

A. R. Swoboda

N-Serve, nitrogen, zinc response; bermudagrass

TX036 Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality

A. R. Swoboda

Sulfur-coated urea, ammonium sulfate, ammonium nitrate, urea; nitrapyrin; fate of applied nitrogen; pollution

TX037 Management of Nitrogen in Flooded Soils

F. T. Turner (TAMU), R. D. Hauck (NFDC-TVA)

Nitrogen fertilizer response; rice

TX038 Investigations on Soil Biological Nitrogen Transformations

R. W. Weaver

Biological nitrogen fixation; denitrification

TX039 Correlation of Boron Fertilization with Crop Yield, Plant Content, and Extractable Soil Boron

C. D. Welch (TAMU), J. R. Turner (U.S. Borax)

Boron response, sunflower, clover, alfalfa

TX040 Response of Grasses and Legumes to Nitrogen, Phosphorus, Potassium Fertilization

C. D. Welch (TAMU), C. P. Ellington (PPI)

Nitrogen, phosphorus, potassium, response; forage

Texas A & M University
Agriculture Research and Extension Center
Corpus Christi, Texas 78408

TX041 Soil Management and Crop Production Studies in the Coastal Bend

J. E. Matocha

Nitrogen, phosphorus, zinc, iron rate; sorghum, cotton

TX042 Crop Response to Phosphorus and Potassium Fertilization on Coastal Bend Soils

J. E. Matocha (TAMU), C. P. Ellington (PPI)

Phosphorus, potassium, response; field crop

TX043 Phosphate Sources for Grain Sorghum

J. Matocha (TAMU), G. E. Richards (Olin)

Phosphorus response; source; grain sorghum

TX044 New Fertilizer Evaluations

J. Matocha (TAMU), Y. C. Smith (NFDC-TVA)

Ammonia, ammonium polyphosphate (suspension) response; sorghum

TX045 Correction of Iron Chlorosis on Grain Sorghum

J. Matocha (TAMU), G. R. Hagstrom (Duval)

Iron response; grain sorghum

Texas A & M University
University Research Center
El Paso, Texas 79927

TX046 Soil Fertility Research in Far West Texas

L. B. Fenn

Ammonium nitrate, ammonium sulfate; liquid; placement; fate of applied nitrogen; irrigation; salt balance; sorghum

TX047 Improving Water and Nitrogen Efficiency by Crops in Arid Regions Soils

L. B. Fenn, J. Moore, R. M. Taylor

Ammonium nitrate, ammonium sulfate, urea; fate of applied nitrogen; irrigation

TX048 Crop Root Physiology and Management

B. W. Hipp

Fertilizer response; trickle irrigation; root studies

TX049 New Fertilizer Evaluations

S. Miyamoto (TAMU) Y. C. Smith (NFDC-TVA)

Urea, sulfur-coated urea 17, sulfur-coated urea 22 response; turf

Texas A & M University
Agriculture Research and Extension Center
Lubbock, Texas 79401

TX050 Soil Fertility Requirements for Sunflower Production

A. B. Onken, D. F. Owen

Nitrogen, phosphorus rate; sunflower

TX051 Fertilizer Responses on Soils of the Southern High Plains

A. B. Onken

Nitrogen rate; sorghum, corn, cotton

TX052 Effects of Irrigation Methods and Fertilizer Techniques on Potential Pollution of Ground Water

A. B. Onken, C. W. Wendt, O. C. Wilke

Slow-release fertilizer, nitrogen response; fate of applied nitrogen; nonpoint source pollution; corn

TX053 Factors Affecting Iron and Zinc Availability in Texas High Plains Soils

A. B. Onken

Nitrogen, phosphorus, iron, zinc rate; cotton

TX054 Effects of Irrigation Methods and Fertilizer Techniques on Potential Pollution of Ground Water

A. B. Onken, C. W. Wendt, O. C. Wilke

Nitrogen rate; irrigation; pollution; corn

TX055 Development and Evaluation of Narrow-Row Production Systems for Cotton

A. B. Onken, L. L. Ray, C. W. Wendt

Nitrogen, phosphorus rate; irrigation; cotton

Texas A & M University
Agriculture Research and Extension Center
Overton, Texas 75684

TX056 Vegetable Production and Evaluation in East Texas

D. R. Earhart, D. R. Paterson

Sulfur, nitrogen, phosphorus, potassium rate; roses, onion, oat, bermudagrass

TX057 Coastal Bermudagrass Stand Recovery and Forage Quality Following Stand Loss Induced by Potassium Deficiency

T. C. Keisling (TAMU), C. P. Ellington (PPI)

Potassium response; bermudagrass

TX058 Influence of Nitrogenous Fertilizers on Soil Chemical Properties and Forage Production

T. C. Keisling

Ammonium sulfate, ammonium nitrate, urea, sulfur-coated urea compared at four rates; effect on exchangeable base; bermudagrass

TX059 Pruning, Soil Fertility, Irrigation, Growth Regulation, and Other Factors on Blackberry Production

J. A. Lipe, J. E. Matocha, A. Powell

Nitrogen, phosphorus, potassium rate; blackberry

TEXAS

TX060 Influence of Sulfur Supply on Estrogenic Isoflavones and Yield of Some Common Forage Legumes

K. L. Smith (TAMU), S. L. Tisdale (TSI)

Sulfur response; forage legume

Texas A & M University
Prairie View A & M University
Cooperative Research Center
Prairie View, Texas 77445

TX061 Development of Production Systems for Chinese Cabbage and Sweet Corn

M. Burns, Y. Chang

Sulfur-coated urea, ammonium nitrate rate; nitrogen source; Chinese cabbage, sweet corn

TX062 Forage Values, Harvest Frequencies, and Fertilizer Requirements for Collie Bermudagrass

J. B. Collins

Nitrogen rate; bermudagrass

TX063 Response of Soybeans, Sunflowers, and Peanuts to Zinc Application on Hockley Fine Sandy Loam. (Ph.D. Thesis)

T. W. Machac (A. Mangaroo, Advisor)

Zinc response; soybean, sunflower, peanut

TX064 Fate of Nitrogen Labeled Fertilizer Nitrogen Applied to Select Intensively Cropped Texas Soils

E. McKenzie, Jr.

Fate of applied nitrogen; corn, triticale

TX065 Quality and Yields of Blackberries in Response to Manure and Potash Treatments. (Ph.D. Thesis)

A. S. Negatu (M. Burns, Advisor)

Potassium, manure response; blackberry

Texas A & M University
Dallas Research and Extension Center
Renner, Texas 75216

TX066 Effect of Fertilization on the Yield and Chemical Composition of Perennial Forages

J. Birchett

Fertilizer rate; source; grass forage

TX067 Effect of Fertilization on the Yield and Chemical Composition of Perennial Forages

J. Birchett

Nitrogen rate; time of application; bermudagrass, lovegrass

Texas A & M University
Agriculture Research and Extension Center
Stephenville, Texas 76401

TX068 Mineral Nutrition of Peanuts in Relation to Fertilization and Plant Growth

J. S. Calahan

Potassium source and rate; peanut

TX069 Longtime Soil Fertility Studies on Peanuts in Texas

J. S. Newman

Nitrogen, phosphorus, potassium rate; soil-test correlation; peanut

TX070 New Fertilizer Evaluations

J. S. Newman (TAMU), Y. C. Smith (NFDC-TVA)

Urea, sulfur-coated urea; foliar application; peanut, pecan, bermudagrass

TX071 Longtime Soil Fertility Studies on Peanuts in Texas

J. S. Newman

Nitrogen, phosphorus, potassium rate; time of application; peanut

Texas A & M University
Agriculture Research and Extension Center
Uvalde, Texas 77801

TX072 New Fertilizer Evaluations

J. F. Mulkey (TAMU), Y. C. Smith (NFDC-TVA)

28-28-0, 35-17-0 response; field crop; grass

Texas A & M University
Agriculture Research and Extension Center
Weslaco, Texas 78596

TX073 Influence of Fertilizers on Vegetables Grown Under Various Plant Densities

B. W. Hipp

Nitrogen rate; carrot, onion, sugarcane

Texas Tech University
Lubbock, Texas 79409

TX074 Effect of Rate, Source, and Application Method of Phosphorus on Corn. (M.S. Thesis)

A. J. Lange (R. G. Stevens, Advisor)

Phosphorus rate; source; method of application; corn

TX075 Effect of Nitrogen Source on the Uptake of Nutrients and Growth in Irish Potatoes. (Ph.D. Thesis)

T. D. Miller (R. G. Stevens, Advisor)

Nitrogen source; potato

United States Department of Agriculture
Agricultural Research Service
Route 5, Box 784
Beaumont, Texas 77706

TX076 Improvement of Rice Production and Rice Quality Through Breeding, Genetics, and Disease Control

J. G. Atkins, C. N. Bollich, B. D. Webb

Nitrogen rate; rice

TX077 Adaptation and Culture of Forage Crops in Southeast Texas

G. W. Evers

Nitrogen rate; phosphorus, potassium response; ryegrass, sudangrass, dallisgrass, bahiagrass

TX078 Physiological and Managerial Aspects of Soybean Productivity

J. W. Sij

Urea response; foliar application; soybean

United States Department of Agriculture
Agricultural Research Service
Bushland, Texas 79012

TX079 Optimizing Nutrient Status of Soils for Efficient Soil, Water, and Fertilizer Use—Southern Plains

H. V. Eck

Nitrogen rate; bromegrass, fescue

TX080 Fertility-Water Relationships Investigated

P. T. Koshi, A. V. Eck, J. Stubbendieck, W. G. McCully

Nitrogen rate; irrigation; fescue, bromegrass, corn

United States Department of Agriculture
Agricultural Research Service
P.O. Box 748
Temple, Texas 76501

TX081 Prediction of Water Quality as Affected by Fertilizer Applied to Agricultural Watersheds

E. Burnett, R. G. Menzel, J. R. Williams

Fate of applied nitrogen, phosphorus; nonpoint source pollution

TX082 Fertilizer Requirements for Increased Production of Cotton Grown on Blackland Soils

D. E. Kissel

Nitrogen, phosphorus, potassium rate; cotton

TX083 Fertilizer Requirements for Increased Production of Grain Sorghum Grown on Blackland Soils

D. E. Kissel

Nitrogen, phosphorus rate; sorghum

UTAH

Utah State University
of Agriculture and Applied Science
Logan, Utah 84322

UT001 Phosphorus Availability as Indicated by Alfalfa Response to Applied Phosphorus on Soils With Low Soil-Test Values. (M.S. Thesis)

J. O. Ghowi (P. D. Christensen, Advisor)

Phosphorus response; alfalfa

UT002 Intensified Management Systems for Cow Calf Ranching Operations

L. E. Harris, L. C. Kearl, J. P. Workman

Nitrogen rate; range forage; beef production

UT003 Nitrogen Fertilization Studies in Dryland Winter Wheat and Potential Nitrogen Losses from the Soil at the Blue Creek Experiment Station in Northern Utah. (Ph.D. Thesis)

S. Intalap (R. W. Miller, Advisor)

Nitrogen response; wheat

UT004 Nitrogen in the Environment

D. W. James

Nitrogen rate; pollution; sugar beet

UT005 Soil, Plant, and Water Analysis Laboratory

R. E. Lamborn

Soil testing laboratory

UT006 Transportation: Implementing Change in Freight Rate Structure with Emphasis on Utah's Agribusiness

H. M. Taylor, Forrest Baker, Jr.

Transportation; distribution; management; cost

UT007 Ammonia and Nitrate Nitrogen in the Soil Profile and Its Relation to Various Nitrogen Treatments on Dryland Winter Wheat. (Ph.D. Thesis)

A. E. Van Luik (R. W. Miller, Advisor)

Nitrogen source; fate of applied nitrogen; wheat

UT008 Potassium and Phosphorus Fertilizer Utilization as Affected by Soil and Water Salinity

R. J. Wagenet (USU), C. P. Ellington (PPI)

Phosphorus, potassium response; field crop

UT009 Range Fertilization—An Economic Analysis of a Potential Range Improvement Practice

J. P. Workman

Farm management; market analysis

VERMONT

University of Vermont
Burlington, Vermont 05401

VT001 Availability of Phosphorus from Rock Phosphate in Three Contrasting Soils. (Ph.D. Thesis)

E. L. Bouton (R. J. Bartlett, Advisor)

Rock phosphate response

VT002 Fertilization of Small Yellow Birch and Sugar Maples Following Crop Tree Thinning

P. R. Hannah, T. L. Turner

Nitrogen, phosphorus, potassium at four rates; forestry:yellow birch, maple

VT003 Growth, Vigor, and Sap Sugar Content of Young Sugar Maple Trees

F. M. Laing, J. W. Marvin

Fertilizer response; sugar maple

VT004 Assessing Phosphorus Fertilizer Needs Based on Intensity-Capacity Relationships. (Ph.D. Thesis)

Y. S. Lee (R. J. Bartlett, Advisor)

Phosphorus, soil test correlation

VT005 Effects of Fertilizers on Alpine Tundra Vegetation

H. W. Vogelmann

Nitrogen, phosphorus, potassium response; alpine tundra

VIRGIN ISLANDS

Virgin Islands Agricultural
Experiment Station
P.O. Box L, Kingshill
Saint Croix, Virgin Islands 08850

VI001 Sorghum Production for Grain, Silage, and Forage in the Virgin Islands

A. M. Conje, D. S. Padda

Nitrogen, phosphorus response; sorghum

VI002 Selection of Superior Forage Grasses and Management Practices for the Virgin Islands

A. M. Conje, D. S. Padda

Fertilizer response; forage grass

VI003 Improvement of Vegetable Production in the Virgin Islands

L. W. Lewis, D. S. Padda

Fertilizer response; yam, sweet potato

VIRGINIA

Virginia Polytechnic Institute
and State University
Southern Piedmont Research and
Continuing Education Center
Post Office Box 148
Blackstone, Virginia 23824

VA001 Botanical Composition is Related to Mulch Used

W. H. Armiger, O. L. Bennett, J. N. Jones, Jr.

Nitrogen, phosphorus, potassium; mulch; tomato, squash

VA002 Soil and Water Management Systems for Revegetation of Strip-Mine Spoil

J. N. Jones, Jr., O. L. Bennett

Fertilizer rate; mine-spoil soil

VA003 Soil and Water Management Systems for Revegetation of Strip-Mine Spoil

J. N. Jones, Jr.

Rock phosphate, nitrogen rate; mulch; mine-spoil renovation; tomato; bean

Virginia Polytechnic Institute
and State University
Blacksburg, Virginia 24061

VA004 Manganese in Virginia Soils and Corrections of Manganese Deficiency in Soybeans (*Glycine max* L.). (Ph.D. Thesis)

M. M. Alley (C. I. Rich, Advisor)

Manganese response; soybean

VA005 Sweet Potato Harvesting, Handling, and Marketing

M. E. Austin, R. D. Wright

Chloride, sulfur response; sweet potato, white potato

VA006 Controlling Erosion Along Highways with Vegetation and Other Protective Cover

R. E. Blaser, J. T. Green, D. L. Wright

Fertilizer, lime response; vegetation of highways

Improving No-Till Cultural Methods in Virginia for Corn, Soybeans, and Tobacco

H. M. Camper, W. W. Moschler

Phosphorus, potassium response; no-till; corn, soybean, tobacco

VA008 Fertilization of Small Grain Followed with Soybeans Seeded No-Till in Double Cropping

H. M. Camper, W. W. Moschler (UPI), C. P. Ellington (PPI)

Fertilizer response; no-till; small grain, soybean

VA009 Nitrogen Requirements for Containerized Nursery Plants in Bark Growth Mixes

S. J. Donohue, R. D. Wright

Nitrogen rate; soil-plant correlation; azalea, holly

VA010 Need for Sulfur Fertilization in the State of Virginia

G. R. Hawkins (VPI), S. L. Tisdale (TSI)

Sulfur fertilization; field crops

VA011 Soil-Plant Nutrient Interrelationships as Affected by Applied Nutrients, Cropping, and Irrigation

G. D. Jones, W. Kroontje, J. A. Lutz

Nitrogen, phosphorus, potassium, sulfur rate; corn, soybean

VA012 Effect of Phosphorus and Potassium Rates on Production of Forage Sorghum

G. D. Jones, R. B. Reneau (VPI), C. P. Ellington (PPI)

Phosphorus, potassium rate; forage sorghum

VA013 Effect of Potassium, Sulfur, and Foliar Fertilization on Soybean Yields

G. D. Jones, R. B. Reneau (VPI), C. P. Ellington, (PPI)

Potassium, sulfur response; foliar fertilization; soybean

VA014 Effect of Phosphorus, Potassium, Sulfur, and Foliar Fertilization on Yield and Quality of Alfalfa

G. D. Jones, R. B. Reneau (VPI), C. P. Ellington (PPI)

Phosphorus, potassium, sulfur response; foliar fertilization; alfalfa

VA015 Soil-Water Conservation in Middle Appalachia

J. N. Jones, Jr., J. D. Miller

Nitrogen rate; rock phosphate, lime response; tomato, vetch, trefoil, clover

VA016 Mineral Nutrient Requirements of Floricultural Crops

R. S. Linstrom

Fertilizer rate; chrysanthemum, lily

VA017 Effect of Fertilizer Treatments on Corn Production

J. A. Lutz (VPI), C. P. Ellington (PPI)

Fertilizer response; corn

VA018 Movement of Soluble Constituents of Fertilizers in Certain Soils of Virginia

J. D. Pendleton

Nitrogen, phosphorus, potassium rate; corn

VA019 Effect of Phosphorus and Potassium Fertilization on Yield, Nodulation, and Quality of Soybeans

J. A. Lutz, G. P. Jones (VPI), C. P. Ellington (PPI)

Phosphorus, potassium response; soybean

WASHINGTON

Pacific Northwest Forest and
Range Experiment Station
Wenatchee, Washington 98801

WA001 Water Yield Improvement and Erosion Control in Mid-Columbia River Basin Forests (Water Yield and Erosion)

A. T. Tiedemann, G. O. Klock

Sulfur-coated urea; forest

Pacific Northwest Forest and
Range Experiment Station
Olympia, Washington 98501

WA002 Intensive Culture of Douglas Fir and Associated Species

R. E. Miller

Urea; method of application; fir, hemlock

United States Department of Agriculture
Agricultural Research Service
Box 99, P.O. Annex 111
Wenatchee, Washington 98801

WA003 Influence of Cultural Conditions on Quality and Storage Potential of Apples

K. L. Olsen

Nitrogen response; apple

University of Washington
Institute of Forest Products
Seattle, Washington 98195

WA004 Effect of Nitrogen on Growth of Douglas Fir

S. P. Gessel, T. N. Stoate

Urea rate; fir

WA005 Forest Fertilization

S. P. Gessel

Fertilizer response; fir; hemlock

WASHINGTON

WA006 Tree Nutrition Study II

S. P. Gessel

Fertilizer response; fir, hemlock

WA007 Seedling Production and Establishment Studies

R. M. Kenady, R. J. Zasoski

Fertilizer response; fir, container-grown plant

WA008 Diagnosis of Nutrient Deficiencies and Prediction of Growth Response to Nitrogen Fertilizer Using Soil Properties

I. G. Morison

Nitrogen rate; forestry: fir, hemlock

Washington State University
Coastal Research and Extension Unit
Long Beach, Washington 98631

WA009 Post Harvest Physiology and Storage of Cranberries

A. Shawa

Sulfur-coated urea; foliar application of manganese, magnesium, zinc, boron, calcium, lime; cranberry

WA010 Nutrient Sources for Cranberries

A. Y. Shawa (WSU), C. B. Kresge (NFDC-TVA)

Sulfur-coated urea, sulfur-coated potassium chloride, sulfur-coated potassium sulfate, potassium chloride, potassium sulfate response; cranberry

Washington State University
Northwest Washington Research
and Extension Unit
Mount Vernon, Washington 98273

WA011 Introduction, Evaluation, and Culture of Vegetable Crops for Western Washington

W. C. Anderson

Ammonium nitrate; nitrogen, phosphorus rate; grape, mint, hop, tall fescue, orchardgrass, broccoli, pea, cauliflower, artichoke, sweet corn

Washington State University
Irrigation Agriculture Research
and Extension Center
Prosser, Washington 99350

WA012 Soil Fertility and Soil Test Calibration in Outlying and Newly Irrigated Areas of Central Washington

A. I. Dow

Nitrogen, phosphorus, potassium, sulfur rate; sudangrass, fescue, corn silage, orchardgrass, peppermint

WA013 Management of Irrigation and Fertilization on Different Irrigated Soils

J. E. Middleton, S. Roberts

Nitrogen, phosphorus, potassium, zinc fertilizer; nitrogen rate and time of application; irrigation; sugar beet

WA014 Soil and Water Management Systems for Maximum Production in the Northwest

D. E. Miller, D. A. Lauer

Zinc-EDTA, zinc sulfate, phosphorus rate; bean plant

WA015 Chemistry and Fertility of Central Washington Irrigated Soils

S. Roberts

Nitrogen, phosphorus, potassium, magnesium, boron rate; soil-test correlation; potato

Washington State University
Pullman, Washington 99164

WA016 Soil Fertility in Orchards

N. R. Benson

Nitrogen, calcium, iron, zinc rate; plant analysis; apple, peach

WA017 Nitrogen in the Environment

D. F. Bezdicek, F. E. Koehler, N. K. Whittlesey

Calcium nitrate, animal waste, nitrogen rate; potato

WA018 Revegetation of Coal Mine Areas

D. F. Bezdicek, A. R. Halvorson, B. L. McNeal

Nitrogen, phosphorus, potassium rate; renovation of mine-spoil soil; ryegrass

WA019 Improving the Efficiency of Grass Seed Production on Irrigated and Dryland Soils

C. L. Canode

Fertilizer, burning response; bromegrass, bluegrass

WA020 Management Studies on Turfgrasses

C. L. Canode, A. G. Law, R. L. Warner

Ammonium sulfate, urea response; bluegrass, bentgrass

WA021 Effect of Nitrogen Source and 2-Chloro-6-(Trichloromethyl) Pyridine on the Nitrogen and Sulfur Nutrition of Wheat. (Ph.D. Thesis)

T. H. Chaudhary (R. L. Housenbuiller, Advisor)

Nitrogen, sulfur source; wheat

WA022 Management of Soilborne Diseases of Wheat

R. J. Cook

Nitrogen response; root disease; wheat

WA023 Nutrient Element Influences on Growth of Blueberries and Cranberries

C. C. Doughty, A. Y. Shawa

Sulfur-coated urea, sulfur-coated muriate of potash, urea-ammonium phosphate response; method of application; blueberry, cranberry

WA024 Improving Marketing Management Amongst Washington's Fertilizer and Agricultural Chemical Retailers

K. D. Duft

Retail fertilizer marketing; enterprise management

WA025 Fertilizer Use Management for Wheat and Forage Crops Production in Eastern Washington

E. T. Field, A. R. Halvorson, F. E. Koehler (WSU), C. B. Kresge (NFDC-TVA)

Sulfur-coated urea-5, sulfur coated urea-30, sulfur-coated urea-20, sulfur-coated urea-40, 16-20-0, 13-39-0, 11-55-0 rate; wheat, orchardgrass

WA026 Soil Testing

A. R. Halvorson

Soil testing; plant response carrelation

WA027 Fertility Investigations on Eastern Washington Soils

R. L. Hausenbuiller, F. E. Koehler

Ammonium nitrate, urea; nitrogen, phosphorus, potassium, zinc rate, source; time of application; soil-test correlation; wheat

WA028 Quality Factors Affecting Fresh Market and Processing Grades of Washington Potatoes

L. K. Hiller, B. W. Poovaiah

Nitrogen, boron rate; potato

WA029 Management of Salt Load in Irrigation Agriculture

B. L. McNeal, J. E. Middleton

Fate of applied nitrogen; irrigation; minimum tillage; time and method of application; potato

WA030 Control of Fertilizer Nutrient Losses in Irrigated Portions of the Pacific Northwest

B. L. McNeal, N. K. Whittlesey

Fertilizer technology; market analysis

WA031 Economics of Controlling Agricultural Nonpoint Pollution

R. Oehlschlaeger

Farm mangement; fertilizer cost; market analysis

WA032 Soil Fertility Investigations in Western Washington Oriented Toward Extension Programs

D. O. Turner

Ammonium nitrate, ammonium nitrate-sulfate, urea, 10-20-20; salinity; Christmas tree, wheat

WA033 Boron and Calcium Nutrition of Tree Fruits and Grape Vines

C. G. Woodbridge

Band calcium rate; fruit analysis for nitrogen, phosphorus, potassium, magnesium, manganese, zinc, boron; tree fruit, grape

Washington State University
Western Washington Research
and Extension Center
Puyallup, Washington 98371

WA034 Safe and Efficient Use of Nitrogen Fertilizers on Grasslands

A. S. Baker

Nitrogen rate, forage grass

WA035 Soil Fertility Investigations with Vegetable Crops in Western Washington

A. S. Baker, W. P. Mortensen

Ammonium sulfate, concentrated superphosphate rate; lime; corn

WA036 Influence of Management Practices on Turf Quality and Persistence

T. W. Cook, R. L. Goss

Fertilizer response; turfgrass

WA037 Winter Hardiness of Small Fruits in Western Washington

C. C. Doughty

Zinc, phosphorus, manganese response; strawberry

WA038 Factors Affecting Nitrogen Response of Pacific Northwest Forests

P. Heilman

Urea, ammonium nitrate, ammonium sulfate, ammonium chloride; fate of applied nitrogen; ^{15}N; fir, hemlock

WA039 Chemical and Environmental Influences for Efficient Nursery Production

G. F. Ryan

Potassium sulfate, potassium chloride; nitrogen, potassium rate; rhododendron

Washington State University
Southwest Washington Research Unit
Vancouver, Washington 98662

WA040 Red Raspberry Physiology and Culture

B. H. Barritt, P. C. Crandall, R. A. Norton

Slow-release nitrogen fertilizer; foliar application of nitrogen, phosphorus, potassium, zinc; raspberry

WEST VIRGINIA

West Virginia University
Morgantown, West Virginia 26506

WV001 Lime and Rock Phosphate Studies

O. L. Bennett

Rock phosphate, fertilizer, lime rate; mine spoil; fescue, bermudagrass, buckwheat, cucumber, bean, squash, potato, tomato, sweet corn, cabbage

WV002 Soil and Water Management Systems for Appalachia

O. L. Bennett

Nitrogen, phosphorus, lime response; sewage sludge, composted garbage; mine spoil reclamation; grass, legume

WV003 Crop Rotation Experiments

G. G. Pohlman

Nitrogen, phosphorus, potassium rate; corn, small grain, clover, alfalfa

WV004 Evaluation of Phosphorus Availability to Corn from Chicken Manure and Monocalcium Phosphate in Mine Soils. (M.S. Thesis)

D. M. Walters (R. N. Singh, Advisor)

Monocalcium phosphate, manure response; mine-spoil soil; corn

WISCONSIN

United States Department of Interior
Geological Survey
Madison, Wisconsin 59706

WI001 Irrigation and Ground-Water Quality

S. M. Hindall

Fate of fertilizer nitrogen, phosphorus, potassium; nonpoint pollution

United States Department of Agriculture
Agricultural Research Service
Barley and Malt Laboratory
501 North Walnut Street
Madison, Wisconsin 53705

WI002 Evaluation of and Breeding for Malting Quality in Barley

W. C. Burger, G. S. Robbins

Nitrogen response; malting quality; barley

University of Wisconsin
Madison, Wisconsin 53706

WI003 Nitrogen Metabolism, Seed Protein, and Seed Yield in Protein-Modified Bean Strains

F. A. Bliss

Biological nitrogen fixation; beans

WI004 Culture and Protection of Cranberries

D. M. Boone, M. N. Dana, C. F. Koval

Ammonium sulfate, potassium rate; cranberry

WI005 Potato Diseases During Storage and Their Control

F. H. Buelow, A. Kelman

Nitrogen rate; potato; soft rot

WI006 Role of Potassium in Legume Nitrogen Fixation, Winter Hardiness, Dormancy, and Yield

M. Collins (UW), C. P. Ellington (PPI)

Potassium response; legume

WI007 Field Evaluation of Soil Testing Methods

R. B. Corey, L. E. Engelbert, K. C. Kilian

Phosphorus, potassium rate; soiltest correlation; field crop

WI008 Culture and Breeding of Pickling Cucumbers for Mechanical Harvest

D. Curwen, P. H. Williams

Nitrogen, phosphorus, potassium rate; time of application; cucumber

WI009 Nutrient Absorption from Soil by a Fibrous-Rooted and a Tap-Rooted Alfalfa Strain and by Bluegrass

W. R. Gardner, L. A. Peterson, D. Smith

Nitrogen, phosphorus placement; alfalfa, bluegrass

WI010 Plant Nutrition of Red Tart Cherry Trees

F. Gilbert, L. A. Peterson

Nitrogen, phosphorus, potassium; bag placement; copper, iron, zinc, manganese chelate foliar spray; cherry

WI011 Mode of Action and Effects of Nitrification Inhibitors

J. M. Harkin; J. C. Ensign; L. E. Schrader

Ammonium fertilizer; nitrification inhibition

WI012 Environmental Accumulation of Nutrients as Affected by Soil and Crop Management

R. F. Harris, D. R. Keeney

Anhydrous ammonia, phosphorus, nitrapyrin response; nonpoint pollution

WI013 Effectiveness of Sulfur-Coated Urea as a Source of Nitrogen

D. R. Keeney, L. M. Walsh

Sulfur-coated urea 20, sulfur-coated urea 30, urea, N-Serve, ammonium nitrate, diammonium phosphate, ammonium sulfate rate; placement; potato, corn, bean

WI014 Nitrification-Denitrification in Poorly Drained Aerated Soils

D. R. Keeney (UW), R. D. Hauck (NFDC-TVA)

Nitrate level; fate of applied nitrogen

WI015 High Yield Alfalfa Production Through DRIS

K. A. Kelling (UW), C. P. Ellington (PPI)

Fertilizer response; alfalfa

WI016 Evaluation of Certain Nonconventional Soil Additives

K. A. Kelling

Biological amendments; field crops

WI017 Effectiveness of Sulfur-Coated Urea and Urea-Ammonium Polyphosphate on an Irrigated Plainfield Sand. I. Effectiveness of Sulfur-Coated Urea on Irrigated Corn and Potatoes. II. Effectiveness of Banded and Seed-Placed Urea-Ammonium Polyphosphate on Irrigated Corn. (Ph.D. Thesis)

E. A. Liegel (L. M. Walsh, Advisor)

Sulfur-coated urea, urea-ammonium polyphosphate; irrigation; corn

WI018 Determination of Deficiency Symptoms in Turfgrass

J. R. Love

Nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, boron, copper, iron, manganese, molybdenum, zinc; deficiency symptom; bluegrass, bermudagrass, bentgrass

WI019 Soil and Water Management Systems in the Upper Mississippi Valley

W. H. Paulsen, A. E. Peterson

Nitrogen rate; corn, alfalfa

WI020 Nutrition of Selected Horticultural Crops

L. A. Peterson

Nitrogen, phosphorus, potassium rate; leaf analysis correlation; cabbage, cauliflower, broccoli

WI021 Nutrition of Selected Horticultural Crops

L. A. Peterson

Nitrogen, phosphorus, potassium rate; sweet corn, pea, beet

WI022 Response of Corn to Starter and Broadcast Phosphorus on High Phosphorus Soils

R. E. Rand, E. E. Schulte (UW), C. P. Ellington (PPI)

Phosphorus response; method and time of application; corn

WI023 Forage Management Systems and Evaluation with Livestock and by Laboratory Methods

H. W. Ream, J. M. Scholl, J. M. Sund

Nitrogen rate; bromegrass, orchardgrass, reed canarygrass

WI024 Organic Nutrition and Growth Responses of Hay and Pasture Species

J. M. Scholl, D. Smith

Nitrogen, potassium response; rye, wheat

WI025 Yield Potential of Corn on Plano Silt Loam Soil at Arlington

E. E. Schulte (UW), C. P. Ellington (PPI)

Fertilizer response; corn

WI026 Effect of Tillage Systems on the Nutrient Requirements of Corn

E. E. Schulte, L. M. Walsh

Nitrogen, phosphorus, potassium rate; method of application; corn

WI027 Application of Anhydrous Ammonia with a Cold-Flo Converter for the Preservation of High Moisture Baled Hay

R. A. Swanson (UW), R. M. Mitteness (USS Agri-Chemicals)

Anhydrous ammonia; alfalfa hay

WYOMING

United States Department of Agriculture
Soil, Water, Air Research Service
Cheyenne, Wyoming 82001

WY001 Surface Modification Improves Crested Wheatgrass Production

R. E. Bukwell, G. E. Schuman

Nitrogen, phosphorus response; mine-spoil soil; crested wheatgrass

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WYOMING

WY002 Soil Management for Crop Nutrition in Wyoming

H. W. Hough, P. C. Singleton

Nitrogen rate on alfalfa, barley, wheat, corn silage; nitrogen applied via irrigation water, soil-test correlation; anticrustant

WY003 Breeding and Genetic Studies with Wheat, Oats, Barley

B. J. Kolp

Nitrogen response; wheat

WY004 Water Use Efficiency on Range and Disturbed Lands of the Northern Plains

F. Rauzi

Nitrogen, phosphorus rate; native forage, alfalfa, sweet clover

WY005 Runoff Inducement in the Northern Plains

F. Rauzi

Nitrogen, phosphorus response; erosion control; time of application; alfalfa, wheatgrass

WY006 Runoff Inducement in the Northern Plains

F. Rauzi

Nitrogen, phosphorus rate; highway median; wheatgrass

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NAME OF PLANTS

Common	Scientific
Alfalfa	*Medicago sativa* L.
Artichoke	*Cynara scolymus* L.
Asparagus	*Asparagus officinalis* L.
Avocado	*Persea americana* Mill.
Azaleas	*Rhododendron calendulaceum* (Michx.) Torr.
Bahiagrass	*Paspalum notatum* Fluegge
Barberry, American	*Berberis canadensis* Mill.
Barley	*Hordeum vulgare* L.
Beets	
Garden	*Beta vulgaris* L.
Sugar	*Beta vulgaris* L.
Beggarweed, Florida	*Desmodium tortuosum* (Sw.) DC.
Bentgrass, Colonial	*Agrostis tenuis* Sibth.
Bermudagrass	
Coastal	*Cynodon dactylon* (L.) Pers
Common	*Cynodon dactylon* (L.) Pers.
Midland	*Cynodon dactylon* (L.) Pers.
Birdsfoot Trefoil	*Lotus corniculatus* L.
Blackberry	*Rubus* spp.
Blueberry	
Black highbush	*Vaccinium atrococcum* (A. Gray) A. Heller
Lowbush	*V. angustifolium* Ait.
Blue gamagrass	*Tripsacum dactyloides* (L.) L.
Bluegrass, Kentucky	*Poa pratensis* L.
Bluestem	*Andropogon gerardii* Vitm.
Boxwood, common	*Buxas sempervirens* L.
Boysenberry	*Rubus ursinus*
Brocolli	*Brassica oleracea*
Brome	*Bromus* spp.
Buckwheat	*Fagopyrum esculentum*
Bush bean	*Phaseolus vulgaris* L.
Cabbage	*Brassica oleracea*
Cantaloupe	*Cucumis melo* L.
Carnation	*Dianthus caryophyllus* L.
Carrot	*Daucus carota sativus*
Cauliflower	*Brassica oleracea*
Celery	*Apium graveolens* var. *dulce*
Centipedegrass	*Eremochloa ophiuroides* (Munro) Hack.
Chard, Swiss	*Beta vulgaris*
Chokecherry	*Prunus virginiana* L.
Chrysanthemum, florist's	*Chrysanthemum morifolium*
Clover, red	*Trifolium pratense* L.
Collards	*Brassica oleracea*

Corn	
Field	*Zea mays* L. subsp. *mays*
Sweet	*Zea mays rugosa*
Cotton	*Gossypium hirsutum* L.
Cowpea	*Vigna unguiculata* (L.) Walp.
Cranberry	*Vaccinium macrocarpon* Ait.
Crownvetch	*Coronilla varia* L.
Cucumber	*Cucumis sativus* L.
Dallisgrass	*Paspalum dilatatum* Poir.
Eggplant	*Solanum melongena* L.
Fescue, tall	*Festuca arundinacea*
Filbert	*Corylus* spp.
Flax	*Linum usitatissimum*
Gammagrass, eastern	*Tripsacum dactyloides* (L.) L.
Grapes	*Vitis* spp.
Groundnut (peanut)	*Arachis hypogaea* L.
Hops	*Humulus lupulus* L.
Inkberry	*Ilex glabra*
Ladino clover	*Trifolium repens* L.
Lespedeza, sericea	*Lespedeza sericea* L.
Lettuce	*Lactuca sativa* L.
Limpograss	*Hemarthria altissima*
Lovegrass	*Eragrostis* spp.
Milkvetch, cicer	*Astragalus cicer* L.
Millet	
Common	*Panicum miliaceum* L.
Italian	*Setaria italica* (L.) Beauv.
Mint	*Mentha arvensis* L.
Mung beans	*Vigna radiata* (L.) Wilczek
Muskmelon	*Cucumis melo* L.
Mustard	*Brassica carinata* A. Br.
Native bluegrass	*Poa annua* L.
Oats	*Avena sativa* L.
Okra	*Hibiscus esculentus* L.
Orchardgrass	*Dactylis glomerata* L.
Pangolagrass	*Digitaria decumbens* Stent
Pea, garden	*Pisum sativum* L.
Peanut	*Arachis hypogaea* L.
Pepper	
Bell	*Capsicum annuum*
Sweet	*Capsicum annuum*
Peppermint	*Mentha X piperita* L.
Pineapple	*Ananas comosus* (L.) Merr.
Poinsettia	*Euphorbia pulcherrima*
Potato	
Irish	*Solanum tuberosum* L.
Sweet	*Ipomoea batatas* (L.) Lam.
Pumpkin	*Curcurbita* spp.
Radish	*Raphanus sativus* L.
Raspberry, red	*Rubus idaeus* L.
Rhododendron, catawba	*Rhododendron catawbiense* Michx.
Rice	*Oryza sativa* L.
Rose	*Rose* spp.
Rye	*Secale sereale* L.
Ryegrass, annual	*Lolium multiflorum* Lam.
Sainfoin	*Onobrychis viciifolia* Scop.
Sesame	*Sesamum indicum* L.
Shallot	*Allium cepa* L.

Silverberry	*Elaeagnus commutata* Bernh.
Sorghum, grain	*Sorghum bicolor* (L.) Moench
Soybean	*Glycine max* (L.) Merr.
Spearmint	*Mentha spicata* L.
Spinach	*Spinacia oleracea* L.
Squash	*Cucurbita* spp.
St. Augustine grass	*Stenotaphrum secundatum* (Walt.)
Stargrass	*Cynodon plectostachyus* (K. Schum.) Pilg.
Strawberry, garden	*Fragaria X ananassa* Duch.
Sudangrass	*Sorghum sudanense* (Piper) Stapf
Sugarcane	*Saccharum officinarum* L.
Sunflower	*Helianthus annuus* L.
Sweet clover, yellow	*Melilotus officinalis* Lam.
Switchgrass	*Panicum virgatum* L.
Timothy	*Phleum pratense* L.
Tobacco	*Nicotiana tabacum* L.
Tomato	*Lycopersicon esculentum* Mill.
Trees	
Alder, European	*Alnus glutinosa* L.
Apple	*Malus pumila* Mill.
Ash, green	*Fraxinus pennsylvanica*, Marsh.
Beech, American	*Fagus grandifolia* Ehrh.
Birch, river	*Betula nigra*
Cedar, Eastern red	*Juniperus virginiana* L.
Cherry	*Prunus* spp.
Cottonwood	*Populus deltoides* Marsh.
Cypress	*Taxodium distichum* (L.) Rich
Eucalyptus	*Eucalyptus* spp.
Fig, common	*Ficus carica* L.
Fir, Douglas	*Pseudotsuga menziesii* (Mirbel) Franco
Grapefruit	*Citrus paradisi* Macfad
Hemlock	*Tsuga* spp.
Holly, American	*Ilex opaca*
Juniper	*Juniperus communis* L.
Lemon	*Citrus limon* (L.) Burm. f.
Lime	*Citrus aurantiifolia* (Christm.)
Locust, black	*Robinia pseudoacaia* L.
Macadamia, nut	*Macadamia* spp.
Magnolia, Southern	*Magnolia grandeflora* L.
Maple	*Acer saccharum* L.
Oak	*Quercus* spp.
Orange, sweet	*Citrus sinensis* (L.) Osb.
Papaya	*Carica papaya* L.
Peach	*Prumus persical* (L.) Batsch
Pear	*Pyrus communis* L.
Pine	
Loblolly	*Pinus* spp.
Lodgepole	*Pinus contorta*
Longleaf	*Pinus palustris*
Sand	*Pinus clausa*
Scotch	*Pinus sylvestris* L.
Shortleaf	*Pinus echinata* Mill.
Slash	*Pinus elliottii* Engelm.
Red	*Pinus resinosa* Ait.
Western white	*Pinus monticola* Dougl.
Pistachio, nut	*Pistacia vera* L.
Plum	*Prunus domestica* L.

Poplar	
White	*Poplus alba* L.
Yellow	*Liriodendron tulipifera* L.
Redwood	*Sequoia sempervirens* (D. Don) Endl.
Spruce, red	*Picea rubens* Sarg.
Sweetgum	*Liquidambar styraciflua* L.
Sycamore	*Platanus occidentalis* L.
Walnut, black	*Juglens nigra*
Triticale	*X Triticosecale*
Vetch, hairy	*Vicia villosa*
Watermelon	*Citrullus vulgaris* L.
Wheat	*Triticum aestivum* L.
Wheatgrass, crested	*Agropyron desertorum*
White clover	*Trifolium repens* L.
Wildrice, northern	*Zizania palustris* L.
Wildrye	*Elymus* spp.
Yam	*Dioscorea cayenensis* Lam.
Yew	*Taxus canadensis* Marsh.
Zoysia grass	*Zoysia japonica* Steud.

ABBREVIATIONS USED IN FERTILIZER RESEARCH

Symbol	Product
AN	Ammonium nitrate
APP	Ammonium polyphosphate
AS	Ammonium sulfate
CSP	Concentrated superphosphate
DAP	Diammonium phosphate
DCP	Dicalcium phosphate
IBDU	Isobutylidene diurea
MAP	Monoammonium phosphate
OSP	Ordinary superphosphate
PHA	Phosphonitrilic hexamide
PR	Phosphate rock
PTA	Phosphoryl triamide
SCK	Sulfur-coated potassium chloride
SCU	Sulfurcoated urea
TPP	Triammonium pyrophosphate
TSP	Triple superphosphate
UAN	Urea ammonium nitrate
UF	Urea formaldehyde

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Miller, R. J. CA026, CA031
Miller, R. W. . . . OH013, UT003, UT007
Miller, S. S. GA030
Miller, T. C. MS018
Miller, T. D. TX075
Miller, W. W. NV001
Mills, H. A. GA013, GA016
Minden, A. J. IN013
Miner, G. S. NC022, NC023
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Mitchell, W. H. . . DE004, DE008
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Miyamoto, S. TX049
Mohler, M. A. IN022
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Moline, W. J. NE020
Moncol, D. J. NC005
Mondart, C. L., Jr. LA013, LA019, LA052
Moore, D. P. . . . OR021, OR029
Moore, F. D., III CO013
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Moraghan, J. T. . ND014, ND016, ND018, ND023, ND024
Morgan, T. H. Jr. . TN017, TN022
Morison, I. G. WA008
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Morris, H. D. . . . GA019, GA020
Mortensen, J. A. FL075
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Morton, B. C. . . . SC004, SC005
Mortvedt, J. J. . . CO007, NA010, NA011, NA017, NA018, NA019, NA020, NA021, NA022
Moschler, W. W. . VA007, VA008
Moser, D. E. . . . MO014, MO015, MO016
Moslemi, A. A. ID015
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Mulchi, C. L. . . . MD004, MD005
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Murray, G. A. . . . ID016, ID018
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Myhre, D. L. MS022

Nagel, D. H. . . . AR014, AR015
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Nakayama, R. M. NM015
Naney, J. W. OK035
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Negatu, A. S. TX065
Neiland, B. J. AK005
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Nelson, D. C. ND013

Nelson, D. W. IN014
Nelson, J. M. AZ010
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Oberly, G. H. . . NY015, NY017
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Onken, A. B. . . TX009, TX025, TX028, TX050, TX051, TX052, TX053, TX054, TX055
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Orton, F. R., Jr. NJ010
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Padda, D. S. VI001, VI002, VI003
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Parker, M. B. . . GA045, GA046, GA047
Parks, C. L. SC004, SC005, SC018
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Patel, A. J. AL005
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Patrick, W. H., Jr. LA020, LA021, LA022
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Perry, F. B., Jr. AL027
Pesek, J. T. IA027, IA028
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Phillips, R. E. . . KY005, KY010
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Quance, L. C. NA042
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Raguse, C. A. CA028
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Raney, R. J. . . . KS055, KS056
Rasmussen, P. E. OR036, OR039
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Rauschkolb, R. S. . CA029, CA031
Rauzi, F. WY004, WY005, WY006
Ray, L. L. TX055
Ream, H. W. WI023
Reddy, K. N. AR017
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Rhoads, F. M. . . . FL084, FL085
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Sabbe, W. E. . . . AR006, AR012, AR019, AR020, AR021
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Salako, E. A. KS057
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Savoy, H. J., Jr. MS012
Scanlin, D. C. . . . ID012, ID013
Scarborough, E. N. DE005
Scarsbrook, C. E. . AL028, AL029, AL030
Schank, S. C. FL057
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Scholl, J. M. . . . . WI023, WI02[illegible]
Schoof, R. R. OK034
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Schroder, V. N. FL042
Schruben, L. W. . . KS059, KS060
Schulte, E. E. . . . WI022, WI025, WI026
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Scott, H. D. . . . AR004, AR022
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Scott, T. W. . . . NY018, NY021, NY022, NY023
Seany, R. NY024
Seatz, L. F. . . . TN003, TN020, TN021
Sedberry, J. E., Jr. LA016, LA033
Seeley, J. G. NY002
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Selleck, G. W. . . NY005, NY025, NY026
Shaffer, J. D. MI011
Shallenberger, R. S. NY028
Shannon, J. G. MO025
Sharma, G. C. . . AL005, AL006, AL007
Sharp, M. J. NV003
Sharratt, W. J. . . AK004, AZ004, CA024, CA029, NV002, NV004
Shaw, R. J. RI003, RI005
Shawa, A. Y. . . WA009, WA010, WA023
Shearman, R. C. NE017
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Sheldon, V. L. . . . IL027, IL028, IL029, IL030
Shelton, J. E. . . NC028, NC029
Shepard, R. K. ME009
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Shetron, S. G. . . . MI022, MI023
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Shigeura, G. T. . HI003, NH004, HI009
Shoop, M. C. CO004
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Siddoway, F. H. . MT029, MT031
Sij, J. W. TX078
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Sims, E. T., Jr. SC012
Sims, J. L. KY008, KY006, MT010, MT011
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Sinclair, L. R. FL087
Singh, B. GA002
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Singleton, P. C. WY002
Skaar, P. D. MT002
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Smith, G. R. AK003
Smith, K. L. TX060
Smith, R. L. FL057
Smith, R. T. NA033
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Smith, Y. C. . . . NM003, TX005, TX044, TX049, TX070, TX072
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Sneva, F. A. OR003
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Tamimi, Y. N. . . . HI014, HI015, HI016
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Taylor, A. W. NA028
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Trammel, C. A., Jr. MS013
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Van Buren, N. . . GA013, IN003, KS032, KS037, KS049, NE016, NE028, NE029
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Woodward, R. S. . LA037, LA038
Wooiverton, M. W. MO016
Woon, C. K. AR037
Wooten, O. B. MS017
Workman, J. P. . . UT002, UT009
Wright, D. L. VA006
Wright, J. R. MT030
Wright, R. D. . . VA005, VA009
Wu, I. P. HI011

Young, J. L. IA038
Young, R. A. . . MN002, NV003, NV005
Young, T. W. . . . FL061, FL062
Youngberg, C. T. OR034
Yuan, T. L. FL026, FL051

Zantua, M. I. IA039
Zapata, J. PR006
Zasada, Z. A. MN003
Zasoski, R. J. WA007
Zech, A. C. MO002, MO003, MO004
Zublena, J. NJ019
Zubriski, J. C. . . ND005, ND007, ND014, ND017, ND019, ND023
Zwerman, P. J. NY004

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Amaranth, nitrogen, rate of application, HI010
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time of application, potato, CT002
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Ammonium Fertilizer, nitrification inhibition, N-Serve, WI011
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broadcast application, field crop, NY003
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TX036
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response, bentgrass, WA020, bluegrass, NE017, WA020, choke cherry, ND030, Christmas tree, WA032, corn, TN013, ground cover, NE017, pepper, FL064, pine, AL034, poplar, AL034, silverberry, ND030, snowberry, ND030, sunflower, ND007, sweetgum, AL034, sycamore, AL034, tomato, FL064, turf, SC008, wheat, WA032
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time of application, alfalfa, ND014, barley, ND014, bermudagrass, KS027, LA002, bromegrass, KS069, corn, MD019, MN006, MN024, MT022, ND014, cottonwood, MS016, potato, ND014, rice, NA003, small grain, MN024, ND026, soybean, MD019, strawberry, FL016, sugar beet, MT022, ND014, sunflower, ND014, sweetgum, MS017, walnut, KS019, wheat, ND014, ND028, NE031, WA027
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response, choke cherry, ND030, Christmas tree, WA032, wheat, WA032
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Ammonium Phosphate
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rate of application, corn, KS028
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Ammonium Phosphate Sulfate
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Ammonium Polyphosphate
band application, corn, NE034, soybean, NE034
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efficiency, corn, KS042, grain sorghum, KS042, wheat, KS042
fluid application, corn, KS025, NC001, NE034, corn forage, NA010, grain sorghum, KS025, TX044, grass, KS026, KS032, soybean, NC001, NE034, zinc, NA010
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placement, wheat, KS024
rate of application, corn, KS028, KS043, MN005, NA013, NC001, NE034, NE037, fescue, NA013, sorghum, KS043, soybean, NC001, NE034, wheat, KS024
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Ammonium Polysulfide, saline soils, reclamation, AZ013
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control release, N-Serve, GA006, ID016, TX036
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grass tetany, bromegrass, NY010
hexon, spinach, MA005
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N-Serve, bean, WI013, corn, GA005, IN014, WI013, cucumber, MA004, fescue, GA006, nitrate-nitrogen, TX035, potato, WI013, radish, MA004, spinach, MA005, wheat, ID016
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salt balance, grain sorghum, TX046
terrazole, corn, IN014
time of application, alfalfa, ND014, barley, ND014, bean, WI013, corn, ND014, pepper, FL038, rice, NA003, NA009, wheat, ID016, ND014
transformation, alfalfa, OH021, bermudagrass, TX026, corn, KS041, OH021, fir, WA038, flooded soil, CA025, fungicide effect, IL030, grass, OH021, hemlock, WA038, high carbonate soil, TX018, millet, AL028, CO025, rice, LA020, LA021, LA022, soil, FL038, spinach, MA005, wheat, KS050
truban, spinach, MA005
uptake, alfalfa, OH021, corn, OH021, grass, OH021
Ammonium Sulfate Phosphate, rate of application, small grain, MT008
Ammonium-Nitrogen
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response, corn, IL003, soybean, IL008
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Analysis, boron, fertilizer materials, MO034
Anhydrous Ammonia
acidulation, irrigation application, NE004
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Animal Waste, rate of application, potato, WA017
Apple
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co-op iron, rate of application, CO019
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sis, WA016, source comparison, CO020
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Aquatic Plants
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Arsenic
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Artichoke
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Artificial Soil soil test correlation, tomato, NJ017
Asean Group, regional cooperation, distribution, NA002
Ash, nutrient management, forest, NY034
Asparagus
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fertilizer, management, OH030, rate of application, OH030
flyash, rate of application, OH030
Aspen
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potassium chloride, response, AK001
ATC, urea transformation, nitrification inhibitor, IA010
Athletic Field
controlled-release, nitrogen, IN007
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Avocado
aluminum sulfate, rate of application, FL062
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copper, plant analysis, CA038, uptake, CA038
iron, leaf analysis, CA038, uptake, CA038
iron EDDHA, uptake, FL062
iron EDTA, rate of application, FL062
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osmocote, response, FL063
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plant analysis, copper, CA038, magnesium, CA038, nitrogen, CA038, phosphorus, CA038, potassium, CA038, zinc, CA038
potassium, response, FL062, uptake, CA038
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sulfur-coated urea, response, FL063
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Azalea
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bark, growth media, VA009
calcium nitrate, rate of application, SC013
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ureaform, rate of application, OR002
Bahiagrass
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phosphorus, rate of application, TX077
potassium, rate of application, TX077
Banana
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nitrogen, rate of application, HI017, PR015
phosphorus, rate of application, PR015
potassium, rate of application, HI017, PR015
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ammonium polyphosphate, corn, NE034, soybean, NE034
calcium, grape, WA033, tree fruit, WA033
concentrated superphosphate, sweet corn, NY029
cyanuric acid, container-grown plant, CA012
fertilizer, corn, MO020, NE029, field crop, NH003, vegetable crop, NH003
high-phosphorus soil, corn, WI022
nitrogen solution, field crop, NY003
phosphorus, corn, WI017, WI022, potato, WI017, sweet corn, NY029
potassium chloride, sweet corn, NY029
salt effect, corn, NE029
urea, field crop, NY003, sweet corn, NY029
zinc EDTA, corn, NE034
zinc oxide, corn, NE034
zinc sulfate, corn, NE034
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Barberry
IBDU, rate of application, SC014, response, SC014
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sulfur-coated urea, rate of application, SC014
urea formaldehyde, rate of application, SC014
Barge, public policy, distribution, IA004, transportation, IA004
Bark
growth media, azalea, VA009, holly, VA009
nutrient management, asparagus, OH030, ornamental, OH030
potassium, soil test correlation, AL027
rate of application, asparagus, OH030, ornamental, OH030
soil mixture, nutrient management, LA046, soil test correlation, AL027, NJ017
Barley
ammonium nitrate, no-till, MT027, placement, SD001, rate of application, MD007, MT027, ND014, ND027, SD001, time of application, ND014
ammonium phosphate, placement, MT003
ammonium sulfate, placement, SD001, rate of application, ND014, SD001, time of application, ND014
anhydrous ammonia, placement, SD001, rate of application, SD001
boron, plant analysis, OR020, rate of application, OR020

broiler litter, rate of application, MD007
concentrated superphosphate, placement, SD001, rate of application, SD001
copper, uptake, OR024
crop residue, nitrogen, MT029, phosphorus, MT029
dairy manure, rate of application, AZ017
fertilizer, double cropping, NJ013, management, NJ013, NM004, TN003, rate of application, TN003, response, AZ016, NM004
lime, rate of application, OR020
manganese, rate of application, OR024, uptake, OR024
micronutrients, sewage sludge, CA008
mixed fertilizer, rate of application, AK006, variety, AR006
molybdenum, plant analysis, OR020, rate of application, OR020
municipal wastewater, rate of application, AZ016
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phosphorus, method of application, MT009, no-till, MT027, plant analysis, ND014, OR020, rate of application, ID002, MT009, MT012, MT027, MT029, ND014, OR020, soil test correlation, ID002, time of application, MT009, ND014, uptake, CA008, OR024
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sodium nitrate, rate of application, MD007
sulfur, placement, SD001, rate of application, OR020, SD001, uptake, CA008
sulfur-coated urea, rate of application, MD007
urea, no-till, MT027, placement, SD001, rate of application, MD007, MT012, MT027, ND014, ND027, SD001, time of application, ND014
winter hardiness, nitrogen, NY013, phosphorus, NY013
Bayfolan, foliar application, soybean, IA042
Bean
ammonium nitrate, placement, IN020, rate of application, IN020
ammonium sulfate, N-Serve, WI013, placement, IN020, rate of application, IN020, WI013, time of application, WI013
boron, uptake, IN020
calcium carbonate, placement, IN020, rate of application, IN020
calcium nitrate, placement, IN020, rate of application, GA041, IN020
diammonium phosphate, N-Serve, WI013, placement, WI013
fertilizer, irrigation application, FL020, management, CO005, LA037, mine-spoil soil, WV001
fluid application, mine-spoil soil, WV001, rate of application, CO005, FL020, LA037
lime, mine-spoil soil, WV001, rate of application, NH006, PR005, PR014, tropical soil, PR014
magnesium, placement, IN020, rate of application, IN020
manganese, uptake, IN020
micronutrients, rate of application, PR005, uptake, IN020
monocalcium phosphate, mine-spoil soil, VA003
nitrogen, management, LA009, placement, IN020, rate of application, IN020, LA009, MS001, PR005, PR012, TN009, VA003, seed protein, WI003
nitrogen fixation, metabolism, WI003, Rhizobium, ID001
nitrogen-phosphorus-potassium-sulfur combination, foliar application, MI014
nitrogen-phosphorus-potassium-sulfur-boron combination, foliar application, MI014
nutrient efficiency, rate of application, FL020
phosphorus, management, LA009, placement, IN020, rate of application, GA016, ID002, IN020, LA009, MS001, PR005, PR012, TN009, WA014, soil test correlation, ID002, GA016
plant analysis, phosphorus, GA016, potassium GA016
potassium, effect on quality, LA009, management, LA009, placement, IN020, rate of application, GA016, GA041, IN020, LA009, MS001, PR005, PR012, TN009
potassium frit, placement, IN020
potassium nitrate, irrigation, GA041, rate of application, GA041
rock phosphate, mine-spoil soil, VA003, WV001
soil test correlation, phosphorus, GA016, ID002, potassium, GA016
sulfur-coated urea, placement, WI013
urea, N-Serve, WI013, placement, IN020, rate of application, IN020
zinc, uptake, IN020
zinc EDTA, rate of application, WA014
zinc sulfate, rate of application, WA014
Beech
fertilizer, management, NH005
lime, response, NH005
nutrient management, lime, NH005, NY034
Beet
nitrogen, rate of application, WI021
phosphorus, rate of application, WI021
potassium, rate of application, WI021
Beggarweed
copper, rate of application, FL023
lime, rate of application, FL023
phosphorus, rate of application, FL023
potassium, rate of application, FL023
Bentgrass
ammonium nitrate, rate of application, MI007, WA020, response, WA020, turf, WA020
ammonium sulfate, rate of application, AZ011
boron, response, WI018
calcium, deficiency symptom, WI018
controlled-release fertilizer, rate of application, TN008
copper, deficiency symptom, WI018
fertilizer, management, KS010
herbicide, rate of application, NJ008
IBDU, rate of application, AZ011, MI007, PA007
iron, deficiency symptom, WI018
lime, rate of application, NJ008
manganese, deficiency symptom, WI018
management, micronutrients, KS010
micronutrients, rate of application, KS010
milorganite, rate of application, MI007
nitrogen, deficiency symptom, WI018, pulp mill sludge, PA007, quality, OH004, rate of application, MI007, NJ008
phosphorus, deficiency symptom, WI018, quality, OH004, rate of

application, NH008
plant analysis, nitrogen, OR004, phosphorus, OH004, potassium, AR014
potassium, deficiency symptom, WI018, quality, OH004, rate of application, NH008
sludge, pulpmill, PA007
sulfur, deficiency symptom, WI018
sulfur-coated urea, rate of application, MI007, PA007, response, PA007
urea, rate of application, AZ011, MI007, response, PA007, turf, WA020
urea formaldehyde, rate of application, AZ011, MI007, response, MI007
ureaform, response, MI007, PA007
zinc, uptake, WI018
Bermudagrass
Ammonium nitrate, rate of application, FL010, FL011, KS027, LA002, LA019, LA051, LA052, TX033, TX058, time of application, KS027, LA002, uptake, AR015
ammonium nitrate solution, transformation, TX026
ammonium nitrate sulfate, rate of application, SC004, time of application, SC004
ammonium sulfate, rate of application, TX026, TX033, TX058, transformation, TX026
anhydrous ammonia, rate of application, TX033
boron, deficiency symptom, WI018, establishment, AR023, rate of application, AR023, GA054, soil test correlation, OK025
calcium deficiency symptom, WI018
calcium carbonate, uptake, AR015
calcium potassium phosphate, rate of application, FL027
controlled-release fertilizer, rate of application, TN008
copper, deficiency symptom, WI018
dairy manure, rate of application, AZ017
deficiency symptom, boron, WI018, calcium, WI018, copper, WI018, iron, WI018, magnesium, WI018, manganese, WI018, molybdenum, WI018, nitrogen, WI018, phosphorus, WI018, potassium, WI018, sulfur, WI018, zinc, WI018
establishment, boron, AR023
fertilizer, method of application, AR025, mine-spoil soil, WV001, rate of application, AL019, GA008, response, AZ016, seed production, WA019, time of application, AR025, turf, GA008, LA002
greensand, rate of application, FL027
gypsum, rate of application, TX030
IBDU, rate of application, FL010, HI013, turf, FL010, HI013
iron, deficiency symptom, WI018, turf, HI013
lime, mine-spoil soil, KY002, KY003, KY007, WV001, placement, NA016, plant analysis, AR014
magnesium, rate of application, FL027, TX030
manganese, deficiency symptom, WI018
milorganite, rate of application, LA002, time of application, LA002
mine-spoil soil, lime, KY002, KY003, KY007, WV001, monocalcium phosphate, KY007, nitrogen, KY007, phosphorus, KY003, KY007, potassium, KY007
molybdenum, deficiency symptom, WI018
municipal wastewater, response, AZ016
nitrogen, deficiency symptom, WI018, multiple cropping, OK008, N-Serve, TX035, plant analysis, AR014, TX067, rate of application, AR001, AL019, FL027, GA003, GA042, LA019, LA051, MO029, MS004, MS005, NA016, NC005, NC014, OK004, OK008, TN010, TN016, TX056, TX062, response, AR001, source, OK004, time of application, OK004, TX067
nitrogen solution, rate of application, GA019
nitrogen-phosphorus-potassium combination, rate of application, AR011, TX030
phosphoric acid, rate of application, GA019
phosphorus, deficiency symptom, WI018, mine-spoil soil, KY002, KY003, KY007, multiple cropping, OK008, rate of application, LA002, LA019, OK008, TX032, TX056, soil phosphorus, TX027, soil test correlation, OK025
plant analysis, lime, AR014, nitrogen, AR014, FL010, TX067, potassium, AR014
potassium, application, TX057, deficiency symptom, WI018, forage quality, TX057, management, LA048, method of application, LA048, multiple cropping, OK008, plant analysis, AR014, rate of application, AR001, FL019, GA019, LA002, LA019, LA048, NA016, OK008, TX032, TX056, response, AL021, AR001, OK008, TX032, soil test correlation, OK025, stand recovery, TX057, uptake, AR015
potassium carbonate, rate of application, FL027, uptake, AR015
potassium frit, rate of application, FL027
potassium sulfate, rate of application, FL027
pulp effluent, rate of application, AR011
refinery sludge, rate of application, AR011
rock phosphate, mine-spoil soil, WV001
sewage sludge, rate of application, AZ016, GA008, HI013, transformation, GA008
sulfur, deficiency symptom, TX030, WI018, rate of application, LA019, TX030, TX056
sulfur-coated urea, rate of application, FL056, GA019, HI013, NC005, OK012, TX030, TX058, TX070
turf, ammonium nitrate, FL010, IBDU, FL010, urea, FL010, HI013, NV004, urea formaldehyde, FL010
urea, foliar application, TX070, rate of application, CA029, CO016, FL010, GA019, KS027, LA052, SC004, TX030, TX048, WA023, time of application, SC004, transformation, TX026
urea formaldehyde, rate of application, FL010, HI013, LA002, time of application, LA002
urea-ammonium phosphate, rate of application, SC004, time of application, SC004
urea-ammonium sulfate, rate of application, SC004, time of application, SC004
zinc, application, TX035, uptake, TX035, WI018
Birch
ammonium nitrate, nutrient cycling, AK001
concentrated superphosphate, response, AK001
fertilizer, management, NH005
lime, management, NH005
potassium chloride, nutrient cycling, AK001
Birdsfoot Trefoil
fertilizer, application, MI001
lime, rate of application, NA027, VA015
nitrogen, rate of application, VA015
potassium, rate of application, MI001
rock phosphate, rate of application, NA027, VA015
sewage, rate of application, NA027
Blackberry
fertilization, sprinkle irrigation, OR001, trickle irrigation, OR001
manure, quality, TX065, response, TX065
nitrogen, rate of application, LA047, TX059

phosphorus, rate of application, LA047, TX059
potassium, quality, TX065, rate of application, LA047, TX059, response, TX065
Blackland Soil, urea, bermudagrass, TX026
Blood Meal, blueberry, propagation, NJ004
Blue Grama
nitrogen, rate of application, ND020, NM010, NM011
phosphorus, rate of application, ND020
potassium, rate of application, ND020
Blueberry
blood meal, propagation, NJ004
boron, rate of application, NC012
fertilizer, management, ME004
magnesium, rate of application, NJ006
nitrogen, application, LA009, irrigation, GA033, management, LA009, rate of application, GA033, LA009, LA047, ME003, NC012, NJ006
nitrogen-phosphorus-potassium combination, rate of application, GA032
osmocote, propagation, NJ004
phosphorus, application, LA009, management, LA009, rate of application, GA033, LA047, NC012, NJ006, uptake, NC011
potassium, application, LA009, rate of application, GA033, LA047, NC012
potassium sulfate, rate of application, NJ006
quality, plant nutrients, LA009
sulfur-coated muriate of potash, rate of application, WA023
sulfur-coated urea, rate of application, WA023
urea, rate of application, NJ004
urea ammonium phosphate, rate of application, WA023
Bluegrass
ammonium nitrate, rate of application, MI007, NE017, WA020, response, NE017, WA020, turf, NE017, WA020
boron, response, WI018
calcium, deficiency symptom, WI018
controlled-release nitrogen, response, IN007
copper, deficiency symptom, WI018
diammonium phosphate, disease, RI002
fertilizer, application, KS010, OR042, irrigation, GA033, WA019, rate of application, GA008, seed production, WA019
herbicide, rate of application, NJ008
IBDU, rate of application, MI007, NE017, PA007, response, NE017, PA007, turf, NE017
iron, deficiency symptom, WI018
lime, rate of application, NJ008
magnesium, rate of application, NJ006
management, micronutrients, KS010
methylene urea, turf, NE017
micronutrients, application, KS010, WI018
milorganite, rate of application, MI007
molybdenum, uptake, WI018
nitrogen, control release, IN007, deficiency symptom, WI018, disease, RI002, irrigation, NV003, method of application, WA023, placement, WI009, pulp mill sludge, PA007, quality, OH004, rate of application, MI007, MN015, MS004, NJ008, NV003, NV005, RI002, residual effect, MD018, response, NA032, OH013, source, NV005, time of application, MN015
osmocote, groundcover, NE017
phosphorus, deficiency symptom, WI018, disease, RI002, placement, WI009, quality, OH009, rate of application, NJ008, RI002, response, NA032
plant analysis, nitrogen, OR004, phosphorus, OH004, potassium, OH004
potassium, deficiency, WI018, disease, RI002, quality, OH004, rate of application, NJ008, RI002, response, NA032, uptake, NH004
pulp mill sludge, response, PA007
sewage sludge, rate of application, MI007, NE017, PA007, PA027, transformation, GA008
urea, rate of application, MI007, PA007, WA020, turf, WA020
urea formaldehyde, rate of application, MI007, NE017, turf, NE017
ureaform, response, MI007, PA007
zinc, uptake, WI018
Bluestem
fertilization, burning, OK011, management, OK011, rate of application, OK011
nitrogen, analysis, IA018, management, IA018, rate of application, KS021, KS052
Borate 65, rate of application, grape, OH019, peach, OH019
Borax, rate of application, corn, MN005
Boron (see also specific sources: Borate 65, Borax, Sodium Tetraborate, Solubor)
analysis, fertilizer materials, MO034, grain sorghum, MN001
application, corn, TN001
container grown plants, chrysanthemum, NY002, poinsettia, NY002, rose, NY002
deficiency symptom, bentgrass, WI018, bermudagrass, WI018, bluegrass, WI018
establishment, bermudagrass, AR023
foliar application, corn, MO022, cranberry, WA009, filbert, OR011, prune, OR011, soybean, MT006, MO022, NC003, uptake, AL032, watermelon, FL073
irrigation, corn, DE008
management, alfalfa, MT019, apple, MA001, corn, KS005, grass, MT019, oat, NA034, sorghum, KS005, NA034, tomato, NA034, wheat, KS005
method of application, alfalfa, MT019, apple, MA001, grass, MT019, pepper, MS002, sugar beet, MT005, tomato, MS002, watermelon, MS002
plant analysis, alfalfa, TX039, barley, OR020, grain sorghum, MN001, grape, WA033, ladino clover, NJ014, onion, OR021, orchardgrass, NJ014, subterranean clover, OR020, sunflower, TX039, table beet, OR021, tree fruit, WA033, wheat, OR020
quality, potato, WA028
rate of application, alfalfa, TN011, apple, MA001, TN011, barley, OR020, bermudagrass, AR023, GA054, blueberry, NC012, chrysanthemum, NY002, clover, GA053, corn, DE008, GA005, GA054, IN001, SC015, SC018, TN011, cotton, TN011, fescue, AR023, forage, MN005, grain crop, NM005, grain sorghum, NM001, grape, NC012, ladino clover, NJ014, onion, OR021, orchardgrass, NJ014, peanut, FL067, GA054, poinsettia, NY002, potato, WA015, WA028, rose, NY002, soybean, AL026, GA054, MN018, SC015, SC016, SC018, TN011, subterranean clover, OR020, table beet, OR021, vegetables, TN011, wheat, OR020, white clover, AR023
response, avocado, FL062, clover, TX039, cotton, TX001, peanut, AL009, sunflower, TX039
soil acidity, corn, AL026, soybean, AL026
soil test correlation, alfalfa, TX039, bermudagrass, OK025, clover, TX039, cotton, AR021, fescue, OK025, grain sorghum, NM001, ladino clover, NJ014, orchardgrass, NJ014, potato, WA015, sunflower, TX039
time of application, alfalfa, MT019, grass, MT019, pepper, MS002, potato, NY005, tomato, MS002, watermelon, MS002
toxicity, grape, CA015
uptake, alfalfa, TX039, bean, IN020, carrot, NY007, clover, TX039, cot-

ton, AR021, filbert, OR033, foliar application, AL032, OR011, ladino clover, NJ014, orchardgrass, NJ014, plum, OR033, soybean, AR021, sugar beet, MI016, sunflower, TX039, vegetable, NY007
Boxwood
IBDU, rate of application, SC014, response, SC014
resin-coated urea, rate of application, SC014
sulfur-coated urea, rate of application, SC014
urea formaldehyde, rate of application, SC014
Boysenberry, fertilization, irrigation, OR001
Broadcast Application
ammonium nitrate, field crop, NY003
nitrogen solution, field crop, NY003
phosphorus, corn, WI022
urea, field crop, NY003
Broccoli
ammonium nitrate, rate of application, WA011
nitrogen, plant analysis, WI020, rate of application, WI020, response, TX023, transformation, TX023
phosphorus, plant analysis, WI020, rate of application, WA011, WI020
plant analysis, nitrogen, WI020, phosphorus, WI020, potassium, WI020
potassium, plant analysis, WI020, rate of application, WI020
Broiler Litter
no-till, corn, MD008
rate of application, barley, MD007, corn, MD007, oat, MD007, wheat, MD007
Bromegrass
ammonium nitrate, fluid application, ND033, rate of application, AK002, AK003, AK004, MI012, ND033, NY010, time of application, KS069
ammonium sulfate, grass tetany, NY010, response, NY010
anhydrous ammonia, rate of application, NE036
calcium nitrate, grass tetany, KS073, NY010, rate of application, KS073, NY010
fertilizer, irrigation, WA019, response, IA019, WA019, seed production, WA019
grass tetany, ammonium sulfate, NY010, calcium nitrate, KS073, NY010, urea, KS073
irrigation, anhydrous ammonia, NE036, fertilization, WA019, nitrogen, NV003, TX080, phosphorus, NE036, potassium, NE036
nitrogen, fluid application, ND033, management, KS072, no-till, KS035, rate of application, IA016, KS035, ND020, ND021, NV003, TX079, TX080, WI023, source, IA016, KS036, time of application, CO020, IA016
nitrogen solution, fluid application, ND033, response, ND033
phosphorus, fluid application, ND033, management, KS072, no-till, KS035, rate of application, AK002, AK003, AK005, KS035, ND020, ND033, NE036, time of application, CO020
plant analysis, nitrogen, IA016, MI012
potassium, fluid application, ND033, management, KS072, rate of application, AK002, AK003, ND020, ND033, NE035
potassium sulfate, response, AK004
sulfur, rate of application, AK002, AK003
sulfur-coated urea, rate of application, AK004, ND033, time of application, KS069
urea formaldehyde, rate of application, ND033
urea-ammonium nitrate, time of application, KS069
urea-ammonium nitrate solution, time of application, KS069
urea-ammonium sulfate, time of application, KS069
Buckwheat
fertilizer, mine-spoil soil, WV001
lime, mine-spoil soil, WV001
nitrogen, rate of application, ME006
phosphorus, rate of application, ME006
potassium, rate of application, ME006
rock phosphate, mine-spoil soil, WV001
Bulk Handling
ammonium phosphate, corn, MO008, wheat, MO008
distribution, agricultural chemical, GA021, fertilizer, IN009
seed, distribution, GA021
storage, transportation, MN009
Bushbean, nitrogen-phosphorus-potassium combination, rate of application, HI011
Cabbage
ammonium nitrate, rate of application, TX061
fertilizer, mine-spoil soil, WV001, soil test correlation, NJ009
lime, mine-spoil soil, WV001, rate of application, PR005, soil test correlation, NJ009
micronutrients, rate of application, PR005
nitrogen, leaf analysis, WI020, rate of application, FL087, MS001, PR005, PR012, TN009, WI020
phosphorus, rate of application, MS001, PR005, PR012, TN009, WI020
plant analysis, nitrogen, WI020, potassium, WI020
potassium, plant analysis, WI020, rate of application, FL055, MS001, PR005, PR012, TN009, WI020, time of application, FL055
rock phosphate, mine-spoil soil, WV001
sulfur-coated urea, rate of application, TX061
Cadmium (see also specific sources: Cadmium Phosphate)
feedlot manure, uptake, CA034
interaction, calcium, OH020, potassium, OH020, sewage sludge, NA008
transformation, crop residue, CA034
uptake, corn, NA017, feedlot manure, CA034, soybean, OH020, vegetables, NA008
Cadmium Phosphate, rate of application, phosphate, NA019
Calcium (see also specific sources: Calcium Carbonate, Calcium Chelates, Calcium Chloride, Calcium Hydroxide, Calcium Nitrate, Calcium Potassium Phosphate, Calcium Oxide, Calcium Silicate, Calcium Silicate Slag, Calcium Sulfate, Gypsum, Magical, Monocalcium Phosphate)
analysis, water, FL011
band application, grape, WA033, tree fruit, WA033
deficiency symptom, bentgrass, WI018, bermudagrass, WI018, bluegrass, WI018
effect on quality, apple, WA016
foliar application, apple, GA030, cranberry, WA009, response, AL032, rose, MO035, watermelon, FL073
interaction, cadmium, OH020, irrigation, KS018, magnesium, SC005, zinc, MA007
irrigation, ammonium polyphosphate, KS018, interaction, KS018, peanut, GA039
management, peanut, GA049
plant analysis, apple, WA016, orange, FL070, peach, WA016
quality, peach, WA016
rate of application, apple, WA016, corn, FL043, GA039, papaya, HI002, peach, WA016, peanut, GA039, pine, OR034, plantain, PR001, potatoes, FL043, potato scab, ID004, rice, PR001, soybean, LA056, tanier, PR001, wild yam, PR001
response, alfalfa, OH012, carrot, NY007, cotton, AR021, foliar application, AL032, rice, KY008, soybean, AR021, OH012, wheat,

OR029, vegetables, NY007
soil test correlation, cotton, AR021, orange, FL070, sweet corn, PA004
tundra, soil, NJ003
zinc uptake, MA007
Calcium Carbonate (see also: Lime)
placement, bean, IN020
rate of application, bean, IN020, corn, HI006, soybean, AR029
uptake, bermudagrass, AR015
Calcium Chelate, response, peanut, GA052
Calcium Chloride
placement, bean, IN020
rate of application, bean, IN020, peanut, GA052, tobacco, MD005
Calcium Hydroxide, rate of application, macadamia, HI009
Calcium Nitrate
denitrification, soil, IL001
foliar application, rose, MO035, soybean, MN019
grass tetany, bromegrass, KS073, NY010
irrigation application, apple, AR018, bean, GA041, cucumber, GA041, peach, AR018, pepper, GA041, squash, GA041, tomato, GA041
nitrate-nitrogen, movement, OK001
N-Serve, corn, OH008
placement, bean, IN020
rate of application, azalea, SC013, bean, GA041, IN020, bromegrass, KS073, NY010, cucumber, GA041, forage, KS012, grass tetany, KS012, holly, SC013, pepper, GA041, potato, AL022, WA017, rose, MO035, snap bean, AL022, squash, GA041, tobacco, KY006, MD005, tomato, AL022, GA041
response, bromegrass, KS073, NY010
transformation, denitrification, IL001, soil, IL001
Calcium Oxide, granule size, peanut, AL008
Calcium Potassium Phosphate, rate of application, bermudagrass, FL027, ryegrass, FL027
Calcium Silicate, rate of application, corn, HI006
Calcium Silicate Slag
rate of application, sugarcane, FL006
response, sugarcane, FL004
Calcium Sulfate, granule size, peanut, AL008
Cantaloupe
ammonium sulfate, rate of application, CA020
lime, rate of application, PR005
micronutrients, rate of application, PR005
nitrogen, rate of application, AZ012, PR005, PR012
phosphorus, rate of application, AZ012, PR005, PR012
plant analysis, nitrogen, CA020, phosphorus, CA020
phosphorus, response, CA020
potassium, rate of application, PR005, PR012, response, CA020
urea, rate of application, CA020
Camellia
nitrogen-phosphorus-potassium combination, rate of application, FL040
osmocote, rate of application, FL040
urea-formaldehyde, rate of application, FL040
Carnation
nitrogen, rate of application, RI005
phosphorus, rate of application, RI005
potassium, rate of application, RI005
Carrot
boron, uptake, NY007
calcium, response, NY007
nitrogen, management, FL039, rate of application, AZ012, FL003, FL039, TX073
nitrogen-phosphorus combination, fluid application, FL003, placement, FL003
phosphorus, management, FL039, rate of application, AZ012, FL003, FL039, soil test correlation, FL003
potassium, management, FL039, rate of application, FL003, FL039
soil test correlation, nitrogen, FL003, organic soil, FL003, phosphorus, FL003, potassium, FL003
Cauliflower
ammonium nitrate, rate of application, WA011
nitrogen, plant analysis, WI020, rate of application, WI020
phosphorus, plant analysis, WI020, rate of application, WA011, WI020
potassium, plant analysis, WI020, rate of application, WI020
Cedar, fertilizer, management, ID015
Celery
ammonium nitrate, rate of application, CA024
ammonium sulfate, rate of application, CA024
irrigation, trickle, CA024
sulfur-coated nitrogen-phosphorus-potassium, rate of application, CA024
urea, rate of application, CA024
Cement
mine-spoil reclamation, corn, OH001
rate of application, corn, IN018, soybean, IN018
Centipedegrass
iron, rate of application, AL014
lime, rate of application, PR013
nitrogen, rate of application, AL014, MS004, PR013, SC009, turf, AL014
phosphorus, rate of application, AL014, PR013, SC009, turf, AL014
potassium, rate of application, AL014, PR013, SC009, turf, AL014
Chard
ammonium nitrate, rate of application, NA005
phosphorus, rate of application, NA005
potassium, rate of application, NA005
sulfur-coated urea, rate of application, NA005
Chemical Analysis
fertilizer, MO034, NA012
heavy metal, NA012
micronutrients, NA012
nitrogen, NA012
organic material, NA012
phosphorus, NA012
potassium, NA012
quality control, NA012
Cherry
control-release fertilizer, response, WI010
copper, foliar application, WI010
fertilizer, irrigation application, MI004, response, OH023
iron, foliar application, WI010
manganese, foliar application, WI010
zinc, foliar application, WI010, uptake, WI010
Chicken Manure
mine-spoil reclamation, corn, WV004
response, onion, CO005, sweet corn, CO005, OR027
Chip-Sulfur, rate of application, wheat, ID006
Chlorine (see also specific sources: Calcium Chloride, Magnesium Chloride, Potassium Chloride)
movement, soil, AR010
quality effects, potato, VA005, sweet potato, VA005, wheat, MT005, MT021
rate of application, potato, VA005, sweet potato, VA005, tobacco, KY006
response, wheat, MT021
root rot, wheat, OR018
uptake, wheat, MT005
Choke Cherry
ammonium nitrate, response, ND030
ammonium nitrate sulfate, response, ND030
sulfur-coated urea, response, ND030
urea formaldehyde, response, ND030
Christmas Tree
ammonium nitrate, response, WA032
ammonium nitrate sulfate, response, WA032
controlled-release fertilizer, response, GA010
fertilizer, management, MN003

phosphorus, source, NC029, response, AL001, LA006
lime, rate of application, NC029
mixed fertilizer, rate of application, AL001
nitrogen, management, MN003, rate of application, NC029, source, NC029
nitrogen-phosphorus-potassium combination, rate of application, WA032
phosphorus, rate of application, NC029, source, NC029
potassium, management, MN003, rate of application, NC029, source, NC029
sulfur, rate of application, NC029
urea, rate of application, WA032
Chromium, heavy metal, corn, NA019
Chrysanthemum
boron, rate of application, NY002
fertilizer, rate of application, VA016
manganese, rate of application, NY002
nitrogen, rate of application, FL014, NY002, OK023, RI005
nitrogen-phosphorus-potassium combination, fluid application, FL014
osmocote, rate of application, FL014
phosphorus, rate of application, FL014, OK023, RI005
potassium, rate of application, FL014, NY002, OK023, RI005
sewage sludge, rate of application, NY002
sulfur-coated urea, response, AL007
Citrus
ammonium nitrate, rate of application, FL071
fertilizer, rate of application, FL022, response, FL022
iron disulfide, foliar application, FL017, rate of application, FL017
irrigation, basin, AZ007, micronutrients, AZ007, nitrogen, AZ007, phosphorus, AZ007
micronutrients, rate of application, AZ007
nitrogen, management, AZ007, FL035, LA005, TX022, time of application, TX022, transformation, TX023
phosphorus, management, LA005, rate of application, AZ007, FL035
potassium, management, LA005, rate of application, FL035
sulfur-coated urea, rate of application, FL071
Clover
ammonium nitrate, rate of application, AK002, LA051, LA052, LA054
boron, rate of application, GA053, OR020, response, TX039, soil test correlation, TX039, uptake, TX039
fertilizer, rate of application, TN022
lime, placement, FL030, rate of application, FL029, FL030, LA042, NA027, VA015
micronutrients, rate of application, FL029, TX013
molybdenum, rate of application, GA053, OR020
nitrogen, forage quality, LA013, management, LA013, rate of application, AL010, FL029, FL086, LA042, TN015, TN016, TN022, VA015, WV003
phosphorus, rate of application, AK002, AL010, FL029, GA053, LA042, MS012, WV003
potassium, rate of application, AK002, AL010, FL029, GA053, LA042, MS012, WV003
rock phosphate, rate of application, NA027, VA015
sewage sludge, rate of application, NA027
sodium, rate of application, FL029
soil test correlation, boron, TX039
sulfur, rate of application, AK002, FL029
sulfuric acid, application, TX013
urea, rate of application, AK002, LA052
Clover-Grass Pasture
molybdenum, rate of application, OR015
sulfur, rate of application, OR015
Co-op Iron, rate of application, apple, CO020, peach, CO017
Cobalt
response, grass, CA030
uptake, grass, CA030
Coffee, nitrogen, rate of application, HI004, time of application, HI004
Collard
magnesium sulfate, rate of application, NY009
nitrogen, rate of application, GA037, NY018
poultry manure, rate of application, NY018
Colloidal Potash, rate of application, loblolly pine, TX002
Compost
heavy metal, uptake, NA017, NA020
rate of application, pepper, FL009, radish, FL009
response, corn, NA017, NA020, snapbean, NA017
soil mixture, soil test correlation, NJ017
Composted Garbage, mine-spoil soil, forage, WV002
Concentrated Superphosphate
band application, sweet corn, NY029
placement, alfalfa, SD001, barley, SD001, corn, PA005, SD001, flax, SD001, oats, SD001, snapbean, PA005, tomato, PA005, wheat, SD001
rate of application, alfalfa, SD001, barley, SD001, corn, NA013, NA021, PA005, SD001, fescue, NA013, flax, SD001, forestry, AK001, MT018, grain sorghum, NA013, oats, SD001, rice, CA029, snapbean, PA005, sugar beet, OH027, sweet corn, WA035, tomato, PA005, yellow poplar, OH032, wheat, SD001
residual effect, vegetables, NY031
response, aspen, AK001, birch, AK001, poplar, AK001, spruce, AK001
Container-Grown Plant (see also specific plants: Barberry, Boxwood, Chrysanthemum, Holly, Juniper, Ornamental, Poinsettia, Rose)
boron, chrysanthemum, NY002, poinsettia, NY002, rose, NY002
controlled-release nitrogen, rate of application, FL001
cyanuric acid, band application, CA012
fertilizer, bark-soil mixture, LA046, fir, WA007, management, NY032, rate of application, GA025
IBDU, barberry, SC014, boxwood, SC014, holly, SC014, juniper, SC014
lime, floricultural crop, FL001, ornamental, NC029
manganese, chrysanthemum, NY002, poinsettia, NY002, rose, NY002
nitrogen, azalea, SC013, bark mixture, AR005, VA009, chrysanthemum, FL014, NY002, OK023, RI005, holly, SC013, ornamental, OH006, OK032, poinsettia, NY002, rate of application, AR005, NC004, NC029, OK023, rose, NY002, source, AL027, NC004, NC029, OH006
nitrogen-phosphorus-potassium, response, FL001
nutrient management, ornamental, NY032
osmocote, container grown plants, FL001, rate of application, FL001, FL014, FL040
phosphorus, rate of application, NC029, OK023, soil test correlation, AL027, source, NC029
potassium, chrysanthemum, NY002, holly, NJ010, poinsettia, NY002, rate of application, NC029, OK023, rose, NY002, soil test correlation, AL027, source, NC029
resin-coated urea, barberry, SC014, boxwood, SC014, holly, SC014, juniper, SC014
sewage sludge, chrysanthemum, NY002, poinsettia, NY002, rose, NY002
sulfur, rate of application, NC029
sulfur-coated urea, barberry, SC014,

boxwood, SC014, holly, SC014, juniper, SC014
urea formaldehyde, barberry, SC014, boxwood, SC014, holly, SC014, juniper, SC014
Controlled-Release Fertilizer (see also Controlled-Release Iron, Controlled-Release Nitrogen, Controlled-Release Potassium)
management, ornamental, GA010, GA011
mixed fertilizer, horticultural crop, AL005
placement, nitrogen, CO002
rate of application, bentgrass, TN008, bermudagrass, TN008, container grown plants, FL001, turf, IA024
response, azalea, LA046, NJ009, cherry WI010, Christmas tree, GA010, corn, TX052, horticultural crop, AL005, FL001, ornamental, GA011, TX017, rose, LA003, turf, FL005, FL013, NJ007, PA026
Controlled-Release Iron (see specific sources: Hamp Iron, Iron Chelates, Iron Frits)
Controlled-Release Nitrogen (see also specific sources: IBDU, Methylene Urea, Milorganite, Osmocote, Oxamide, Resin-Coated Urea, Sulfur-Coated Nitrogen With Potassium, Urea Formaldehyde)
inhibitors, ATC, IA010, N-Serve, AZ011, FL010, FL033, HI013, IL015, MI007, NA021, NE017, NV004, OH008, OK032, PA007, PA008, SC008, SC014, terrazole, AL013, MI006, MN023, MC002, OH007
Controlled-Release Potassium (see specific sources: Sulfur-Coated Muriate of Potash, Sulfur-Coated Nitrogen With Potassium, Sulfur-Coated Potassium Chloride, Sulfur-Coated Potassium Sulfate)
Cooperatives
marketing, efficiency, MN028, structure, MN028
transportation, coordination, MN028, NA036
Co-op Iron
foliar application, apple, CO019, peach, CO019
rate of application, apple CO019, peach, CO017
Copper (see also specific sources: Copper DPTA, Copper EDTA)
analysis, fertilizer materials, MO034, soil, CO008
deficiency symptom, bentgrass, WI018, bermudagrass, WI018, bluegrass, WI018
feedlot manure, uptake, CA034
foliar application, cherry tree, WI010, corn, CO016, rice, AR028, sugar beet, CO016
method of application, alfalfa, MT019, grass, MT019
mobility, sewage sludge, NA011
plant analysis, avocado, CA038, grain sorghum, NM001, orange, CA038, orchardgrass, CA038
rate of application, AZ015, beggarweed, FL023, corn, CA012, CO016, cotton, OK020, grain sorghum, NM001, peanut, OK020, rice AR028, soybean, GA047, OK020
redox potential, soil, CO007
response, alfalfa, MT019, orange, CA038
sewage sludge, corn, NA017, mobility, NA011
soil, analysis, CA012
soil test correlation, corn, CO016, grain sorghum, NM001, soybean, NJ016, sugar beet, CO016
time of application, alfalfa, MT019, grass, MT019
transformation, crop residue, CA034
uptake, avocado, CA038, barley, OR024, corn, CA034, NA017, feedlot manure, CA034, oats, OR024, orange, CA038, snapbean, NA017, soybean, GA047, sugar beet, CA009, triticale, OR024, wheat, OR024
Copper DPTA, soil, redox potential, CO007
Copper EDTA, soil, redox potential, CO007
Corn
ammelide, response, KS017
ammonium nitrate, leaching, SD009, method of application, DE004, MD009, MN001, movement, SD009, nitrification, MN024, no-till, DE004, DE005, MD008, PA010, N-Serve, FL052, WI013, placement, MT022, SD001, rate of application, CO016, DE005, GA007, MD001, MD007, MD008, MD009, MD019, MN001, MN006, MN019, MN024, MT022, NA005, NA021, ND014, ND029, PA010, SD001, TN013, TN014, response, TN013, time of application, MD019, MN005, MN024, MT022, ND014, transformation, MD001
ammonium nitrate sulfate, rate of application, SC004, time of application, SC004
ammonium nitrogen, leaf uptake, CO027, residual, SD009, response, IL003, transformation, CA033
ammonium orthophosphate, method of application, KS015, rate of application, KS028
ammonium phosphate, band application, MO008, bulk handling, MO008, method of application, KS015, MT003, rate of application, KS028, MD014, NA019
ammonium polyphosphate, band application, NE034, efficiency, KS042, fluid application, KS025, NC001, NE034, method of application, KS043, N-Serve, KS025, no-till, KS043, rate of application, KS025, KS028, MN005, NA013, NC001, NE034, NE037, terrazole, KS025
ammonium sulfate, isotope, OH021, method of application, DE004, N-Serve, GA006, IN014, WI013, no-till, DE004, MD008, MD010, MD026, MO021, PA010, protein quality, CA030, placement, SD001, rate of application, GA006, KS017, KS041, MD008, ND014, OH021, PA010, SD001, response, KS017, terrazole, IN014, time of application, ND014, transformation, KS041, OH021, uptake, OH021
anhydrous ammonia, efficiency, KS042, irrigation, NE014, NE036, method of application, KS043, no-till, DE005, KS043, MO037, NE010, N-Serve, IA044, IL012, IN014, KS025, KS030, MI014, NC018, NE013, OH008, OK026, placement, MT022, SD001, rate of application, DE005, IA044, IL022, KS043, MI014, MT022, NE010, NE036, SD001, silage, IN010, PA023, time of application, IA044, IL014, KS044, MT022
borax, rate of application, MN005
boron, application, MO022, TN001, irrigation, DE008, management, KS005, rate of application, DE008, GA005, IN001, SC015, SC018, TN011, soil acidity, AL026
broiler litter, no-till, MD008, rate of application, MD007
cadmium, uptake, NA017, NA019
calcium, rate of application, FL043, GA039
calcium carbonate, rate of application, HI006
calcium nitrate, N-Serve, OH008
calcium silicate, rate of application, HI006
cement, mine spoil reclamation, OH001, rate of application, IN018
chicken manure, mine spoil reclamation, WV004
chromium, response, NA019
compost, response, NA017, NA020
concentrated superphosphate, placement, PA005, SD001, rate of application, NA013, NA021, PA005,

SD001
controlled-release fertilizer, response, TX052
controlled-release nitrogen, sulfur-coated urea, MD016
copper, foliar application, CO016, rate of application, CA012, CO016, uptake, CA034, NA017
cyanuric acid, method of application, KS023, rate of application, KS023, response, KS017
dairy manure, nitrogen, TN013
diammonium phosphate, germination, NA013, PA011, method of application, DE004, no-till, DE004, N-Serve, WI013, rate of application, NA013
dicalcium phosphate, rate of application, NA013, NA021
elemental sulfur, rate of application, MN005, MN006, time of application, MN006
feedlot waste, groundwater, NE011, method of application, NE011, microbiology, NE011, rate of application, NE007
fertilizer, band application, MO020, NE029, foliar application, IA023, IN022, management, IA019, IN002, MD003, NC019, NE039, NJ011, TN003, TN020, TN022, VA017, no-till, MD003, OH031, rate of application, MN025, ND005, PA018, TN003, TN020, TN022, residual effect, NJ011, response, IA015, time of application, IA023, MO020, ND005
fluid application, nitrogen solution, MD008, PA010, no-till, MD008, orthophosphate, KS025, NE028
flyash, rate of application, OH001
high phosphorus soils, band application, WI022
high yield, soil management, FL085
IBDU, rate of application, NA021
iron, rate of application, CA012, NE037
iron DPTA, response, IA028
iron EDDHA, rate of application, IA028
iron sulfate, response, IA028
irrigation, fertilization, FL080, FL085, GA039, IA013, KS023, MN006, ND005, ND019
lead, uptake, NA017, NA019
lime, foliar application, FL067, TN021, irrigation, NE014, PR010, management, IA037, MO024, method of application, NE008, PR010, no-till, PA015, organic soil, NC020, placement, PA015, rate of application, FL077, FL079, GA018, IA043, IN018, NC008, NE008, PA015, PA019, PR014, TN021, soil test correlation, IA043, MO018, source, PR010, time of application, PR010, tropical soil, PR014, uptake, DE007
liquid, efficiency, KS043
magnesium, application, IL013, PA020, irrigation, FL043, management, KS007, rate of application, FL043, IL013, KS065, uptake, IL020, SC005
magnesium sulfate, rate of application, GA001
manganese, rate of application, CA012, OK026, SC015
manganese sulfate, rate of application, MN005
manure, rate of application, TN014, response, TN013
micronutrients, placement, IN015, rate of application, IN015, SD002, TX013, soil test correlation, SD002
mine-spoil soil, flyash, OH001, monocalcium phosphate, WV004, nitrogen, OH001, no-till, OH031, nutrient management, OH031, nickel, NA017, NA019, phosphorus, OH001, WV004, potassium, OH001, sewage sludge, OH001
monoammonium phosphate, rate of application, MN005, NA013, NA021
nickel, corn, NA017, corn forage, NA019
N-Serve, ammonium polyphosphate, KS025, anhydrous ammonia, IA044, IL012, IN014, KS025, KS030, MI014, NC018, NE013, OH008, OK026
nitran, transformation, PA012
nitrate-nitrogen, composition, NA024, dentrification, IL026, movement, IL026, response, IL003, transformation, KY010
nitric phosphate, fluid application, NC001, rate of application, NC001
nitrogen, application method, MD008, controlled-release, NA005, TX052, efficiency, NE024, NE025, equipment, LA017, PA001, foliar application, IL002, TN021, IBDU, NA021, interaction, KS068, intercropped, NC006, irrigation, CA032, CO023, FL042, FL043, IA033, KS003, KS004, KS068, KS074, ND019, ND023, NE007, NE012, NE021, NE022, PR010, TX054, WY002, management, GA001, IA037, KS004, KS005, KS007, MO024, NE021, NE022, NE024, method of application, AL015, KS025, KS026, MD008, MO021, ND023, NE008, PR010, TN017, movement, MN007, MO012, OH021, multiple cropping, MS022, no-till, AL015, DE004, KS035, KS046, KY005, MD008, MD010, MD020, MO021, MO037, NE010, NJ012, OH022, PA010, PA015, VA007, N-Serve, GA006, IL019, IN014, KY013, organic, CT004, FL069, NC020, physiology, KS053, placement, IN015, LA011, MD010, rate of application, AL015, CA032, FL042, FL043, FL067, FL077, FL079, FL080, FL087, GA018, GA051, HI016, IA033, IA041, IA043, IL002, IN004, IN015, IN018, IN019, KS003, KS011, KS035, KS046, KS056, KS067, KS074, KY005, KY010, LA011, LA016, LA030, LA050, MD016, MD020, MI008, MI014, MN005, MO021, MO026, MS001, MS006, MS019, MT012, NA007, NA024, NC006, ND023, NE007, NE008, NE012, NY022, OH001, OH010, PA019, SC017, SD002, TN009, TN013, TN017, TN022, TX051, TX054, TX080, VA011, VA018, WI019, WI026, WV003, WY002, residual effect, MD018, NY022, NY023, response, CO023, NA023, seed analysis, OH003, sewage sludge, NY021, TN013, TN014, soil test correlation, CO016, GA051, IA043, MO018, OH010, OH025, SC017, SD002, TN017, source, KY013, MD016, MI008, ND023, PR010, SD008, TX052, sulfur, KS068, tillage system, WI026, time of application, FL080, MO021, MS019, NE024, PR010, transformation, CA032, IA022, KY009, KY010, MN002, OH022, OH034, TX064, uptake, DE007, IA028, IA038, IL019, MI009, NA024, ND019, OH022
nitrogen solution, method of application, MN001, no-till, MD008, PA010, N-Serve, OH008, rate of application, MN001, PA010
nitrogen source, N-Serve, SD008
nitrogen-phosphorus combination, protein quality, CA030, rate of application, MD012
nitrogen-phosphorus-potassium-sulfur-boron, foliar application, MO022
N-Serve, rate of application, FL043, IA044
nutrient management, corn, IN002, NE029, irrigation, KS007, salt effect, NE029
organic soil, nitrogen, NC020
organic waste, nitrogen, FL069, phosphorus, FL069, zinc, FL069
orthophosphate, fluid application, KS025, NE028, zinc source, NE028
oxamide, rate of application, NA021
phosphate, rate of application, MD009, residual, SD009

phosphate rock, heavy metal, NA019
phosphorus, accumulation, KS040, band application, WI017, WI022, broadcast application, WI022, foliar application, IL002, TN021, irrigation, FL043, KS003, KS004, KS046, KS056, KS074, ND023, NE014, NE036, PR016, management, GA001, IA037, KS004, KS005, KS007, MN002, MO024, method of application, AL014, KS023, KS046, MD009, MO021, ND023, NE008, PR010, TN017, TX074, movement, MO012, multiple cropping, IA034, no-till, AL015, KS035, KS046, MD010, MO021, PA015, VA007, organic soil, FL069, NC020, placement, IL024, IN015, LA011, MD010, MT022, PA015, WI017, plant analysis, NE034 rate of application, AL015, FL043, FL067, FL077, FL079, FL080, GA016, GA018, HI016, IA041, IA043, ID002, IL002, IL024, IN015, KS003, KS013, KS014, KS023, KS035, KS046, KS056, KS074, LA011, LA016, LA030, MI014, MI015, MO021, MS001, MS006, MT012, MT022, NA005, NA007, NA024, ND003, ND014, ND023, NE008, NE036, OH010, OK026, PA015, PA019, TN009, TN017, TX074, VA011, VA018, WI026, WV003, residual effect, GA048, MN026, NE023, TN018, response, NA023, seed analysis, OH003, soil test correlation, GA016, GA048, HI005, IA043, ID002, IL024, KS013, MO018, NE023, OH010, OH025, TN017, source, ND023, PR010, TX074, tillage system, WI026, time of application, FL080, MO021, ND014, PR010, transformation, HI005, uptake, IA028, IA038, IN005
phosphorus-zinc, method of application, KS023, rate of application, KS023
phosphoryl triamide, method of application, KS046, rate of application, KS003
plant analysis, magnesium, IL020, nitrogen, IA038, IN019, KY009, OH003, phosphorus, GA016, IA038, NE034, potassium, OH003, zinc, NE034
plant nutrient, placement, IN022
polyphosphate, fluid application, KS025, NE028, hydrolysis, KS040, rate of application, GA020, zinc source, NE028
potassium, foliar application, IL002, TN021, irrigation, FL024, KS004, KS074, NE036, management, GA001, IA009, IA037, KS004, KS007, MO024, method of application, AL015, MD009, MO021, NE008, TN017, multiple cropping, IA037, no-till, AL015, MD010, MO021, NJ012, VA007, organic soil, NC020, placement, IL024, IN015, LA011, MD010, SD001, rate of application, AL015, FL042, FL043, FL067, FL077, FL079, FL080, GA016, GA018, HI006, HI016, IA034, IA035, IA041, IA043, ID002, IL002, IL013, IL022, IL024, IN004, IN016, KS013, KS014, KS035, KS046, KS056, KS067, KS074, LA001, LA011, LA016, LA030, MD009, MI014, MI015, MO021, MO026, MS001, MS006, MT012, MT022, NA005, NA007, NA024, NC008, ND014, ND023, NE008, NE035, OH001, OH010, OK026, PA015, PA019, SD001, SD003, TN009, TN017, TX074, VA011, VA018, WI026, WV003, residual, GA048, IA034, MN026, NE023, TN018, response, NA023, seed analysis, OH003, soil test correlation, CA012, GA016, GA048, IA043, MO018, NE023, OH010, OH025, TN017, source, IA035, tillage system, WI026, time of application, MO021, ND014, uptake, DE007, IA028, IA038, IL020, IN006
potassium chloride, placement, PA005, rate of application, IL014, PA005, response, OH009
potassium polyphosphate, foliar application, KS028, rate of application, KS028
prilled urea, method of application, MD009, rate of application, MD009
pulp waste, application, MI003
rock phosphate, heavy metal, NA019, rate of application, NA013
rum distillery slop, fertilizer value, PR006
salt effect, band placement, NE029
sewage sludge, application, MI003, heavy metal, NA020, NY021, method of application, IN002, nitrogen, NY021, rate of application, AZ016, GA006, MD019, NY021, OH001, TN012, TN014, response, GA006, TN013, time of application, MD019, toxic metal, MA003, transformation, IN014, MA003, NA011
sodium nitrate, rate of application, MD007
sodium tetraborate, rate of application, GA001
soil test correlation, copper, CO016, fertilizer, GA051, IA015, lime, MO018, nitrogen, CO016, GA051, IA043, MO018, OH010, OH025, SC017, SD002, WY002, phosphorus, CO016, GA016, GA048, HI005, ID002, IL024, KS013, NE023, OH025, TN017, potassium, CA012, GA016, GA048, IL024, NE023, OH025, TN017
sulfur, foliar application, TN021, interaction, KS068, irrigation, CO009, KS068, management, CO009, KS007, method of application, NE008, nitrogen, KS068, placement, SD001, rate of application, IL013, KS068, MI014, NC008, NE008, OK026, SD001, VA011, response, KS007, soil test correlation, MO018
sulfur-coated potassium sulfate, response, FL067
sulfur-coated urea, method of application, KS023, rate of application, CO016, GA039, KS023, MD007, MD016, NA005, NA021, ND029, WI017
sulfur-potassium-magnesium combination, rate of application, IL013
sulfuric acid, soil application, TX013
swine manure, method of application, MN011, rate of application, MN011
terrazole, ammonium sulfate, IN014, urea, IL027, IN014, OK026
triammonium polyphosphate, rate of application, NA013
urea, fluid application, KS025, germination, PA011, method of application, DE004, MD009, PA011, nitrification, MN024, no-till, DE004, MD001, MD008, MD009, NE010, PA010, N-Serve, FL052, IL027, IN014, KS025, NC018, OH008, WI013, placement, MT011, SD001, prilled, MD008, rate of application, CO016, MD007, MD009, MD019, MN006, MN024, MT022, ND014, PA005, PA010, SC004, SD001, terrazole, IL027, IN014, KS025, OK026, time of application, MD019, MN006, MN008, MN024, MT022, ND014, SC004, transformation, MD001, MN008, PA012
urea-ammonium nitrate, response, KS017, time of application, KS044
urea-ammonium nitrate solution, fluid application, KS025, method of application, KS030, KS043, MD009, no-till, KS043, N-Serve, KS025, KS030, rate of application, KS043, MD009, response, KS017, time of application, KS044
urea-ammonium phosphate, rate of application, CO016, SC004, time of application, SC004
urea-ammonium polyphosphate, rate

of application, KS028, WI017
urea-ammonium sulfate, rate of application, SC004, time of application, SC004
zinc, foliar application, CO016, irrigation application, IA033, management, KS005, method of application, IA033, rate of application, CA012, CO016, FL069, IA033, KS013, KS014, MT022, NA017, NA019, ND003, NE037, NE039, OK026, SC015, SC017, TN012, response, IL017, soil test correlation, CO016, KS013, MO018, SC017, uptake, CO016, FL069, NA017, NA019, ND003, NE037, OK026, SC015, SC017
zinc chelate, rate of application, GA020
zinc DPTA, soil, CO007
zinc EDTA, band application, NE034, fluid application, KS016, NA010, NE034, rate of application, CO007, KS016, NA009, NE034, WA014
zinc nitrate, band application, NE034, fluid application, NE034, rate of application, NE034
zinc oxide, availability, GA020, NC009, PA003, band application, NE034, fluid application, GA020, KS016, NE034, rate of application, GA020, KS016, NE034
zinc sulfate, availability, GA020, band application NE034, fluid application, KS016, NE034, rate of application, FL036, GA020, GA028, KS016, KY011, LA033, MS009, NA017, NA020, NC009, NE034, PA003, TN012, soil test correlation, NC009, uptake, NA020
zinc-ammonia complex, band application, NE034, fluid application, NE034, rate of application, NE034

Corn Forage
cadmium, rate of application, NA019
chromium, rate of application, NA019
copper, uptake, NA019
micronutrients, zinc, NA010, NA019
monoammonium phosphate, fluid application, NA010
nickel, rate of application, NA019
rock phosphate, rate of application, NA019
zinc EDTA, fluid application, NA010
zinc sulfate, fluid application, NA010
zinc-citric acid, fluid application, NA010
zinc-glucoheptanate, fluid application, NA010
zinc-lignin sulfonate, fluid application, NA010

Corn Silage
anhydrous ammonia, response, IN010, PA023
fertilizer, management, KS047
nitrogen, rate of application, MN013, WA012, WY002
nonprotein nitrogen material, rate of application, MN013
phosphorus, rate of application, MN013, WA012
plant analysis, nitrogen, IN010
potassium, preservation, PA023, rate of application, WA012
soil test calibration, nitrogen, WA012, phosphorus, WA012, potassium, WA012, sulfur, WA012
sulfur, rate of application, WA012

Cotton
ammonium nitrate, rate of application, NM007
ammonium nitrate sulfate, rate of application, SC004, time of application, SC004
ammonium sulfate, disease control, NM007, method of application, AL016, rate of application, AL016
boron, rate of application, TN011, response, TX011, uptake, AR021
calcium, response, AR021
copper, rate of application, OK020
deep tillage, nitrogen, SC021
deficiency, zinc, NM007
fertilizer, application, NC030, management, GA034, NM002, response, AZ005, AZ016, source, LA036, time of application, LA036
fiber quality, nitrogen, GA050, OK017
iron, rate of application, MN014, OK020, TX041, TX053, uptake, AR021, wilt, NM007, NM014
irrigation, nitrogen, SC021, TX055, phosphorus, TX055, response, LA008, LA034
lime, foliar application, TN021, management, LA023, method of application, AL016, NA025, rate of application, AL016, NA025, OK020, TN021, soil test correlation, AL009, MO018, TX010
magnesium, rate of application, AR021, uptake, AR021
manganese, rate of application, OK020, uptake, AR021
micronutrients, application, MO013
multiple cropping, residue management, MS022
municipal wastewater, response, AZ016
nitrate-nitrogen, plant analysis, TX034
nitrogen, application, MO013, application equipment, MS017, deep tillage, SC021, fiber quality, OK017, foliar application, LA035, TN021, irrigation, SC021, management, MO013, method of application, TN017, movement, OK035, multiple cropping, MS022, plant analysis, TX034, plant density, OK017, rate of application, GA050, LA008, LA016, LA034, LA050, MS017, MS019, NA007, NM014, OK020, SC003, TN017, TX034, TX041, TX051, TX053, TX055, TX082, requirement, TX009, residual, MS022, response, OK017, sediment, MS021, soil test correlation, AL009, MO018, OK024, TN017, source, LA008, time of application, MS019, transformation, AZ003, uptake, AZ003
phosphorus, application, MO013, foliar application, TN021, management, GA050, LA023, MO013, method of application, TN017, movement, OK035, rate of application, GA050, LA016, LA024, NA007, NM014, OK020, TN017, TX041, TX053, TX055, TX082, requirements, TX009, residual effect, TN018, sediment, MS021, soil test correlation, AL009, MO018, OK024, TN017, TX010, uptake, AR021
plant analysis, nitrogen, TX034, potassium, GA050, MS008
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potassium, application, MO013, foliar application, TN021, management, GA050, MO013, method of application, TN017, plant analysis, MS008, rate of application, AR021, GA050, LA016, LA024, MS008, NA007, NM014, OK020, TN017, TX082, requirement, TX009, residual effect, TN018, soil test correlation, AL009, MO018, MS007, MS008, OK024, TX010, uptake, AR021
sodium, uptake, AR021
soil test correlation, boron, AR021, calcium, AR021, iron, AR021, lime, AL009, MO018, TX010, magnesium, AR021, manganese, AR021, nitrogen, OK024, phosphorus, AL009, MO018, OK024, TN017, TX010, potassium, MS007, MS008, OK024, TN017, sodium, AR021, zinc, AR021
sulfur, foliar application, TN021, rate of application, SC007, soil test correlation, MO018, source, SC007
sulfur dioxide, rate of application, NM008
sulfur-coated urea, rate of application, MO023
urea, rate of application, SC004, time of application, SC004
urea-ammonium phosphate, rate of application, SC004, time of application, SC004
urea-ammonium sulfate, rate of appli-

cation, SC004, time of application, SC004
zinc, rate of application, NM007, NM014, OK020, TX041, TX053, soil test correlation, AR021, MO018, uptake, AR021, NM007, NM014, OK020, TX041, TX053
Cottonwood
ammonium nitrate, rate of application, MS016, time of application, MS016
irrigation, fertilization, TX031
nitrogen, rate of application, MS016
phosphorus, rate of application, MS016, time of application, MS016
potassium, rate of application, MS016, time of application, MS016
Cover Crop
anhydrous ammonia, no-till, KS006, MO037
fertilizer, application, PA006
nitrogen, rate of application, KY005, MD020, NJ012
no-till, anhydrous ammonia, MO037, nitrogen, KS006, MO020, MO037, NJ012, potassium, NJ012
Cowpea
nitrogen, placement, OK027, rate of application, OK027, time of application, OK027
phosphorus, placement, OK027, rate of application, OK027, time of application, MS016, OK027
potassium, placement, OK027, rate of application, OK027, time of application, OK027
rock phosphate, rate of application, NA014
Cranberry
ammonium sulfate, rate of application, WI004
boron, foliar application, WA009
controlled-release nitrogen, response, WA040
foliar application, boron, WA009, calcium, WA009, magnesium, WA009, manganese, WA009, nitrogen, WA040, phosphorus, WA040, potassium, WA040, zinc, WA009, WA040
lime, rate of application, WA009
micronutrients, management, WA009
nitrogen, method of application, WA023, rate of application, NJ005
phosphorus, foliar application, WA040
potassium, rate of application, WI004
potassium chloride, rate of application, WA010
potassium sulfate, rate of application, WA010
sulfur, rate of application, NJ005
sulfur-coated muriate of potash, rate of application, WA023
sulfur-coated potassium chloride, rate of application, WA010
sulfur-coated potassium sulfate, rate of application, WA010
sulfur-coated urea, rate of application, WA009, WA010, WA023
urea-ammonium phosphate, rate of application, WA023
zinc, foliar application, WA009, WA040
Crop Drying
economic, fertilizer effect, IN016
energy, cranberry, IN016
fertilizer, interaction, IN016
Crop Residue
nitrogen, barley, MT029, millet, CO024, rate of release, NY022, transformation, CA034, CO014
phosphorus, barley, MT029, transformation, CO014
transformation, cadmium, CA034, copper, CA034, lead, CA034, zinc, CA034
Crownvetch, quality, magnesium, PA024, micronutrient, PA024, phosphorus, PA024, potassium, PA024
Cucumber
ammonium nitrate, N-Serve, MA004, rate of application, CA024
ammonium sulfate, N-Serve, MA004, rate of application, CA024
calcium nitrate, rate of application, GA041
fertilizer, management, CO005, mine-spoil soil, WV001, rate of application, AR002, CO005
irrigation, trickle, CA024
lime, mine-spoil soil, WV001, rate of application, PR005
micronutrients, rate of application, PR005
milorganite, N-Serve, MA005
nitrogen, rate of application, PR005, TN009, WI008, time of application, WI008
phosphorus, rate of application, PR005, TN009, WI008, time of application, WI008
potassium, rate of application, PR005, TN009, WI008, time of application, WI008
potassium nitrate, irrigation, GA041, rate of application, GA041
rock phosphate, mine-spoil soil, WV001
soil test correlation, fertilizer, AR002
sulfur-coated nitrogen phosphorus-potassium, rate of application, CA024
urea, rate of application, CA024
Cyanuric Acid
band application, container-grown plant, CA012
irrigation, corn, KS023, soybean, KS023
method of application, corn, KS023, soybean, KS023
rate of application, corn, KS023, soybean, KS023
response, corn, KS017, soybean, KS017, wheat, KS017
Dairy Manure
nitrogen, corn, TN013
rate of application, barley, AZ017, bermudagrass, AZ017, sundangrass, AZ017
Dairy Waste Water, fertilizer, transformation, SC006
Dallisgrass
nitrogen, rate of application, MS005, TX004, TX077
phosphorus, rate of application, TX077
potassium, rate of application, TX077
Deep Tillage, nitrogen, cotton, SC021
Deficiency Symptom
boron, grass, WI018
calcium, grass, WI018
copper, grass, WI018
iron, grass, WI018
magnesium, grass, WI018
manganese, grass, WI018
molybdenum, grass, WI018
nitrogen, grass, WI018
phosphorus, grass, WI018
potassium, grass, WI018
sulfur, grass, WI018
zinc, grass, WI018
Dendrobium
foliar 63, rate of application, HI008
osmocote, rate of application, HI008
Denitrification
calcium nitrate, transformation IL001
fertilizer, ^{15}N, IL023
nitrogen, organic, TX038
Diammonium Phosphate
band application, sweet corn, NY029
germination, corn, PA011, WI013
heavy metal, corn, NA019
method of application, corn, DE004
no-till, corn, DE004
N-Serve, bean, WI013, corn, WI013, potato, WI013
placement, bean, WI013, potato, WI013, wheat, KS029
rate of application, bean, WI013, corn, NA013, fescue, NA013, grain sorghum, NA013, wheat, KS029, sugar beet, OH027
Dicalcium Phosphate, rate of application, corn, NA013, NA021, grain sorghum, NA013
Digitgrass
lime, rate of application, FL029
micronutrients, rate of application, FL029
nitrogen, rate of application, FL019, FL029

phosphorus, rate of application, FL029
potassium, rate of application, FL019, FL029
sodium, rate of application, FL029
sulfur, rate of application, FL029
Distribution
ASEAN group, regional cooperation, NA002
barge, public policy, IA004
bulk, retail marketing, IN009, storage, MN009, transportation, MN008, MN009
capacity, port, IA006, LA034
channel, fertilizer, NH001
economics, fertilizer industry, NA040
fertilizer, barge, IA004, bulk, IN009, channel, MO015, cost, LA034, economics, MA040, NA042, fluid, IN009, forecast, OH028, logistics, NM009, marketing organization, MO015, policy, NE003, railroad, IA005, OK015, regional cooperation, NA002, retail outlet, KS062, NE001, storage, IA007, IA014, KS062, NA050, NC033, transportation, IA007, IA014, KS062, MO016, NA050, NE001, NE033
forecasting, fertilizer, OH028
marketing, capacity, NA050, cost, IL009, UT006, fertilizer, IA006, IA014, IL029, KS059, KS062, LA034, NA040, NE003, NH001, OH011, SD006, fluid, IN009, management, UT006, storage, IA006, IA007, KS060, KS061, LA034, MN009, SD006, transportation, IA004, IA005, IA006, IA007, KS059, KS060, KS061, KS062, LA034, MN009, MO014, MO015, NA036, NA040, NA050, NE001, OH011, OH028, OK015, SD006, UT006
organization, retail, LA032
policy, retail outlet, OK015
public policy, economics, NA042, marketing, IA004
resource requirement, economics, LA032
retail outlet, structure, OK015
storage, capacity, NA050, cost, IL009, LA034, SD006, fertilizer, IL009, KS060, KS061, NE033, OH028, port, IA006, LA034, retail, IA005, system, MO014
structure, fertilizer industry, NE003
transportation, alternative, MO015, barge, IA004, bulk, MN009, capacity, IA006, NA050, cost, LA034, MO015, NE003, UT006, economics, MO015, NA042, fertilizer, IA009, IA014, KS060, KS061, MO016, NA041, NA042, NE001, OH011, OH028, mode, KS059, KS060, KS061, LA034, MN009, MO015, OH011, nitrogen, NA041, public policy, IA004, OH028, railroad, IA004, IA005, IL009, KS062, NA036, NA050, NE001, OK015
Disturbed Soil, nitrogen-phosphorus-potassium combination, wetlands, FL088
Double Cropping
aerial seeding, grain sorghum, OK007, mungbean, OK007, soybean, OK007
fertilizer, barley, NJ013, management, NJ013, small grain, VA008, soybean, OK007, NJ013, wheat, OK007
nitrogen, soybean, AR004, wheat, AR004
wheat, tillage method, OK007
soybean, tillage method, OK007
Durham Wheat, soil test correlation, nitrogen, AZ009, phosphorus, AZ009
Economics
crop drying, fertilizer effect, IN016
distribution, resource requirements, LA032, transportation, NA040, NA042
enterprise, management, CA016, OR007, WA024
farm management, fertilizer, NA039, range improvement, UT009
fertilizer, cost, CA016, NE032, OK018, cost:benefit ratio, IL021, KS051, MO038, NE015, OR007, RR008, efficiency, MT004, WA031, energy, NA039, field crop, MT016, NE032, fish pond, AL031, forest, OR006, grass, KS051, pineapple, PR008, rate of application, KS051, squash, AR022, tomato, AL019, vegetables, LA044, wheat, NE015
fertilizer industry, demand, NA043, supply, NA043, transportation, NA040
fertilizer use, corn-belt farm, MO038
field crop, fertilizer, MT016
forest land, fertilization, OR041
manure, transformation, OH005
marketing, cost:benefit ratio, KS051, NA040, demand, NA048, distribution, KS051, NA040, fertilizer, KS051, NA037, OR007, retail, NA037, sales, NA037, supply, NA048
model, farm management, AZ006
nutrient management, field crop, MT016
public policy, distribution, NA042, fertilizer, NA042, transportation, NA042
rate of application, fertilizer, KS051
sewage, transformation, OH005
soil group, market analysis, MS014
transportation, alternative, MO015, fertilizer, MO015, mode, MO015
trend, retail, NA037, sale, NA037
wheat, fertilizer, NE015
Efficiency
ammonium polyphosphate, grain sorghum, KS042
anhydrous ammonia, grain sorghum, KS042, liquid corn, KS042
Eggplant
nitrogen, placement, LA011, rate of application, LA011
phosphorus, placement, LA011, rate of application, LA011
potassium, placement, LA011, rate of application, LA011
Energy
consumption, fuel type, MO038, NA040
crop drying, cranberry, IN016
fertilizer, cost, NA039, crop drying, IN016, farm management, NA039
fertilizer industry, cost, NA040
Enterprise Management
fertilizer, cost, MI002, marketing, LA031, NE032, OR007, WA024
marketing, personnel, LA031, retail, MO008, MT016, WA024
retail, marketing, WA024
Equipment
anhydrous ammonia, handling, LA017, PA001
fertilizer application, design, MD015
nitrogen, application, MS017
Erosion Control
highway vegetation, fertilization, VA006, lime, VA006
mine-spoil soil, sewage sludge, PA028
nutrient management, grass, MS013
Eucalyptus, irrigation, leach water, CA034
Export, forecast, market analysis, NA049
Farm Management
crop drying, economics, IN016
crop production, cost, NA047
energy, consumption, MO038, NA040
enterprise management, cost, NE032, fertilizer, MI002, NE015, market analysis, NE015
fertilizer, cost, CA016, IA007, IL009, IN009, KS009, LA034, NA036, NE032, OK015, OK018, cost:benefit ratio, IL021, KS051, MO038, NE015, OR007, PR008, demand analysis, AZ006, economics, NA039, efficiency, MT004, WA031, energy, NA039, market research, MI002, procurement, MT004, range improvement, UT009, supply analysis, AZ006
field crop, fertilizer, MT016, NE032
forest land, economics, FL050, OR006, OR041
irrigation, fertilizer cost, KS009

market analysis, economics, OK018, UT009
model, economics, AZ006, supply analysis, AZ006
nutrient management, pineapple, PR008
Farm Pond, fertilizer, management, TX016
Farm Supply Firm
storage, cost, IL009, LA034, SD006
transportation, cost, SD006
Feedlot Manure
cadmium, uptake, CA034
copper, uptake, CA034
lead, uptake, CA034
nitrogen, transformation, CA041, CO014, ^{15}N, CA041
phosphorus, mineralization, CO015
rate of application, corn, NE007, field crop, CO025, range forage, CA028, ryegrass, CA005, soybean, GA002
transformation, cadmium CA034, copper, CA034, lead, CA034, nitrogen, CA034, CA041, zinc, CA034
zinc, uptake, CA034
Feedlot Waste
ground water, alfalfa, NE011, corn, NE011
method of application, alfalfa, NE011, corn, NE011
microbiology, corn, NE011
Fertilizer (See also specific compounds; example, Ammonium Nitrate)
alkali soils, grain sorghum, KS039
analysis, boron, MO034, copper, MO034, heavy metal, NA012, iron, MO034, manganese, MO034, micronutrients, MO034, NA012, molybdenum, MO034, organic matter, NA012, phosphorus, NA012, potassium, NA012, zinc, MO034
bulk, fluid distribution, IN009
cost:benefit ratio, farm management, IL021, KS051, MO038, NE015, OR007, RR008, field crop, MT016, grass, KS051, market analysis, MN022, NA047, NE003, pineapple, PR008
demand, market analysis, IN013, NA038, NA049, OK007, OK018
double cropping, barley, NJ013, grain sorghum, OK007, soybean, NJ013, VA008
efficiency, irrigation, WA030
energy cost, market analysis, AZ002
export, forecast, NA049, market analysis, NE003, OK010
fluid distribution, ornamental, GA029, RI003, pine, MI025, reduced tillage, KS037, retail marketing, IN009, vegetable, FL046, OK006
foliar application, corn, IA023, IN022, efficiency, OK028, WA030, field crop, FL048, forage, FL048, oats, IA030, plum, MI004, soybean, IA017, MN017, MN018, time of application, IA023, vegetable, FL046
irrigation, apple, AR018, MD013, MI004, application, AR003, CA031, CA037, FL020, MD013, MI004, WA019, bean, FL010, blackberry, OR001, bluegrass, WA019, boysenberry, OR001, bromegrass, WA019, cherry, MI004, cotton wood, TX031, field crop, CA007, hardwood, SC019, lettuce, CA037, peach, MI004, pepper, FL020, GA040, pine, SC019, potato, FL045, ND005, raspberry, OR001, strawberry, FL045, sugar beet, ND005, sunflower, ND005, sweetcorn, CA042, tomato, GA040, trickle, FL045, MI004
management, alfalfa, KS047, MI013, MT026, asparagus, OH030, band application, MO020, NE029, NH003, barley, NJ013, NM004, bean, LA037, beech, NH005, bentgrass, KS010, birch, NH005, blueberry, ME004, bluegrass, OR042, WA019, bluestem, OK011, bromegrass, NE036, cedar, ID015, cherry, OH023, Christmas tree, AL001, LA006, MN003, chrysanthemum, VA016, clover, TN022, container grown plants, NY032, corn, IA019, IN002, MD003, NC019, NE014, NE039, NJ011, TN020, TN022, VA017, corn silage, KS047, cotton, GA034, MN002, efficiency, OK028, WA030, farm pond, TX016, fescue, KS010, OR042, field crop, MO027, MS020, MT016, fluid application, FL082, IN003, RI003, forage, FL082, ID015, OK028, VI002, forestry, OR006, OR030, grain sorghum, KS047, grape, PA014, SC012, grass, MT023, hemlock, ID015, WA005, highway vegetation, VA006, horticultural crop, IN021, legume, MT023, maple, NH005, method of application, AR025, FL018, MT023, NY030, minimum tillage, MT023, ornamental, GA026, OH030, RI003, pasture, MO003, peach, GA009, residual effect, MN027, NJ011, sand pine, LA006, soybean, IA019, NJ011, TN003, spruce, LA006, squash, LA037, sugar beet, NE038, tulip poplar, MI010, vegetable crop, GA035, NC021, MA002, viburnum, LA006, wheat, KS039, KS047, NM002, NM004, TN003, TN022, yam, VI003
marketing, analysis, OK002, California, CA014, channel, NH001, development, IL029, tomato, CA014, distribution, IA006, IA014, IL029, LA034, NA040, NE003, NE033, NH001, OH011, SD006, legislation, OK002, organization, IL029, NH001, NM009, personnel development, IL029, pineapple, PR008, planning, IL029, product quality, MO034, NA012, retail, NA037, WA024, storage, IA005, taxes, OK002
method of application, bermudagrass, AR025, field crop, NY030, onion, FL018, orchard grass, AR025, pepper, FL045, potato, FL045, rye, AR025, ryegrass, AR025, sorghum, AR025, strawberry, FL045, sudangrass, AR025, tomato, FL045, tree, GA029, watermelon, FL045
mine spoil soil, bean, WV001, bermudagrass, WV001, buckwheat, WV001, cabbage, WV001, cucumber, WV001, fescue, IA021, MS020, WV001, grass, MI023, legume, MI023, potato, WV001, rate of application, VA002, reclamation, KY001, MI023, squash, WV001
movement, forestry, OR030, storage, KA041
placement, lettuce, FL049, no-till, WA030, reed canarygrass, NA030, white clover, AR025
product quality, market analysis, CT003, pasture, LA013
quality, sugar maple, VT003, winter wheat, MT001
rate of application, alfalfa, CO011, ND005, MD011, PA018, Arizona cypress, AR013, asparagus, OH030, athletic field, KS010, barley, TN003, bean, CO005, FL020, LA037, bluegrass, GA008, bermudagrass, AL019, GA008, chrysanthemum, VA016, citrus, FL022, clover, TN022, container grown plants, GA025, corn, MN025, ND005, PA018, TN003, TN020, TN022, cucumber, AR002, CO005, economics, KS051, fescue, OR042, TN005, fir, WA005, fish pond, AL031, foliar application, TX066, forage crop, GA004, grass, KS051, guava, HI003, hemlock, WA005, lily, OR012, VA016, loblolly pine, SC011, longleaf pine, SC011, ornamental, OH030, pasture, MO003, pepper, FL020, FL045, pine, AR013, TN006, poplar, TN006, potato, FL045, ND005, red cedar, AR013, soybean, PA018, TN001, TN003, squash, AR002, strawberry, FL045, sugar beet, ND004, sunflower, ND005, tomato, CO005, FL045, AL019, vegetables, LA044, watermelon, FL045, wheat, ND005, PA018, TN003, TN022, winter wheat, MT001

residual, corn, MN027, NJ011, pineapple, HI018, soybean, MN027, NJ011, tomato, FL012
response, alfalfa, AZ016, MI001, NC024, ND008, WI015, animal, NA046, athletic field, KS010, barley, AZ016, NM004, bermudagrass, AZ016, birdsfoot trefoil, MI001, bluegrass, KS010, OR042, bromegrass, IA019, cherry, OH023, Christmas tree, AL001, LA006, citrus, FL022, corn, IA015, MO020, NE029, cotton, AZ005, AZ016, NC030, cover crop, PA006, field crop, NH003, golf course, KS010, highway roadside, VA006, irrigation, AR003, CA031, CA037, FL020, MD013, MI004, WA013, muskmelon, KS020, nutrient management, KY006, ornamental, GA025, park, KS010, peach, LA038, pepper, FL007, FL012, pine, MN005, pistachio, CA017, plants, NA046, potato, LA037, MI001, ryegrass, KS010, small grain, ND008, snapbean, FL007, sorghum, AZ016, trees, HI014, ID012, SC019, vegetable crop, NH003, wheat, AZ016, MT001
retail marketing, cost, IN009
seed production, bermudagrass, WA019, bluegrass, WA019
soil management, forage, FL082
soil test correlation, alfalfa, NV001, PA017, cabbage, NJ009, grape, NJ009, holly, NJ009, inkberry, NJ009, oak, NJ009, potato, NJ009, soybean, NJ009, sugar beet, ND005, NE038
source, cotton, LA036, foliar application, TX066
stand longevity, alfalfa, MT014, sainfoin, MT014
storage, organization, IA014, plant size, LA032, retail, IA005, KS062, NA050
supply, market analysis, NA038, NA049
time of application, alfalfa, ND005, apple, PA016, bermudagrass, AR025, corn, IA023, MO020, ND005, cotton, LA036, oak, IA030, orchard grass, AR025, peach, PA016, pepper, FL045, potato, FL045, ND005, rice, MS018, rye, AR025, ryegrass, AR025, sorghum, AR025, strawberry, FL045, sudangrass, AR025, sunflower, ND005, tomato, FL045, watermelon, FL045, wheat, ND005, white clover, AR025, winter wheat, MT001
transportation, port, IA006
uptake, alfalfa, CA042, fescue, TN005, field crop, GA024
use, corn belt farm, MO038, economics, MO038
Fertilier Cost, farm management, distribution, IN009, NA040, irrigation, KS009, marketing, IN009, storage, IA007, IN009, transportation, IA007, IL009, NA036, LA034, OK015
Fertilizer Industry
cooperative, ASEAN group, NA002, competition, MN028, NA036
demand, economics, NA043, forecast, IN013, NA048
distribution, barge, IA004, NA042, economics, IN009, NA040, fluid, IN009, forecasting, OH028, logistics, MN009, marketing organization, IA014, MO015, railroad, IA005, regional cooperation, NA002, storage, IA007, IA014, KS062, NA050, NE033, transportation, IA007, IA014, KS062, NA050, MO016, NA050, NE001, energy costs, NA040
grain industry, interaction, IA006, KS060
market analysis, demand, NA049, market structure, IL029, ND015, product quality, CT003, public policy, IN012, supply, NA049
market research, regulation, CO016
marketing, competition, MN028, demand, IN013, distribution, IA006, IA014, IL029, KS059, KS062, LA034, NA040, NE001, NE003, NE033, NH001, OH011, SD006, market analysis, ND015, market structure, IL029, MN010, ND015, product quality, CT003, retail outlet, KS062, NE001, retail, NA044, sales volume, ND015, supply, IN013
organization, retail, IN013, LA032, supply system, MI011
product, enterprise analysis, MI002, price, MN022
regulation, law, CO016, public policy, IA004
retail marketing, efficiency, MT004
storage, retail, IA005, NA050
structure, ASEAN group, NA002, channel, IN013
supply, economics, NA043, forecast, IN013, NA048
transportation, capacity, IA006, NA050, economics, NA040, port, IA006, storage, IA006
Fertilizer Plant Size, storage, retail, LA032
Fescue
ammonium nitrate, rate of application, MI012, NA005, NA005, WA011
ammonium nitrate sulfate, rate of application, SC004, time of application, SC004
ammonium polyphosphate, rate of application, NA013
ammonium sulfate, N-Serve, GA006
boron, rate of application, AR023, soil test correlation, OK025
concentrated superphosphate, rate of application, NA013
diammonium phosphate, rate of application, NA013
fertilizer, management, KS010, OR042, mine-spoil soil, IA021, MS020, WV001, rate of application, TN005
grass tetany, magnesium, TN005
irrigation, nitrogen, NV003, TX080
lime, mine-spoil soil, NA027, WV001, rate of application, NA027, TN005, soil test correlation, MO018
magnesium, rate of application, TN005, soil test correlation, AR019, uptake, TN005
micronutrients, rate of application, KS010
monoammonium phosphate, rate of application, NA013
nitrate-nitrogen, composition, NA024
nitrogen, beef cattle, NC014, control release, NA005, irrigation, TX080, management, KS072, MO031, N-Serve, GA006, rate of application, GA003, IA016, IN011, MO031, NA024, NC005, NC014, NV003, TN010, TN015, TN016, TX079, TX080, WA012, response, NA032, soil test correlation, AR019, MO018, source, IA016, KS036, time of application, CO020, IA016, transformation, NC007, uptake, NA024
organic waste, nitrogen, NC007, transformation, NC007
phosphate rock, mine-spoil soil, NA013, NA027
phosphonitrilic hexamide, rate of application, NA013
phosphorus, management, KS072, rate of application, NA005, NA024, WA011, WA012, response, NA032, soil test correlation, AR019, MO018, OK025, time of application, CO020, uptake, AR024
phosphoryl triamide, rate of application, NA013
plant analysis, nitrogen, IA016, IA018, IN011, MI012
potassium, management, KS072, rate of application, NA005, NA024, WA012, response, NA032, soil test correlation, AR019, MO018, OK025
rock phosphate, mine-spoil soil, NA027, WV001, rate of application, NA013, NA027
sewage, rate of application, NA027
sewage sludge, response, GA006, NA032

soil test calibration, nitrogen, WA012, phosphorus, WA012, potassium, WA012, sulfur, AR019, MO018, WA012
soil test correlation, magnesium, AR019, nitrogen, AR019, MO018, phosphorus, AR019, MO018, potassium, AR019, MO018, OK025, sulfur, AR019
sulfur, rate of application, WA012, soil test correlation, AR019, MO018
sulfur-coated urea, movement, OR008, rate of application, NA004, NA005, NC005, OR008, release, OR032, source, OR008, transformation, OR008
urea, rate of application, MI01[illegible], SC004, time of application, SC00[illegible]
urea-ammonium phosphate, rate of application, SC004, time of application, SC004
urea-ammonium sulfate, rate of application, SC004, time of application, SC004
zinc, soil test correlation, MO018
Field Crop
ammonium nitrate, band application, NY003, broadcast application, NY003, rate of application, NY003, OH024
ammonium sulfate, rate of application, CO025
anhydrous ammonia, N-Serve, WI012, rate of application, OH024
feedlot manure, rate of application, CO025
fertilization, mine-spoil soil, IA021, MS020
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Flax
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polyphosphate, corn, KS025, NE028, grain sorghum, KS025, OK029, wheat, KS025, OK029
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copper, cherry tree, WI010, corn, CO016, rice, AR028, sugar beet, CO016
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manganese, cherry tree, WI010, cranberry, WA009, oats, ID018, rate of application, ID018, uptake, AL032
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Forage
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Fruit Tree, zinc sulfate, foliar application, ID011
Furrow Irrigation
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Fungicide, urea, transformation, IL030
Gin Trash, growth media, ornamental, TX017
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Granumag, rate of application, grape, OH019, peach, OH019
Grape
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lime, soil test correlation, NJ009
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Grass
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Ground Cover
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Guava
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Gypsum
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fertilizer, pepper, NM006, potato, NM006
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response, alfalfa, OR037, peanut, GA052, tomato, CT001, turf, CT001
Hamp Iron, foliar application, apple, CO019, NA022, peach, CO019
Hardwood, irrigation, nutrient management, SC019
Hay
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Heavy Metal
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compost, corn, NA017, NA020
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fertilizer, analysis, NA012
lead, corn, NA017, NA019, sewage sludge, NA011, NA017, snapbean, NA017
nickel, corn, NA017, NA019, sewage sludge, NA011, NA017, snapbean, NA017
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rock phosphate, corn, NA019
sewage sludge, cadmium, NA011, corn, NA020, NY021, lead, NA011, nickel, NA011, zinc, NA011, uptake, NA020
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Herbicide
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rate of application, bentgrass, NJ008, bluegrass, NJ008
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Hexon
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Highway Roadsides
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Holly
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IBDU, rate of application, SC014, response, SC014
lime, soil test correlation, NJ009
nitrogen, bark growth media, AR005, VA009, rate of application, SC013, VA009

osmocote, rate of application, NJ010
phosphorus, time of application, NJ010
resin-coated urea, rate of application, SC014
sulfur-coated urea, rate of application, SC014
urea formaldehyde, rate of application, NJ010, SC014, time of application, NJ010
Hops
ammonium nitrate, rate of application, WA011
phosphorus, rate of application, WA011
Horticultural Crop
controlled-release, response, AL005, FL001, FL013
micronutrient, fertilization, FL002
mixed fertilizer, controlled-release, AL005
phosphorus, rate of application, AZ008, soil test correlation, AZ008
plant nutrients, management, IN021
response, micronutrients, FL002
Horticultural Plants
phosphorus, foliar application, NY011
potassium, foliar application, NY011
Humates, fertilizer, pepper, NM006, potato, NM006
Humus, mineralization, nitrogen, AR016, phosphorus, AR016
Hydroquinone, urease, response, IA039
IBDU
irrigation, bermudagrass, FL010
particle size, soil, IL015
rate of application, barberry, SC014, bentgrass, AZ011, MI007, PA007, bermudagrass, FL010, HI013, bluegrass, MI007, PA007, boxwood, SC014, corn, NA021, holly, SC014, juniper, SC014, ornamental, OK032, pepper, FL033
response, barberry, SC014, bluegrass, NE017, PA007, boxwood, SC014, holly, SC014, juniper, SC014
transformation, soil, IL015
turf, bermudagrass, FL010, HI013, bluegrass, NE017, ground cover, NE017, response, SC008
Industrial Waste
ammelide, corn, KS017, soybean, KS017, wheat, KS017
cyanuric acid, corn, KS017, soybean, KS017, wheat, KS017
nitrogen, transformation, CA026
Inkberry, fertilizer, soil test correlation, NJ009
Inoculum, rhizobium, soybean, LA010, MN021
Insect Resistance, forest, fertilization, MI024
Interaction, nitrogen, corn, KS068
Intercropped System, nitrogen, corn, NC006, soybean, NC006, sweet potato, NC006
Irish Potato
nitrogen, application, LA009, management, LA009
phosphorus, application, LA009
potassium, application, LA009
Iron (see also specific sources: Iron Chelates, Iron Disulfide, Iron DPTA, Iron EDDHA, Iron, EDTA, Iron Frit, Iron HEEDTA, Iron Sulfur)
content, fertilizer, MO034
controlled-release, hamp iron, NA022, iron chelate, NA022, iron frit, NA022
cotton, wilt, NM007, NM014
deficiency symptom, bentgrass, WI018, bermudagrass, WI018, bluegrass, WI018
fluid application, grain sorghum, OK029, wheat, OK029
foliar application, cherry tree, WI010, source, IA028
implant, magnolia, OH016, oak, OH016, pine, OH016, sweetgum, OH016
leaf analysis, apple, WA016, avocado, CA038, orange, CA038
management, alfalfa, MT019, grass, MT019, oat, NA034, sorghum, NA034, tomato, NA034
method of application, alfalfa, MT019, grass, MT019
plant analysis, apple, WA016, grain sorghum, NM001, orange, FL070, peach, WA016
quality, peach, WA016
rate of application, alfalfa, NM014, apple, WA016, centipedegrass, AL014, corn, CA012, NE037, cotton, MN014, OK020, TX041, TX053, flax, ND018, ND024, forage, NM005, grain crop, NM005, grain sorghum, NM001, TX012, TX041, peach, WA016, peanut, OK020, small grain, OK019, soybean, ND018, OK020, sugar beet, ND024, turf, AL014
redox potential, soil, CO007
soil, analysis, CA012
soil test correlation, cotton, AR021, soybean, NJ016
source comparison, apple, CO020, grain sorghum, NM001
sulfur interaction, pin oak, IN008, turf, IN008
time of application, alfalfa, MT019, grass, MT019
uptake, avocado, CA038, cotton, AR021, orange, CA038, rice, TX014, soybean, AR021
urea ke-min, peach, CO018
Iron Chelate, rate of application, grain sorghum, NA022
Iron Disulfide
foliar application, citrus, FL017
rate of application, citrus, FL017
Iron DPTA
response, corn, IA028, soybean, IA028
soil, redox potential, CO007
Iron EDDHA
foliar application, apple, CO019, peach, CO019
rate of application, apple, CO020, avocado, FL062, corn, IA028, peach, CO017, CO019, soybean, IA028
Iron EDTA
rate of application, avocado, FL062
soil, redox potential, CO007
Iron Frit, rate of application, grain sorghum, NA022
Iron HEEDTA, response, corn, IA028, soybean, IA028
Iron Sulfate
foliar application, grain sorghum, NA022
rate of application, grain sorghum, NA022
response, corn, IA028
soil application, soybean, IA028, MN004
Iron Sulfur
band application, soybean, NE035
broadcast, soybean, NE035
chlorosis, soybean, NE035
rate of application, grain sorghum, OK031, TX045
turf, evaluation, TX003
Irrigation
ammonium nitrate, bermudagrass, FL010, corn, MN001, placement, TX047
ammonium polyphosphate, corn, KS028, water interaction, KS018
ammonium sulfate, field crop, CO025, placement, TX047
anhydrous ammonia, acidulation, NE004, corn, NE014, NE036, native range, NC036, sugar beet, AZ001, wheat, AZ001
basin, citrus, AZ007
boron, corn, DE008
calcium, interaction, KS018, peanut, GA039
cyanuric acid, corn, KS023, soybean, KS023
fertilization, corn, FL080, FL085, GA039, MN006, ND005
fertilizer, apple, AR018, MD013, MI004, application, AR003, CA031, CA037, FL020, MD013, MI004, WA019, blackberry, OR001, bluegrass, WA019, boysenberry, OR001, cherry, MI004, cottonwood, TX031, efficiency, WA030, farm management, KS009, field crop, CA007,

hardwood, SC019, pepper, FL020, GA040, pine, SC019, potato, ND005, raspberry, OR001, strawberry, FL045, sugar beet, ND005, sunflower, ND005, sweet corn, CA042, tomato, GA040
foliar application, corn, NE014
furrow, corn, KS023, soybean, KS023
high yield, corn, FL085, phosphorus, CA031
IBDU, bermudagrass, FL010
leach water, eucalyptus tree, CA034
lime, corn, NE014, potato, AL017, sorghum, NE014, soybean, NE014, tomato, AL017
magnesium, corn, KS065, soybean, AR012
management, alfalfa, KS045, grain sorghum, KS045, orange, FL008, soybean, KS023, KS045
municipal wastewater, field crop, AZ016
nitrogen, alfalfa, SD004, barley, WY002, blueberry, GA033, bluegrass, NY003, bromegrass, NV003, TX080, control release, FL034, corn, CA032, CO023, FL042, FL043, IA033, KS003, KS004, KS046, KS056, KS068, KS074, ND019, NE007, NE012, NE022, TX054, WY002, cotton, SC021, TX055, efficiency, NE024, NE025, fescue, NV003, TX080, grain sorghum, KS046, KS074, movement, NE019, orchardgrass, NV003, pepper, NM006, popcorn, KS003, potato, AL017, CO021, NM006, NY016, WA029, sorghum, KS003, KS004, source, FL034, soybean, AR012, KS056, ND004, sugar beet, KS001, KS004, WA013, tomato, AL017, turf, NY016, wheat, KS074, OR038, SD004, WY002
nitrogen solution, corn, MN001, method of application, GA013
nutrient management, apple, MD013, bluegrass, WA019, bromegrass, WA019, corn, KS007, cottonwood, TX031, forest, NY033, grain sorghum, KS007, grape fruit, FL081, hardwood, SC019, nitrogen, NE019, WA029, phosphorus, NE019, pine SC019, potassium, NE019, sandy soil, KS007
open ditch, pepper, FL064, SD002, tomato, FL064
phosphorus, alfalfa, SD004, blueberry, GA033, bromegrass, NE036, corn, KS003, KS004, KS046, KS056, KS074, ND023, NE014, NE036, cotton, TX055, grain sorghum, KS046, KS074, native range, NE036, pepper, NM006, popcorn, KS003, potato, AL017, NM006, sorghum, KS003, KS004, NE014, soybean, KS056, sugar beet, KS004, NE014, WA013, tomato, AL017, FL034, wheat, KS074, SD004, wheatgrass, NV003
phosphorus-zinc, corn, KS023, soybean, KS023
plant nutrient, apple, AR018, MD013
potassium, alfalfa, NE027, SD004, blueberry, GA033, bromegrass, NE036, corn, FL024, KS004, KS074, NE036, grain sorghum, KS074, native range, NE036, pepper, NM006, potato, AL017, NM006, sorghum, KS003, KS004, NE014, soybean, AR012, sugar beet, KS004, WA013, tomato, AL017, FL034, wheat, KS074, SD004
potassium polyphosphate, corn, KS028
response, alfalfa, KS045, apple, LA008, MD013, MI004, cotton, LA008, LA035, grain sorghum, KS045, peach, GA039, snapbean, FL007, soybean, KS045, vetch, LA008
soil management, corn, NE021
soil productivity, fertilizer, NE008
spray, citrus, AZ007
sprinkler, citrus, AZ007, potato, FL045, strawberry, FL045, tomato, FL045, watermelon, FL045
subsurface, plant nutrients, AR003, potato, FL058, SC020, row crop, SC020
sulfur, corn, CO009, KS068, soybean, AR012
sulfur-coated urea, corn, KS023, WI017, lettuce, MI017, peanut, GA039, potato, WI017, soybean, KS023
sulfuric acid, sugar beet, AZ001, wheat, AZ001, IA033
timing, field crop, KS056
trickle, apple, AR018, celery, CA024, citrus, AZ007, cucumber, CA024, fertilizer, FL045, MI004, fir, CA024, muskmelon, SD007, nitrogen, FL043, FL063, SD007, peach, AR018, CA024, pepper, FL064, SD007, phosphorus, CA031, FL043, FL060, NA035, potassium, FL043, FL060, NA035, potato, SD007, range forage, CA024, sulfur, NA035, tomato, CA024, FL064, urea, NA035
urea, bermudagrass, FL010, placement, TZ047
urea ammonium polyphosphate, corn, KS028
urea formaldehyde, bermudagrass, FL010
yield, corn, ND019
zinc, corn, IA033, sugar beet, WA013
ISU-3, foliar application, soybean, IA042
Juniper
IBDU, rate of application, SC014
nitrogen, rate of application, NM012
resin-coated urea, rate of application, SC014
sulfur-coated urea, rate of application, SC014
urea formaldehyde, rate of application, SC014
Ladino Clover
boron, plant analysis, NJ014, rate of application, NJ014, soil test correlation, NJ014, uptake, NJ014
nitrogen, management, MO031
Lead
corn, uptake, NA017, NA019
feedlot manure, uptake CA034
sewage sludge, mobility, NA011, NA017, NA019
snapbean, uptake, NA017
transformation, crop residue, CA034
Legume
fertilizer, management, MT023, sod-seeding, MT023
lime, nitrogen fixation, CA027, rate of application, FL005
manganese, management, KY012, response, KY012, soil test correlation, KY012
mine spoil soil, fertilizer, MI023
molybdenum, management, KY012, response, KY012
monocalcium, phosphate, CO028
nitrogen, rate of application, HI015
nitrogen fixation, mine-spoil soil, CO028, phosphorus, CA027, potassium, WI006
phosphorus, nitrogen fixation, CA027, rate of application, FL005, HI015, response, CO012
potassium, dormacy, WI006, management, WI006, rate of application, HI015, winter hardiness, WI006, yield, WI006
soil test correlation, manganese, KY012, molybdenum, KY012
sulfur, application, TX060, response, TX060
Legume-Grass Hay
lime, rate of application, PA019
nitrogen, rate of application, PA019
phosphorus, rate of application, PA019
potassium, rate of application, PA019
Lemon
nitrogen, method of application, CA035, movement, CA040, rate of application, CA035, FL072, time of application, CA035, transformation, CA040
potassium, rate of application, FL072
Lespedeza, nitrogen, rate of application, TN015, TN016
Lettuce

anhydrous ammonia, rate of application, MI017
fertilizer, placement, FL059, trickle irrigation, CA037
nitrogen, management, FL039, method of application, FL059, rate of application, AZ012, FL003, FL039, transformation, AZ003, uptake, AZ003
nitrogen-phosphorus combination, fluid application, FL003, placement, FL003
nitrogen-phosphorus-potassium combination, rate of application, HI011
N-Serve, method of application, CO013, rate of application, CO013
phosphorus, management, FL039, method of application, FL059, rate of application, AZ012, FL003, FL039, soil test correlation, FL003
potassium, management, FL039, method of application, FL059, rate of application, FL003, FL039, soil test correlation, FL003
slow release nitrogen, method of application, CO013, rate of application, CO013
soil test correlation, nitrogen, FL003, phosphorus, FL003, potassium, FL003
sulfur-coated urea, rate of application, MI017
urea, rate of application, MI017, terrazole, MI017
Lily, fertilizer, rate of application, OR012, VA016
Lime (see also specific sources: Calcium Carbonate, Calcium Silicate Slag)
alfalfa, method of application, MT019, minimum-tillage, NY020, placement, OR025, rate of application, IA043, soil test correlation, IA043, time of application, MT019
fluid application, corn, KS025, NC001, NE034, corn forage, NA010, grain sorghum, KS025, grass, KS026, KS032, response, KS041, soybean, KS032, NC001, NE034, wheat, KS032
foliar application, corn, FL067, TN021, cotton, TN021
highway roadside, erosion control, VA006, fertilization, VA006
irrigation, corn, NE014, potato, AL017, sorghum, NE014, soybean, NE014, tomato, AL017
magnesium, rate of application, FL061, source, FL061
management, alfalfa, MT019, beech, NH005, birch, NH005, corn, IA037, MO024, cotton, LA023, field crop, IA036, forage, FL082, MO032, grass, MT019, maple, NH005, potato, ME002, sorghum, LA023, soybean, IA037, LA023
method of application, alfalfa, MT019, apple, MA001, corn, NE008, PR010, cotton, AL016, NA025, grass, MT019, peach, GA023 sorghum, NE008, soybean, NE008, PR010, watermelon, FL074, PR005, wheat, NE008, winged bean, PR010
mine-spoil soil, bean, WV001, bermudagrass, KY002, KY003, KY007, WV001, birdsfoot trefoil, NA027, VA015, buckwheat, WV001, cabbage, WV001, clover, NA027, cucumber, WV001, fescue, NA027, WV001, forage, WV002, orchardgrass, NA027, potato, WV001, reclamation, KY001, squash, WV001, sweet corn, WV001, tomato, WV001
minimum-tillage, alfalfa, NY020
multiple cropping, corn, IA037, soybean, IA037
nitrogen, rate of application, FL061
nitrogen fixation, legume, CA027, CA028, WI008
no-till, corn, PA015
nutrient efficiency, watermelon, FL074
nutrient uptake, vegetable, PA025
organic soil, corn, NC020, sorghum, NC020, PR014, soybean, NC020, wheat, NC020
phosphorus, rate of application, FL061
placement, alfalfa, OR025, bermudagrass, NA016, clover, FL030, corn, PA015, grass, FL030, wheat, OR025
plant analysis, bermudagrass, AR014, potato, OR010
potassium, rate of application, FL061
quality, tobacco, NC027
rate of application, alfalfa, IA043, apple, MA001, aquatic plant, AL012, barley, OR020, bean, PR005, PR014, NH005, beggarweed, FL023, bentgrass, NJ008, birdsfoot trefoil, NA027, VA015, bluegrass, NJ008, cabbage, PR005, cantaloupe, PR005, centipedegrass, PR013, Christmas tree, NC029, clover, FL029, FL030, LA042, NA027, VA015, container-grown plant, FL001, NC029, corn, FL067, FL077, FL079, GA018, IA043, IN018, NC008, NC020, NE008, PA015, PA019, PR014, TN020, TN021, corn-soybean rotation, IA043, corn-wheat-alfalfa rotation, IA043, cotton, AL016, NA025, OK020, TN021, cranberry, WA009, cucumber, PR005, digitgrass, FL029, fescue, NA027, TN005, fish pond, AL012, forage, FL082, MO032, NC031, grain sorghum, GA018, grass, FL030, PR014, legume, FL005, legume-grass hay, PA019, onion, OR021, organic soil, NC020, ornamental, NC029, pangolagrass, FL029, peach, LA038, peanut, OK020, pepper, PR005, pimento, AL018, plant disease, FL015, plantain, PR009, PR014, potato, AL017, AL018, ME005, ME007, red clover, NY024, rose, MO035, ryegrass, LA041, LA042, soil test correlation, FL068, sorghum, FL005, LA041, NE008, PR014, soybean, IA043, IN018, NC008, NE008, OK020, PA019, PR014, TN021, subterranean clover, OR020, sudan-sorghum, PR009, sweet corn, WA035, table beet, OR021, tobacco, NC027, PR014, TN004, tomato, AL017, AL018, VA015, vetch, VA015, watermelon, FL044, PR005, wheat, IA043, NE008, OR020, PA019, yam, PR009, PR014
response, beech, NH005, field, crop, FL051, forage, FL025, oats, ME002, plantain, PR009, PR014, potato, ME002, rice, PR009, PR014, soybean, AR027, stargrass, PR009, sudangrass, PR009, sugarcane, PR014, tanier, PR009, PR014, timothy, ME002, tobacco, KY006, NC027, yam, PR009, PR014
root properties, alfalfa, OH012, OR025, wheat, OR020, OR022
soil test correlation, alfalfa, IA043, apple, NJ009, azalea, NJ009, cabbage, NJ009, corn, IA043, MO018, cotton, AL009, MO018, TX010, crop rotation, IA043, fescue, MO018, field crop, OH026, forage, TX010, grape, NJ009, holly, NJ009, inkberry, NJ009, oak, NJ009, peanut, AL009, pine, NJ009, poinsettia, NJ009, potato, NJ009, rate of application, FL068, red clover, NA018, romeda, NJ009, soybean, AL009, IA043, MO018, NA018, NJ009, tomato, NJ009, walnut, NJ009, wheat, MO018, OR014, TX010
source, corn, PR010, soybean, PR010, winged bean, PR010
time of application, alfalfa, MT019, corn, PR010, grass, MT019, potato, AL017, NY005, soybean, PR010, tomato, AL017, watermelon, FL074, winged bean, PR010
tropical soil, bean, PR014, corn, PR014, grass, PR014, plantain, PR014, rice, PR014, sorghum, PR014, soybean, PR014, sugarcane, PR014, tanier, PR014, tobacco, PR014, yam, PR014
uptake, corn, DE007

urea-ammonium nitrate, compatability, KS032
Limpograss
nitrogen, rate of application, FL019
potassium, rate of application, FL019
Liquid
efficiency, corn, KS042, grain sorghum, KS042, wheat, KS042
fertilizer, placement, IN003, red pine, MI021, reduced tillage, KS037
Loblolly Pine
ammonium sulfate, rate of application, TX002, survival, TX002
fertilization, rate of application, SC011
muriate of potash, rate of application, TX002
nitrogen, foliar analysis, AL023, plant density, AL033, rate of application, AL023, AL033, AR016, FL049, southern pine beetle, NC015
phosphorus, rate of application, AR016, FL049, source, FL049
plant nutrients, plant analysis, SC011
sul-po-mag, rate of application, FL049
Locust, phosphorus, response, OH033
Loess Soil
nitrogen, movement, MO010
phosphorus, movement, MO010
Longleaf Pine
fertilization, rate of application, SC011
plant nutrients, plant analysis, SC011
Lovegrass
nitrogen, plant analysis, TX067, rate of application, TX067, time of application, TX067
plant analysis, carbohydrate, AZ014, nitrogen, AZ014, TX067
Macadamia
calcium hydroxide, rate of application, HI009
phosphorus, rate of application, HI009
Machinery
no-till, pasture, NA030
placement, pasture, NA030
Magical, response, peanut, GA052
Magnesium (see also specific sources: Granumag, Magnesium Ammonium Phosphate, Magnesium Chloride, Magnesium EDTA, Magnesium Oxide, Magnesium Sulfate)
application, avocado, CA038, corn, IL013, PA020, forage, KS012, grass tetany, KS012
calcium, interaction, SC005
content, fertilizer materials, MO034
deficiency symptom, bentgrass, WI018, bermudagrass, WI018, bluegrass, WI018
foliar application, cranberry, WA009, peanut, GA049, watermelon, FL073
granumag (87% MgO), grape, OH019, peach, OH019
grass, tetany, wheat, KS022
hay, response, PA020
irrigation application, corn, KS065, soybean, AR012
management, corn, KS007, field crop, MO019, oat, ME002, potato, ME002, sorghum, KS007, soybean, FL054, timothy, ME002
method of application, peach, GA023, potato, SC020, sugar beet, MI005, sweet corn, IA040
placement, bean, IN020
plant analysis, avocado, CA038, corn, IL020, grape, WA033, orange, CA038, FL070
quality, crownvetch, PA024
rate of application, banana, PR025, bean, IN020, bermudagrass, FL027, TX030, blueberry, NJ006, corn, FL043, IL013, KS065, cotton, AR021, fescue, TN005, lime, FL061, papaya, HI002, plantain, PR001, PR015, potato, FL043, SC020, WA015, rice, PR001, ryegrass, FL027, soybean, AR021, IL028, LA056, tanier, PR001, turf, PA008, wild yam, PR001
response, alfalfa, PA013, PA020, orchardgrass, PA013, potato, FL060
soil test correlation, cotton, AR021, fescue, AR019, orange, FL070, potato, WA015, soybean, AR019, sweet corn, PA004
source, lime, FL061, sugar beet, MI005
sul-po-mag, rate of application, FL049
time of application, turf, PA008
tundra, soil, NJ003
uptake, avocado, CA038, corn, IL020, SC005, cotton, AR021, fescue, TN005, grass tetany, KS022, orange, CA038, soybean, AR012, AR021, wheat, OR029
Magnesium Ammonium Phosphate, foliar application, azalea, NC025, poinsettia, NC025
Magnesium Chloride, placement, soybean, KS033, wheat, KS033
Magnesium EDTA, placement, soybean, KS033, wheat, KS033
Magnesium Oxide, rate of application, soybean, AR029
Magnesium Sulfate
irrigation, peach, AR018
placement, apple, AR018, soybean, KS033, wheat, KS033
rate of application, collard, NY009, corn, GA001, grape, OH019, peach, OH019, spinach, NY009
response, apple, AR018, peach, AR018, OH019
Magnolia
iron, implant, OH016
manganese, implant, OH016
nitrogen, rate of application, OH016
Manganese (see also specific sources: Manganese DPTA, Manganese EDTA, Manganese Sulfate)
deficiency symptom, bentgrass, WI018, bermudagrass, WI018, bluegrass, WI018
fertilizer material, analysis, MO034
foliar application, cherry tree, WI010, cranberry, WA009, oat, ID018
implant, magnolia, OH016, oak, OH016, pine, OH016, sweetgum, OH016
management, alfalfa, MT019, grass, MT019, legume, KY012, soybean, KY012
method of application, alfalfa, MT019, grass, MT019
plant analysis, grape, WA032, potato, OR010, soybean, AR027, tree fruit, WA033
rate of application, alfalfa, MT019, barley, OR024, chrysanthemum, NY002, corn, CA012, OK026, SC015, cotton, OK020, foliar application, ID018, grain sorghum, OK026, peanut, OK020, poinsettia, NY002, rose, NY002, soybean, GA027, GA047, OK047, OK020, SC015, SC016, VA004, urban tree, OK033
redox potential, soil CO007
response, legume, KY012, strawberry, WA037, sugar beet, MI016
soil, analysis, CA012
soil test correlation, cotton, AR021, legume, KY012, soybean, NJ016
time of application, alfalfa, MT019, grass, MT019
uptake, barley, OR024, bean, IN020, cotton, AR021, foliar application, AL032 oat, OR024, rice, TX014, soybean, AR021, GA047, triticale, OR024, wheat, OR024
Manganese DPTA, soil redox potential, CO007
Manganese EDTA, soil redox potential, CO007
Manganese Sulfate, rate of application, corn, MN005
Manure
blackberry, quality, TX065, yield, TX065
nitrate-nitrogen, content, IA025
nutrient management, corn, NE039, soybean, TN001
pollution, environment, FL047
rate of application, corn, TN014, soybean, TN001
response, corn, TN013, snapbean, OR027, table beet, OR027
transformation, economic, OH005, nutrient movement, IA025, soil, IA002, NY004, sugar beet, AZ010

Maple
fertilizer, management, NH005
lime, management, NH005
nitrogen, rate of application, MI022, VT002
phosphate, rate of application, VT002
phosphorus, rate of application, MI022
plant nutrients, management, NY034
potassium, rate of application, MI022, VT002
Market Analysis
crop production, cost NA047
demand, projection, CA014, IN013, NA038, NA049, OK002, OK018
economics, rate of application, KS051
export, forecast, NA049
farm enterprise, fertilizer, NE015
farm management, economics, KS009, UT009, fertilizer, CA016, NE032, OK018
farm sector, economics, OK018, UT009
fertilizer, commodity, export, OK010, cost, NA047, demand, NA038, NA049, energy, cost, AZ002, land use, NJ002, product quality, CT003, pineapple, PR008, public policy, OK010, retail, ND015, supply, NA038, NA049
fertilizer industry, market structure, IL029, ND015, public policy, IN012
fertilizer use, economics, MO038
forecast, demand, NA048, NA049, supply, IN013, NA048, NA049
legislation, taxes, OK002
market size, land use, NJ002
public policy, land use, NJ002
soil group, economic decision, MS014
supply, projection, CA014
wheat, fertilizer, NE015
Market Development, fertilizer, demand, IL029, NA038, supply, IL029, NA038
Market Research
farm management, fertilizer, MI002
fertilizer industry, regulation, CO015
phosphorus in soil, northern United States, MO009
supply-demand, world food need, NE003
Market Structure
California, fertilizer, CA014, tomato, CA014,
fertilizer, retail, ND015
transportation, fertilizer, IA014
Marketing
barge, policy, IA004
behavioral, theory, MI011
channel, fertilizer, NH001
competition, cooperative, MN028
cooperative, structure, MN028
distribution, capacity, NA050, cost, IL009, UT006, fertilizer, IA006, IA014, IL029, KS059, KS062, LA034, NA040, NE003, NE033, NH001, OH011, SD006, fertilizer industry, IL029, management, UT006, public policy, IA004, storage, IA006, IA007, KS060, KS061, LA034, MN009, SD006, transportation, IA004, IA005, IA006, IA007, KS059, KS060, KS061, KS062, LA034, MN009, MO024, MO025, NA036, NA040, NA050, NE001, OH011, OH028, OK015, SD006, UT006
economic, cost:benefit ratio, KS051, NA040, demand, NA048, fertilizer, KS051, NA037, OR007, supply, NA048
efficiency, cooperative, MN028
export, forecast, NA049
farm management, fertilizer, MI002, MT016
fertilizer, analysis, OK002, cost, MN022, NE003, cost:benefit ratio, NA038, farm sector analysis, OK018, legislation, OK002, market analysis, NE003, OK010, organization, IL039, NH001, personnel development, IL029, planning, IL029, product quality, NA012, retail, IA014, NA037, NA044, WA024, taxes, OK002
fertilizer industry, product quality, CT003, retail, NA044, sales volume, ND015, structure, NM010, supply, IN013
management, personnel, LA031, retail, WA024
nitrogen, distribution, NA041, fertilizer, NA041, storage, NA041, transportation, NA041
organization, fertilizer, IL029, NH001, NM009, promotion, IL029, retail, IN013, LA032, supply system, MI011
personnel, enterprise management, LA031
personnel development, fertilizer industry, IL029
planning, input, IL029
policy, fertilizer, NA048
product, enterprise analysis, MI002, pricing, MN022
promotion, fertilizer industry, IL029
range improvement, analysis, UT009
regulations, law, CO015
research, retail outlet, NE001
retail, efficiency, MT004, fertilizer, MO008, MT016, WA024, management, WA024, plant size, LA032, sales, NA037, ND015, storage, IA005, structure, MN010, trend, NA037
retail outlet, fertilizer, ND015, NE001, KS062, grain, NE002, location, NE001
structure, distribution system, LA032, retail, IN013, NE003, supply system, LA032
supply, forecast, NA049
supply demand analysis, world forecast, NA001
system, bulk handling, MO008, input, IL029
Metal Chelates, rate of application, rice, AR009
Method of Application
ammonium phosphate, band application, MO008
broadcast application, corn, WI020, field crop, NY003
bulk handling, agricultural chemical, GA021, seed, GA021
dry blending, agricultural chemical, GA021, seed, GA021
fertilizer, onion, FL018
fluid application, vegetable, FL046
Methylene Urea, turf, bluegrass, NE017, ground cover, NE017
Micronutrients (see also specific sources: Arsenic, Borate 65, Boron, Cadmium, Chromium, Copper, Copper DPTA, Copper EDTA, Iron, Iron DPTA, Iron EDTA, Iron Sulfate, Lead, Manganese, Manganese DPTA, Manganese EDTA, Manganese Sulfate, Molybdenum, Nickel, Sodium Tetraborate, Zinc, Zinc Chelate, Zinc DPTA, Zinc EDTA, Zinc Oxide, Zinc Sulfate)
feedlot manure, zinc, CA034
fertilizer material, analysis, MO034, NA012
foliar application, copper WI010, iron, WI010, manganese, WI010, zinc, WI010
management, bentgrass, KS010, bluegrass, KS010, cotton, MO013, fescue, KS010, field crop, MO027, ornamental, LA043, ryegrass, KS010, sorghum, NA034, soybean, GA045
nutrition, horticultural crop, FL002, orchard, NH002, turf, FL002
phosphorus-zinc, method of application, KS023, rate of application, KS023
placement, corn, IN015
plant analysis, barley, CA008
quality, crownvetch, PA024
rate of application, alfalfa, SD002, bean, PR005, beet, KS010, bluegrass, KS010, WI018, cabbage, PR005, cantaloupe, PR005, citrus, AZ007, clover, FL028, TX013, corn, IN015, SD002, TX013, cotton, MO013, cucumber, PR005, digitgrass, FL029, fescue, KS010, flax, TX013, grain sorghum, TX013, pangolagrass, FL029, peach, LA038, peanut,

TX013, pecan, TX013, pepper, PR005, rice, TX013, small grain, SD002, sugarcane, TX013, watermelon, PR005
release, sulfuric acid, TX013
response, copper, CA038, horticultural crop, FL002, oat, NA034, tomato, NA034
rock phosphate, corn forage, NA019
sewage sludge, barley, CA008
soil test correlation, alfalfa, SD002, corn, SD002, small grain, SD002
solubor, foliar application, MD006, MN018, rate of application, MN016, soybean, MD006, MN018, MS010
sulfur, interaction, CA002
time of application, alfalfa, MT019
intake, barley, CA008, bean, IN020, sugar beet, MI016
Milkvetch
nitrogen, management, NE020, time of application, CO020
phosphorus, time of application, CO020
plant analysis, nitrogen, NE020
Millet
ammonium nitrate, rate of application, LA051
ammonium sulfate, isotope, AL028, transformation, AL028, CO025
anhydrous ammonia, rate of application, CO024
nitrogen, crop residue, MT029, rate of application, LA051
phosphorus, soil test correlation, ND010
Milorganite
hexon, spinach, MA005
N-Serve, cucumber, MA004, radish, MA004, spinach, MA004, MA005
rate of application, bentgrass, MI007, bermudagrass, LA001, bluegrass, MI007
time of application, bermudagrass, LA002
transformation, spinach, MA005
truban, spinach, MA005
turf, response, SC008
Mine-Spoil Reclamation
cement dust, rate of application, OH001
chicken manure, corn, WV004
composted garbage, forage, WV002
erosion control, sewage sludge, PA028
fertilizer, bean, WV001, bermudagrass, WV001, buckwheat, WV001, cucumber, WV001, fescue, IA021, MS020, WV001, grass, MI023, legume, MI023, potato, WV001, rate of application, IA021, VA002, reclamation, KY001, sweet corn, WV001
flyash, rate of application, OH001, reclamation, KY001
lime, bean, WV001, bermudagrass, KY002, KY003, KY007, WV001, birdsfoot trefoil, NA027, VA015, buckwheat, WV001, cabbage, WV001, clover, NA027, cucumber, WV001, fescue, NA027, WV001, grass, NA027, potato, WV001, reclamation, KY001, squash, WV001, sweet corn, WV001, tomato, WV001
monocalcium phosphate, bean, WV003, bermudagrass, KY007, corn, WV004, fixation, CO028, legume, CO028, rate of application, OH001, tomato, VA003, transformation, CO028, CO029, NA045, wheatgrass, WY001
nitrogen, bermudagrass, KY007, forage, WV002, rate of application, VA003, transformation, CO028
no-till, corn, OH031
nutrient management, corn, OH031, revegetation, VA002
phosphorus, bermudagrass, KY002, KY003, KY007, corn, OH001, WV004, forage, KY003, WV002, wheatgrass, WY001
potassium, bermudagrass, KY007, forage, WV002, rate of application, OH001, ryegrass, WA018
reclamation, fertilizer, MI023, sewage sludge, PA028
revegetation, ryegrass, WA108
rock phosphate, bean, VA003, WV001, bermudagrass, WV001, buckwheat, WV001, cucumber, WV001, fescue, NA027, WV001, grain sorghum, NA013, grass, NA027, potato, WV001, tomato, VA003
ryegrass, nitrogen, WA018, phosphorus, WA018, potassium, WA018
sewage, grass, NA027
sewage sludge, forage, WV002, rate of application, OH001
Mineral, potassium, release, LA007
Minimum-Tillage
fertilizer, management, MT023
lime, alfalfa, MY020
nitrogen, potato, WA029, plant nutrients, WA029, sorghum, GA026, soybean, GA026, wheat, GA026
nitrogen solution, efficiency, NE016
phosphorus, potato, WA029, sorghum, GA026, soybean, GA026, wheat, GA026
Mint
ammonium nitrate, rate of application, WA011
phosphorus, rate of application, WA011
sulfur-coated urea, rate of application, ID017
urea, rate of application, ID017
Mixed Fertilizer
controlled-release, horticultural crop, AL005
growth rate, red cedar, AL003, scotch pine, AL003, Virginia pine, AL003, white pine, AL003
insect resistance, forest, MI024
rate of application, barley, AK006, Christmas tree, AL001, oat, AR006
response, forest, MI024
variety trial, barley, AK006, oats, AK006, wheat, AK006
Molybdenum
deficiency symptom, bentgrass, WI018, bermudagrass, WI018, bluegrass, WI018
fertilizer, analysis, MO034
foliar application, soybean, TN021
management, alfalfa, MT019, grass, MT019, legume, KY012, soybean, KY012
method of application, alfalfa, MT019, grass, MT019, pepper, MS002, tomato, MS002, watermelon, MS002
plant analysis, barley, OR020, soybean, AR027, subterranean clover, OR020, wheat, OR020
rate of application, barley, OR020, clover, GA053, OR020, clover-grass pasture, OR015, popcorn, OR015, subterranean clover, OR020, wheat, OR020
response, legume, KY012, tobacco, KY006
soil test correlation, legume, KY012, red clover, NA018, soybean, NA018
time of application, alfalfa, MT019, grass, MT019, pepper, MS002, tomato, MS002, watermelon, MS002
Monoammonium Phosphate
fluid application, corn forage, NA010, orchardgrass, WA025, zinc, NA010
placement, wheat, KS029
rate of application, corn, MN005, NA013, NA021, fescue, NA013, grain sorghum, NA013, sugar beet, OH027, wheat, KS029, WA025
Monocalcium Phosphate
mine-spoil soil, bean, VA003, bermudagrass, KY007, corn, WV004, fixation, CO028, legume, CO028, rate of application, OH001, tomato, VA003, transformation, CO028, CO029, NA045, wheatgrass, WY001
rate of application, mine-spoil soil, OH001, potato, ME005
Muck Soil, micronutrients, small grain, OR019
Mulch Production
nitrogen, squash, VA001
osmocote, pepper, FL064, tomato, FL064
sulfur-coated urea, pepper, FL064, FL066, tomato, FL064, FL066

Multiple Cropping
nitrogen, bermudagrass, OK008, corn, MS022, cotton, MS022, soybean, IA037, wheat, OK008
phosphorus, bermudagrass, OK008, method of application, GA031, rate of application, GA031, time of application, GA031, wheat, OK008
potassium, bermudagrass OK008, method of application, GA031, rate of application, GA031, time of application, GA031, wheat, OK008
residue management, cotton, MS022, sorghum, MS022, wheat, MS022
Mungbean
aerial seeding, double cropping, OK007
nitrogen, placement, OK027, rate of application, OK027, time of application, OK027
Municipal Waste, nitrogen, transformation, CA026
Municipal Wastewater, rate of application, alfalfa, AZ016, barley, AZ016, bermudagrass, AZ016, cotton, AZ016, sorghum, AZ016, soybean, AZ016, wheat, AZ016
Muriate of Potash, loblolly pine, survival, TX002
Mushroom Compost, growth media, ornamental, TX017
Muskmelon
fertilizer, application, KS020
nitrogen, irrigation application, SD007, rate of application, MS001, SD007, time of application, SD007, trickle irrigation, SD007
phosphorus, rate of application, MS001
potassium, rate of application, MS001
Mustard
ammonium nitrate, rate of application, NA005, ND027
nitrate-nitrogen, composition, NA024
nitrogen, application, LA009, management, LA009, rate of application, NA005, NA024, uptake, NA024
phosphorus, application, LA009, management, LA009, rate of application, NA005, NA024
potassium, application, LA009, rate of application, NA005, NA024
sulfur-coated urea, rate of application, NA005
urea, rate of application, ND027
Mycorrhiza
fertilizer, fir, NC013, pine, NC013
nitrogen, availability, IL016, hemlock, OR026, relationship, GA022
phosphorus, availability, IL016, relationship, GA022
potassium, relationship, GA022
Native Bluejoint
ammonium nitrate, rate of application, AK002
phosphorus, rate of application, AK002
potassium, rate of application, AK002
sulfur, rate of application, AK002
urea, rate of application, AK002
Native Grass
nitrogen, movement, OK036
phosphorus, rate of application, ND020, ND025
potassium, rate of application, ND020
Native Prairie
nitrogen, transformation, MN002
phosphorus, management, MN002
Native Range
ammonium nitrate, rate of application, ND029
anhydrous ammonia, rate of application, NE036
nitrogen, rate of application, MT026
phosphorus, rate of application, NE036
potassium, rate of application, NE036
sulfur-coated urea, rate of application, ND029
Navy Bean, foliar application, nitrogen-phosphorus-potassium-sulfur combination, MI014
Nickel
micronutrients, corn forage, NA019
sewage sludge, corn, NA017, mobility, NA011
Nitran, transformation, corn, PA012
Nitrate-Nitrogen
ammonium sulfate, bacteriocide, IL030
anhydrous ammonia, N-Serve, WI012
calcium nitrate, movement, OK001
composition, corn, NA024, fescue, NA024, mustard, NA024
denitrification, corn, IL026
movement, corn, IL026, irrigation, CO013, lemon, CA040, manure content, IA025, pollution, AL029, soil, IA022, TX015, soybean, IL008, SD009
N-Serve, corn, TX036
plant, uptake, NJ020
plant analysis, cotton, TX034, spinach, NA024
response, corn, IL003
sewage sludge, mobility, NA011
soil, movement, NJ020
transformation, corn, KY010, soil, CA033
uptake, source, TX015, time of application, TX015
Nitric Phosphate
fluid application, corn, NC001, soybean, NC001
rate of application, corn, NC001, soybean, NC001
Nitrification Inhibitor
ATC, soil, IA010
mode of action, ammonium fertilizer, WI011
N Serve, ammonium fertilizer, WI011, corn, KY013, mode of action, WI011, soil, IA010
nitrogen, source, TX015
terrazole, urea, MI006, MN023, NC002, OH007
urea, rice, LA025, soil, IA010
Nitrogen (see also specific sources: Ammonia, Ammonia Ammonium Polyphosphate, Ammoniated Superphosphate, Ammonium Carbonate, Ammonium Nitrate, Ammonium Nitrate Solution, Ammonium Nitrate Sulfate, Ammonium Orthophosphate, Ammonium Phosphate, Ammonium Phosphate-Sulfate, Ammonium Polyphosphate, Ammonium Polysulfide, Ammonium Sulfate, Anhydrous Ammonia, Blood Meal, Broiler Litter, Calcium Nitrate, Cyanuric Acid, Dairy Manure, Diammonium Phosphate, Feedlot Manure, IBDU, Magnesium Ammonium Phosphate, Methylene Urea, Milorganite, Nitric Phosphate, Nitrogen Solution, Osmocote, Oxamide, Parafinized Urea, Phosphonitrilic Hexamide, Phosphoryl Triamide, Potassium Nitrate, Prilled Urea, Pulp Mill Sludge, Resin Coated Urea, Sodium Nitrate, Sulfur-Coated Nitrogen with Potassium, Sulfur-Coated Nitrogen-Phosphorus-Potassium, Sulfur-Coated Urea, Terrazole, Triammonium Polyphosphate, Uramite, Urea, Urea Ammonium Nitrate, Urea Ammonium Nitrate Solution, Urea Ammonium Phosphate, Urea Ammonium Polyphosphate, Urea Ammonium Sulfate, Urea Formaldehyde, Urea Phosphate, Urea Polyphosphate, Ureaform)
agricultural waste, transformation, CA026
application, cotton, MO013, equipment, MS017, fig, LA009, fir, ME009, forage, MS014, grain sorghum, KS048, irish potato, LA009, liquid, KS042, mustard, LA009, ornamental, LA043, MD014, pea, LA009, pine, MN002, pond, NJ018, spruce, ME009, squash, VA001, sweet potato, LA009, tomato, VA001, yellow poplar, SC002
application equipment, cotton, MS017
application method, corn, MD008
availability, avocado, CA038, FL062, mycorrhiza, IL016
balance, soil-plant system, NE022
band application, sweet corn, NY029
bark mixture, container-grown plants, AR005, VA009
beef cattle, fescue, NC014, range

forage, UT002
chemical analysis, fertilizer, MO034, NA012
compost, rate of application, FL009
container-grown plant, azalea, SC013, holly, SC013, ornamental, OK032, rose, NY002, viburnum, NY008
controlled-release, athletic field, IN007, bluegrass, IN007, chard, NA005, cherry, WI010, corn, NA005, TX052, cranberry, WA040, fescue, NA005, fir, CA004, floricultural crop, FL001, irrigation, FL034, mustard, NA005, placement, CO002, range, NM003, rasberry, WA040, redwood, CA004, roadside turf, IN007, rose, FL037, spinach, LA003, NA005, sulfur-coated urea, FL056, NA005, tomato, FL034, turf, NJ007, viburnum, NY008
deficiency symptom, bentgrass, WI018, bermudagrass, WI018, bluegrass, WI018
denitrification, isotope, IL023
development, soybean, ND001
disease, bluegrass, RI002, wheat, WA022
distribution, transportation, NA041
double cropping, soybean, AR004, wheat, AR004
effect on quality, apple, WA003, bentgrass, OH004, bluegrass, OH004, cotton, OK017
efficiency, TX015, corn, NE024, NE025, forage, WA034
erosion control, alfalfa, WY005
fertilization, forage, MS014, peanut, AL024, pine, OR034, soybean, AL024, MN020
fertilizer, manufacture, NA041, organic, TX033, transportation, NA041, triticale, TX064
fixation, alfalfa, OH013, bean, ID001, legume, CA027, CO028, WI006, peanut, AL024, rhizobium, GA014, GA015, ID001, LA014, MN019, MN020, MN021, rice, AR008, sainfoin, MT001, soybean, AL024, MN021, OH014, subtropical grass, FL057, tropical grass, FL057
flooded soil, rice, TX037
fluid application, alfalfa, ND033, bromegrass, ND033, container-grown plant, OH006, grain sorghum, TX046, ornamental, OH006, viburnum, NY008, wheat, KS063
fluid nitrogen, rate of application, KS033
foliar analysis, loblolly pine, AL023
foliar application, corn, IL002, TN021, cotton, LA035, TN021, cranberry, WA040, grapefruit, CA036, intercrop, NC006, orange, CA036, potato, ID003, TX028, raspberry WA040, rose, MO035, soybean, IA020, IL002, LA004, TN021
foliar wilt, potato, ID004
forage quality, clover, LA013
germination, potato, TX029
granular urea, corn, MD001, MD008, MD009, method of application, MD009, rate of application, MD009
greenhouse soil, response, MI018
humus, mineralization, AR016
industrial waste, transformation, CA026
inorganic, rate of application, CT004, transformation, CT004
insect population, soybean, AR035
interaction, corn, KS068
intercropped, corn, NC006, soybean, NC006, sweet potato, NC006
irrigation application, alfalfa, SD004, barley, WY002, blueberry, GA033, bluegrass, NV003, bromegrass, NV003, TX080, corn, CA032, CO023, FL042, IA033, KS003, KS004, KS068, KS074, ND019, ND023, NE007, NE012, NE021, NE022, TX054, WY002, fescue, TX080, grain sorghum, KS046, KS074, muskmelon, SD007, pepper, SD007, potato, SD007, sorghum, KS003, KS004, soybean, AR012, KS056, ND004, tomato, CA031, FL034, turf, NJ016, wheat, KS074, OR038, SD004, WY002, wheatgrass, NV003
large-pellet urea, corn, MD001, wheat, KS074, MD001, OR038, SD004, WY002
liquid 10-34-0, application, KS042
loss, N-Serve, TX036, soil, KS064
malting quality, barley, WI002
management, alfalfa, MT019, ND006, NE020, bean, LA009, blueberry, LA009, bluestem, IA018, bromegrass, KS072, carrot, FL039, Christmas tree, MN003, citrus, AZ007, FL035, LA005, TX022, clover, LA013, corn, GA001, IA037, KA004, KS005, KS007, MO024, NE021, NE022, NE024, cotton, MO013, fescue, KS072, MO031, NC007, field crop, IA036, fig, LA009, flower, MT024, forage, LA013, LA028, grape, FL075, grapefruit, FL081, grass, MT019, irish potato, LA009, ladino clover, MO031, lettuce, FL039, milkvetch, NE020, mustard, LA009, native range, MT026, oats, KS036, orange, FL081, orchardgrass, KS072, NE020, ornamental, LA043, MT024, pasture, MO031, pea, LA009, ryegrass, LA013, sand pine, KS072, sainfoin, KS072, sesame, CO022, shallot, LA009, soil, MN012, sorghum, GA026, KS004, KS005, KS007, soybean, GA026, GA045, IA037, NE009, sugar beet, KS004, sugarcane, LA015, sweet potato, LA009, switchgrass, IA018, wheat, GA026, KS005, KS038, wheatgrass, KS072
manure, corn, TN014
marketing, distribution, NA041
metabolism, bean, WI003
method of application, alfalfa, MT019, apple, MA001, barley, MT009, blueberry, WA023, corn, AL015, KS025, KS046, MD008, MO021, ND023, NE008, PR010, TN017, cotton, TN017, cranberry, WA023, flax, ND024, furrow irrigation, CA031, grain sorghum, KS025, KS046, MO021, grass, MT019, lemon, CA035, lettuce, FL059, N-Serve, KS025, orange, CA035, pepper, MS002, potato, CO003, NA026, ND013, NY025, SC020, WA029, soybean, NE008, PR010, sugar beet, MI005, ND024, tomato, MS002, trickle irrigation, CA031, turf, NY026, vegetable, FL078, watermelon, FL074, MS002, wheat, KS025, MO021, NE008, wild rice, MN016, winged bean, PR010
mine-spoil soil, bermudagrass, KY007, forage, WV002, ryegrass, WA018, wheatgrass, WY001
minimum-tillage, potato, WA029, sorghum, GA026, soybean, GA026, wheat, GA026
monoammonium phosphate, corn, MN005, NA013, NA021, corn forage, NA010, fescue, NA013, grain sorghum, NA013, orchardgrass, WA025, placement, KS029, rate of application, KS029, MN005, NA013, NA021, OH027, WA025, sugar beet, OH027, wheat, KS029, WA025
movement, alfalfa, OH021, corn, MN007, MO012, OH021, OH022, cotton, OK035, grass, OH021, irrigation, NE019, lemon, CA040, loess soil, MO010, native grass, OK026, pollution, AL029, NA031, range, OK035, soil, IA022, NJ020, NY004, TX015, sugar beet, NE026, wheat, OK035
multiple cropping, bermudagrass, OK008, corn, IA037, cotton, MS022, sorghum, MS022, soybean, IA037, wheat, MS022
municiple waste, transformation, CA026
mycorrhiza, response, GA022
nitran, corn, PA012
nitrapyrin, rate of application, CO013

nitrate-nitrogen, corn, IL003, IL026, KY010, movement, AL029, CA040, IA022, IL008, IL026, SD009, TX015, TX036, plant, NJ020, potato, MI008, soil, NJ020, soil analysis, ND011, soybean, IL008, transformation, CA011, CO025, WI014, uptake, SD009, water, FL011, NJ020
nitrification inhibitor, ATC, IA010, N-Serve, IA010, IL023, KY013, WI011
nitrogen fixation, alfalfa, OH017, bean, WI003, grass, FL057, legume, CA027, CO028, OH017, rhizobium, GA015, ID001, IL008, IL010, IN014, LA010, LA014, rice, AR008, sainfoin, MT002, soybean, GA014, GA015, IL008, IL010, IN014, LA014, OH014, transformation, TX038
nitrogen-phosphorus combination, fluid application, FL003, MD012, SD001, placement, FL003, KS034, SD001, protein quality, CA030, rate of application, FL003, MD012, SD001
nitrogen-phosphorus-potassium combination, aquatic plant, AL012, disturbed soil, FL088, fluid application, FL014, placement, FL060, propagation, NJ004, rate of application, AR011, FL001, FL040, FL041, GA032, HI011, MD012, PR002, TX030, WA032
nitrogen-phosphorus-potassium-sulfur combination, foliar application, AL009, FL052, GA014, GA049, IA042, MI014, MN019, MO005
nitrogen-phosphorus-potassium-sulfur-boron combination, foliar application, MI014, MO022
no-till, alfalfa, MD003, barley, MT027, bromegrass, KS035, corn, AL015, DE004, DE005, KS035, KS043, KS046, KY005, MD008, MD010, MD020, MO021, MO037, NE010, NJ012, OH022, PA010, PA015, VA007, cover crop, MD020, MO037, NJ012, grain sorghum, KS046, MO021, rye, NJ012, soybean, AR004, AR036, KS035, tobacco, KY004, vetch, NJ012, wheat, AR004, AR036, KS006, MO021, MT027
N-Serve, bermudagrass, TX035, corn, GA006, IL019, IN014, KY013, fescue, GA006, flax, ND024, grain sorghum, KS038, oats, KS038, plant root disease, NE005, rate of application, FL043, sugar beet, ND024, transformation, IL019, wheat, KS038, MO017
nutrient management, citrus, AZ007, FL035, LA005, TX022, irrigation, NE019, WA029
nutrient uptake, atmosphere, CO027
oil content, peppermint, OR016
organic, corn, NC020, rate of application, CT004
organic soil, management, FL039
organic waste, corn, FL069, fescue, NC007, grain sorghum, FL069, rate of application, AL030, transformation, AL030, AZ017, FL047
placement, alfalfa, WI009, bean, IN020, bluegrass, WI009, corn, IN015, LA011, MD010, cowpea, OK027, eggplant, LA011, grain sorghum, TX046, mungbean, OK027, okra, LA011, pea, LA011, pecan, LA011, potato, CO003, CO021, SC001, snapbean, PA005, soybean, AR004, IA027, squash, LA011, sweet potato, AL011, tobacco, NC022, tomato, SC001, wheat, AR004, ID014, NE040
plant analysis, alfalfa, ND014, apple, NY015, WA016, avocado, CA038, barley, ND014, OR020, bentgrass, OR020, bermudagrass, AR014, FL010, TX067, bluestem, IA018, bromegrass, IA016, MI012, cabbage, WI020, cauliflower, WI020, corn, IA038, IN019, KY009, OH003, corn silage, IN010, fescue, IA016, IA018, IN011, MI012, grama grass, AZ014, grape, WA033, grapefruit, CA036, loblolly pine, SC011, long leaf pine, SC001, lovegrass, AZ014, TX067, milkvetch, NE020, onion, OR020, OR021, orange, CA036, CA038, orchardgrass, MI012, peach, WA016, reedgrass, MI012, rice, AR038, KY014, LA018, LA039, NA033, soybean, IA038, OH003, subterranean clover, OR020, sugar beet, CO016, ND014, sunflower, ND014, table beet, OR021, tobacco, MD004, tree fruit, WA033, wheat, ND014, OR020
plant density, cotton, OK017, loblolly pine, AL033
plant disease, N-Serve, NE005
plant residue, vegetables, NY019
quality, bentgrass, OH004, bluegrass, OH004, forage, LA028, peppermint, OR016, potato, WA028, ryegrass, LA013, sugarcane, LA015, table beet, NY028
range, blue grama, NM010, forage, OR043
rate of application, alfalfa, CO002, HI016, IA043, LA008, MT007, MT019, NA007, NA029, ND020, ND021, ND031, NE020, NJ019, NM014, OK012, OR037, PA013, SD002, SD004, WA012, WI009, WI019, WV003, WY004, WY005, amaranth, HI010, apple, GA030, MA001, WA016, azalea, SC013, VA009, bahiagrass, GA042, LA051, MS004, TX004, TX077, banana, HI017, PR015, bark growth media, VA009, barley, AL002, MT009, MT012, NA029, NA026, OR020, WY002, WY003, bean, IN020, LA009, MS001, PR005, TN009, VA003, beet, WI021, bentgrass, MI007, bermudagrass, AR001, FL019, FL027, GA003, GA042, LA019, LA051, MS004, MS005, MO029, NA016, NC005, NC014, NJ008, OK004, OK008, TN010, TN016, TX056, TX062, TX067, birdsfoot trefoil, VA015, blackberry, LA047, TX059, blue grama, ND020, NM010, NM011, blueberry, GA033, LA009, LA047, ME003, NC012, NJ006, bluegrass, MI007, MN015, MS004, NJ008, NV003, NV005, RI002, bluestem, KS021, KS052, broccoli, WI020, bromegrass, IA016, KS035, ND020, ND021, TX079, TX080, WI023, buckwheat, ME006, cabbage, FL087, MS001, PR005, PR012, TN009, WI020, cantalope, AZ012, PR005, PR012, carnation, RI005, carrot, AZ012, FL003, FL039, TX073, cauliflower, WI020, centipedegrass, AL014, MS004, PR013, SC009, Christmas tree, NC029, chrysanthemum, FL014, NY002, OK023, RI005, citrus, AZ007, FL035, LA005, TX022, clover, AL010, FL029, FL086, LA042, TN015, TN016, TN022, VA015, WV003, coffee, HI004, collard, GA037, NY018, container-grown plant, AR005, NC004, NC029, OK023, corn, AL015, CA032, FL042, FL043, FL067, FL077, FL079, FL080, FL087, GA018, GA051, HI016, IA033, IA041, IA043, IL002, IN004, IN015, IN018, IN019, KS003, KS011, KS035, KS046, KS056, KS067, KS074, KY005, KY010, LA011, LA016, LA030, LA050, MD016, MD020, MI008, MI014, MN005, MO021, MO026, MS001, MS006, MS019, MT012, NA007, NA024, NC006, ND023, NE007, NE008, NE012, NY022, OH001, OH010, PA019, SC017, SD002, TN009, TN013, TN017, TN022, TX051, TX054, TX080, VA011, VA018, WI019, WI026, WV003, WY002, corn silage, MN013, WA012, WY002,

cotton, GA050, LA008, LA016, LA035, LA050, MS017, MS017, MS019, NA007, NM014, OK020, SC003, TN017, TX034, TX041, TX051, TX053, TX082, cottonwood, MS016, cover crop, KY005, MD020, NJ012, cowpea, OK027, cranberry, NJ005, cucumber, PR005, TN009, WI008, dallisgrass, MS005, TX004, TX077, digitgrass, FL109, FL029, eggplant, LA011, fescue, GA003, IA016, IN011, MO031, NA024, NC005, NC014, NV003, TN010, TN015, TN016, TX079, TX080, WA012, field crop, CA011, OK030, OR040, fig, LA047, filbert, OR011, fir, WA008, fish pond, AL011, flax, ND024, flower, MT024, fluid, KS033, forage, FL083, NC031, NM005, WY004, forage legume, NY022, forest, CT004, grain crop, NM005, grain legume, NY022, grain sorghum, AR033, FL067, GA018, IA041, KS011, KS046, KS067, KS074, MO021, TX012, TX025, TX041, TX051, TX083, grape, CA015, NC012, grapefruit, CA036, grass, HI015, MT007, grass tetany, GA003, hemlock, WA008, highway roadside, AK005, WY006, holly, SC013, VA009, juniper, NM012, ladino clover, MO031, legume, HI015, legume-grass hay, PA019, lemon, CA035, FL072, lespedeza, TN015, TN016, lettuce, AZ012, FL003, FL039, lime, FL061, limpograss, FL019, loblolly pine, AL023, AL033, AR016, FL049, lovegrass, TX067, magnolia, OH016, maple, MI022, VT002, milkvetch, NE020, millet, LA051, mine-spoil soil, VA003, mungbean, OK027, muskmelon, MS001, SD007, mustard, NA024, native grass, ND020, ND025, native range, MT026, nursery plant, NC004, oak, MS016, NM012, OH016, oats, KS011, LA051, TX056, WY003, okra, LA011, onion, OR021, OR035, TX056, TX073, orange, CA035, CA036, FL021, FL072, orchardgrass, MN015, NE020, NJ019, NV003, PA013, TN016, WA012, WI023, organic soil, NC020, ornamental, IL004, MT024, OH006, pangolagrass, FL029, pasture, FL083, MO031, pea, LA011, MS011, TN009, WI021, peach, FL021, WA016, peanut, FL067, OK020, TX069, TX071, pecan, LA011, LA047, NM015, pepper, MS001, NM006, PR005, SD007, peppermint, WA012, pimento, AL018, pine, IL005, ME010, MI022, MN029, OH016, OR034, SC010, TN007, pineapple, FL072, PR003, PR011, plant disease, FL015, plant population, AL033, plantain, PR001, PR009, PR015, poinsettia, FL014, GA022, NY022, RI005, popcorn, KS003, poplar, ME010, potato, AL017, AL018, AL020, AZ012, CO021, FL043, IA033, ID004, ME007, MI014, MT012, NA026, NM006, NY016, NY025, NY026, OR037, SC001, SC020, SD007, TX029, WA015, WA028, WI005, potato scab, ID004, prune, OR011, pumpkin, PR004, range, NM011, range forage, CA028, OR003, UT002, rangeland, MT007, NM010, reed canarygrass, WI023, rhododendron, WA039, rice, AR009, AR028, AR038, KY014, LA039, LA040, NA033, PR001, PR009, SC017, TX004, TX006, TX007, TX076, rose, MO035, NY002, TX056, rye, AL002, AL010, LA051, WI024, ryegrass, AL010, CA005, FL027, FL086, LA012, LA019, LA041, LA042, MS004, TX004, TX007, WA018, sand pine, FL049, sesame, CA001, CO022, short leaf pine, AR016, slash pine, FL049, small grain, MD016, MT017, NY012, snapbean, PA005, sorghum, KS003, KS055, LA041, LA050, LA051, MS003, MS006, NE008, soybean, AR029, AR032, AR034, AR035, AR036, FL067, IA027, IA041, IA043, IL002, IL010, IN018, KS011, KS035, KS035, KS056, LA004, LA010, LA014, LA016, LA030, LA056, NA007, NC006, ND004, NE008, OH014, OK020, PA019, VA011, spearmint, WA012, spinach, HI010, NA024, spring wheat, ND002, spruce, ME010, MN029, squash, LA011, TN009, St. Augustine grass, MS004, stargrass, FL083, PR009, strawberry, LA045, LA047, MS001, subterranean clover, OR020, sudangrass, HI010, LA051, PR009, TX077, WA012, sudan-sorghum, PR009, sugar beet, KS001, KS002, MT012, MT020, MT028, ND024, UT004, WA013, sugarcane, LA027, TX073, sunflower, TX050, sweet clover, WY004, sweet corn, WI021, sweet potato, AL035, LA011, MS001, NC006, sweetgum, AR031, MS016, OH016, SC002, table beet, NY028, OR021, tanier, PR001, PR009, timothy, MN015, tobacco, FL076, GA044, KY004, MD004, TN004, tomato, AL017, AL018, FL065, MS001, SC001, TN009, WA003, VA015, triticale, AL002, LA051, turf, AL014, CT001, IL004, NV004, NV005, NY016, NY026, PA009, umbrella plant, OK023, vegetable, FL078, vetch, LA008, VA015, watermelon, MS001, PR004, PR005, wheat, AL002, AR036, CO018, IA043, ID014, KS011, KS074, LA051, MO002, MO021, MT010, MT012, MT020, MT029, MT030, ND031, NE008, NE030, NE040, NE041, OK008, OK009, OR004, OR018, OR020, OR036, OR038, OR039, PA019, SD004, TN022, WI024, WY002, WY003, wheatgrass, MT025, ND020, NV003, white ash, TN019, white wheat, OR036, wild rice, MN014, MN016, wild ryegrass, MT025, wild yam, PR001, PR009, yellow birch, VT002, yellow poplar, AR031, MS016, SC002, zoysiagrass, MO029

release rate, crop residue, NY022, sulfur-coated urea, OR023

requirement, cotton, TX009

residual, level, ND031, NE009

residual effect, bluegrass, MD018, corn, MD018, NY022, NY023, orchardgrass, MD018, grain legume, NY022, soybean, MD018, wheat, MD018

residue management, cotton, MS022, sorghum, MS022, wheat, MS022

response, alfalfa, MT007, avocado, FL062, bermudagrass, AR001, AR021, bluegrass, NA032, OH013, broccoli, TX023, corn, CO023, NA023, cotton, OK017, crop residue, CA034, feedlot manure, CA034, fescue, NA032, field crop, CO014, forage, LA013, grass, MT007, ornamental, FL037, pecan, KS070, potato, ID003, range forage, CO004, snapbean, OR027, soybean, LA030, MN021

row spacing, corn, LA030, soybean, LA030

salt balance, grain sorghum, TX046, potato, TX029

sediment, alfalfa, ND006, cotton, MS021

seed analysis, corn, OH003

seed protein, bean, WI003

sewage sludge, corn, NY021, TN013, TN014, nitrate-nitrogen, NA011, rate of application, FL009, FL016, soybean, NY021, transformation, CA041, NA011

soil, alfalfa, ND006, model, CA022, FL013, transformation, TX023, wheat, OK021

soil test calibration, alfalfa, WA012,

corn silage, WA012, fescue, WA012, orchardgrass, WA012, peppermint, WA012, spearmint, WA012, sudangrass, WA012
soil test correlation, alfalfa, IA043, SD002, azalea, NJ009, VA009, bark growth media, VA009, barley, WY002, carrot, FL003, corn, CA012, CO016, GA016, GA048, GA051, IA015, IA043, ID002, HI005, MO018, OH010, OH025, SC017, SD002, TN017, WY002, cotton, AL009, MO018, MS007, MS008, OK024, TN017, TX010, durham wheat, AZ009, fescue, AR019, MO018, grain sorghum, OK024, holly, VA009, lettuce, FL003, peanut, AL009, TX069, pimento, AL018, pine, IL005, potato, AL018, TX007, WA015, rice, NC009, SC017, TX007, small grain, SD002, sorghum, AL009, MS011, soybean, AL009, AR019, IA043, MS011, MO018, NA018, NJ016, OH025, sugar beet, CA018, CO016, MI020, ND011, vegetable, NC028, NY019, wheat, ID007, MO018, OH025, OK024, OR014, TX010, WA027, WY002
source, alfalfa, LA008, apple, GA030, bermudagrass, OK004, bluegrass, NV005, bromegrass, IA016, KS036, Christmas tree, NC029, container-grown plant, AL027, NC004, NC029, OH006, corn, KY013, MD016, MI008, ND023, PR010, SD008, TX052, cotton, LA008, fescue, IA016, KS036, grain sorghum, SD008, nitrification inhibitor, TX015, N-Serve, SD008, ornamental, IL004, OH006, potato, TX075, rice, KY014, rose, FL037, small grain, MD016, soybean, PR010, SD008, sugar beet, MI005, MT006, tomato, FL034, turf, IL004, NV005, vetch, LA008, wheat, NE041, OR018, UT007, WA021, winged bean, PR010
southern pine beetle, loblolly pine, NC015
time of application, alfalfa, CO020, MT019, OR037, WY005, barley, MT009, NJ015, bermudagrass, OK004, TX067, bluegrass, MN015, bromegrass, CO020, IA016, citrus, TX022, coffee, HI004, corn, FL080, MO021, MS019, NE024, PR010, cotton, MS019, cottonwood, MS016, cowpea, OK027, cucumber, WI008, fescue, CO020, IA016, foxtail, CO020, grain sorghum, MO021, grass, MT019, lemon, CA035, lovegrass, TX067, milkvetch, CO020, mungbean, OK027, muskmelon, SD007, oats, MS016, NJ015, orange, CA035, orchardgrass, CO020, MN015, peanut, TX071, pepper, MS002, SD007, potato, AL017, ND013, NY016, NY026, OR037, SD007, TX028, WA029, pumpkin, PR004, reed canarygrass, CO020, rice, AR028, LA039, soybean, AR036, PR010, sugar beet, MT006, WA013, sweetgum, MS016, timothy, CO020, MN015, tomato, AL017, MS002, turf, NY016, NY026, vegetable, FL078, GA038, watermelon, FL074, MS002, PR004, wheat, AR036, MO021, NJ015, wheatgrass, WY005, winged bean, PR010, yellow poplar, MS016
topdressing, reed canarygrass, MO033, tall fescue, MO033
transformation, agricultural waste, CA026, alfalfa, NA029, broccoli, TX023, citrus, TX023, corn, CA032, IA022, KY009, KY010, MN002, OH022, OH034, cotton, AZ003, crop residue, CA034, CO014, fescue, NC007, field crop, CA011, CO014, flooded soil, CA021, TX037, forest, MN002, furrow irrigation, CA031, grapefruit, FL081, industrial waste, CA026, inorganic, CT004, lemon, CA040, lettuce, AZ003, mine-spoil soil, CO028, native paririe, MN002, nitrate-nitrogen, CA033, CO025, WI014, N-Serve, IL019, onion, ID005, orange, FL081, organic matter, TX038, potato, ME008, NY026, rice, CA010, TX037, ryegrass, CA005, small grain, AZ003, soil, CA022, CA033, CO029, FL031, IA011, IA012, IA032, KS064, MI009, NJ020, soil management, NE021, soil moisture, NE009, soybean, IA022, IN017, NA019, NA035, sugar beet, ID005, tomato, TX023, trickle irrigation, CA031, triticale, TX064, turf, NY026, RI004
transportation, fertilizer, NA041
trickle irrigation, muskmelon, FL043, FL063, SD007, pepper, FL064, SD007, potato, SD007, tomato, CA031
turf, centepede grass, AL014, control release, IN077, NJ007
uptake, avocado, CA038, barley, CA008, OR024, corn, DE007, IA028, IA038, IL019, MI009, NA024, ND019, OH022, cotton, AZ003, fescue, NA024, forage, TX040, grass, FL024, mustard, NA024, nitrate, SD009, oats, OR024, orange, CA038, potato, ME008, TX075, soil moisture, NE009, small grain, AZ003, soybean, AR012, IA038, NE002, NE009, spinach, NA024, sugar beet, AZ010, CA009, sugarcane, LA001, sunflower, ND017, table beet, NY028, triticale, OR024, wheat, MT005, OR024, WA021
winter hardiness, barley, NY013, wheat, NY013
Nitrogen Fixation
fertilizer effect, bean, WI003, grass, FL057, sainfoin, MT002
metabolism, bean, WI003, legume, OH017
nitric phosphate, corn, NC001, soybean, NC001
rhizobium, bean, ID001, soybean, GA014, GA015, IL008, IL010, IN014, LA010, LA014
transformation, soil, TX038
Nitrogen Solution
band application, field crop, NY003
broadcast application, field crop, NY003
desiccation, sorghum, NE006
efficiency, minimum-tillage, NE016
method of application, corn, MN001, irrigation, GA013, wheat, CO010
minimum-tillage, dry land, NE016
no-till, corn, MD008, PA010
N-Serve, corn, OH008
paraquat, sorghum, NE006
rate of application, bermudagrass, GA019, corn, MN001, PA010, field crop, NY003, wheat, CO010
response, alfalfa, ND033, bromegrass, ND033
Nitrogen-Phosphorus Combination
fluid application, carrot, FL003, lettuce, FL003, placement, SD001, rate of application, FL003, MD012, SD001
placement, carrot, FL003, field crop, KS034, lettuce, FL003
protein quality, corn, CA030, grass, CA030
rate of application, carrot, FL003, corn, MD012, lettuce, FL003, sorghum, MD012, sunflower, MD012
response, grass, TX072
Nitrogen-Phosphorus-Potassium Combination
application, wheat, WA032
aquatic plant, fish pond, AL012
disturbed soil, wetland, FL088
fluid application, chrysanthemum, FL014, poinsettia, FL014
osmocote, chrysanthemum, FL014, poinsettia, FL014
placement, potato, FL060, tomato, FL060
propagation, blueberry, NJ004
rate of application, bermudagrass, AR011, TX030, blueberry, GA032,

bushbean, HI011, camellia, FL040, Christmas tree, WA032, corn, MD012, lettuce, HI011, onion, HI011, ornamental, FL001, FL041, rhododendron, FL040, sorghum, MD012, soybean, AR011, sugarcane, PR002, sunflower, MD012, tomato, HI011, wheat, WA032, yew, FL040
Nitrogen - Phosphorus - Potassium - Sulfur Combination
foliar application, bean, MI014, folian, GA049, navy bean, MI014, peanut, GA049, rate of application, MO005, soybean, AL009, FL052, GA014, IA042, MI014, MN019, MO005
Nitrogen - Phosphorus - Potassium - Sulfur-Boron Combination, foliar application, bean, MI014, corn, MO022, soybean, MO022
No-Till
ammonium nitrate, barley, MT027, corn, DE004, DE005, MD008, PA010, soybean, DE005, wheat, MT027
ammonium polyphosphate, corn, KS043, sorghum, KS043
ammonium sulfate, corn, DE004, MD008, MD010, MD026, MO021, PA010
anhydrous ammonia, corn, DE005, KS043, MO037, NE010, cover crop, KS006, MO037, sorghum, KS006, KS043, soybean, DE005, MO037, wheat, KS006
broiler litter, corn, MD008
diammonium phosphate, corn, DE004
fertilizer, alfalfa, MD003, corn, MD003, OH031, placement, NA030, small grain, MD003, VA008, soybean, VA008
fluid application, corn, MD008
foliar application, peanut, GA049, soybean, MO022
granular urea, corn, MD001, MD008, MD009
lime, corn, PA015
machinery, pasture, NA030
mine-spoil soil, corn, OH031
nitrogen, alfalfa, MD003, barley, MT027, bromegrass, KS035, corn, AL015, DE005, KS035, KS046, KY005, MD008, MD010, MD020, MO021, MO037, NE010, NJ012, OH022, PA010, PA015, VA007, cover crop, KS006, MD020, MO037, NJ012, grain sorghum, KS046, MO021, placement, MD010, TX046, rye, NJ012, soybean, AR004, AR036, KS035, tobacco, KY004, vetch, NJ012, wheat, AR004, AR036, KS006, MO021, MT027
nitrogen solution, corn, MD008, PA010
phosphorus, barley, MT027, bromegrass, KS035, corn, AL015, KS035, KS046, MD010, MO021, PA015, VA007, grain sorghum, KS046, MO021, placement, MD010, soybean, AR036, GA026, KS035, OH029, VA007, tobacco, VA007, wheat, AR036, MO021, MT027
placement, corn, MD010
potassium, barley, MT027, corn, AL015, MD010, MO021, NJ012, VA007, cover crop, NJ012, placement, MD010, rye, NJ012, soybean, AR036, VA007, tobacco, VA007, vetch, NJ012, wheat, AR036, MO021, MT027
prilled urea, corn, MD009
urea, barley, MT027, corn, DE004, MD008, NE010, PA010, PA011
urea ammonium nitrate solution, corn, KS043, sorghum, KS043
Nonprotein Nitrogen Material, rate of application, corn silage, MN013
N-Serve
ammonium fertilizer, nitrification inhibitor, WI011
ammonium nitrate, bean, WI013, corn, FL052, cucumber, MA004, nitrogen loss, TX036, potato, WI013, small grain, ND026, urea, TX036
ammonium polyphosphate, corn, KS025, grain sorghum, KS025, KS030, OK026, wheat, KS025
ammonium sulfate, bean, WI013, corn, GA006, IN014, WI013, cucumber, MA004, fescue, GA006, nitrate, TX036, potato, WI013, radish, MA004, spinach, MA005, wheat, ID016
anhydrous ammonia, corn, IA044, IL012, IN014, KS025, KS030, MI014, NC018, ND026, NE013, OH008, OK026, field crop, WI012, grain sorghum, KS025, KS030, OK026, nitrate-nitrogen, WI012, potato, MI014, small grain, ND026, wheat, KS025, KS030
diammonium phosphate, bean, WI013, corn, WI013, potato, WI013
method of application, lettuce, CO013
miloranite, hexon, MA005
nitrogen, bermudagrass, TX035, corn, GA006, IL019, IN014, KY013, TX036, fescue, GA006, flax, ND024, grain sorghum, KS038, loss, TX036, method of application, KS025, oat, KS038, plant root disease, NE005, source, SD008, sugar beet, ND024, transformation, IL019, wheat, KS038, MO017
nitrogen solution, corn, OH008
nitrogen source, corn, SD008, grain sorghum, SD008, soybean, SD008
nutrient management, corn, IN002, soybean, IN002
rate of application, corn, FL043, IA044, lettuce, CO013, potato, FL043
urea, bean, WI013, corn, FL052, IL027, IN014, KS025, NC018, OH008, WI013, grain sorghum, AR030, KS025, nitrate-nitrogen, TX036, potato, WI013, small grain, ND026, soil, IA010, transformation, IA010, wheat, KS025
urea-ammonium nitrate, corn, KS025, KS030, grain sorghum, KS025, KS030, wheat, KS025, KS030
Nursery Plant, container-grown, nitrogen, NC004
Nutrient Efficiency
lime, watermelon, FL074
method of application, watermelon, FL074, PR005
nitrogen, watermelon, FL074
phosphorus, watermelon, FL074
potassium, watermelon, FL074
rate of application, bean, FL020, pepper, FL007, FL012, FL020, potato, FL058, snapbean, FL007, tomato, FL012, triticale, AL004
time of application, watermelon, FL074, MS002, PR004
Nutrient Management
anhydrous ammonia, forage, MO032
ash, forest, NY034
band placement, corn, NE029, salt effect, NE029
bark, asparagus, OH030, ornamental, OH030
bark-soil mixture, azalea, LA046
calcium, tomato, MA002
controlled-release fertilizer, azalea, LA046
erosion control, grass, MS013
fertilizer, alfalfa, KS047, MI013, MT026, application, NY006, asparagus, OH030, band application, NH003, barley, NM004, bean, LA037, beech, NH005, NY034, bentgrass, KS010, birch, NH005, blueberry, ME004, bluegrass, OR042, WA019, bluestem, OK011, bromegrass, IA019, WA019, cedar, ID015, cherry, OH013, Christmas tree, LA006, chrysanthemum, VA016, clover, TN022, container-grown plant, NY032, corn, IA019, IN002, MD003, NC019, NE014, NE039, TN020, TN022, VA017, corn silage, KS047, cotton, GA034, NM002, efficiency, OK028, WA030, farm pond, TX016, fescue, KS010, OR042, field crop, MO027, MS020, MT016, fir, ID015, WA007, fluid application, FL082, IN003, RI003,

forage, FL082, ID015, OK028, forestry, NY033, OR006, OR030, grain sorghum, KS047, grape, PA014, SC012, grass, MT023, hemlock, ID015, WA005, highway vegetation, VA006, horticultural crop, IN021, legume, MT023, maple, NH005, method of application, AR025, FL018, MT023, NY030, minimum-tillage, MT023, muskmelon, KS020, ornamental, GA025, OH030, RI003, pasture, MO003, pea, LA037, peach, GA009, OH023, SC012, pear, NY017, pine, SC011, LA055, plum, OH023, poplar, TN006, potato, LA037, range forage, OK013, residual effect, MN027, NJ011, slash pine, SC011, small grain, MD003, MT015, soybean, IA019, IN002, NJ011, TN020, squash, LA037, sugar beet, NE038, sugar maple, NY032, sweet corn, LA037, sweet potato, VT003, sweetgum, AL025, TN006, tobacco, SC022, SC023, TN020, tomato, LA037, OH018, tulip popular, MI010, vegetable crop, NC021, watermelon, KS020, wheat, CA042, MT001, ND005
fluid application, tobacco, GA043, vegetable, FL046, OK006
flyash, asparagus, OH030, corn, OH001, ornamental, OH030
foliar application, corn, IA023, IN022, field crop, FL048, forage, FL048, oats, IA030, soybean, IA017, IN022, MN017, MN018
forest, cedar, ID015, fir, ID015, WA006, hemlock, IS015, WA005, WA006
irrigation, apple, MD013, blackberry, OR001, bluegrass, WA019, boysenberry, OR001, bromegrass, WA019, cottonwood, TX031, forest, NY033, hardwood, SC019, lettuce, CA037, nitrogen, NE019, WA029, pepper, GA040, phosphorus, NE019, pine, SC019, potassium, NE019, raspberry, OR001
lime, beech, NH005, birch, NH005, forage, MO032, maple, NH005
manure, corn, NE039, soybean, TN001
method of application, field crop, NY030
mine-spoil soil, corn, OH031, revegetation, VA002
minimum-tillage, nitrogen, WA029
mycorrhiza, fir, NC013, pine, NC013
nature range, alfalfa, MT026, NM013
nitrogen, alfalfa, ND006, citrus, AZ007, FL035, LA005, TX022, fescue, KS072, MO031, NC007, flower, MT024, native range, MT026, oats, KS038, ornamental, MT024, sediment, MO036, wheat, GA026, KS005, KS038
organic waste, fescue, NC007
phosphorus, alfalfa, IL007, MT019, ND006, ornamental, MT024, pine, GA012, TN006, pineapple, PR007
placement, corn, IN022, soybean, IN022, wheat, IN022
plant analysis, alfalfa, NV001
potassium, alfalfa, ND006, citrus, LA005, forage, MO032
productivity, farm pond, TX016
quality, turf, WA036, walnut, MI019
rate of application, alfalfa, MD011, bean, CO005, barley, TN003, cucumber, CO005, corn, TN003, forage crop, GA004, guava, HI003, mine spoil, IA021, oats, PA018, TN003, onion, CO005, red spruce, ME001, soybean, IA019, NJ011, TN003, sweet corn, CO005, tomato, CO005, wheat, KS047, TN003
residual effect, corn, NJ011, soybean, NJ011
rock phosphate, forage, MO032
soil test correlation, alfalfa, NV001, PA017, field crop, GA024, WA026, lime, NJ009
source, cotton, LA036, rice, MS018
time of application, alfalfa, ND005, apple, PA016, bermudagrass, AR025, corn, IA023, MO020, ND005, cotton, LA036, peach, PA016, rice, MS018
trickle irrigation, blackberry, OR001, boysenberry, OR001, raspberry, OR001
tundra, lake, NJ003, river, NJ003, soil, NJ003, stream, NJ003
turf, quality, WA036
uptake, fescue, TN005
waste, application, NY006
Nutrient Movement
manure, transformation, IA025
pollution, soybean, AR022
Nutrient Requirement, response, alfalfa, ND008, small grain, ND008
Nutrient Uptake, nitrogen, atmosphere, CO027
Oak
ammonium nitrate, rate of application, MS016, time of application, MS016
fertilizer, soil test correlation, NJ009
iron, implant, OH016
lime, soil test correlation, NJ009
manganese, implant, OH016
nitrogen, rate of application, MS016, NM012, OH016
phosphorus, rate of application, MS016, OH033, time of application, MS016
phosphoryl triamide, time of application, MS016
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Oats
ammonium nitrate, foliar application, IL025, leaching, SD009, movement, SD009, placement, SD001, rate of application, LA051, MD007, ME002, SD001
ammonium sulfate, placement, SD001, rate of application, SD001
anhydrous ammonia, placement, SD001, rate of application, SD001
boron, response, NA034
broiler litter, rate of application, MD007
concentrated superphosphate, placement, SD001, rate of application, SD001
copper, response, NA034, uptake, OR024
fertilizer, foliar application, IA030, rate of application, PA018, TN003, time of application, IA030
iron, management, NA034, response, NA034
lime, management, ME002
magnesium, management, ME002
manganese, foliar application, ID018, rate of application, ID018, uptake, OR024
micronutrients, response, NA034
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nitrogen, N-Serve, KS038, rate of application, KS011, LA051, TX056, WY003, time of application, MS016, NJ015, uptake, OR024
phosphate, residual, NA034
phosphorus, management, ME002, NA034, rate of application, LA053, TX056, response, NA034
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sodium nitrate, rate of application, MD007
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ira
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phosphorus, application, LA009, placement, LA011, rate of application, LA011
potassium, application, LA009, placement, LA011, rate of application, LA011
ion
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ime, rate of application, OR021
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phosphorus, rate of application, HI005, OR021, TX056, soil test correlation, HI005, transformation, HI005
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otassium, rate of application, OR021, TX056
ulfur, rate of application, TX056
nge
calcium, leaf analysis, FL070, soil test correlation, FL070
copper, plant analysis, CA038, uptake, CA038
irrigation, management, FL081
iron, leaf analysis, CA038, uptake, CA038
magnesium, leaf analysis, FL070, soil test correlation, FL070, uptake, CA038
nitrogen, foliar application, CA036, management, FL081, method of application, CA035, rate of application, CA035, CA036, FL021, FL072, time of application, CA035, transformation, FL081, uptake, CA038
phosphorus, leaf analysis, CA038, FL070, management, FL081, rate of application, FL021, soil test correlation, FL070, uptake, CA038
plant analysis, calcium, FL070, copper, CA038, iron, FL076, magnesium, CA038, nitrogen, CA036, CA038, phosphorus, CA038, FL070, potassium, CA038, FL070, zinc, CA038
potassium leaf analysis, FL070, rate of application, FL021, FL072, soil test correlation, FL070, uptake, CA038
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Orchard, micronutrients, nutrition, NH002
Orchardgrass
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lime, rate of application, NA027
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phosphorus, management, KS072, rate of application, WA011, WA012, time of application, CO020
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potassium, management, KS072, rate of application, WA012
rock phosphate, rate of application, NA027
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silage, nitrogen, NJ019
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sulfur-coated urea-17, rate of application, WA025
sulfur-coated urea-20, rate of application, WA025
sulfur-coated urea-30, rate of application, WA025
sulfur-coated urea-40, rate of application, WA025
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Orchid
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foliar 63, rate of application, HI008
osmocote, rate of application, HI008
Organic
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phosphate, transformation, IA008
Organic Matter
fertilizer, chemical analysis, NA012
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Organic Soil
lime, corn, NC020, sorghum, NC020, soybean, NC020, wheat, NC020
nitrogen, corn, NC020, soil management, FL039, sorghum, NC020, soybean, NC020, wheat, NC020
phosphorus, corn, NC020, soil management, FL039, sorghum, NC020, soybean, NC020, wheat, NC020
potassium, corn, NC020, soil management, FL039, sorghum, NC020, soybean, NC020, wheat, NC020
Organic Waste
nitrogen, corn, FL069, fescue, NC007, grain sorghum, FL069, rate of application, AL030, transformation, NA031, NC007
phosphorus, corn, FL069, grain sorghum, FL069, rate of application, AL030
zinc, corn, FL069, grain sorghum, FL069
Organization, fertilizer industry, retail, IN013
Ornamental
ammonium phosphate, response, MD014
application, ammonium phosphate, MD014, fertilizer, GA025, micronutrients, LA043, nitrogen, LA043, MD014, phosphorus, MD014, potassium, LA043, MD014
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container grown, nitrogen, OK032
controlled-release fertilizer, response, FL037, GA011
fertilizer, fluid application, RI003, lily, OR012, management, GA025, OH030, RI003, rate of application, OH030
flyash, rate of application, OH030
gin trash, growth media, TX017
IBDU, rate of application, OK032
lime, rate of application, NC029
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phosphorus, management, MT024, rate of application, MT024
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Orthophosphate
fluid application, corn, KS025, NE028, grain sorghum, KS025, wheat, KS025
response, field crop, FL051
zinc, corn, NE028, fluid application, NE028
Osmocote
management, avocado, FL063, azalea, OR002, blueberry, NJ004, dendrobium, HI008, orchid, HI008
mulch production, tomato, FL064
phosphorus, rate of application, FL041
placement, pepper, FL064, potato, FL060, strawberry, FL016, tomato, FL060, FL064
potassium, avocado, FL063, rate of application, FL041
rate of application, azalea, OR002, camellia, FL040, chrysanthemum, FL014, dendrobium, HI008, holly, NJ010, ornamental, FL001, FL040, FL041, OK032, poinsettia, FL014, potato, FL060, rhododendron, FL040, OR002, strawberry, FL016, yew, FL040
response, avocado, FL063
time of application, holly, NJ010, strawberry, FL016
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Oxamide, rate of application, corn, NA021
Pangolagrass
lime, rate of application, FL019
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nitrogen, rate of application, FL029
phosphorus, rate of application, FL029
potassium, rate of application, FL029
sodium, rate of application, FL029
sulfur, rate of application, FL029
Papaya
calcium, rate of application, HI002
magnesium, rate of application, HI002
phosphorus, rate of application, HI002
potassium, rate of application, HI002
Paper Waste, phosphorylated, sweet corn, RI001
Paraffinized Urea, oil slick, microbiology, NJ001
Paraquat, nitrogen solution, desiccation, NE006
Park, fertilizer, application, KS010
Pasture
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nitrogen, management, MO031, rate of application, FL083, MO031
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P-Benzoquinone, urease, response, IA039
Pea
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phosphorus, application, LA009, placement, LA011, rate of application, GA016, LA011, MS001, TN009, WA011, WI021, soil test correlation, GA016
plant analysis, phosphorus, GA016, potassium, GA016
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soil test correlation, phosphorus, GA016, potassium, GA016
Peach
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ammonium sulfate, rate of application, CA024, CO019
borate 65, rate of application, OH019
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co-op iron, rate of application, CO017
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granumag (87% MgO), rate of application, CO019
iron, fruit quality, WA016, leaf analysis, WA016, rate of application, WA016
iron EDDHA, foliar application, CO019, rate of application, CO017, CO019
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magnesium, method of application, AR018, OH019
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phosphorus, rate of application, FL021
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urea ke-min, response, CO017
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Peanut
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calcium sulfate, granule size, AL008
chelate calcium, response, GA052
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gypsum, rate of application, GA052
iron, rate of application, OK020
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manganese, rate of application, OK020
micronutrients, rate of application, TX013
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GA039, TX070, response, GA039
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Peat, fertilizer, rate of application, NY017
Peat, soil mixture, soil test correlation, NJ017
Pecan
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phosphorus, placement, LA011, rate of application, LA011, LA047, NM015
potassium, placement, LA011, rate of application, LA011, LA047
sulfur dioxide, rate of application, NM008
sulfur-coated urea, rate of application, TX070
sulfuric acid, soil application, TX013
urea, foliar application, TX070
Pepper
ammonium nitrate, placement, FL064, rate of application, FL009, response, FL064
ammonium sulfate, method of application, FL038, rate of application, FL033, time of application, FL038
boron, method of application, MS002, time of application, MS002
calcium nitrate, rate of application, GA041
compost, rate of application, FL009
fertilizer, humate, NM006, irrigation application, FL020, FL045, FL064, GA040, NM006, method of application, FL045, rate of application, FL020, FL045, response, FL007, FL012, time of application, FL045
fluid application, rate of application, FL020
IBDU, rate of application, FL033
lime, rate of application, PR005
micronutrients, rate of application, PR005
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nitrogen, irrigation application, NM006, SD007, method of application, MS002, rate of application, MS001, NM006, PR005, SD007, response, KS070, time of application, MS002, SD007
nutrient efficiency, rate of application, FL007, FL012, FL020
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sulfur, foliar application, TX013
sulfur-coated urea, rate of application, FL033, response, FL064
sulfur dioxide, rate of application, NM008
trickle irrigation, nitrogen, SD007
urea, rate of application, FL033
zinc, method of application, MS002, time of application, MS002
Peppermint
nitrogen, oil content, OR016, oil quality, OR016, rate of application, WA012
oil content, nitrogen, OR016
oil quality, nitrogen, OR016
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sulfur, rate of application, WA012
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Personnel Development, marketing, fertilizer, IL029, input, IL029
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Phosphonitrilic Hexamide, rate of application, fescue, NA013
Phosphorus (See also specific sources: Ammoniated Superphosphate, Ammonium Orthophosphate, Ammonium Phosphate, Ammonium Phosphate Sulfate, Ammonium Polyphosphate, Ammonium Sulfate Phosphate, Cadmium Phosphate, Calcium Potassium Phosphate, Concentrated Superphosphate, Diammonium Phosphate, Dicalcium Phosphate, Magnesium Ammonium Phosphate, Monoammonium Phosphate, Monocalcium Phosphate, Nitrogen-Phosphorus Combination, Nitrogen-Phosphorus-Potassium Combination, Nitrogen-Phosphorus-Potassium-Sulfur Combination, Nitrogen-Phosphorus-Potassium-Sulfur-Boron Combination, Octylphosphate, Organic Phosphate, Orthophosphate, Phosphate Sludge, Phosphonitrilic Hexamide, Phosphoric Acid, Phosphorus-Zinc, Phosphoryl Triamide, Polyphosphate Potassium Phosphate, Potassium Polyphosphate, Pyrophosphate, Rock Phosphate, Sodium Phosphate, Sodium Tripolyphosphate, Triammonium Polyphosphate, Urea Ammonium Phosphate, Urea Ammonium Polyphosphate, Urea Phosphate, Urea Polyphosphate)
accumulation, corn, KS040, soil, KS040
analysis, water, FL011
application, blueberry, LA009, cotton, MO013, fig, LA009, fir, ME009, irish potato, LA009, mustard, LA009, okra, LA009, ornamental, MD014, pea, LA009, pine, MN003, pond, NJ018, spruce, ME009, sugar beet, WA013, tomato, VA001, walnut, KS019
availability, mycorrhiza, IL016
band application, corn, WI017, WI022, potato, WI017, sweet corn, NY029, tomato, CA031
bark mixture, soil test correlation, AL027
broadcast application, corn, WI022
container grown, holly, NJ010, viburnum, NY008
controlled-release fertilizer, cherry tree, WI010
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disease, bluegrass, RI002
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efficiency, rice, TX019
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fertilization, field crop, TX042
fertilizer, bermudagrass, TX027, chemical analysis, NA012, floodwater composition, AR007, movement, MO036
fixation, soil, TN017, TX024
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germination, potato, TX029
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leaf analysis, orange, CA038, FL070
legume, nitrogen fixation, CA027
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management, alfalfa, IL007, MT019, ND006, bean, LA009, blueberry, LA009, bromegrass, KS072, carrot, FL039, Christmas tree, MN003, citrus, LA005, corn, GA001, IA037, KS004, KS005, KS007, MN002, MO024, cotton, GA050, LA023, MO013, fescue, KS072, field crop, IA036, fig, LA009, flower, MT024, forage, LA028, forest, MN002, grape, FL075, grapefruit, FL081, grass, MT019, high-yield corn, MO024, irish potato, LA009, lettuce, FL039, mustard, LA009, native prairie, MN002, oats, ME002, NA034, okra, LA009, orange, FL081, orchardgrass, KS072, ornamental, MT024, pea, LA009, pine, GA012, TN006, pineapple, PR007, potato, ME002, sainfoin, KS072, sand pine, KS072, sediment, MO036, sesame, CO022, shallot, LA009, soil, MN012, sorghum, GA026, KS004, KS005, KS007, LA023, NA034, soybean, FL053, GA026, GA045, LA023, sugar beet, KS004, sweet potato, LA009, timothy, ME002, tomato, NA034, wheat, GA026, KS005, KS054, wheatgrass, KS072
market research, northern United States, MO009
method of application, alfalfa, MT019, barley, MT009, corn, AL015, KS023, KS046, MD009, MO021, ND023, NE008, PR010, TN017, TX074, cotton, TN017, furrow irrigation, CA031, grain sorghum, KS046, MO021, grass, MT019, lettuce, FL059, multiple cropping, GA031, pepper, MS002, potato, ND013, NY025, SC020, sorghum, NE008, soybean, KS023, PR010, tomato, MS002, trickle irrigation, CA031, vegetable, FL078, watermelon, FL074, MS002, wheat, MO021, NE008, wild rice, MN016, winged bean, PR010
mine-spoil soil, bermudagrass, KY002, KY003, KY007, corn, OH001, WV004, forage, KY003, WV002, ryegrass, WA018, wheatgrass, WY001
minimum-tillage, range grass, OR005, soybean, AR036, GA026, KS035, OH029, VA007, wheat, GA026
movement, corn, MO012, cotton, OK035, fertilizer, MO036, loess soil, MO010, range, OK035, rice, TX019, sediment, MO036, soil, NY004, turf, RI004, wheat, OK035
mulch, squash, VA001, tomato, VA001
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nitrogen fixation, legume, CA027
no-till, barley, MT027, bromegrass, KS037, corn, AL015, KS035, KS046, MD010, MO021, PA015, VA007, grain sorghum, KS046, MO021, soybean, AR036, KS035, OH029, VA007, tobacco, VA007, wheat, AR036, MO021, MT027
nutrient management, citrus, LA005, irrigation, NE019, orchardgrass, PA013
organic soil, corn, NC020, soil management, FL039, sorghum, NC020, soybean, NC020, wheat, NC020
organic waste, corn, FL069, NC020, grain sorghum, FL069, rate of application, AL030
osmocote, rate of application, FL041
placement, alfalfa, WI009, bean, IN020, bluegrass, WI009, corn, IL024, IN015, LA001, MD010, MT022, PA015, WI017, cowpea, OK027, eggplant, LA011, mungbean, OK027, okra, LA011, pea, LA011, pecan, LA011, potato, CO002, WI017, pumpkin, PR004, rice, AR007, soybean, IA027, squash, LA011, sugar beet, MT022, sweet potato, LA011, watermelon, PR004, wheat, ID014, wheatgrass, ND034
plant analysis, alfalfa, ND014, NE020, NM013, avacado, CA038, barley, ND014, OR020, bean, GA016, bentgrass, OH004, bluegrass, OH004, broccoli, WI020, cantalope, CA020, cauliflower, WI020, corn, GA016, IA038, NE034, OH003, grape, WA033, onion, OR021, orange, CA038, FL070, pea, GA016, prune, CA013, soybean, IA038, NE030, NE034, OH003, subterranean clover, OR020, sugar beet, ND014, sunflower, ND014, table beet, OR021, tree fruit, WA033, wheat, ND014, OR020
quality, bluegrass, OH004, crown vetch, PA024, forage, LA028, ryegrass, LA041, sorghum, LA041, subclover, OR017, sugar beet, CA009, ND009, wheat, AR016, KS051, MT005, MT021, NY013, OR022
range, forage, OR043
rate of application, alfalfa, HI016, IA043, IL006, MT007, MT013, NA0017, MN014, ND012, ND014, ND020, ND031, ND033, NM013, NM014, SD004, UT001, WA012, WV003, WY004, artichoke, WA011, bahiagrass, TX077, banana, PR015, barley, GA016, ID022, MT009, MT012, MT027, MT029, ND014, OR020, bean, GA016, ID002, IN020, LA009, MS001, PR005, PR012, TN009, WA014, beet, WI021, beggerweed, FL023, bentgrass, NJ008, bermudagrass, LA002, LA019, OK008, TX032, TX056, blackberry, LA047, TX059, blue grama, ND020, blueberry, GA033, LA047, NC012, NJ006, bluegrass, NJ008, RI002, broccoli, WA011, WI020, bromegrass, AK002, AK003, AK004, KS035, ND020, ND033, NE036, buckwheat, ME006, cabbage, MS001, PR005, PR012, TN009, WI020, cantalope, AZ012, PR005, PR012, carnation, RI005, carrot, AZ012, FL003, FL039, cauliflower, WA011, WI020, centipedegrass, AL014, PR013, SC009, chard, NA005, Christmas tree, NC029, chrysanthemum, FL014, OK023, RI005, citrus, AZ007, FL035, clover, AK002, AL010, FL029, GA053, LA042, MS012, WV003, container-grown plant, NC029, OK023, corn, AL015, FL042, FL043, FL067, FL077, FL079, FL080, GA016, GA018, HI006, IA034, IA035, IA041, IA043, ID002, IL002, IL013, IL022, IL024, IN004, IN015, KS013, KS014, KS023, KS035, KS046, KS056, KS067, KS074, LA011, LA016, LA030, MD009, MI014, MI015, MO021, MO026, MS001, MS006, MT012, MT022, NA005, NA007, NA024, ND014, ND023, ND008, NE036, OH001, OH010, OK026, PA015, PA019, SD001, SD003, TN009, TN017, TX074, VA011, VA018, WI026, WV003, corn silage, MN013, WA012, cotton, GA050, LA016, LA024, MS016, NA007, NM014, OK020, TN017, TX041, TX053, TX055, TX082, cowpea, OK027, cucumber, PR005 TN009, WI008, dallisgrass, TX077, digitgrass, FL029, eggplant, LA011, fescue, NA005, NA024, WA011, WA012, field crop, TX042, WI007, fig, LA047, fish pond, AL011, flax, ND024, flower, MT024, forage sor-

ghum, VA012, forage, MT031, NC031, NM005, WY004, forest, FL028, grain crop, NM005, grain sorghum, AR033, FL067, GA018, IA041, KS046, KS074, MO021, OK026, OK029, TX012, TX025, TX041, TX083, grape, NC012, WA011, grass, HI015, MT007, highway roadside, AK005, WY006, hops, WA011, horticultural crop, AZ008, legume, FL005, HI015, legume-grass hay, PA019, lettuce, AZ012, FL003, FL039, lime, FL061, loblolly pine, AR016, FL049, macadamia, HI009, maple, MI022, VT002, mint, WA011, multiple cropping, GA031, mungbean, OK027, muskmelon, MS001, mustard, NA005, NA024, native bluejoint, AK002, native grass, ND020, ND025, native range, NE036, nitrogen-phosphorus-potassium combination, FL060, oak, MS016, OH033, oats, LA053, TX056, okra, LA011, onion, HI005, OR021, TX056, orange, FL021, orchardgrass, PA013, WA011, WA012, ornamental, MT024, organic soil, NC020, pangolagrass, FL029, papaya, HI002, pea, GA016, LA011, MS001, TN009, WA011, WI021, peach, FL021, peanut, FL067, OK020, TX069, TX071, pecan, LA011, LA047, NM015, pepper, MS001, NM006, PR005, peppermint, WA012, pimento, AL018, pine, FL032, IL005, ME010, MI022, MN029, TN007, plantain, PR001, PR015, poinsettia, FL014, GA022, RI005, pollution, AL030, popcorn, KS003, poplar, ME010, potato, AK002, AL017, AL018, AZ012, CO002, FL043, HI005, ID002, ME007, MI014, MT012, ND014, NM006, NY025, SC020, TX029, WA015, pumpkin, PR004, range forage, CA028, range forage, CA028, range grass, OR005, rangeland, MT007, rice, PR001, TX006, TX007, rose, MO035, TX056, rye, AL010, LA053, ryegrass, AL010, LA012, LA019, LA041, LA042, LA053, MS012, TX077, WA018, sand pine, FL049, short leaf pine, AR016, slash pine, FL049, small grain, NY014, TX011, WV003, snapbean, PA005, sorghum, FL005, KS003, LA041, MS003, MS006, NE008, soybean, AR029, AR036, DE001, FL067, IA027, IA041, IA043, IL002, IL028, KS023, KS035, KS056, LA004, LA010, LA016, LA030, LA056, MO025, MO035, NA007, NE008, OK020, PA019, VA011, spearmint, WA012, spinach, NA005, NA024, spruce, ME010, MN029, squash, LA011, TN009, St. Augustine grass, FL008, strawberry, FL016, LA045, LA047, MS001, WA037, subterranean clover, OR020, sudangrass, TX077, WA012, sugar beet, ID002, MT012, MT020, MT022, MT028, ND014, ND024, sugarcane, LA027, sunflower, ND014, TX050, sweet clover, WY004, sweet corn, NY029, WA011, WI021, sweet potato, AL035, LA011, MS001, sweetgum, AR031, MS016, table beet, OR021, tanier, PR001, tobacco, GA044, MD005, OH002, TN004, tomato, AL017, AL018, FL065, MS001, TN009, triticale, LA053, turf, PA008, umbrella plant, OK023, vegetable, FL078, NY031, viburnum, NY008, watermelon, FL044, MS001, PR004, PR005, wheat, AR036, IA043, ID002, ID008, ID014, ID016, KS074, LA053, MO021, MT012, MT020, MT027, MT029, MT030, ND014, ND031, NE008, OK008, OK029, OR020, PA019, SD004, WA027, wheatgrass, LA053, MT025, ND020, ND025, ND034, white ash, TN019, wild rice, MN014, MN016, wild ryegrass, MT025, wild yam, PR001, yellow birch, VT002, yellow poplar, AR031, MS016, OK032

requirement, cotton, TX009

residual effect, alfalfa, ND031, corn, GA048, MN026, NE023, TN018, cotton, TN018, forage, MT031, soybean, OK029, TN018, wheat, ND031, NE023

response, alfalfa, MT007, PA013, alpine tundra, VT005, avocado, FL062, bluegrass, NA032, cantaloupe, CA020, corn, NA023, fescue, NA032, field crop, CO014, UT008, grass, MT007, legume, CO012, locust, OH033, oats, NA034, potato, ID003, rangeland, MT007, soybean, IL008, LA030, tomato, NA034, turf, PA009, wheat, CO010, ID008

row spacing, corn, LA030, soybean, LA030

salt index, potato, TX029

sediment, alfalfa, ND006, cotton, MS021, movement, MO036

seed analysis, corn, OH003, soybean, OH003

soil, accumulation, KS040, alfalfa, ND006, availability, NA028, equilibrium, TX024, fixation, TN017, TX024, laboratory study, TX024, management, MN012, movement, NY004, northern United States, MO009, testing, TX024, transformation, AR020, ID010

soil factor, wheat, OK021

soil phosphorus, bermudagrass, TX027

soil salinity, field crop, UT008

soil test calibration, alfalfa, WA012, corn silage, WA012, fescue, WA012, orchardgrass, WA012, peppermint, WA012, spearmint, WA012, sudangrass, WA012

soil test correlation, alfalfa, IA043, ND012, bark mixture, AL027, barley, ID002, bean, GA016, ID002, bermudagrass, OK025, carrot, FL003, container-grown plant, AL027, corn, CO016, GA016, GA048, HI005, IA043, ID002, IL024, KS013, MO018, NE023, OH010, OH025, TN017, cotton, AL009, MO018, OK024, TN017, TX010, crop rotation, IA043, durham wheat, AZ009, fescue, AR019, MO018, OK025, field crop, IA032, KS066, OH026, WI007, forage, TX010, grain sorghum, OK024, horticultural crop, AZ008, lettuce, FL003, millet, ND010, onion, HI005, orange, FL070, pea, GA016, peanut, AL009, TX069, pimento, AL018, pine, IL005, potato, WA015, rice, TX007, soil, VT004, sorghum, AL009, MS011, soybean, AL009, AR019, AR021, FL068, IA043, MS011, OH025, sugar beet, CO016, ID002, ND009, ND011, sweet potato, NC026, wheat, IA043, ID002, ID007, MO018, NE023, OH025, OK024, OR004, TX010, WA027

source, Christmas tree, NC029, container-grown plant, NC029, corn, ND023, PR010, TX074, field crop, IA003, grain sorghum, TX043, loblolly pine, FL049, sand pine, FL049, slash pine, FL049, soybean, MO025, PR010, winged bean, PR010

sulfur, interaction, CA003

tillage system, corn, WI026, sorghum, GA026

time of application, alfalfa, CO020, MT019, ND014, barley, MT009, ND014, bromegrass, CO020, corn, FL080, MO021, ND014, PR010, cottonwood, MS016, OK017, cowpea, OK027, cucumber, WI008, fescue, CO020, forage, MT031, foxtail, CO020, grain sorghum, MO021, grass, MT019, holly, NJ010, milkvetch, CO020, multiple cropping, GA031, mungbean, OK027, oak, MS016, orchardgrass, CO020, peanut, TX071, pepper, MS002, potato, AL017, ND013, ND014, reed canarygrass, CO020, soybean, PR010, St. Augustine grass, FL008, sugar beet,

ND014, sunflower, ND014, sweetgum, MS016, timothy, CO020, tomato, AL017, MS002, turf, PA008, vegetable, FL078, watermelon, FL074, MS002, wheat, ID016, MO021, ND014, winged bean, PR010, yellow poplar, MS016
topdressing, reed canarygrass, MO033, tall fescue, MO033
transformation, corn, HI005, crop residue, CO014, field crop, CO014, onion, HI005, potato, HI005, soil, AR020, IA011, ID010
turf, centepede grass, AL014, establishment, PA009, movement, RI004, rate of application, PA008, time of application, PA008
uptake, alfalfa, NM013, OH012, avocado, CA038, barley, CA008, OR024, blueberry, NC011, corn, IA028, IA038, IN005, cotton, AR021, fescue, AR024, forage, TX040, orange, CA038, rice, KY008, soybean, AR021, IA038, OH012, sugar beet, AZ010, CA009, sunflower, ND017, wheat, MT005, OR022
winter hardiness, barley, NY013, strawberry, WA037, wheat, NY013
zinc, interaction, HI001, KS013, KS014
zinc uptake, radish, MA007
Phosphoryl Triamide
method of application, corn, KS046, grain sorghum, KS046
plant analysis, table beet, OR021
rate of application, corn, KS003, fescue, NA013
time of application, oak, MS016
Pimento
lime, rate of application, AL018, soil test correlation, AL018
nitrogen, rate of application, AL018, soil test correlation, AL018
phosphorus, rate of application, AL018, soil test correlation, AL018
potassium, rate of application, AL018, soil test correlation, AL018
Pin Oak, iron, sulfur interaction, IN008
Pine
ammonium nitrate, response, AL034
ammonium sulfate, rate of application, FL032
calcium, rate of application, OR034
fertilizer, fluid application, MI025, management, LA055, mycorrhiza, NC013, rate of application, AR013, TN006, soil test correlation, NJ009
iron, implant, OH016
irrigation, nutrient management, SC019
lime, soil test correlation, NJ009
manganese, implant, OH016
nitrogen, fertilization, OR034, rate of application, IL005, ME010, MI002, MN029, OH016, OR034, SC010, TN007
phosphorus, fertilization, OR034, rate of application, FL032, IL005, ME010, MI022, MN029, TN007, soil test correlation, IL005
potassium, fertilization, OR034, rate of application, FL032, ME010, MI022, MN029
sulfur, fertilization, OR034
sul-po-mag, rate of application, FL049
urea, rate of application, FL032
Pineapple
fertilizer, cost:benefit ratio, PR008, economic, PR008
nitrogen, rate of application, FL072, PR003, PR011
potassium, rate of application, FL072, PR011
residue management, fertilizer, HI018
Pistachio, fertilizer, foliar application, CA017
Placement
ammonium nitrate, alfalfa, SD001, barley, SD001, bean, IN020, corn, MT022, SD001, flax, SD001, grain sorghum, TX046, irrigation, TX047, oats, SD001, pepper, FL064, potato, CO002, range forage, CA024, sugar beet, MT002, tomato, FL064, wheat, SD001
ammonium phosphate, barley, MT003
ammonium sulfate, alfalfa, SD001, barley, SD001, bean, IN020, corn, SD001, flax, SD001, irrigation, TX047, oats, SD001, wheat, SD001
anhydrous ammonia, alfalfa, SD001, barley, SD001, corn, MT022, SD001, flax, SD001, oats, SD001, soybean, KS033, sugar beet, MT022, wheat, KS033, SD001
concentrated superphosphate, alfalfa, SD001, barley, SD001, corn, PA005, SD001, flax, SD001, oats, SD001, snapbean, PA005, wheat, SD001
fertilizer, lettuce, FL059, no-till, NA030
machinery, pasture, NA030
magnesium chloride, soybean, KS033, wheat, KS033
magnesium EDTA, soybean, KS033, wheat, KS033
magnesium sulfate, soybean, KS033, wheat, KS033
nitrogen, alfalfa, CO002, WI009, bean, IN020, bluegrass, WI009, corn, IN015, LA011, MD010, cowpea, OK027, eggplant, LA011, grain sorghum, MD010, TX046, mungbean, OK027, okra, LA011, pea, LA011, pecan, LA011, potato, CO003, CO021, SC001, snapbean, PA005, soybean, AR004, IA027, squash, LA011, sweet potato, LA011, tobacco, NC022, tomato, SC001, wheat, AR004, ID014, NE040
nitrogen-phosphorus combination, carrot, FL003, field crop, KS034, lettuce, FL003
no-till, corn, AL015, DE004, KS035, KS046, KY005, MD008, MD010, MD020, MD021, MO037, NE010, NJ012, OH022, PA010, PA015, VA007
phosphorus, alfalfa, WI009, bean, IN020, bluegrass, WI009, corn, IL024, IN015, LA011, MD010, MT022, PA015, WI017, cowpea, OK027, eggplant, LA011, mungbean, OK027, okra, LA011, pea, LA011, pecan, LA011, potato, CO002, WI017, pumpkin, PR004, rice, AR007, soybean, AR004, IA027, squash, LA011, sugar beet, MT022, sweet potato, LA011, watermelon, PR004, wheat, ID014, wheatgrass, ND034
potassium, alfalfa, SD001, bean, IN020, barley, SD001, corn, IL024, IN015, LA011, MD010, SD001, cowpea, OK027, eggplant, LA011, flax, SD011, mungbean, OK027, oats, LA011, okra, LA011, pea, LA011, pecan, LA011, rice, AR007, soybean, IA027, squash, LA011, sweet potato, LA011, tobacco, NC022, wheat, SD001
Planning
input, marketing, IL029, system, IL029
marketing, fertilizer, IL029
Plantain
calcium, rate of application, PR001
nitrogen, rate of application, PR001, PR009, PR015
phosphorus, rate of application, PR001, PR015
Plant Analysis
ammonium, bluestem, IA018
boron, alfalfa, TX039, barley, OR020, grain sorghum, MN001, grape, WA033, ladino clover, NJ014, onion, OR021, orchardgrass, NJ014, subterranean clover, OR020, table beet, OR021, tree fruit, WA033, wheat, OR020
calcium, apple, WA016, orange, FL070, peach, WA016
carbohydrate, lovegrass, AZ014
copper, avocado, CA038, grain sorghum, MN001, orange, CA038, orchardgrass, CA038
iron, apple, WA016, grain sorghum, NM001, orange, FL070, peach, WA016

lime, bermudagrass, AR014, potato, OR010
magnesium avocado, CA038, corn, IL020, grape, WA033, orange, CA038, FL070, tree fruit, WA033
manganese, grape, WA033, potato, OR010, soybean, AR027, tree fruit, WA033
molybdenum, barley, OR020, subterranean clover, OR020, wheat, OR020
nicotine, tobacco, KY004
nitrogen, alfalfa, ND014, apple NY016, WA016, avocado, CA038, barley, ND014, OR020, bentgrass, OR004, bermudgrass, AR014, FL010, TX067, bluegrass, OR004, bluestem, IA018, broccoli, WI020, bromegrass, IA016, MI012, cabbage, WI020, cantalope, CA020, cauliflower, WI020, corn, IA038, KY009, cotton, TX034, fescue, IA016, IA018, IN011, MI012, grape, WA033, grapefruit, CA036, loblolly pine, SC011, longleaf pine, SC011, lovegrass, AZ014, TX067, milkwetch, NE020, onion, OR020, OR021, orange, CA036, CA038, orchardgrass, MI012, peach, WA016, reedgrass, MI012, rice, AR038, KY014, LA018, LA039, NA033, soybean, IA038, OH003, subterranean clover, OR020, sugar beet, CO016, ND014, sunflower, ND014, table beet, OR021, tobacco, MD004, tree fruit, WA033, wheat, ND014, OR020
phosphorus, alfalfa, ND014, NE020, NM013, avocado, CA038, barley, ND014, OR020, bean, GA016, bentgrass, OH004, bluegrass, OH004, broccoli, WI020, cantalope, CA020, cauliflower, WI020, corn, GA016, IA038, NE034, grape, WA033, onion, OR021, orange, CA038, FL070, pea, GA016, prune, CA013, soybean, IA038, NE034, OH003, subterranean clover, OR020, sugar beet, ND014, sunflower, ND014, table beet, OR021, tree fruit, WA033, wheat, ND014, OR020
plant nutrients, alfalfa, NV001, field crop, CA007
potassium, alfalfa, ND014, avocado, CA038, barley, ND014, OR020, bean, GA016, bentgrass, AR014, bermudagrass, AR014, bluegrass, OH004, broccoli, WI020, cabbage, WI020, cauliflower, WI020, cotton, GA050, MS008, grape, WA033, onion, OR021, orange, CA038, FL070, pea, GA016, prune, CA013, soybean, IA038, OH003, subterranean clover, OR020, sugar beet, ND014, sunflower, ND014, table beet, OR021, tree fruit, WA033, wheat, ND014, OR020
soil test correlation, field crop, GA024
sulfur, apple, WA016, avocado, CA038, barley, OR020, orange, CA038, potato, OR010, subterranean clover, OR020, wheat, OR020
zinc, apple, WA016, avocado, CA038, corn, NE034, grain sorghum, NM001, grape, WA033, orange, CA038, peach, WA016, potato, OR010, soybean, NE034, tree fruit, WA033
Plant Disease
lime, rate of application, FL015
nitrogen, N-Serve, NE005, rate of application, FL015
Plant Nutrients
analysis, alfalfa, NV001, field crop, CA007, loblolly pine, SC011, longleaf pine, SC011
burning, bluestem, OK01[illegible]
effect on quality, blueberry, LA009
efficiency, rate of application, AL004
irrigation, apple, AR018, MD013, corn, KS007, forest, NY033, grain sorghum, KS007, grape fruit, FL081, subsurface, AR003
management, cotton, GA034, hardwood, GA012, horticultural crop, IN021, irrigation, KS007, TX048, maple, NH005, pine, GA012, southern pine, LA055, vegetable, HI012
method of application, watermelon, FL074
nitrogen, watermelon, FL074
phosphorus, watermelon, FL024
placement, corn, IN022, soybean, IN022, wheat, IN022
pollution, soybean, AR022
potassium, watermelon, FL074
rate of application, farm pond, TX016, pepper, FL007, FL012, FL020, potato, FL058, snapbean, FL007, tomato, FL012, triticale, AL004
tillage, sorghum, GA026
time of application, watermelon, FL074
Plant Residue, nitrogen, vegetable, NY019
Plantain
calcium, rate of application, PR001
lime, rate of application, PR014, response, PR009, PR014, tropical soil, PR014
magnesium, rate of application, PR001, PR015
nitrogen, rate of application, PR001, PR009, PR015
phosphorus, rate of application, PR001, PR015
potassium, rate of application, PR001, PR015
Plum
boron, uptake, OR033
fertilizer, irrigation application, MI004
Poinsettia
boron, rate of application, NY002
fertilizer, soil test correlation, NJ009
magnesium-ammonium phosphate, foliar application, NC025
manganese, rate of application, NY002
nitrogen, container grown plants, NY002, rate of application, FL014, GA022, NY002, RI005
nitrogen-phosphorus-potassium combination, fluid application, FL014, osmocote, FL014
phosphorus, rate of application, FL014, GA022, RI005
potassium, rate of application, FL014, GA022, NY002, RI005
sewage sludge, rate of application, NY002
Policy, marketing, fertilizer, NA048, retail outlet, OK015
Pollution
forest, model, FL028
inorganic nitrogen, rate of application, FL028, CT004
manure, environment, FL047
nitrate-nitrogen, movement, AL029
nitrogen, organic waste, AL030, rate of application, AL030, transformation, AL030, AZ017, FL047
organic nitrogen, rate of application, CT004
phosphorus, rate of application, AL030
plant nutrients, soybean, AR022
Polyphosphate
application, field crop, KS058
fluid application, corn, KS025, NE028, grain sorghum, KS025, OK029, wheat, KS025, OK029
hydrolysis, corn, KS040
rate of application, corn, GA020, sorghum, KS071, wheat, KS071
response, field crop, FL051
transformation, soil, IA008
zinc source, corn, NE028, fluid application, NE028
Pond
nitrogen, management, NJ018
nitrogen-phosphorus-potassium combination, aquatic plants, AL012
phosphorus, management, NJ018
potassium, management, NJ018
Popcorn
molybdenum, rate of application, OR015
nitrogen, rate of application, KS003
phosphorus, rate of application, KS003
sulfur, placement, OR015, rate of application, OR015

Poplar
ammonium nitrate, nutrient cycling, AK001, AL034, response, AK001
concentrated superphosphate, response, AK001
fertilizer, rate of application, TN006
nitrogen, rate of application, ME010
phosphorus, rate of application, ME010
plant height, ammonium nitrate, AL034
potassium, rate of application, ME010
Port, fertilizer, capacity, IA006
Potassium (See also specific sources: Calcium Potassium Phosphate, Colloidal Potash, Muriate of Potash, Nitrogen-Phosphorus-Potassium Combination, Nitrogen-Phosphorus-Potassium-Sulfur Combination, Potassium Azide, Potassium Carbonate, Potassium Chloride, Potassium Frits, Potassium Nitrate, Potassium Phosphate, Potassium Polyphosphate, Potassium Sulfate, Sulfur-Coated Muriate of Potash, Sulfur-Coated Nitrogen with Potassium, Sulfur-Coated Potassium Chloride, Sulfur-Coated Potassium Sulfate).
analysis, water, FL011
application, blueberry, LA009, cotton, MO013, fig, LA009, fir, ME009, forage, KS012, grass tetany, KS012, grain sorghum, KS048, irish potato, LA009, mustard, LA009, okra, LA009, pea, LA009, pine, MN003, pond, NJ018, spruce, ME009, squash, VA001, sugar beet, WA013, sweet potato, LA009, tomato, VA001
bark mixture, soil test correlation, AL027
boron, avocado, FL062
cadmium, uptake, OH020
container-grown plants, chrysanthemum, FL014, NY002, OK023, RI005, holly, NJ010, poinsettia, FL014, GA022, NY002, RI005, rose, NY002, viburnum, NY008
controlled-release fertilizer, cherry tree, WI010
deficiency symptom, bentgrass, WI018, bermudagrass, WI018, bluegrass, WI018
disease, bluegrass, RI002
effect on quality, bean, LA009, bentgrass, OH004, bermudagrass, TX057, blackberry, TX065, bluegrass, OH004
fertilization, bermudagrass, TX057, field crop, TX042, pine, OR034
fertilizer, chemical analysis, NA012
fixation, soil, TN017, TX024
fluid application, alfalfa, ND033, bromegrass, ND033, tobacco, NC023, wheat, KS063
foliar application, alfalfa, VA014, corn, IL002, TN021, cotton, TN021, cranberry, WA040, horticultural plant, NY011, peanut, GA049, potato, ID003, raspberry, WA040, soybean, DE001, IA020, IA029, TN021, VA013
fungus resistance, soybean, DE006
greenhouse soil, response, MI018
interaction, cadmium, OH020
irrigation application, alfalfa, NE027, SD004, blueberry, GA033, bromegrass, NE036, corn, FL024, FL043, KS004, KS074, NE036, grain sorghum, KS074, native range, NE036, pepper, NM006, potato, AL017, NM006, sorghum, KS004, soybean, AR012, sugar beet, KS004, WA013, tomato, AL017, FL034, trickle, FL043, FL060, NA035, wheat, KS074, SD004
magnesium uptake, corn, SC005
management, alfalfa, IL007, LA005, MO032, MT019, ND007, NE027, bean, LA009, bermudagrass, LA049, blueberry, LA009, bromegrass, KS072, carrot, FL039, Christmas tree, MN003, citrus, LA005, corn, GA001, IA009, IA037, KS004, KS007, MO024, cotton, GA050, MO013, fescue, KS072, field crop, IA036, fig, LA009, forage, LA028, LA029, MO032, grape, FL075, grass, MT019, irish potato, LA009, legume, WI006, lettuce, FL039, mustard, LA009, oats, ME002, okra, LA009, orchardgrass, KS072, ornamental, LA043, pea, LA009, pond, NJ018, potato, ME002, sand pine, KS072, sainfoin, KS072, shallot, LA009, sorghum, KS004, KS007, soybean, DE006, GA045, IA037, FL053, FL054, MD017, sugar beet, KS004, sugarcane, LA015, sweet potato, LA009, timothy, ME002, tobacco, GA036, wheat, KS054, wheatgrass, KS072
method of application, alfalfa, MT019, apple, MA001, barley, MT009, bermudagrass, LA048, corn, AL015, MD009, MO021, NE008, TN017, cotton, TN017, grain sorghum, MO021, grass, MT019, lettuce, FL059, multiple cropping, GA031, pepper, MS002, potato, ND013, NY025, SC020, sorghum, NE008, tomato, MS002, watermelon, FL074, MS002, wheat MO021, NE008, wild rice, MN016
mine-spoil soil, bermudagrass, KY007, forage, WV002, rate of application, OH001, ryegrass, WA018
mineral, release, LA007
minimum-tillage, range grass, OR005
multiple cropping, bermudagrass, OK008, corn, IA037, soybean, IA037
mycorrhiza, relationship, GA022
nitrogen, interaction, HI017, IN004, KS048
nitrogen fixation, legume, OH017
no-till, barley, MT027, corn, AL015, MD010, MO021, NJ021, VA007, cover crop, KS006, MO037, NJ012, rye, NJ012, soybean, AR036, VA007, tobacco, VA007, vetch, NJ012, wheat, AR036, MO021, MT027
nutrient management, alfalfa, ND006, citrus, LA005, forage MO032, irrigation, NE019
organic, corn, NC020, wheat, NC020
organic soil, management, FL039
osmocote, avocado, FL063, rate of application, FL041
phosphorus, rate of application, WV003
placement, FL003, barley, SD001, bean, IN020, corn, IL024, IN015, LA011, MD010, SD001, cowpea, OK027, eggplant, LA011, flax, SD001, mungbean, OK027, oats, SD001, okra, LA011, pea, LA011, pecan, LA011, rice, AR007, soybean, IA027, squash, LA011, sweet potato, LA011, tobacco, NC022, wheat, SD001
plant analysis, alfalfa, ND014, avocado, CA038, barley, ND014, OR020, bean, GA016, bentgrass, AR014, bermudagrass, AR014, bluegrass, OH004, broccoli, WI020, cabbage, WI020, cauliflower, WI020, corn, OH003, cotton, GA050, MS008, grape, WA033, onion, OR021, orange, FL070, pea, GA016, prune, CA013, soybean, IA038, OH003, subterranean clover OR020, sugar beet, ND014, sunflower, ND014, table beet, OR021, tree fruit, WA033, wheat, ND014, OR020
preservation, corn silage, PA023
quality, bentgrass, OH004, bluegrass, OH004, crown vetch, PA024, forage, LA028, ryegrass, LA041, sorghum, LA041, strawberry, NC010, sugar beet, CA009, sugarcane, LA015, WA012, WV003, wheat, KS054
rate of application, alfalfa, IA043, IL006, MT013, NA007, ND014, ND020, ND033, NM014, SD001, SD004, apple, MA001, avocado, FL062, bahiagrass, TX077, banana, HI017, FR015, barley, MT009, MT012, MT027, ND014, OR020, SD001, bean, GA016, GA041,

IN020, LA009, MS001, PR005, PR012, TN009, beet, WI021, beggerweed, FL023, bentgrass, NJ008, bermudagrass, AR001, FL019, GA019, LA002, LA019, LA048, NA016, OK008, TX032, TX056, birdsfoot trefoil, MI001, blackberry, LA047, TX059, blue grama, ND020, blueberry, GA033, LA047, NC012, bluegrass, NJ008, RI002, broccoli, WI020, bromegrass, AK002, AK003, ND020, ND033, NE036, buckwheat, ME006, cabbage FL055, MS001, PR005, PR012, TN009, WI020, cataloupe, PR005, PR012, carnation, RI005, carrot, FL003, FL039, cauliflower, WI020, centipedegrass, AL014, PR013, SC009, chard, NA005, Christmas tree, NC029, chrysanthemum, FL014, NY002, OK023, RI005, citrus, FL035, clover, AK002, AL010, FL029, GA053, LA042, MS012, WV003, container-grown plant, NC029, OK023, corn, AL015, FL042, FL043, FL067, FL077, FL079, FL080, GA016, GA018, HI006, HI016, IA034, IA035, IA041, IA043, ID002, IL002, IL013, IL022, IL024, IN004, IN015, KS013, KS014, KS035, KS046, KS056, KS067, KS074, LA001, LA011, LA016, LA030, MD009, MI014, MI015, MO021, MO026, MS001, MS006, MT012, MT022, NA005, NA007, NA024, NC008, ND014, ND023, NE008, NE036, OH001, OH010, OK026, PA015, PA019, SD001, SD003, TN009, TN017, TX074, VA011, VA018, WI026, WV003, corn silage, WA012, cotton, AR021, GA050, LA016, LA024, MN014, MS008, NA007, NM014, OK020, TN017, TX082, cottonwood, MS016, cowpea, OK027, cranberry, WI004, cucumber, PR005, TN009, WI008, dallisgrass, TX077, digitgrass, FL019, FL029, eggplant, LA011, fescue, NA005, NA024, WA012, field crop, TX042, WI007, fig, LA047, filbert, OR011, fish pond, AL011, flax, SD001, forage, NM005, forage sorghum, VA012, grain crop, NM005, grain sorghum, AR033, GA018, IA041, KS067, MO021, NA006, OK026, TX012, grape, NC012, grass, HI015, highway roadside, AK005, legume, HI015, legume-grass hay, PA019, lemon, FL072, lettuce, FL003, FL039, lime, FL061, limpograss, FL019, maple, MI022, VT002, multiple cropping, GA031, mungbean, OK027, muskmelon, MS001, mustard, NA005, NA024, native bluejoint, AK002, native grass, ND020, native range, NE036, oak, MS016, oats, ID018, LA043, SD001, TX056, okra, LA011, onion, OR021, TX056, orange, FL021, FL072, orchardgrass, WA012, organic soil, NC020, pangolagrass, FL029, papaya, HI002, pea, GA016, LA011, MS001, TN009, WA011, WI021, peach, FL021, peanut, GA052, OK020, TX068, TX069, TX071, pecan, LA011, LA047, pepper, GA041, MS001, NM006, PR005, peppermint, WA012, pimento, AL018, pine, FL032, ME010, MI022, MN029, OR034, pineapple, FL072, PR011, plantain, PR001, PR015, poinsettia, FL014, GA022, NY002, RI005, poplar, ME010, potato, AK002, AL017, AL018, FL043, ID003, ME007, MI014, MT012, ND014, NM006, NY024, SC020, WA015, prune, OR011, pumpkin, PR004, range grass, OR005, rhododendron, WA039, rice, PR001, TX006, TX007, rose, NY002, TX056, rye, AL010, LA053, WI024, ryegrass, AL010, LA012, LA019, LA041, LA042, LA053, MS012, TX077, WA018, small grain, TX011, WV003, sorghum, KS071, LA041, MS003, MS006, NE008, soybean, AR021, AR036, DE001, FL055, IA027, IA034, IA041, IA043, IL002, KY015, LA004, LA010, LA016, LA030, LA056, MO025, NA007, NC008, NE008, OK020, PA019, TN002, VA011, spearmint, WA012, spinach, NA005, NA024, spruce, ME010, MN029, squash, GA041, LA011, TN009, St. Augustine grass, FL008, strawberry, FL016, LA034, LA047, MS001, subterranean clover, OR020, sudangrass, NA006, TX077, WA012, sugar beet, MT012, MT020, MT022, ND014, sugarcane, LA027, sunflower, ND014, sweet corn, FL055, WI021, sweet potato, AL035, LA011, MS001, sweetgum, AR031, MS016, table beet, OR021, tanier, PR001, tobacco, GA044, MD005, OH002, TN004, tomato, AL017, AL018, FL065, GA041, MS001, TN009, triticale, LA053, turf, PA008, umbrella plant, OK023, viburnum, NY008, watermelon, FL044, MS001, PR004, PR005, wheat, AR036, IA043, KS071, KS074, LA053, MO021, MT012, MT020, MT027, ND014, NE008, OK008, OR018, OR020, PA019, SD001, SD004, WA027, WI024, wheatgrass, LA053, ND020, wild rice, MN014, MN016, wild yam, PR001, yellow poplar, AR031, MS016, OH032, yellowbirch, VT002

requirement, cotton, TX009

residual effect, corn GA048, IA034, MN026, NE023, TN018, cotton, TN018, soybean, IA034, TN018, wheat, NE023

response, alpine tundra, VT005, avocado, FL062, bermudagrass, AL021, AR001, OK008, TX032, blackberry, TX065, bluegrass, NA032, cantaloupe, CA020, corn, NA023, fescue, NA032, field crop, UT008, peanut, GA052, soybean, LA030, NA035

row spacing, corn, LA030, soybean, LA030

sediment, alfalfa, ND006

seed analysis, corn, OH003

soil, alfalfa, ND006, PA021, analysis, LA007, mineral, LA007, temperature, IN006, transformation, AR020

soil test calibration, alfalfa, WA012, corn silage, WA012, fescue, WA012, orchardgrass, WA012, peppermint, WA012, spearmint, WA012, sudangrass, WA012

soil test correlation, alfalfa, IA043, SD002, bark mixture, AL027, bean, GA016, bermudagrass, OK025, carrot, FL003, container grown plant, AL027, corn, CA012, GA016, GA048, IA043, MO018, NE023, OH010, OH025, TN017, cotton, AL009, AR021, MO018, MS007, MS008, OK024, TN017, TX010, fescue, AR019, MO018, OK025, field crop, KS066, OH026, WI007, forage, TX010, grain sorghum, OK024, lettuce, FL003, orange, FL070, pea, GA016, peanut, AL009, TX069, pimento, AL018, potato, AL018, TX007, WA015, rice, TX007, sorghum, AL009, MS011, soybean, AL009, AR019, AR021, FL068, IA043, MS011, MO018, OH025, sweet corn, PA004, sweet potato, NC026, tomato, AL018, wheat, ID007, MO018, NE023, OH025, OK024, TX010, WA027

soil salinity, field crop, UT008

soil-plant relation, alfalfa, PA021, PA022

source, Christmas tree, NC029, container grown plant, NC029, corn, IA034, peanut, TX068, soybean, MO025, wheat, OR018

stand recovery, bermudagrass, TX057

sul-po-mag, rate of application, FL049

tillage system, corn, WI026

time of application, alfalfa, MT019, ND014, barley, MT009, ND014,

cabbage, FL055, corn, MO021, ND014, cottonwood, MS016, cowpea, OK027, cucumber, WI008, grain sorghum, MO021, grass, MT019, holly, NJ010, multiple cropping, GA031, mungbean, OK027, oak, MS016, peanut, TX071, pepper, MS002, potato, AL017, ND013, ND014, NY005, soybean, FL055, KY015, St. Augustine grass, FL008, sugar beet, ND014, sunflower, ND014, sweet corn, FL055, sweetgum, MS016, tobacco, NC023, tomato, AL017, MS002, turf, PA008, vegetable, GA038, watermelon, FL074, MS002, wheat, MO021, ND014, yellow poplar, MS016
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uptake, alfalfa, NH004, avocado, CA038, barley, CA008, bermudagrass, AR015, bluegrass, NH004, corn, DE007, IA028, IA038, IL020, IN006, cotton, AR021, forage, TX040, orange, CA038, soybean, AR012, AR021, DE003, IA038, sugar beet, WA013, sugarcane, LA001, sunflower, ND017, wheat, OR029
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yield, legume, WI006
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Potassium Azide, urease, response, IA039
Potassium Carbonate
rate of application, bermudagrass, FL027, ryegrass, FL027
response, forage, FL025
Potassium Chloride
band application, sweet corn, NY029
method of application, potato, CT002
movement, soil, AR010
nutrient cycling, birch, AK001
placement, corn, PA005, snapbean, PA005, tomato, PA005, watermelon, FL073
rate of application, corn, IL014, PA005, cranberry, WA010, grain sorghum, NA006, potato, CT002, rhododendron, WA039, snapbean, PA005, soybean, AR029, sudangrass, NA006, tomato, PA005, watermelon, FL073
residual, vegetables, NY031
response, aspen, AK001, corn, OH009, forage, FL025, poplar, AK001, spruce, AK001
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uptake, bermudagrass, AR015
Potassium Frit
rate of application, bermudagrass, FL027, ryegrass, FL027
placement, bean, IN020
Potassium Nitrate
foliar application, rose, IL025, MO035, soybean, AR037
irrigation application, apple, AR018, bean, GA041, cucumber, GA041, peach, AR018, pepper, GA041, squash, GA041, tomato, GA041
N-Serve, cucumber, MA004, radish, MA004
placement, pepper, FL064, tomato, AL022, FL064, GA041
rate of application, bean, GA041, cucumber, GA041, pepper, FL064, GA041, potato, AL022, snapbean, AL022, squash, GA041, tomato, AL022, FL064, GA041
Potassium Phosphate
response, forage, FL025
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Potassium Polyphosphate
foliar application, corn, KS028, oats, IL025, soybean, IL025, LA026, NA015, wheat, IL025
irrigation, corn, KS028
rate of application, corn, KS028, soybean, NA015
Potassium Sulfate
foliar application, oats, IL025, soybean, IL025, LA026, NA015, wheat, IL025
method of application, potato, CT002
movement, soil, AR010
rate of application, bermudagrass, FL027, blueberry, NJ006, cranberry, WA010, pepper, FL064, potato, CT002, rhododendron, WA039, ryegrass, FL027, small grain, MT008, soybean, AR029, NA015, tomato, FL064
response, bromegrass, AK004, pecan, FL064, tomato, FL064
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Potato
ammoniated superphosphate, method of application, CT002, rate of application, CT002, time of application, CT002
ammonium carbonate, rate of application, AL022
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potassium, foliar application, ID003, management, ME002, method of application, ND013, NY025, SC020, rate of application, AK002, AL017, AL018, AL020, FL043, ID003, ME007, MI014, MT012, ND014, NM006, NY025, SC020, WA015, soil test correlation, AL018, TX007, WA015, time of application, AL017, ND013, ND014, NY005
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urea phosphate, rate of application, ME007
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Potato Scab
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fertilizer, application, MI001
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phosphorus, rate of application, ID004
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potassium sulfate, method of application, CT002, rate of application, CT002, time of application, CT002
Poultry Manure, rate of application, collard, NY018
Powdery Mildew Control, elemental sulfur, sugar beet, CA018
Prilled Urea
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rate of application, corn, MD009
Product Quality, fertilizer industry, market analysis, CT003
Promotion, marketing, fertilizer, IL029, input, IL029
Prune
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Pumpkin
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Radish
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potassium, zinc uptake, MA007
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Range
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Range Forage
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ammonium sulfate, rate of application, CA024
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urea, rate of application, CA024
Range Grass
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potassium, rate of application, OR005
sulfur, rate of application, OR005
Range Improvement, economics, farm management, UT009
Rangeland
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Raspberry
controlled-release nitrogen, rate of application, WA040
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Red Cedar
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Red Clover
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Red Pine, fertilizer, application, MI021
Red Spruce, fertilizer, application, ME001
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Redwood, growth, controlled-release nitrogen, CA004, urea, CA004
Reed Canarygrass
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Refinery Sludge, rate of application, bermudagrass, AR011, soybean, AR011
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Residual Phosphorus, irrigated soil, alfalfa, CA042, sweet corn, CA042, wheat, CA042
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grain, transportation, NE001
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Rhododendron
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potassium, rate of application, WA039
potassium chloride, rate of application, WA039
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Rice
ammonium nitrate, rate of application, NA003, time of application, NA003, transformation, CA010
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arsenic, rate of application, AR028
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concentrated superphosphate, rate of application, CA029
copper, rate of application, AR028
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phosphorus, efficiency, TX019, flooded soil, LA022, movement, TX019, placement, AR007, rate of application, PR001, TX006, TX007, soil-test correlation, TX007, uptake, KY008
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Rock Phosphate
heavy metal, corn, NA019
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quality, forage, MO032
rate of application, bean, VA003, WV001, birdsfoot trefoil, VA015, clover, NA027, VA015, corn, NA013, NA014, corn forage, NA019, cowpea, NA014, fescue, NA013, NA027, forage, MO032, grain sorghum, NA013, mine-spoil soil, VA003, orchardgrass, NA027, tomato, VA003, VA015, vetch, VA015
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Romeda, fertilizer, soil-test correlation, NJ009

Rose
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Row Spacing
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Rye
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potassium, rate of application, AL010, LA053, WI024
Ryegrass
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Salt
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Sand Pine
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Sesame
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Sewage
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Sewage Sludge
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container-grown plant, chrysanthemum, NY002, poinsettia, NY002, rose, NY002
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placement, strawberry, FL016
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NA011, radish, MA003, soybean, IN017, tomato, MA003
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Shallot
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Short-Leaf Pine
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Silage
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Silverberry
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Slash Pine
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Slow-Release Nitrogen
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rate of application, lettuce, CO013
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Snapbean
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Snowberry
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legume, fertilizer, MT023
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response, cotton, AR021, ornamental, IL004, soybean, AR021, turf, IL004
tundra, soil, NJ003
uptake, cotton, AR021, wheat, OR029
Sodium Nitrate
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soybean, response, GA017
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calcium, orange, FL070, soybean, AR021, sweet corn, PA004
compost, soil mixture, NJ017
copper, corn, CO015, grain sorghum, NM001, soybean, NJ016, sugar beet, CO016
fertilizer, alfalfa, NV001, PA017, apple, NJ009, azalea, NJ009, cabbage, NJ009, corn, GA051, IA015, cucumber, AR002, field crop, GA024, WA026, holly, NJ009, inkberry, NJ009, lime, NJ009, oak, NJ009, pine, NJ009, poinsettia, NJ009, potato, NJ009, romeda, NJ009, soybean, NJ009, squash, AR002, sugar beet, NE038, tomato, NJ009, walnut, NJ009
iron, cotton, AR021, grain sorghum, NM001, soybean, AR021, NJ016
legume, manganese, KY021, molybdenum, KY012
lime, alfalfa, IA043, apple, NJ009, azalea, NJ009, cabbage, NJ009, corn, MO018, cotton, AL009, MO018, TX010, crop rotation, IA043, fescue, MO018, field crop, OH026, forage, TX010, grape, NJ009, holly, NJ009, inkberry, NJ009, oak, NJ009, peanut, AL009, pimento, AL018, pine, NJ009, poinsettia, NJ009, potato, AL018, NJ009, rate of application, FL068, red clover, NA018, romeda, NJ009, soybean, AL009, FL068, NA018, NJ009, tomato, AL018, NJ009, walnut, NJ009, wheat, MO018, OR014, TX010
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molybdenum, red clover, NA018, soybean, KY012, NA018
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organic soil, carrot, FL003, lettuce, FL003
peat, soil mixture, NJ017
phosphorus, alfalfa, ND012, WA012, bark mixture, AL027, barley, ID002, bean, ID002, GA016, bermudagrass, OK025, carrot, FL003, container-grown plant, AL027, corn, CO016, GA016, GA048, HI005, IA043, ID002, IL024, KS013, MO018, NE023, OH010, OH025, TN017, corn silage, WA012, cotton, AL009, AR021, MO018, OK024, TN017, TX010, crop rotation, IA043, durham wheat, AZ009, fescue, AR019, MO018, OK024, WA012, field crop, IA032, KS066, OH026, WI007, forage, TX010, grain sorghum, OK024, horticultural crop, AZ008, lettuce, FL003, millet, ND010, onion, HI005, orange, FL070, orchardgrass, WA012, pea, GA016, peanut, AL009, TX069, pimento, AL018, pine, IL005, potato, AL018, HI005, ID002, TX007, WA015, rice, TX007, soil, VT004, sorghum, MS011, soybean, AL009, AR019, AR021, FL068, MS011, OH024, spearmint, WA012, sudangrass, WA012, sugar beet, CO016, ID002, ND011, sweet potato, NC026, tomato, AL018, vegetables, NC028, wheat, ID002, ID007, NE023, OH025, OK024, TX010, WA027
plant analysis, field crop, GA020
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SC017, cotton, AR021, MO018, fescue, MO018, grain sorghum, NM001, rice, SC017, soybean, AR021, MS011, NJ016, sugar beet, CO016, wheat, MO018, WA027
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Solubor
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Southern Pine
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Soybean
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phosphorus, foliar application, DE001, IA020, IA029, IL002, IL008, LA004, NA035, TN021, irrigation, KS056, NE014, management, FL053, GA026, GA045, IA037, LA023, method of application, KS023, NE008, PR010, minimum tillage, AR036, GA026, KS035, OH029, VA007, multiple cropping, IA037, organic soil, NC020, placement, AR004, IA027, rate of application, AR029, AR036, DE001, FL067, IA027, IA041, IA043, IL002, IL028, KS023, KS035, KS056, LA004, LA010, LA016, LA030, LA056, MO025, MO035, NA007, NE008, OK020, PA019, VA011, residual effect, OH029, TN018, response, IL008, LA030, seed analysis, OH003, soil test correlation, AL009, AR019, AR021, FL068, IA043, MO018, MS011, source, MO025, PR010, time of application, PR010, uptake, AR021, IA038, NE002, OH012
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potassium, foliar application, DE001, IA020, IA029, IL008, LA004, NA035, TN021, VA013, management, DE006, FL053, FL054, GA034, IA037, MD017, multiple cropping, IA037, no-till, AR036, VA007, organic soil, NC020, placement, IA027, rate of application, AR021, AR036, DE001, FL055, IA027, IA034, IA041, IA043, IL002, KY015, LA004, LA010, LA016, LA030, LA056, MO025, NA007, NC008, NE008, OK020, PA019, TN002, VA011, residual effect, IA034, TN018, response, LA030, LA035, soil test correlation, AL009, AR019, AR021, FL068, IA043, MS018, MO011, OH025, source, MO025, sulfur-coated potassium sulfate, FL067, time of application, FL055, KY015, uptake, AR012, AR021, DE003, IA038
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potassium nitrate, foliar application, AR037
potassium phosphate, response, LA026
potassium polyphosphate, foliar application, IL025, LA026, NA015, rate of application, NA015
potassium sulfate, foliar application, IL025, LA026, NA015, method of application, CT002, rate of application, AR029, NA015
pulp effluent, rate of application, AR011
seed analysis, nitrogen, OH003, phosphorus, OH003, potassium, OH003
sewage sludge, heavy metal, NY021, method of application, IN002, nitrogen, NY021, rate of application, MD019, NY021, time of application, MD019, transformation, IN017
sodium, uptake, AR021
sodium nitrate, response, GA017
soil test correlation, boron, AR021, calcium, AR021, copper, NJ016, fertilizer, NJ009, iron, AR021, NJ016, lime, FL068, magnesium, AR019, AR021, manganese, AR021, KY012, NJ016, molybdenum, KY012, NA018, nitrogen, AL009, AR019, MS011, OH025, phosphorus, AL009, AR019, AR021, FL068, MS011, OH025, potassium, AL009, AR019, AR021, FL068, IA043, MS018, MO011, OH025, sodium, AR021, sulfur, AR019, zinc, AR021, MS011, NJ016
solubor, foliar application, MD006, MN018, rate of application, MD006, MN018, MS010
sugar, foliar application, IA020
sulfur, foliar application, IA020, IA029, VA013, method of application, NE008, rate of application, KS045, NC008, NE008, SC016, VA011, response, NA035, soil test correlation, AR019, MO018, source, KS045, VA011, transformation, IN017, uptake, AR012

sulfur-coated potassium sulfate, response, FL067
sulfur-coated urea, rate of application, KS023, LA010, MO023, response, MO023
sulfuric acid, foliar application, AR037, DE001, GA014, IA020, IA029, IL008, IL025, MN019, NA015, NA035, TX070, TX078
urea, method of application, TX008, rate of application, AR037, DE001, GA014, IA020, IL008, IL025, LA010, MD019, ND015, TX008, response, IL008, time of application, MD019, TX008, transformation, NA035
urea-ammonium nitrate, response, KS017
urea-polyphosphate, foliar application, LA026
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zinc EDTA, band application, NE034, fluid application, NE034, rate of application, NE034
zinc nitrate, band application, NE034, fluid application, NE034, rate of application, NE034
zinc oxide, band application, NE034, fluid application, NE034, rate of application, NE034
zinc sulfate, band application, NE034, fluid application, NE034, rate of application, LA033, NE034
zinc-ammonia complex, band application, NE034, fluid application, NE034, rate of application, NE034
Spearmint
nitrogen, rate of application, WA012
phosphorus, rate of application, WA012
potassium, rate of application, WA012
soil test calibration, nitrogen, WA012, phosphorus, WA012, potassium, WA012, sulfur, WA012
sulfur, rate of application, WA012
Spinach
ammonium nitrate, rate of application, NA005
ammonium sulfate, hexon, MA005, N-Serve, MA005, truban, MA005
mangesium sulfate, rate of application, NY009
milorganite, hexon, MA005, N-Serve, MA005, truban, MA005
nitrate-nitrogen, plant analysis, NA024
nitrogen, control release, NA005, rate of application, HI010, NA024, uptake, NA024
phosphorus, rate of application, NA005, NA024
potassium, rate of application, NA005, NA024
sulfur-coated urea, rate of application, NA005
Spring Wheat, nitrogen, rate of application, ND002
Sprinkler Irrigation, fertilizer, blackberry, OR001, boysenberry, OR001, raspberry, OR001
Spruce
ammonium nitrate, nutrient cycling, AK001
concentrated superphosphate, response, AK001
nitrogen, application, ME009, rate of application, ME010, MN029
phosphorus, application ME009, rate of application, ME010, MN029
potassium, application, ME009, rate of application, ME010, MN029
potassium chloride, response, AK001
Spruce Pine, fertilizer, management, LA006
Squash
calcium nitrate, rate of application, GA041
fertilizer, management, LA037, mine-spoil soil, WV001, rate of application, AR002
lime, mine-spoil soil, WV001
nitrogen, application, VA001, placement, LA011, rate of application, LA011, TN009
phosphorus, mulch, VA001, placement, LA011, rate of application, LA011, TN009
potassium, application VA001, placement, LA011, rate of application, LA011, TN009
potassium nitrate, irrigation, GA041, rate of application, GA041
rock phosphate, mine-spoil soil, WV001
soil test correlation, fertilizer, AR002
St. Augustine Grass
animal, response, FL008
nitrogen, rate of application, MS004
phosphorus, rate of application, FL008, time of application FL008
potassium, rate of application, FL008, time of application, FL008
Stand Establishment
nutrient management, vegetables, HI012
seedling vigor, vegetables, HI012
Stand Longevity, fertilizer, alfalfa, MT014, sainfoin, MT014
Stargrass
lime, response, PR009
nitrogen, rate of application, FL083, PR009
Storage
bulk, fertilizer, MN009
fertilizer, cost, IL009, LA034, SD006, distribution, IA007, NA050, NE033, port, IA006, LA034, requirement, OH028, retail, IA005
nitrogen, fertilizer, NA041
organization, fertilizer, IA014
retail, fertilizer, IA005, NA050, plant size, LA032
retail outlet, location, KS062
system alternative, MO014
Strawberry
ammonium nitrate, placement, FL016, rate of application, FL016, time of application, FL016
fertilizer, irrigation application, FL045, method of application, FL045, rate of application, FL045, time of application, FL045
irrigation, sprinkler, FL045
manganese, rate of application, WA037
nitrogen, rate of application, LA045, LA047, MS001
osmocote, placement, FL016, rate of application, FL016, time of application, FL016
phosphorus, rate of application, FL016, LA045, LA047, MS001, WA037, winter hardiness, WA037
potassium, quality, NC010, rate of application, FL016, LA045, LA047, MS001
sewage sludge, placement, FL016, rate of application, FL016, time of application, FL016
uramite, placement, FL016, rate of application, FL016, time of application, FL016
urea, placement, FL016, rate of application, FL016, time of application, FL016
zinc, application, WA037, winter hardiness, WA037, uptake, WA037
Structure, fertilizer, distribution system, LA032, retail, IN013, NE003, supply system, LA032
Subclover, quality, phosphorus, OR017, sulfur, OR017
Subterranean Clover
boron, rate of application, OR020
lime, rate of application, OR020
molybdenum, rate of application, OR020
nitrogen, rate of application, OR020
phosphorus, rate of application, OR020
plant analysis, boron, OR020, molybdenum, OR020, nitrogen, OR020, phosphorus, OR020, potassium, OR020, sulfur, OR020
potassium, rate of application, OR020

sulfur, quality, OR017, rate of application, OR020
Subtropical Grasses, nitrogen fixation, bacteria, FL057
Sudan-Sorghum
lime, rate of application, PR009
nitrogen, rate of application, PR009
Sudangrass
ammonium nitrate, rate of application, LA051, NA006
dairy manure, rate of application, AZ017
fertilizer, method of application, AR025, time of application, AR025
lime, response, PR009
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phosphorus, rate of application, TX077, WA012
potassium, rate of application, NA016, TX077, WA012
potassium chloride, rate of application, NA006
soil test calibration, nitrogen, WA012, phosphorus, WA012, potassium, WA012, sulfur, WA012
sulfur, rate of application, WA012
sulfur-coated potassium chloride, rate of application, NA006
urea, rate of application, NA006
Sugar, foliar application, soybean, IA020
Sugar Beet
ammonium nitrate, placement, MT022, rate of application, CO016, MT022, ND014, OH027, time of application, MT022, ND014
ammonium sulfate, rate of application, ND014, OH027, soil test correlation, CA018, time of application, ND014
anhydrous ammonia, irrigation, AZ001, placement, MT022, rate of application, MT022, time of application, MT022
boron, method of application, MI005, source, MI005, uptake, MI016
concentrated superphosphate, rate of application, OH027
copper, foliar application, CO016, uptake, CA009
diammonium phosphate, rate of application, OH027
elemental sulfur, powdery mildew control, CA018, rate of application, CA018
fertilizer, management, NE038, rate of application, ND005, time of application, ND005
iron, rate of application, ND024
irrigation, phosphorus, KS004, WA013, potassium, KS004, WA012
magnesium, method of application, MI005, source, MI005
manganese, uptake, MI016
manure, transformation, AZ010
micronutrients, uptake, MI016
monoammonium phosphate, rate of application, OH027
nitrogen, irrigation, KS001, KS004, WA012, management, KS004, method of application, MI005, ND024, movement, NE026, N-Serve, ND024, rate of application, KS001, KS002, MT012, MT020, MT028, ND024, UT004, WA013, soil test correlation, CA018, CO016, MI020, ND011, source, MI005, MT006, time of application, MT006, WA013, transformation, ID005, uptake, AZ010, CA009
phosphorus, application, WA013, management, KS004, placement, MT022, quality, CA009, ND009, rate of application, ID002, MT012, MT022, MT028, ND014, ND024, soil test correlation, CO016, ID002, ND011, time of application, ND014, uptake, AZ010, CA009
plant analysis, nitrogen, CO016, ND014, phosphorus, ND014, potassium, ND014
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quality, fertilizer, CO006
soil test correlation, copper, CO016, fertilizer, NE038, phosphorus, CO016, ID002, ND009, ND011
sulfur, quality, CA009, rate of application, MT020, uptake, CA009
sulfur-coated urea, rate of application, CO016
sulfuric acid, irrigation application, AZ001
urea, placement, MT022, rate of application, CO016, MT012, MT022, ND014, OH027, time of application, MT022, ND014
urea-ammonium phosphate, rate of application, CO016
zinc, application, WA013, foliar application, CA016, method of application, MI005, rate of application, CO016, MT020, MT022, ND024, WA013, soil test correlation, CO016, source, MI005, uptake, CO016, ND024, WA013
Sugar Maple, fertilization, growth, VT003, management, NY032, quality, VT003
Sugarcane
calcium silicate slag, rate of application, FL006, response, FL004
juice quality, nitrogen, LA015, potassium, LA015, sulfur, LA015
lime, resonse, PR014, tropical soil, PR014
micronutrients, rate of application, TX013
nitrogen, management, LA015, rate of application, LA027, TX073, uptake, LA001
nitrogen-phosphorus-potassium combination, rate of application, PR002
phosphorus, rate of application, LA027
potassium, management, LA015, rate of application, LA027, uptake, LA001
rum distillery slop, fertilizer value, PR006
sulfur, foliar application, TX013, management, LA015
sulfur-coated urea, rate of application, FL006, response, FL004
sulfuric acid, soil application, TX013
urea, rate of application, HI007
Sul-po-mag, rate of application, pine, FL049
Sulfate, rate of application, tobacco, KY006
Sulfur (see also specific sources: Ammonium Nitrate Sulfate, Ammonium Phosphate Sulfate, Ammonium Polysulfide, Ammonium Sulfate, Ammonium Sulfate Phosphate, Chip Sulfur, Elemental Sulfur, Gypsum, Magnesium Sulfate, Manganese Sulfate, Potassium Sulfate, Sulfate, Sul-Po-Mag, Sulfur-Coated Muriate of Potash, Sulfur-Coated Nitrogen with Potassium, Sulfur-Coated Potassium Chloride, Sulfur-Coated Potassium Sulfate, Sulfur-Coated Urea, Sulfur Dioxide, Sulfuric Acid, Urea Ammonium Sulfate, Zinc Sulfate)
application, field crop, VA010, forage, TX060, legume, TX060
deficiency symptom, bentgrass, WI018, bermudagrass, TX030, WI018, bluegrass, WI018
fertilization, forage, MS014, pine, OR034
foliar application, alfalfa, VA014, corn, TN021, cotton, TN021, grain sorghum, TX013, peanut, GA049, pecan, TX013, rice, TX013, soybean, IA020, IA029, IL008, NA035, TN021, VA013, sugarcane, TX013
iron-sulfur, grain sorghum, OK031, TX045
irrigation application, corn, CO009, KS068, soybean, AR012, trickle, NA035
lamb growth, range forage, CA019
management, alfalfa, MT019, corn, CO009, KS007, forage, LA028, grass, MT019, soil, MO007, sorghum, KS007, sugarcane, LA015
method of application, alfalfa, MT019,

corn, NE008, grass, MT019, peach, GA023, sorghum, NE008, soybean, NE008, wheat, NE008
micronutrients, interaction, CA002
nitrogen, corn, KS068, interaction, KS068
nitrogen-phosphorus-potassium-sulfur combination, foliar application, GA014, FL052, IA042, MO005, MO022, peanut, GA049
phosphorus, interaction, CA002, CA003
placement, alfalfa, SD001, barley, SD001, corn, SD001, flax, SD001, oats, SD001, popcorn, OR015, wheat, ID014, SD001
plant analysis, barley, OR020, subterranean clover, OR020, wheat, OR020
powdery mildew control, sugar beet, CA018
quality, forage, LA028, subterranean clover, OR017, sugar beet, CA009, sugarcane, LA015, OR028, wheat, MT005, MT021
range forage, lamb growth, CA019
rate of application, alfalfa, KS045, SD001, WA012, barley, OR020, SD001, bermudagrass, LA019, TX030, TX056, bromegrass, AK002, AK003, Christmas tree, NC029, clover, AK002, FL029, clover-grass pasture, OR015, container-grown plant, NC029, corn, IL013, KS068, MI014, MN005, MN006, NC008, NE008, OK026, PA020, SD001, VA011, corn silage, WA012, cotton, SC007, cranberry, NJ005, digitgrass, FL029, fescue, WA012, field crop, MO030, OK006, OR040, flax, SD001, forage, NC031, grain sorghum, KS045, OK026, native bluejoint, AK002, oats, SD001, TX056, onion, TX056, orchardgrass, WA012, pangolagrass, FL029, peppermint, WA012, pine, OR034, popcorn, OR016, potato, AK002, MI014, VA005, powdery mildew control, CA018, range forage, OR003, range grass, OR005, rose, TX056, ryegrass, LA019, LA041, small grain, MT008, sorghum, LA041, NE008, soybean, KS045, NC008, NE008, SC016, VA011, spearmint, WA012, subterranean clover, OR020, sudangrass, WA012, sugar beet, MT020, sweet potato, VA005, turf, PA008, urban tree, OK033, wheat, ID008, ID014, MT020, NE008, OR020, OR036, OR039, SD001, white potato, VA005, white wheat, OR036
requirement, field crop, GA046
response, alfalfa, PA020, corn, KS007, field crop, GA046, IL011, hay, PA020, legume, TX060, sorghum, KS007, soybean, NA035, wheat, ID008
soil, reclamation, AZ013
soil test calibration, alfalfa, WA012, corn silage, WA012, fescue, AR019, MO018, WA012, orchardgrass, WA012, peppermint, WA012, spearmint, WA012, sudangrass, WA012
soil test correlation, corn, MO018, cotton, MO018, fescue, AR019, soybean, AR019, MO018, wheat, MO018, OR014
source, alfalfa, KS045, cotton, SC007, grain sorghum, KS045, soybean, KS045, VA011, wheat, WA021
tillage system, field crop, OR040
time of application, alfalfa, MT019, corn, MN006, grass, MT019, turf, PA008
transformation, soil, IA002, IA010, IA012, IA031, IA032, ID009, soybean, IN017
uptake, barley, CA008, soybean, AR012, sugar beet, CA009, wheat, MT005, WA021
Sulfur-Coated Muriate of Potash, rate of application, blueberry, WA023, cranberry, WA023
Sulfur-Coated Nitrogen with Potassium, response, avocado, FL063
Sulfur-Coated Nitrogen-Phosphorus-Potassium, rate of application, celery, CA024, cucumber, CA024, fir, CA024, peach, CA024, range forage, CA024, tomato, CA024
Sulfur-Coated Potassium Chloride, rate of application, cranberry, WA010, grain sorghum, IA006, sudangrass, NA006
Sulfur-Coated Potassium Sulfate, rate of application, corn, FL067, cranberry, WA010, grain sorghum, FL067, soybean, FL067
Sulfur-Coated Urea
irrigation, corn, KS023, WI017, lettuce, MI017, peanut, GA039, potato, WI017, soybean, KS023
method of application, corn, KS023
movement, fescue, OR008, soil system, OR008
mulch production, tomato, FL064, FL066
nitrogen, release rate, NA005, OR023, small grain, MD016
placement, potato, FL060, tomato, FL060, FL064, watermelon, FL073
rate of application, alfalfa, ND033, barberry, SC014, barley, MD007, bentgrass, MI007, bermudagrass, FL056, GA019, HI013, NC005, OK012, TX030, TX070, blueberry, WA023, bluegrass, MI007, NE017, PA007, PA027, boxwood, SC014, bromegrass, AK004, ND033, cabbage, TX061, chard, NA005, choke cherry, ND030, chrysanthemum, AL007, citrus, FL071, container-grown plant, SC014, corn, CO016, GA039, KS023, MD007, MD016, NA005, NA021, ND029, cotton, MO023, cranberry, WA009, WA010, WA023, fescue, NA004, NA005, NC005, OR008, OR032, forestry, MT018, WA001, grain sorghum, AR030, grass, OR013, ground cover, NE013, holly, SC014, juniper, SC014, lettuce, MI017, mint, ID017, mustard, NA005, native range, ND029, oats, MD007, ornamental, AL006, peanut, GA039, TX070, pecan, TX070, pepper, FL033, FL064, FL066, range, NM003, range forage, AZ004, small grain, MD016, MT008, soybean, KS023, LA010, MO023, spinach, NA005, sugar beet, CO016, sugarcane, FL006, sweet corn, MI017, TX061, turf, PA008, SC008, watermelon, FL044, FL073, wheat, MD007, ND[illegible], NE031
release, crop residue, NY[illegible], fescue, OR032
response, avocado, FL063, bentgrass, PA007, choke cherry, ND030, chrysanthemum, AL007, fescue, OR008, rice, LA025, ryegrass, TX005, silverberry, ND030, snowberry, ND030, sorghum, MO023, soybean, MO023, sugarcane, FL004, sweet corn, MI017
time of application, bromegrass, KS069, turf, PA008, wheat, NE031
transformation, fescue, OR008
turf, bermudagrass, HI013, bluegrass, NE017, ground cover, NE017
Sulfur-Coated Urea-5, rate of application, orchardgrass, WA025, wheat, WA025
Sulfur-Coated Urea-17
placement, bean, WI013, corn, WI013, potato, WI013
rate of application, orchardgrass, WA025, turf, TX049
Sulfur-Coated Urea-20, rate of application, bean, WI013, boxwood, SC014, corn, WI013, orchardgrass, WA025, potato, WI013, turf, TX049, wheat, WA025
Sulfur-Coated Urea-30
placement, bean, WI013, corn, WI013, potato, WI013, wheat, WA025
rate of application, orchardgrass, WA025
Sulfur-Coated Urea-40, rate of application, orchardgrass, WA025, wheat, WA025
Sulfur Dioxide, rate of application,

pecan, NM008, pepper, NM008
Sulfur-Potassium-Magnesium Combination, rate of application, corn, IL013
Sul-Po-Mag, rate of application, sand pine, FL049, slash pine, FL049
Sulfuric Acid
application, clover, TX013, corn, TX013, flax, TX013, grain sorghum, TX013, peanut, TX013, pecan, TX013, rice, TX013, sugar beet, AZ001, sugarcane, TX013
foliar application, soybean, AR037
irrigation application, sugar beet, AZ001, wheat, AZ001
micronutrient, release, TX013
Sunflower
ammonium nitrate, rate of application, ND007, ND014, response, ND007, time of application, ND014
ammonium sulfate, rate of application, ND007, ND014, response, ND007, time of application, ND014
boron, response, ND007, uptake, TX039
fertilizer, rate of application, ND005, time of application, ND005
nitrogen, rate of application, TX050, uptake, ND017
nitrogen-phosphorus combination, rate of application, MD012
oil, ammoniun nitrate, ND007, ammonium sulfate, ND007, urea, ND007
phosphorus, rate of application, ND014, TX050, time of application, ND014, uptake, ND017
plant analysis, boron, TX039, nitrogen, ND014, phosphorus, ND014, potassium, ND014
plant population, ammonium nitrate, ND007, ammonium sulfate, ND007, urea, ND007
potassium, rate of application, ND014, time of application, ND014, uptake, ND017
soil test correlation, boron, TX039
urea, rate of application, ND007, ND014, response, ND007, time of application, ND014
zinc, rate of application, TX063
Supply Analysis
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Supply-Demand
data bank, world forecast, NA001
world food need, distribution, NE003, fertilizer, NE003
world forecast, marketing, CA014, NA001
Sweet Clover
nitrogen, rate of application, WY004
phosphorus, rate of application, WY004
Sweet Corn
ammonium nitrate, band application, NY029, rate of application, NY029, TX061, WA011
ammonium sulfate, rate of application, WA035
anhydrous ammonium, rate of application, MI017
calcium, soil test correlation, PA004
chicken manure, response, CO005, OR027
concentrated superphosphate, band application, NY029, WA035
diammonium phosphate, band application, NY025
fertilizer, management, LA037, mine-spoil soil, WV001, rate of application, CO005
lime, application, WA035, mine-spoil soil, WV001
magnesium, method of application, IA040, soil test correlation, PA004
nitrogen, band application, NY029, rate of application, WI021
paper waste, phosphorylated, RI001
phosphorus, band application, NY029, irrigation, CA042, rate of application, NY029, WA011, WI021
potassium, rate of application, FL055, WI021, soil test correlation, PA004, time of application, FL055
potassium chloride, band application, NY025
rock phosphate, mine-spoil soil, WV001
sulfur-coated urea, rate of application, MI017, TX061, response, MI017
urea, band application, NY025, rate of application, MI017, NY025, NY029, terrazole, MI017
Sweet Potato
chlorine, quality, VA005, rate of application, VA005
fertilizer, management, VI003
nitrogen, application, LA009, management, LA009, placement, LA011, rate of application, AL035, LA011, MS001, NC006
phosphorus, application, LA009, placement, LA011, rate of application, AL035, LA011, MS001, soil test correlation, NC026
potassium, application, LA009, placement, LA011, rate of application, AL035, LA011, MS001, soil test correlation, NC026
rum distillery slop, fertilizer value, PR006
sulfur, rate of application, VA005
Sweetgum
ammonium nitrate, rate of application, AL034, MS016, response, AL034, time of application, MS017
fertilizer, rate of application, AL025, TN006
iron, implant, OH016
manganese, implant, OH016
nitrogen, rate of application, AR031, MS016, OH016, SC002
phosphorus, rate of application, AR031, MS016, time of application, MS016
potassium, rate of application, AR031, MS016, time of application, MS016
Swine Manure
method of application, corn, MN011
rate of application, corn, MN011
Switchgrass, nitrogen, analysis, IA018, management, IA018
Sycamore, ammonium nitrate, response, AL034
System, transportation, alternative, MO014
Table Beet
boron, plant analysis, OR021, rate of application, OR021
lime, rate of application, OR021
manure, response, OR027
nitrogen, quality, NY028, rate of application, NY028, OR021, uptake, NY028
phosphorus, rate of application, OR021
plant analysis, boron, OR021, nitrogen, OR021, phosphorus, OR021, potassium, OR021
potassium, rate of application, OR021
Tall Fescue
nitrogen, topdressing, MO033
phosphorus, topdressing, MO033
Tanier
calcium, rate of application, PR001
lime, response, PR009, PR014, tropical soil, PR014
magnesium, rate of application, PR001
nitrogen, rate of application, PR001, PR009
phosphorus, rate of application, PR001
potassium, rate of application, PR001
Terrazole
ammonium polyphosphate, corn, KS025, grain sorghum, KS025, wheat, KS025
ammonium sulfate, corn, IN014
nitrification, inhibitor, AL013
response, corn, IN014
urea, corn, IL027, IN014, KS025, OK026, grain sorghum, KS025, OK026, grass, KS031, OK014, nitrification, MI006, MN023, NC002, OH007, rate of application, MI017, transformation, DE002, MI017
urea-ammonium nitrate, corn, KS025, grain sorghum, KS025, wheat, KS025
Tiba, foliar fertilization, soybean, IA042
Tillage System, plant nutrients, corn,

WI026, field crop, OR040
Timothy
ammonium nitrate rate of application, ME002
lime, response, ME002
magnesium, management, ME002
nitrogen, rate of application, MN015, time of application, CO020, MN015
phosphorus, management, ME002, time of application, CO020
potassium, management, ME002
urea, rate of application, ME002
Tobacco
ammonium nitrate, rate of application, KY006, MD005
ammonium polyphosphate, method of application, FL084
ammonium sulfate, rate of application, MD005
calcium chloride, rate of application, MD005
calcium nitrate, rate of application, KY006, MD005
chlorine, rate of application, KY006
fertilizer, rate of application, SC022, SC023, TN020
fluid application, fertilizer, GA043
lime, rate of application, NC027, PR014, TN004, response, KY006, NC027, tropical soil, PR014
manganese, placement, NC022
method of application, fluid application, GA043, sodium phosphate, FL084
molybdenum, response, KY006
nitrogen, placement, NC022, rate of application, FL076, GA044, KY004, MD004, TN004
no-till, nitrogen, KY004, phosphorus, VA007, potassium, VA007
phosphorus, fluid application, NC023, no-till, VA007, rate of application, GA044, MD005, OH002, TN004, time of application, NC023
plant analysis, nicotine content, KY004, nitrogen, MD004
potassium, fluid application, NC023, management, GA036, placement, NC022, rate of application, GA044, MD005, OH002, TN004, time of application, NC023
quality, lime, NC027
sulfate, response, KY006
urea, fluid application, NC023, rate of application, GA036, KY006, time of application, NC023
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Triticale
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IBDU, bermudagrass, FL010, HI013, bluegrass, NE017, ground cover, NE017
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Tween 80, foliar application, soybean, AR037
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Uramite
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Urban Tree
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Urea
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granular, corn, MD008, MD009, MD001
grass tetany, bromegrass, KS073
irrigation, bermudagrass, FL010, trickle, NA035
large pellet, corn, MD001, wheat, MD001
method of application, corn, DE004, MD009, NE010, PA011, fir, WA002, hemlock, WA002, potato, CT002, rice, TX008, soybean, TX008, wheat, CO010
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prilled, corn, MD008
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response, bentgrass, PA007, WA021, fir, CA004, soybean, IL008, sunflower, ND007
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Urea Formaldehyde
container-grown ornamental, barberry, SC014, boxwood, SC014, holly, SC014, juniper, SC014
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rate of application, alfalfa, ND033, barberry, SC014, bentgrass, AZ011, MI007, bermudagrass, FL010, HI013, LA002, bluegrass, MI007, NE017, boxwood, SC014, bromegrass, ND033, camellia, FL040, choke cherry, ND030, container-grown plant, SC014, ground cover, NE017, holly, SC014, juniper, SC014, rhododendron, FL040, silverberry, ND030, snowberry, ND030, turf, HI013, NE017, PA008, SC008, yew, FL040
response, bentgrass, MI007, PA007, bluegrass, MI007, PA007, choke cherry, ND030
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Urea-Ammonium Nitrate
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rate of application, wheat, NE030
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Urea-Ammonium Nitrate Solution
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MD009, wheat, KS030
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Urea-Ammonium Phosphate
method of application, small grain, KS015, wheat, OK016
rate of application, bermudagrass, SC004, blueberry, WA023, corn, CO016, SC004, cotton, SC004, cranberry, WA023, fescue, SC004, rice, CA029, small grain, SC004, sugar beet, CO016
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Urea-Ammonium Polyphosphate, irrigation, corn, KS028, method of application, corn, KS028, placement, wheat, KS029, rate of application, corn, KS028, wheat, KS029
Urea-Ammonium Sulfate
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Ureaform
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Urea-Ke-Min, rate of application, peach, CO017
Urea-Phosphate, rate of application, potato, ME007, small grain, MT017
Urea-Polyphosphate, foliar application, soybean, LA026
Urease
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cyanuric acid, container-grown crop, CA012
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irrigation, seedling vigor, HI012
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soil test correlation, nitrogen, NC028, phosphorus, NC028
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Vetch
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Viburnum
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Virgin Islands, fertilization, forage, VI002
Virginia Pine
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Walnut
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Waste
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Watermelon
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Wheat
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broiler litter, rate of application, MD007
calcium, response, OR029
chip-sulfur, rate of application, ID006
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concentrated superphosphate, placement, SD001, rate of application, SD001
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diammonium phosphate, placement, KS029, rate of application, KS029
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lime, method of application, NE008, organic soil, NC020, placement, OR025, rate of application, IA043, NE008, OR020, PA019, root properties, OR020, OR022, soil test correlation, IA043, MO018, OR014, TX010
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magnesium EDTA, placement, KS033
magnesium sulfate, placement, KS033
manganese, uptake, OR024
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monoammonium phosphate, placement, KS029
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Wheatgrass
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White Ash
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White Clover
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White Potato, sulfur, rate of application, VA005
White Wheat
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Wild Rice
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Wild Yam
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magnesium, rate of application, PR001
nitrogen, rate of application, PR001
phosphorus, rate of application, PR001
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Yew
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