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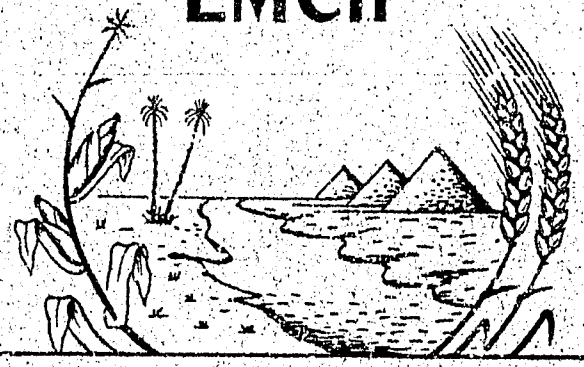

المشروع المصرى لتحسين محاصيل الحبوب الرئيسية

EGYPTIAN MAJOR CEREALS IMPROVEMENT PROJECT

RESEARCH - EXTENSION

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TDY REPORT

MAIZE, SORGHUM & CENTER DEVELOPMENT PROGRAMS BY DR. FINKNER

COMMENTS ON THE EGYPTIAN SOYBEAN RESEARCH PROG. BY DR. HARTWIG

EMCIP Publication No. 51

by

Consortium for International Development

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TDY Report

"MAIZE, SORGHUM AND CENTER DEVELOPMENT PROGRAMS"

by

Ralph E. Finkner

EMCIP Publication No.

Dr. Finkner is a Professor of Agronomy and Superintendent, Plains Branch Station, New Mexico State University, Clovis, New Mexico.

Acknowledgements

The author wishes to gratefully acknowledge the generous help and courteous consideration extended to him and his wife during their short tour of duty in Egypt. A special thanks goes to Dr. Shehata for requesting my services. I hope that my suggestions and discussions will have some meaningful value to him and his staff. Thanks also goes to Drs. Sidky and Ismail of the maize section and Drs. Fayed and Bashir of the sorghum section who traveled with us to several of the R/E centers.

We wish to express our appreciation to Dr. Boyce Williams for his guidance while stationed here. We also thank the entire staff for their helpfulness and several of the professional staff for their most candid opinions on various phases of the research program.

We greatly appreciated Tewfik Yanni for his efficient assistance throughout our stay.

Finally, we must mention the excellent performance of all the drivers who work on the EMCIP staff. They were always on time, courteous, helpful and extremely pleasant. It was a joy to travel with them.

MAIZE, SORGHUM AND CENTER DEVELOPMENT PROGRAMS

by

Ralph E. Finkner

Professor of Agronomy and Superintendent

Sorghum Program

Sorghum is the fourth most important cereal produced in Egypt. It is an important source of food, feed (grain, fodder and stover), and industrial raw material. Statistics show that sorghum grain yields per unit of area in Egypt are among the highest of any nation in the world. These statistics, however, need to be digested with caution as all of Egypt's sorghum production is under irrigated conditions.

Grain sorghum was included in the Egyptian Major Cereals Improvement Project. This project was initiated to address problem areas, which limited grain production in maize, wheat, sorghum and barley. EMCIP was to address these problems and to organize an effective research-extension team to disperse new technology and material to the farmers to effect a 25 percent yield increase in the eight governorates served by the project.

The major sorghum production areas are in middle and upper Egypt. The majority of the research work is conducted at the Shandaweel Station with additional investigation carried out at Nubaria and Giza.

During my TDY assignment, I was asked to review the sorghum research project and make recommendations. My general observation is that the breeding, testing and seed increase programs are satisfactory to good. The newly released open-pollinated variety, Giza 15, appears to be an excellent choice for all farmers who wish to grow a tall variety. In visiting with several professionals, I could not get a completely clear picture as to the future status of tall sorghum varieties. The breeding and improvement program of the future depends, to a great extent, on how we view the future needs of the Egyptian sorghum producers.

In my opinion, as I look at the hazy crystal ball, I see tall varieties giving way to intermediate tall hybrids. As a general rule, tall plants yield more than short plants and this has been verified by many researchers

and is well documented in the literature. However, intermediate or 2-dwarf hybrids planted at a denser population may well yield as much grain as tall varieties. (This needs to be verified by research.) The shorter hybrids planted at the higher population will have finer stems and more leaves per unit area and, therefore, will be much more valuable for animal feed than the tall varieties.

Perhaps a research economic study and a survey of the farmers' needs and preferences for sorghum types (tall vs intermediate) would help clarify this picture. Dr. Deuson indicated to me that he would be willing to undertake such a study.

As I see the overall picture, I would make the following suggestions. I believe Giza 15 is an excellent tall sorghum variety and that it will serve the growers well for the next five to eight years. The breeding program also has several new selections that may be even better but this has not yet been verified by replicated tests over years and locations. It would seem to me that, in the future, less effort and resources should be spent in the tall sorghum improvement program and more resources channeled to develop intermediate tall hybrids. The tall sorghum program should be reduced in total effort to 20 percent and decreased yearly until it is nearly phased out. Some of the effort exerted should be for identifying R-lines (pollen restorers) which could be used in a hybrid program.

The intermediate tall sorghum program should be increased in scope and intensity. Selection should be applied for both long-large heads and compact-club types. The long-large, somewhat lax, head type may be slightly more bird resistant than the compact head. I believe 50 percent of the available resources should be applied to this program.

This program should be designed so that 20 to 25 percent of the time will be used to develop A- and B-lines (cytoplasmic male steriles and sterile maintainer lines). Another 5 to 10 percent should be spent in R-line (pollen restorer) development. The remainder of the time should be spent in population and variety development. Such a program has as its final goal the production of hybrid seed. Male sterile lines (A-Lines) developed from this program could be crossed with tall lines that would produce tall hybrids and crossed with intermediate or short R-lines to produce intermediate tall hybrids.

The remainder of the time (30 percent) should be devoted to the development of short (3-dwarf) lines and hybrids. At least 15 percent of this time should be spent in A- and B-line development and at least five percent in R-line development at the 3-dwarf level types. Good 3-dwarf A-lines can be crossed with intermediate (2-dwarf types) or tall to obtain intermediate or tall hybrids and 3-dwarf R-lines to obtain combined height hybrids.

Most plant breeding programs look for various techniques to speed up their programs by producing two or three generations a year. Species that are photosensitive and thermal sensitive are produced in greenhouses under artificial lights or in other locations where these environmental conditions are favorable for floral induction. It seems to me that Egypt has an excellent climate for producing two generations of sorghum per year. Therefore, I would recommend that 20 of the best lines of sorghum be selected in the fall at Shandaweel. Each line should be selected with a definite purpose in mind. Sufficient seed (100-200 kernels) of each line should be harvested, threshed and shipped to Giza for planting. A 20 meter long row should be planted of each line and the plants spaced 20-25 centimeters apart within the row. The short days (long nights) will tend to shorten the height of the plants and speed up flowering. This should be ideal for hand emasculation and crossing. Insect control should be carried out weekly by spraying the plants with a relatively safe insecticide like the new pyrethrum (Warning: read and follow label instructions). The crossing block should be sprayed every week regardless of the insect population.

Obtained F_1 seed should be sent to an F_1 nursery at Shandaweel to produce F_2 seed. Under good growing conditions, one healthy F_1 plant should produce 500 to 1000 F_2 seeds which is probably more than the plant breeder can adequately evaluate. If backcrosses are needed, some F_2 seeds could be returned to Giza the following fall and again entered in the crossing program.

The on-the-farm trials and demonstration plots are good and very helpful information should be forthcoming. The leaf disease nursery at Nubaria also was working very well and good selections and data should be available from these tests.

In general, the sorghum breeding program is progressing very well. However, I believe the sorghum breeders are well educated, well trained, and the time is right to move into more sophisticated techniques of producing hybrids.

The yield increases from heterotic effects of hybrid maize and sorghum are well documented throughout the world.

Once a good variety or hybrid has been produced, many problems can arise in maintaining the purity of these cultivars during seed increases. This is one area that needs constant attention. Breeder's and foundation seed fields must be continually rogued before pollination and great care needs to be taken during harvesting, threshing and cleaning procedures. The plant breeder should take a special interest in the production of breeder's and foundation seed. He should inspect these fields several times before pollination and the uniformity and purity should meet his approval. Winter "grow-outs" of selected seed samples would be another check as to the uniformity and purity of the seed produced during the summer. The plant breeders and seed producers should take pride in producing the best varieties that are available.

Maize Program

Maize is the major summer cereal crop produced in Egypt and is grown throughout the country. The Delta is the major producing area where approximately 75 percent of the 2 million feddans of maize are planted.

Many of the maize trials were harvested when I arrived the last week in September. However, I visited research maize programs at R/E centers at Sids, Mallawi, Shandaweel, Sakha and Gemmeiza and several on-farm tests. I visited with several maize breeders and observed some of the harvest at Sakha.

Egypt is fortunate that it has a group of well trained, competent scientists and knowledgeable administrators on the EMCIP programs. The maize section has many of these people and they are conducting a good maize improvement program. It is well documented that late wilt caused by Cehpalosporium maydis is currently the most serious disease of maize in Egypt. Top priority has been given to developing composites and inbred lines that are resistant to this disease. I certainly concur with this approach and, hopefully, better and quicker methods can be developed to test plant resistance to late wilt. I observed a diallel test-cross trial between resistant, intermediate and susceptible lines. It was not possible to determine the mode of inheritance for resistance or susceptibility to

this disease from this field observation. However, several crosses of resistant x resistant and resistant x intermediate showed good resistance to this disease.

The population improvement program, using late wilt disease nursery selections and S_1 progeny trials, appears to be a sound approach. The variety Giza 2 certainly appears to be a suitable and productive variety for the Egyptian farmer for the next several years. Double cross 201 and a production field of double cross 202 were observed and appeared as good or better than Giza 2. However, the most outstanding material observed were single crosses A-8, A-9 and A-10. Single cross A-9 was observed in a demonstration plot north of Mallawi. It was outstanding in uniformity, stand, and overall appearance. In the yield test at Sakha, single cross A-8 and A-10 had excellent ears.

I believe the time has come to put more resources and time into developing hybrid maize for Egypt. Population improvement and composite breeding is just one step toward hybrid development. Yield increases by the use of the heterotic effects of hybrids is well documented for maize in many countries. Although Egypt has many microclimates, compared to many countries, it has a rather uniform environment. With the development of highly resistant late wilt lines, stable, high yielding hybrids appear to have a high probability of success.

At Sakha, I saw several experiments that will show excess variability in the statistical analysis because of soil problems. If computers are available, I would highly recommend that the researchers design their experiments utilizing some type of lattice design. These designs are helpful when trouble spots occur in that the yields can be adjusted to allow for the variations.

In most breeding programs, the researchers try to speed up generations by using greenhouses and/or winter nurseries. The climate in Egypt is such that two breeding nurseries per year is certainly feasible and should be encouraged. The more generations the breeders can evaluate, the greater is the probability for success.

I visited the Pioneer fall crossing nursery and was certainly impressed with their work and the overall farm appearance (very few weeds and excellent

plant growth). It seems to me the time is right to encourage international seed companies to develop and sell their seeds to the Egyptian farmer. Reliable seed companies and ARC scientists should cooperate and develop a good working rapport. In such a cooperative atmosphere, everyone profits, especially the producers and consumers. I agree that material should be thoroughly tested before it is allowed to be sold (the present three year testing program is adequate). However, reliable international seed companies should be given all the scientific and political help and cooperation possible. The program as outlined on pages 37 to 39 of the, "PLAN OF WORK," EMCIP publication No. 36 is an excellent approach for working with seed companies.

I visited several on-farm trials and demonstration plots of maize. The tests I reviewed were generally well cared for and should produce valuable information. I was told that the test involving minimum tillage and plant density was requested by the producer. This is an excellent example of the researchers listening to the producer and trying to solve his problems.

Research/Extension Center Development

Dr. Shehata requested that I observe the various R/E Centers and give my opinion as to their fundamental development. I have several suggestions for his consideration:

1. Give the EMCIP Center Director more flexibility to make decisions. Communications between Giza and the various centers are sometimes difficult and often delays occur because of the lack of quick communications. Therefore. I would suggest that the amount of money the EMCIP Center Director can spend without Giza approval be raised considerably.

2. If the research and extension centers are going to be truly centers of information for two to four governorates, the facilities need to be upgraded. Each center needs a conference room where all the extension agents, researchers and administrators can have meetings, seminars and training sessions. I believe the conference rooms should be part of an overall guesthouse complex. These guesthouses should be large enough to house the off-center personnel when two or three day training sessions are conducted.

I visualize these centers as being somewhat autonomous, each serving the clientele of their area. However, many of the technical programs will have to be cooperative ventures between centers, under the guidance of the Giza headquarters.

I would also suggest that new housing (flats) be constructed on these sites. These centers should have good housing facilities so that personnel will be proud to be stationed on a center. With good facilities and an excellent staff of research and extension personnel to serve the producers of the area, these centers could become the pride and knowledge source of each area.

3. The EMCIP centers are new "per se" and much planning has gone into the development of the research land (leveling, irrigation systems, etc.). On certain centers, poor soil conditions still exist. These areas have been mapped so they can be excluded from research plots. After the land has been leveled and irrigation and drainage systems installed, a great amount of attention should be given to total full-season weed control. End of season nonweed control may not greatly affect the results of the presently grown crop but if allowed to go to seed, the effect on the following crop can be disastrous.

4. The EMCIP Center's Directors need to be convinced and then they should encourage all researchers to mechanize their research plots as fully as possible. The time is right to mechanize the planting and harvesting of most research tests. Some additional machinery will be needed but much can be accomplished with what is available. It may take some time to convince researchers that the results obtained mechanically are as accurate as those taken by hand. Research tests need to be designed to test the validity of hand research results vs mechanical research results.

5. I would also suggest that EMCIP give consideration to repairing (new fixtures, plumbing and wiring), painting, and updating all labs at the R/E Centers. These repairs are badly needed, and a new look would help the morale of all personnel on the station until new facilities are available.

6. The road to Gemmeiza (last few kilometers) should be graded and maintained to a better degree than it has been.

The recommendations presented herein are based purely on my professional knowledge and experiences. The suggestions made are in no way intended to criticize or otherwise cast any doubt on the abilities of others. I trust that some of the suggestions will find some degree of acceptance, however, they are certainly open for scrutiny, criticism and discussion as any other critique.

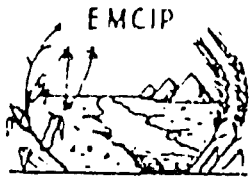
Dr. Shehata asked that I submit some names of professional maize and sorghum TDY researchers that I thought might give meaningful assistance to the research program. Most of the men I have listed have good research programs and probably will not want to leave for over three to six weeks at a time:

	Crop	Specialty
1. Dr. L. L. Darrah Dept. of Agronomy University of Missouri Columbia, MO 65211 Phone: 314-882-2801	White Maize	General Breeding
2. Dr. S. A. Eberhart Funk Seed International, Inc. Box 2911 Bloomington, IL 61701 Phone: 309-828-8211	Maize and Sorghum	Population Improvement
3. Dr. C. O. Gardner University of Nebraska Kein Hall Lincoln, NE 68583 Phone: 402-472-1555	Maize and Sorghum	Population Improvement
4. Dr. Frank Loeffel North American Plant Breeders Brookston, IN 47923 Phone: 317-563-3111	Maize	General Breeding
5. Dr. M. S. Zuber Dept. of Agronomy University of Missouri Columbia, MO 65211 Phone: 314-882-2801	Maize	Stalk Quality
6. Dr. L. R. House International Crop Research Institute for Semi-Arid Tropics ICRISAT Patancheru P.O. Andhra Pradesh 502 324, India	Sorghum	General Breeding
7. Dr. P. T. Nordquist Agricultural Experiment Station Box 429 North Platte, NE 69101 Phone: 308-532-3611	Sorghum	General Breeding
8. Dr. O. T. Rosenow Texas A&M Research and Extension Center RFD #3 Lubbock, TX 79401 Phone: 806-746-6101	Sorghum	General Breeding

9.	Dr. Orrin J. Webster Dept. of Plant Science College of Agriculture, Bldg 36 University of Arizona Tucson, AZ 85721 Phone: 602-626-1945	Sorghum	General Breeding
10.	Dr. D. E. Weibel Agronomy Dept. Oklahoma State University Stillwater, OK 74078 Phone: 405-624-6425	Sorghum	General Breeding
11.	Dr. Greg Hinze c/o Kelley Bean Co. Box 83 Scottsbluff, NE 69361 Phone: 308-247-2101	Sorghum and Beans	General Breeding and Agronomy

If in the future I can be of any meaningful assistance, I would be pleased to return for three to six weeks at a time. The best time periods for me would be in June-July, October-November, and perhaps February-March.

If I can be of any assistance in contacting any of the above listed scientists or other persons, please feel free to call on me.



المشروع المصري لتحسين محاصيل الحبوب الرئيسية

EGYPTIAN MAJOR CEREALS IMPROVEMENT PROJECT

MEMORANDUM

Date : October 19, 1982.

TO : All EMCIP Staff

FROM : Dr. Finkner, TDY

SUBJECT : Seminar on Plant Breeding.

I will present a seminar on:

(1) Breeding Sorghum

(2) Breeding Aphid Resistance in Wheat.

I plan to show you slides from the Clovis Research Station in New Mexico to illustrate the Breeding Programs.

Place: EMCIP Library

Day and Time: Saturday, October 23, 1982 At 10:00 AM

All are welcome to attend the seminar.

RD/mi.

EMCIP

المشروع المصرى لتحسين محاصيل الحبوب الرئيسية
EGYPTIAN MAJOR CEREALS IMPROVEMENT PROJECT

MEMORANDUM

DATE : اكتوبر ١٩٨٢/١٩

TO : الى كل العاملين بالمشروع

FROM : د/ فينكلر

SUBJECT : ندوة عن الانتاج الزراعى

سأقدم ندوة عن

١- انتاج الذرة

٢- مقاومة الحشرات لانتاج القمح وجارى التخطيط لعمل لكم عرض فى برامج الانتاج

المكان : مكتبة المشروع

اليوم والساعة : السبت ٢٣ اكتوبر سنة ١٩٨٢ فى تمام الساعة العاشرة صباحا

ونرحب بالجميع لحضور الندوة

القاهرة فى ٨٢/١٠/١٩ م غ

Comments on the Egyptian Soybean Research Program

Edgar E. Hartwig

TDY - Technical Report

September, 1982

Introduction

Dr. Edgar E. Hartwig visited Egypt from August 31 through September 11, 1982. During his stay he visited the Sids, Bahteem, Sakha, Nubaria, and Giza research stations to observe the soybean field experiments at these sites. In the following text Dr. Hartwig presents his observations and suggestions for improving the current soybean program in Egypt.

COMMENTS ON THE EGYPTIAN SOYBEAN RESEARCH PROGRAM

Soybeans are a legume and as such will produce their own nitrogen if proper strains of Rhizobium are present in the soil to permit nodules to develop. I do not consider it possible to have an efficient soybean production program based upon a nitrogen fertilization program. Neither do I have full confidence in research results from plots in which nitrogen was provided and no nodules were present. Limited studies conducted in Egypt show yields at least 50% higher from well nodulated plots than from uninoculated plots which received 216 kg N/ha. Adding additional N to the nodulated plots showed no yield response. Adding N is a needless expense. In fact, well nodulated soybeans grown without N fertilizer application in other parts of the world leave a residual of approximately 35 kg N/ha for a succeeding grain crop.

In the varietal evalutation and cultural studies which I saw at several research stations, all N fertilizer had been added early in the season. Thus, results obtained will always be biased to favor short season varieties, and possibly also higher density plant populations.

It has been adequately demonstrated that good nodulation can be established when high quality inoculum imported from the U.S. is used. Therefore I strongly urge that for all future research studies soybean inoculum be imported and properly applied. Any plots not well nodulated should be destroyed unless non-nodulation was a part of the experiment.

The farmer should also be encouraged to grow nodulated soybean. If high quality inoculum cannot be produced locally in sufficient quantities, an attempt should be made to establish Rhizobium japonicum in a portion of the field so he may use soil from this area to inoculate other fields. The rhizobia will live in the soil for many years. Therefore the care taken the first year of planting is very important.

I encourage making a strong effort to get a portion of each research farm infested with effective strains of Rhizobium japonicum. However, once this is accomplished, plantings may be made without requiring inoculation with Rhizobium.

Soybeans are a summer crop. They should fit in well with a wheat production program. Each crop can fully utilize the land during a season not needed by the other. Furthermore, a well nodulated soybean crop leaves a supply of nitrogen which can be utilized by the wheat crop.

A minimum tillage program should be possible with a wheat/soybean rotation. I suggest that a minimum of 2 ha. be assigned at the major research farms to study such a program over a 5 year period. Three soybean maturity groups are suggested which might inculde "Crawford" (Group IV), "Forrest" (Group V) and an insect resistant selection of Group VII.

The varietal testing program primarily includes varieties adapted to more northern latitudes of the U.S. Many of these evaluation plots are planted in April. On the basis of my observations in the U.S., maize could better utilize this land, and soybeans could make better utilization of land than maize following wheat when planted in late May or early June.

I see no need for evaluating varieties of Group II or earlier maturity in May or June plantings. Neither do I see a need for evaluating varieties of Group V or later maturity in April plantings. Most Egyptian farmers' fields and in all research plots there was 40 to 60 cm inter-row spacing. With nodulation established, I suggest including a 90 cm row treatment for later maturity varieties. If there is no yield difference between 90 and 60 cm row treatments then the wider row spacing may be recommended which will reduce labor costs during field preparation.

The very early varieties may have a possible use in February or March plantings using high plant populations if land is available for planting at that time. These could be followed by a later maturity variety as a summer crop, or some other summer crop such as sorghum-sudan.

No need is seen for the very late varieties (maturity Groups VIII, IX, or X) unless a system for July or early August plantings is possible with certain rotations in the extreme south.

We find that early maturity varieties (maturity Groups III and IV) grown at this latitude produce seed of poorer quality then later maturity varieties. As a part of the variety evaluation program I suggest checking germination after harvest and also May 10 and June 10 the following year before planting. Perhaps germination tests could be conducted with and without a fungicide. Weed development within plots of varieties should be observed. Late maturity varieties give better

shading of the ground and better suppression of weeds. In a wheat/soybean system it may be necessary to till the soil prior to wheat planting if the soybean crop is harvested in early September, but tillage may not be necessary when a later maturity variety is grown. Thus a late maturity variety could have an economic advantage even if it was no higher in seed yield.

I favor making all plantings at a rate to give the deserved stand. Planting thickly and thinning after emergence can often adversely influence the growth of a variety. The variety giving good emergence can give etiolated seedlings if thinning is delayed only a few days. Pulling plants also disturbs roots of remaining plants.

Past affiliation with two PL-480 projects in Egypt revealed no diseases or virus problems of major importance. Feeding by the cotton leaf worm is reported to be serious for varieties which mature in late September or October. Breeding lines selected for resistance to foliar feeding insects in the U.S. were observed in Egypt in a planting made in 1979. Differences among the lines tested was dramatic. The very susceptible varieties were defoliated in excess of 80% while some breeding lines had less than 20% defoliation. Additional, more advanced breeding lines were sent for a planting this year. However no insect feeding has developed in the area. Furthermore the plants were not nodulated and reliable results could not be expected.

In our studies with insect-resistant soybean lines in the U.S., insects feeding on the resistant lines develop at a slower rate and had a higher mortality rate. The slowly developing larvae would be more vulnerable to disease or predator attack. I am confident that high-yielding soybean varieties resistant to the cotton leaf worm are possible to identify. Studies in the U.S. have shown that as much as 35% of the leaf area may be eaten by insects in a healthy soybean stand with no economic yield loss (yield level 3 t/ha).

At the Sids reseach station, 3 applications of an insecticide and 2 of a miticide had been made even though no economic damage from either mites or insects was apparent in an adjacent unsprayed area.

Where insect feeding is a problem and may be a variable among varieties being evaluated, I suggest allowing insects to cause about 50%

defoliation on the most susceptible variety before applying an insecticide. In this way the varietal selection process will be biased towards selection of insect-resistant varieties.

Seed of 3 commercial varieties and 9 breeding lines selected for resistance to foliar feeding insects were supplied for planting in 1982. I suggest planting these in relocated trials at 3 or more locations in 1983. I urge that no insecticide be applied to this material. If possible, I would like to have estimates of percent defoliation made at regular intervals through the season, beginning when "Forrest" or "Bragg" showed about 40% defoliation. An additional planting may be made for seed increase to permit observational feedings at key locations using larger plots in later years. If a location is identified where consistent insect feeding is obtained, it may be possible to furnish additional lines for screening.

A stem borer has been observed, this insect should be observed further particularly with respect to its identification, host range, and breeding habits. No attempt at control appears necessary at the present time.

Damage by cotton leaf worm has been given as a reason why late season soybeans could not be grown. Therefore every effort possible should be given to observing the effectiveness of the insect-resistant soybean lines.

Research plot techniques should be modified to give a more accurate yield comparison with respect to those obtained in farmers' fields. When the total length of all rows within each reseach plot is harvested, seed yields are inflated. I suggest triming the 3 center rows to an equal length for estimating seed yield, thus eliminating border effects. I suggest removing 40-50 cm from the end of the 3 center rows immediately prior to harvest thus reducing border effects.

I prefer limiting the number of varieties in any given test and also the range in maturity. I realize that a few tests must be conducted which include the entire maturity range previously given. I see no need for evaluating varieties earlier in maturity then "Clark". I would include varieties of IV and V maturity in one test and varieties of VI and VII maturity in a separate test. In the early group I would include

the following:

1. Clark	4. Desoto	7. Hill	10. D65-3168 (at Giza)
2. Columbus	5. Delmar	8. Essex	11. D67-5679 (hard seed)
3. Crawford	6. Union	9. Forrest	12. D75-12035

Three breeding lines D54-354, D65-2262, and D66-556 are of IV maturity which were selected for improved seed quality may also merit testing. Only a small quantity of seed could be provided. For VI and VII maturity I suggest:

1. Tracy-M	5. Bragg
2. Centennial	6. Broiter
3. Gail	7. Wright
4. D79-10158	8. Jackson

"Jackson" is suggested since it is reported to have resistance to spider mite. In 1983 some insect resistant lines might be added.

For planting at 26 or 27° latitude, the varieties "Cobb", "Hardee", and "Foster" could be added. If plantings at the far South were to be made in late July or August other material could be provided.

If material were to be evaluated for forage, I would suggest using "Bragg" as a check and include the insect resistant lines. I could provide a limited amount of old forage varieties. However these lodged easily and thus lost more leaves. Stem size can be reduced by planting more thickly in the row.

We could provide a small quantity of seed of near-isogenic lines differing in seed size (9, 14, or 22 gr/100 seed) for studies to observe effects of seed size upon seedling emergence. Seed would have to be increased for 1983 studies. We could provide seed of some small seeded lines that are in test this year for making a larger planting. For 1984 planting, I should be able to provide seed of some closely selected lines varying in 100 seed wt. from 8 to 15 g/100 seed.

We will have additional insect resistant lines available for evaluation in 1984 that will be earlier in maturity than most of the lines provided in 1982. Most of these will be later in maturity then Forrest.

At Nubaria there appeared to be a considerable area not utilized for summer crops. As seed is increased of the insect resistant lines, perhaps larger plantings could be observed. I believe growing of soybeans would improve the physical condition of those soils.

Soybeans can be an important crop in Egypt and provide needed protein and oil. However, to be grown successfully they must be well nodulated to meet their nitrogen requirement without the use of N-fertilizer. On the basis of observations on a previous visit, I believe the problem of feeding by the cotton leaf worm can be eliminated through the use of resistant varieties. I believe seed quality will be improved by making plantings later in the season and use of later maturity varieties. I also believe that the efficiency of wheat production can be improved by planting after a soybean crop.

EMCIP PUBLICATIONS

PUBLICATION TITLE	PUBLICATION No.
- Quarterly Report (Jan. 1 through March 30, 1980)	1
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