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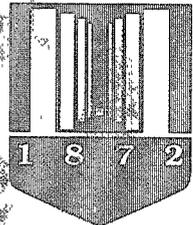
Protecting Food and Environment

Pest and Pesticide Management in Ukraine

USAID Grant # 003-G-00-5126-00

THE OFFICE OF INTERNATIONAL RESEARCH
AND DEVELOPMENT (OIRD) at

Virginia



Tech

VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

Pest and Pesticide Management Project (PPMP) in Ukraine
USAID Grant # 0003-G-00-5125-00

Our Partners from the United States
Ohio State University
Pennsylvania State University
Purdue University
New Mexico State University
and
U.S. Environmental Protection Agency

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Overview

The Office of International Research and Development (OIRD) at Virginia Tech implemented the Pest and Pesticide Management Project (PPMP) as part of USAID's Environmental Protection Program in Ukraine.

PRIMARY GOAL:

To demonstrate and transfer appropriate pest and pesticide management techniques and regulatory approaches that are in practice in the USA, Europe and other countries.

Pest and Pesticide Management Project (PPMP)
1st October 1995 to 30th September 1999

funded by
USAID Environmental Program for Ukraine
(USAID Grant # 003-G-00-5125-00)
was implemented by
The Office of International Research and Development
(OIRD) at Virginia Tech, USA

in partnership with:

In USA

U.S. Environmental Protection Agency (EPA)
Ohio State University
Pennsylvania State University
Purdue University
USDA/New Mexico State University

In Ukraine

State Commission on Testing and Registration of
Plant Protection Products
Growth Regulators and Fertilizers
Central State Station for Soil Fertility and Plant Protection
L'viv Plant Protection Station
Odessa Plant Protection Station
Ukrainian Crop Protection Association (UCPA)
Ukrainian Academy of Agrarian Sciences (UAAS)
Grain Growing Institute, Dnipropetrovsk
Institute of Crops and Animal Husbandry of the W. Region
Dnipropetrovsk State Agricultural University
L'viv State Agricultural Institute
Odessa State Agricultural Institute

Goal

To improve farm worker safety, food quality, and environmental health in Ukraine through:

(1) increased ability to appropriately transport, store, and use pesticides, and

(2) ability to adapt alternative pest control strategies that reduce the rate of pesticide use leading to savings and greater economic efficiency per unit agricultural input.

Specific Project Objectives

1. Training programs for trainers and other local stakeholders
2. Creation of Ukrainian Crop Protection Association (UCPA).
3. Applied research in Ukraine through institutional collaboration with USA and Ukraine based institutions.

Highlights

Timeline and Synopsis of Virginia Tech's Accomplishments in the PPMP program in Ukraine

- December 1995** • Pest and Pesticide Management Office established in Kyiv.
 - Kick-off ceremony to initiate the PPMP project in Ukraine.
 - Three oblasts selected to initiate the PPMP project, based on criteria determined by USAID, Virginia Tech and other collaborating institutions.
- February - March 1996** • Collaborative institutions identified and competent oblast coordinators hired for the project.
- June 1996** • Three-week U.S. study tour and training of trainer program completed.
- July 1996** • Three participatory appraisals to diagnose farmers' information needs conducted.
- November 1996** • Pesticide Safety and Integrated Pest Management training programs for each oblast developed and finalized.
 - Virginia Tech's core training manual "Applying Pesticide Correctly" translated to Ukrainian.
- December 1996 - March 1997** • 15 five-day training workshops for private farmers, agricultural specialists, and officials organized in three oblasts.
- March 1997 - December 1999** • 6 collaborative research projects involving 8 U.S. and 13 Ukrainian scientists were shortlisted, conducted and completed.
- November 1997** • Ukrainian Crop Protection Association, UCPA established (membership rose from 22 to 52 by 1999).
- By December 1999** • 3 books, 5 journal articles, 11 research reports, 11 extension documents published.
 - Five reprints of the Ukrainian version of Virginia Tech's "Applying Pesticide Correctly" manual published.

Strengths of Oblast (or state) program:

1. Initiated collaboration between farmers, local service agencies, agricultural research institutions and agricultural universities within and between oblasts and their U.S. counterparts.
2. Trained local trainers.
3. Developed locally applicable research programs.

Additional Impacts

- PPMP-initiated training activities are continuing with local initiative and funding.
 - One NGO-based training program trained over 700 people through 17 training courses.
 - The L'viv Plant Protection Station trained over 4,000 individuals, and issued 1,169 Pesticide Applicator Certificates.
 - Other trainers work as farmer consultants or provide leadership for training teams sponsored by other donors.
- USAID's PPMP and its training sessions were highly publicized.
 - During the first Dnipropetrovsk training, the US faculty trainers were interviewed by Privat, a local television station.
 - East Central, a television station with network affiliations extending into Russia, shot footage during the morning sessions.
 - A Dnipropetrovsk daily newspaper, *Panorama*, ran a front page article about the training sessions on 23 January 1997.
 - Nationally, the magazine *Propozitsia* published a feature about the follow-on training that PPMP sponsored at the Institute of Occupational Health in Kyiv in late October, 1996.

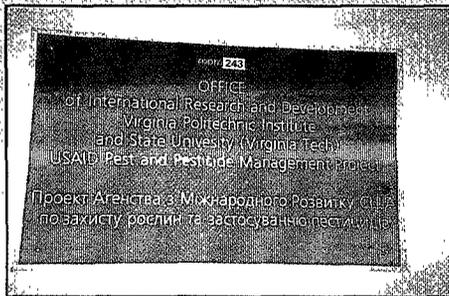
Project Initiation



Inauguration ceremony (from left to right): Dr. S.K. De Datta, OIRD/Virginia Tech, Mr. Harry Walters, USAID, Ms. Lea Swanson, USAID, and Mr. Volodymyr Petrunek, Interdepartmental Commission of Ukraine.

Source: S.K. De Datta, Virginia Tech.

Three Oblasts
Odessa, Dnipropetrovsk, and L'viv were selected for PPMP training centers based on a survey of stake-holders and in consultation with USAID.



By 1996 the Kyiv-based National PPMP Office of Virginia Tech was fully operational.

December 6th 1995, PPMP formally started through a kick-off ceremony in Kyiv.

Inauguration was attended by among others: Dr. S.K. De Datta (Principal Investigator of PPMP and Director of OIRD/Virginia Tech), Ms. Lea Swanson and Mr. Harry Walters (USAID), Dr. Volodymyr Petrunek (Chairman, Inter-departmental Commission), Ms. Emarie Phillips and Ms. Margaret Jones (US EPA), Mr. Ties Van Kempen and Dr. James Holderbaum (CH2M Hill) and several Deputy Ministers of Ukraine.



Virginia Tech's Kyiv-based National PPMP Office
 Source: S.K. De Datta, Virginia Tech.

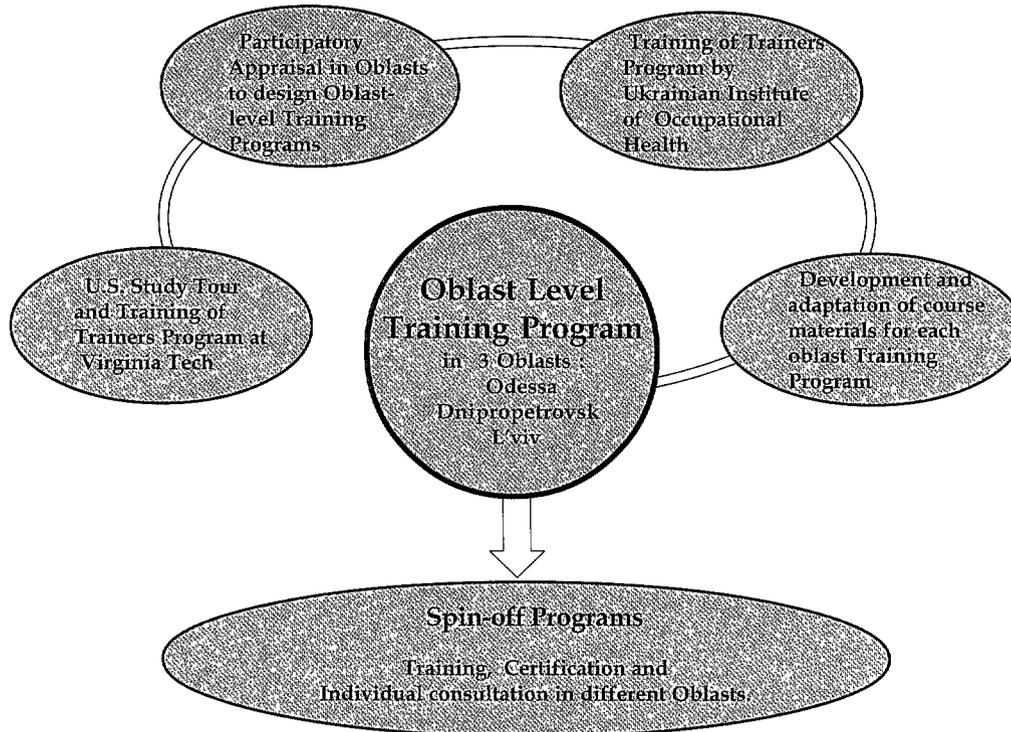
Igor Kopachinsky (back left), National coordinator of PPMP, Svetlana Shmelyova (front left), Katerina Yatsoukh, Olexander Slyusarenko (back), the three oblast coordinators and Volodymyr Loboda (front right), Administrative/Accountant.



Source: MapQuest.com, Inc.

PPMP coordinator and trainer selection process for the 3 selected oblasts was started in Kyiv and was finalized at OIRD/Virginia Tech.

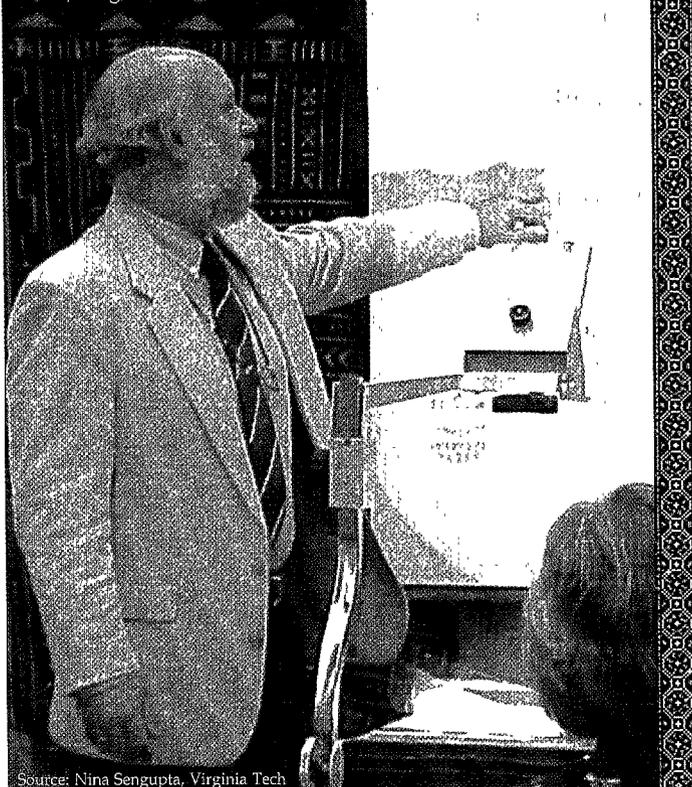
Training Program



MILESTONES IN TRAINING PROGRAM

• Selection of 3 Oblasts	December 1995
• Identification of collaborating institutes.	February 1996
• Oblast coordinators hired	March 1996
• 3-week U.S. Study tour and Training of trainers at Virginia Tech	June 1996
• Participatory appraisal in Dnipropetrovsk and L'viv	July 1996
• Participatory appraisal in Odessa	September 1996
• 10-day training for PPMP trainers on pesticide health	October 1996
• Curriculum and Materials finalized	November 1996
• Translated "Applying Pesticides Correctly"	Nov. to Dec. 1996
• 5 training programs in each of the 3 oblasts(15)	Dec.'96 to Mar.'97

Training program outline presented by Keith Moore, Technical Coordinator, OIRD/Virginia Tech



Source: Nina Sengupta, Virginia Tech

Training of Trainers



TRAINING OF TRAINERS PROGRAM

Trainees:

- 13 trainers and alternates from 3 oblasts
- 2 PPMP oblast coordinators
- 1 national coordinator
- 3 participants from the Environmental Division of Donetsk Oblast.

Topics covered:

By Virginia Tech

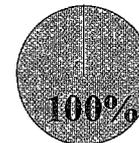
- I) The Land Grant System
- II) Leading issues in Integrated Pest Management
- III) Ukrainian and American Perspectives
- IV) Pesticide Management Issues
- V) Public Sector and Private Sector complementarities

By Ukrainian Institute of Occupational Health

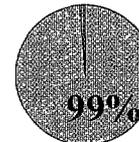
- I) Ecological and Environmental aspects of pesticides
- II) Toxicology of basic pesticide groups
- III) Effects of pesticides on human health
- IV) Legal issues of pesticide use

TRAINERS' EVALUATION

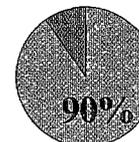
Trainers found the overall Training Workshops to be valuable and appropriate for disseminating information.



Agreed private farmers were the most interested audience



Agreed workshops were most appropriate for those in mid-career



Agreed that the workshops were of appropriate duration.

OTHER TOPICS COVERED IN THE PROGRAM

Pesticide use, storage, disposal, safety issues and regulations, pesticide application, training tools, techniques and materials, integrated pest management and methods, new approaches, participatory approaches to research and extension, organization of agricultural research in the USA, institutional structures of the Land Grant University system which support pest and pesticide management research, teaching and extension, and participatory research and training methods. In addition, there were visits to farms and research stations.

Participatory Appraisal

The success of any training program depends on the extent to which specific needs of the local stakeholders are addressed.

OIRD/Virginia Tech emphasizes the participatory approach in finding and addressing those needs.



Charles Hitts, Keith Moore, Jim Westwood, and Evgeny Lebed, Director, Corn Institute discuss corn weevils through an interpreter in a field in Dnipropetrovsk Oblast as part of the Participatory Appraisal.

Source: Keith Moore, Virginia Tech

The participatory appraisal team in Lviv.



Source: Keith Moore, Virginia Tech

A participatory appraisal team, consisting of both American and Ukrainian experts, interviewed and visited the farm and oblast stakeholders (local agricultural scientists, plant protection officials, agricultural administration officials, farm agronomists and managers) to catalog the training and research needs in each oblast.

Between July and September 1996, a week-long participatory appraisal for pest and pesticide management training needs was conducted in each of the three oblasts by a team consisting of U.S. IPM scientists, USAID representatives, and Ukrainian coordinators and trainers.

Results of participatory appraisal from three oblasts

Three broad topical categories were identified in all 3 oblasts as the areas where PPMP training program should focus:

- 1) Pesticide handling**
Safe and effective transport, storage, application and disposal of pesticides.
- 2) Pest management strategies**
Information gathering and decision making for efficient pest control.
- 3) Economic and financial support**
Market conditions and farm financial resources that influence pesticide usage*.

* This topic was considered beyond the scope of the current project. The other two areas were addressed through the PPMP.

Oblast Training

OBLAST LEVEL TRAINING

Program

15 five-day training seminars
(25 hrs. instructional time)

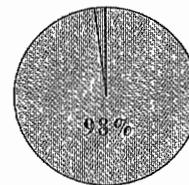
- 1) 9 Seminars: for those advanced in agronomic training, such as farm managers, agronomists, and specialists
- 2) 6 Seminars: for those with less formal background such as pesticide applicators and private farmers.

Topics

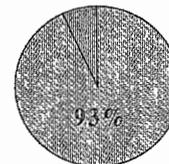
- 1) Integrated Pest Management (IPM) decision-making process, economic thresholds and scouting, identification of diseases, pests and beneficial organisms, and control techniques.
- 2) Pesticide Safety
Pesticide classification, toxicity, personal protection, and environmental protection – especially groundwater

A total of 710
people were trained

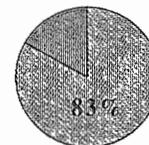
TRAINEES SAID



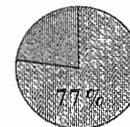
The seminars were good to excellent



instructors were knowledgeable



information was useful



private farmers would use what they learned.

UKRAINE-USA TRAINING PROGRAM COLLABORATORS

14 Ukrainian scientists from agricultural and technical universities/institutes, and professionals from the Plant Protection Service, and 14 U.S. scientists from Purdue, Ohio State, Penn State, and Virginia Tech participated.

The training teams in each oblast were composed of 4-5 Ukrainian and 2 U.S. scientists for each workshop.

Dnipropetrovsk

Coordinator: Svetlana Shmelyova,
Chair, Regional Ecological Knowledge Center
"Green Light" (a non-government organization)

Training in separate sessions were targeted to agronomists and pesticide applicators. Private farmers could be included in either group, but they were mostly included with the second category.

Trainees previously trained by a Dnipropetrovsk Farmers Association training program rated PPMP training much higher in comparison and expressed willingness to even pay for such quality initiatives.

Institutions Involved:

1. Dnipropetrovsk State Agricultural University
2. Grain Growing Institute, Dnipropetrovsk
3. Ohio State University
4. Pennsylvania State University
5. Virginia Tech

Ukrainian Core Trainers for Dnipropetrovsk

- Katerina Maslikova - Lecturer, Agrochemistry and Integrated Pest Management
Dnipropetrovsk State Agricultural University
- Nikolay Kharitonov - Associate Professor, Dnipropetrovsk State Agricultural University
- Yevhen Dudka - Chief, Plant Protection Department, Grain Growing Institute, Dnipropetrovsk
- Nadiya Pinchuk - Plant Protection Specialist, Grain Growing Institute, Dnipropetrovsk

U.S. Counterpart Trainers (pairs working in rotation)

- Sally Miller - Plant Pathology, Ohio State University
- Dan Minnick - IPM Extension Specialist, Consultant to Virginia Tech.
- Kriton Hatzios - Plant Pathology, Plant Physiology and Weed Science, Virginia Tech
- Doug Pfeiffer - Entomology, Virginia Tech
- Win Hock - Entomology, Pennsylvania State University
- Larry Vaughan - IPM Trainer, Virginia Tech



The seminars covered topics such as biological control, resistant varieties, and chemicals.

Win Hock, Nicholai Kharitonov and Katerina Maslikova co-lectured on safety issues. The collaborative effort allowed them to integrate the best of both Ukrainian and American ways of training.

P. A. Machuka gave a presentation on herbicide use and decision-making.

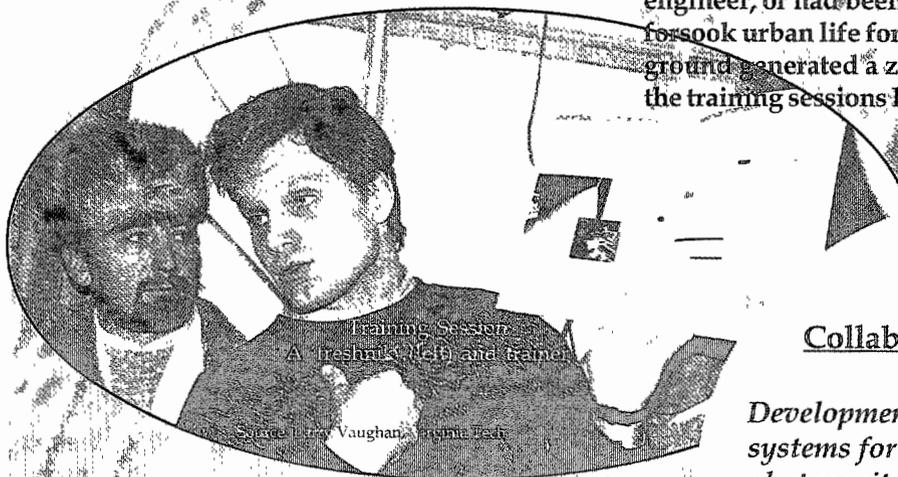
Nickolai Raldugin clearly demonstrated the relation between boom height and evenness of spray using a spray table at the Grain Crop Institute's Experiment Station.



Dnipropetrovsk lecture

Source: Larry Vaughan, Virginia Tech

Farmers came from varied backgrounds. Some had farmed in collective farms, while others were "freshniks" - i.e., they had pursued a completely different profession, like that of a solid fuel rocket engineer, or had been a medical professional who forsook urban life for farming. This mixed background generated a zeal and enthusiasm and made the training sessions lively.



Training Session
A "freshnik" (left) and trainer

Source: Larry Vaughan, Virginia Tech

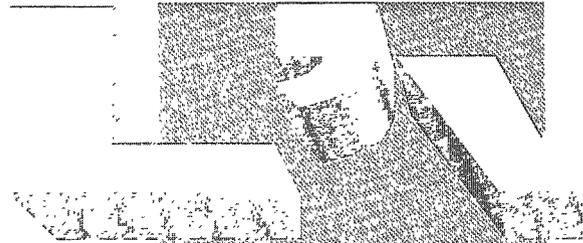
Several presentations emphasized specific thresholds for a variety of insects, weeds, and pathogens. There was also an involved discussion on economic thresholds.

Collaborative Research Projects:

Development of integrated production systems for wheat that provide stable phytosanitary conditions.

Development of integrated production systems for tomatoes that provide stable phytosanitary conditions.

Dnipropetrovsk



Coordinator: Katerina Yatsoukh
 Candidate of Biological Sciences
 Chief, Laboratory of Phytopathology and Chemicobiological Plant Protection
 Institute of Crop and Animal Husbandry of the Western Region, L'viv



Participants from Pustomyty District Farmers Association showed great enthusiasm and livened up discussions at the workshop with questions and comments. They were not willing to passively accept any information.



The PPMP training program in L'viv was an excellent critical thinking exercise for the participants, who through their interactions benefited the group as a whole.

Institutions Involved:

1. Institute of Crop and Animal Husbandry of the Western Region
2. L'viv Plant Protection Station
3. L'viv State Agricultural Institute
4. Pennsylvania State University
5. Purdue University
6. Virginia Tech

Ukrainian Core Trainers for L'viv

- Galina Kosilovitch - Research collaborator, Plant Protection Laboratory, Inst. of Crops and Animal Husbandry of the Western Region.
 Ihor Dolinniy - Chief Agronomist, L'viv Plant Protection
 Yuri Kovalchuk - Candidate of Agricultural Sciences, L'viv State Agricultural Institute

U.S. Counterpart Trainers (pairs working in rotation)

- Rich Edwards - Entomology, Purdue University
 Mike Weaver - IPM Extension Specialist, Virginia Tech.
 Rod Youngman - Entomology, Virginia Tech
 Kriton Hatzios - Plant Pathology, Plant Physiology, and Weed Science, Virginia Tech
 Charlie Pitts - Entomology, Pennsylvania State University
 Ed Rajotte - Entomology, Pennsylvania State University
 Doug Pfeiffer - Entomology, Virginia Tech
 Larry Vaughan - IPM Trainer, Virginia Tech

Targeted pest management for certain pests and crops, decision-making for application of pesticides, and new achievements in integrated pest management were some of the topics covered during the seminar.



Training sessions were held in hotel 'Sputnik', where Dr. C. Richard Edwards and Dr. Charlie Pitts formed a dynamic team in leading a training/discussion session of pest management and precision agriculture, using satellite data. They demonstrated use of satellite data for assessment of ground conditions and targeting pesticide application and other management decisions.

As part of the decision-making exercise based on population dynamics, hands-on sampling of pests during the training session was very well received.

Collaborative Research Projects:

Application of the areawide pest management concept for the management of colorado potato beetle, Leptinotarsa decemlineata (Say), in potato

Designing a functional model for the State Plant Protection Service with proposed fee-based financing

Development and Introduction of a guide for an integrated pest and disease management system for fruit orchards in the western regions of Ukraine



Odessa

Coordinator: Olexander Slyusarenko
Doctor of Agricultural Sciences (Microbiology)
Odessa State University



A group of participants

Training at Odessa had a strong biological control component. Trainer Olexander Kilimnik and the oblast coordinator, Olexander Slyusarenko, were both enthusiastic in further helping the participants after the PPM program.

Institutions Involved:

1. Odessa Plant Protection Station
2. Odessa State Agricultural Institute
3. Institute of Biotechnics, Odessa
4. Ohio State University
5. USDA/New Mexico State University
6. Virginia Tech

IPM as a decision-making tool was identified as an important topic for Odessa during the pre-training participatory appraisal. The topic provided a conceptual framework for plant protection and pesticide safety presentations in the oblast.

Ukrainian Core Trainers for Odessa

- Vitali Kravchenko - Chief, Odessa Plant Protection Station
Valentina Kotsur - Plant Pathologist, Odessa State Agricultural Institute
Olexander Kilimnik - Chief, Department of Agrarian Management, Institute of Biotechnics, Odessa
Albina Volshina - Graduate Student, Odessa State Agricultural Institute.

U.S. Counterpart Trainers (pairs working in rotation)

- Herman Warren - Plant Pathology, Virginia Tech
Mike Weaver - IPM Extension Specialist, Virginia Tech
Larry Burrill - Weed Scientist, Consultant to Virginia Tech
Craig Runyon - Extension Specialist, USDA/New Mexico State University
Harold Wilson - Entomology, Ohio State University
Dan Minnick - IPM Extension Specialist, Consultant to Virginia Tech
Larry Vaughan - IPM Trainer, Virginia Tech

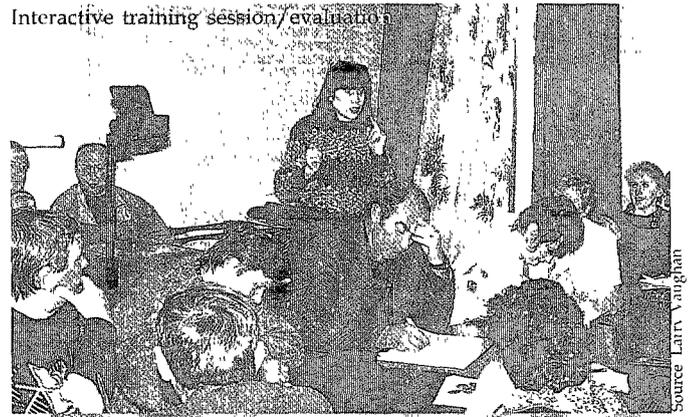


Pesticide Contamination Demonstration

Mike Weaver of Virginia Tech demonstrated how pesticides contaminate in the absence of proper handling.

In this exercise, Mike added fluorescent dye to a flour-potato starch mixture. Two volunteers put on their protective suits and transferred some of the powder between two containers, and returned to their seats for the rest of the lecture. At the end of the lecture a black light was used to show how the volunteers had spread the contamination with their hands. This exercise was very well received and was repeated in other Oblasts.

Interactive training session/evaluation



Source: Larry Vaughan

Topics: Biological control of insects, sprayer calibration, storage and application of pesticides, plant diseases, beneficial insects, pest management for targeted pests, and principles of management were some of the topics that were identified during the participatory appraisal, and covered during the training session. As a result, the participants were enthusiastic and took active part in the discussion/demonstration.



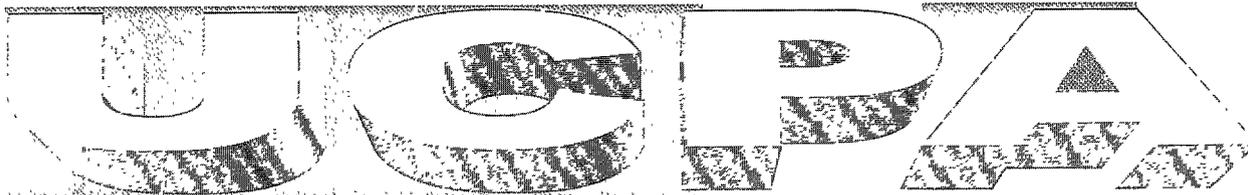
Pesticide safety instruction with fluorescent dye demonstration by Mike Weaver

Source: Larry Vaughan

Collaborative Research Project:

Damage Control of Grain Root Rot.

Odesssa



Ukrainian Crop Protection Association

UCPA was formed to represent the pesticide sector and to improve pest and pesticide standards, information, supply and initiatives in Ukraine.

Virginia Tech took an active role in supporting the formation of UCPA and in its effort to harmonize Ukrainian pesticide standards with international ones.

UCPA was officially inaugurated on November 25th, 1997 and final registration was completed on April 23rd, 1998.

In its prime, UCPA united 52 companies that included:

- 14 International suppliers
- 2 Ukrainian chemical plants
- 36 Local distributors

UCPA addressed the most pressing policy and business issues at the highest levels of the Ukrainian government.



Source: S.K. De Datta, Virginia Tech

Dr. Robert Hedlund, USAID Project Manager, PPMP and Ms. Natalia Kulichenko, representative of the USAID Mission Director, Ukraine, addressing at the UCPA inauguration ceremony

Timeline leading to UCPA inauguration

Virginia Tech gained the trust and confidence of all parties concerned to act as a facilitator/initiator of the UCPA.

- Dec. 1995 -Initial contacts with potential UCPA members.
- Sept. 1996 -1st organizational meeting of potential UCPA members
- April 1997 -Virginia Tech invited companies from Ukraine and abroad to form an association.
- July 1997 -Constituent Agreement drawn up by initial members (5 foreign, and 12 Ukrainian companies)
- Sept. 1997 -UCPA Constituent Agreement submitted for registration (6 foreign and 14 Ukrainian companies)
- Nov. 1997 -UCPA officially inaugurated after approval by Anti-Monopoly Committee. Natalia Koulichenko and Harry Walters (USAID/Kyiv), Bob Hedlund (USAID/ Washington D.C. PPMP Project Manager), Dr. S.K. De Datta (Principal Investigator, PPMP and Director, OIRD/Virginia Tech), and Keith Moore, (Technical Coordinator, Virginia Tech) attended the ceremony.
- Jan. 1998 -First meeting of UCPA general assembly met and discussed pesticide import and supply of credit for the 1998 Ukrainian agricultural season.
- April 1998 -UCPA registered with the local district administration as a public non-profit organization and set up its own bank account.

The 5 working groups of UCPA focus on:

- 1) Ethics and interrelations
- 2) Environmental protection
- 3) Legislative relations
- 4) Information support
- 5) Production and formulation of pesticides

In 1998 there was an outstanding debt of \$138 million to pesticide suppliers and distributors.

75% of the farmers were practically bankrupt due to the existing government policy of collecting grain and sugar stocks from farmers without compensation.

Commenting about the achievements of the UCPA, one member said, "We have already accomplished a great deal; we are talking to each other!"

UCPA's Achievements

The first UCPA general assembly meeting was attended by 120 people in January 1998.

The Association sent a delegation to the First Deputy Vice Prime Minister to address the debt situation and its implication on the cropping season.

Following the UCPA delegation meeting with the First Deputy Vice Prime Minister, an inter-departmental commission was formed by the Cabinet of Ministers to address pesticide import and supply problems.

UCPA was invited to draft handling and storage standards that pesticide distributors must meet in order to receive government credit for pesticide purchase.

The European Crop Protection Association (ECPA) invited UCPA to join in November 1998.

UCPA has raised the awareness of important pesticide safety issues and led to improvements in the legal framework for pesticide handling, storage and use.

In early 1998, the UCPA established close contacts with the Ukrainian Parliament's Agrarian Commission, the Ministry of Agriculture and other government agencies in a sustained lobbying effort which emphasized:

- 1) Adoption of the Law on Plant Protection
- 2) Support for market reforms
- 3) Defense of private business development in Ukraine.



UCPA's lobbying to improve regulations for pesticide application and safety led to adoption of the Law on Plant Protection on October 14th, 1998.

In September 1999 UCPA had its third General Assembly election.

The association has emerged as an important actor in the industry because:

- 1) *it represents the pesticide industry's business interests before key government policy makers;*
- 2) *it has taken a leadership role in setting pesticide industry safety standards.*

The future and functioning of UCPA is closely linked with Ukrainian authorities' ability to amicably address the problem of mounting debt in the agricultural sector.

UCPA

Research

Restoration

Based on the findings of the participatory appraisal in each oblast, a call for research proposals was made. Collaborative proposals (between Ukrainian and American scientists) were submitted and competitively evaluated according to the quality of the proposal and the extent to which farmer-identified problems were addressed.



Source: Sally Miller, Ohio State

N. Kharitonov using a microscope purchased through PPMIP

Following are the winning research proposals that were funded:

1) Research addressing individual crops and specific vegetables

Wheat

Development of integrated production systems for wheat that provide stable phytosanitary conditions.

Damage control of grain root rot

The winning research proposals can be broadly classified into those focusing on :

- 1) individual crops or vegetables that are economically important to the country, oblast, local or individual economy, and
- 2) those that addressed farmers' needs for a sustainable system to provide high quality objective information ensuring high profitability, high productivity, and safe handling, use and disposal of pesticides.

Tomato

Development of integrated production systems for tomatoes that provide stable phytosanitary conditions.

Potato

Application of the areawide pest management concept for the management of Colorado Potato Beetle (CPB), *Leptinotarsa decemlineata* (Say), in potato.

2) Research addressing the farmers' need for a sustainable pest and pesticide management system:

Plant Protection Service Model based on fee-based financing

Designing a functional model for the Oblast Plant Protection Service with proposed fee-based financing

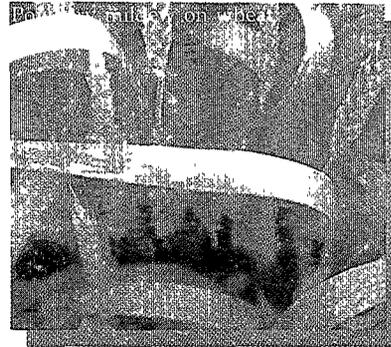
Six collaborative research projects between Ukrainian and U.S. scientists were conducted between 1997 and 1999.

Guidebook

Development and introduction of a guide for an integrated pest and disease management system for fruit orchards in the western regions of Ukraine.

Wheat research in Dnipropetrovsk
 Development of integrated production systems for wheat that provide stable phytosanitary conditions.

Between 1997 and 1998, 36 fields were surveyed to identify the major causes of foliar and root diseases.



Source Dudka and Lipps, 1999. Disease control methods for winter wheat Nova Ideologia (Ukrainian)

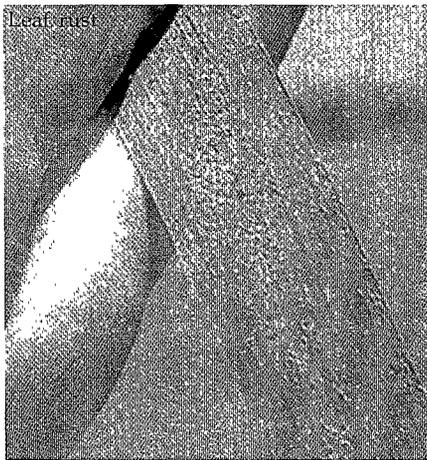
INTEGRATED WHEAT PRODUCTION

Most common /damaging foliar diseases found

- Stagonospora leaf blotch,
- Septoria leaf blotch,
- Powdery mildew,
- Leaf rust, and the

Most destructive root rot:

- Bipolaris root rot



Source Dudka and Lipps, 1999. Disease control methods for winter wheat Nova Ideologia (Ukrainian)

Research evaluated various disease control strategies including

- resistant varieties
- soil tillage
- crop rotation
- nitrogen fertilization
- seeding rates
- date of planting
- fungicide seed treatments
- foliar fungicide applications

The results indicated that two major causes of increased disease incidents were:

- high seeding rates
- higher levels of nitrogen fertilizer

Both of these resulted in an increased moisture requirement and thereby increased stress.

Research Concluded

Root and stem diseases could be reduced by delaying the fall planting so that the soil is cooler.

The new integrated wheat management systems developed by the researchers are based on a combination of management practices that include: use

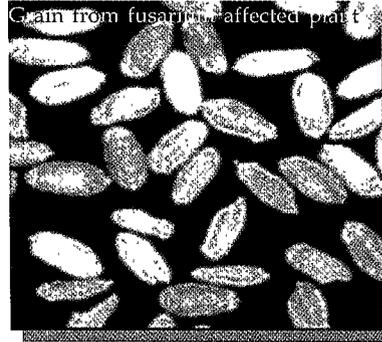
of disease-resistant varieties, adequate crop rotation intervals, moderate use of nitrogen fertilizer based on projected yield goals, adequate seeding rates, proper planting dates to ensure winter survival, universal use of seed treatment fungicides, and judicious use of foliar fungicides based on field scouting for disease threshold levels before applications are made.

Reduced drought stress and cooler planting soils were found to be the keys to improving wheat disease management in the Dnipropetrovsk Oblast.

Integrated Wheat Production

Wheat research in Odessa Damage control of grain root rot

Fusarium or Root Rot (3 species - F.oxysporium, F. graminearum, F. culmorum) were identified as the primary soil pathogens (fungi) that were distributed across the three ecological regions in the Odessa oblast. Unlike other pathogens that were mostly localized, fusarium were well distributed across the oblast.



Grain from fusarium affected plant
Source: Jim Miller, North Dakota State University, Extension Service

More than 100 cultivars were evaluated in the field between 1998-1999 for their resistance to root rot.

The Experiment

Plant and soil samples from winter wheat nurseries were assayed for micro-organisms in three ecological regions in Odessa. The soil-borne pathogens that were most frequently isolated were fusarium.

Wheat seeds were planted in soil with a known history of fusarium infestation. The same soils and isolates from roots or soils were used in the laboratory. Reaction of several wheat varieties to pathogens were tested both in the field (control) and in the lab (experiment - where they are isolated from other variable effects).

The research resulted in finding a cultivar with high resistance to fusarium root disease superior even to the known variety commonly in use.



Root rot
Source: Dudko and Lipp, 1999. Disease control methods of winter wheat. Nova Ideologia (Ukraine)

Results

Plant reactions to pathogens were similar in the field and greenhouse for both highly resistant and susceptible cultivars or wheat varieties.

Of all the varieties tested, Odessa 265 was found to be most resistant to fusarium based on several criteria such as lesion on roots, growth rate, plant vigor, and grain yield.

A wheat cultivar with high resistance to fusarium (fungi) root rot was identified.

Controlling grain root rot

Tomato research in Dnipropetrovsk

Development of integrated production systems for tomatoes that provide stable phytosanitary conditions

In 1997, during unusually cold weather, five districts including 10 collective farms were surveyed. They were re-surveyed in 1998-1999 when the weather was normal/warmer.

Survey and research results revealed

In 1997, severe cold weather conditions resulted in a serious epidemic of late blight, one of the most damaging diseases in tomatoes.

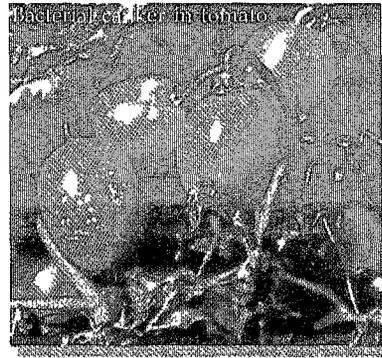
The Lagidny variety of tomato showed general tolerance to late blight. (The tolerance was lesser in warmer weather in the following year).



Source: Sally Miller, Ohio State

Isolates of the late blight pathogen (*Phytophthora infestans*) obtained from diseased tomatoes in 1997 were very similar in isozyme type but were different from the Western isolates.

Even though the tomatoes in Dnipropetrovsk were different from western varieties, the Lagidny variety of tomato showed promising resistance to diseases when combined with a fungicide application.



Source: Maslikova, Kartonov, Lazareva and Miller 2000 Tomato disease management in the Steppe Zone of Ukraine (Ukrainian)

Even though late blight did not appear in the field plots in 1998, yield of the Lagidny variety of tomato increased significantly by applying a fungicide (e.g. Acrobat MC, Ridomil MC, Tattoo and Cuproksat).

Alternative tomato protection methods using biohumus, biohumus plus *Trichoderma* sp., using peat and manure increased tomato yield.



Source: Maslikova, Kartonov, Lazareva and Miller 2000 Tomato disease management in the Steppe Zone of Ukraine (Ukrainian)

Other common/damaging diseases found

Foliar diseases

Damping off, early blight, Verticillium wilt, Septoria leaf spot, Antracnose, bacterial spot, bacterial canker and tomato big bud.

Physiological disorders

Blossom-end rot, soft rot, leaf roll and sunscald. The predominant insect pests were Colorado Potato Beetle and wire worm.

Most common weeds

Canada thistle, common ragweed, Russian sweetsultan, common sowthistle, milk gowan, cornbind weed, dandelion, Japanese barnyard millet, and dodder.

Integrated Tomato Production

Potato research in L'viv

Application of the areawide pest management concept for the management of Colorado Potato Beetle (CPB), *Leptinotarsa decemlineata* (Say), in potato.

Research and Results

1) CPBs have less resistance to some insecticides.

Results show CPBs have variable resistance to different insecticides. Thiodan (endosulfan), Furadan (carbofuran), and Imidan (phosmet) provided higher levels of CPB mortality compared to Asana (esfenvalerate), Asana + PBO (piperonyl butoxide), Agri-Mek (abamectin) and Pravadol (imidicloprid).

2) Areawide management strategies can better control CPBs.

Scouting showed that the levels of CPB can be tracked effectively on a weekly basis. Then the farmers can manage this pest with the timely application of insecticides on reaching the economic thresholds.

3) Use of straw and black plastic mulch reduces the CPB population.

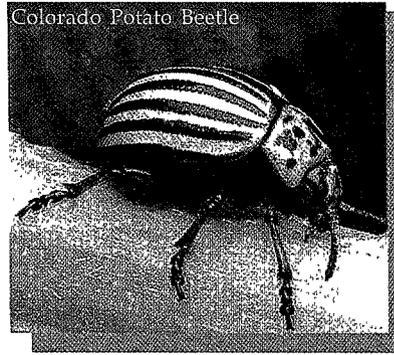
These management techniques effectively reduce CPB population, and can be used by farmers immediately.

4) Some varieties are more resistant to CPB and Late blight (LB) infestation.

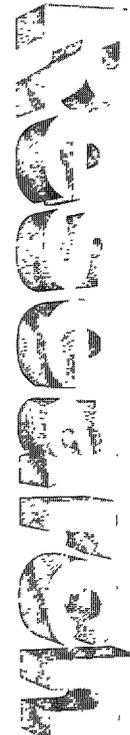
The research identified some varieties of host plants that are more resistant to CPB and LB (*Phytophthora*). Planting such varieties will be beneficial to the farmers.

5) Insecticides and fungicides were evaluated to identify those that are most effective.

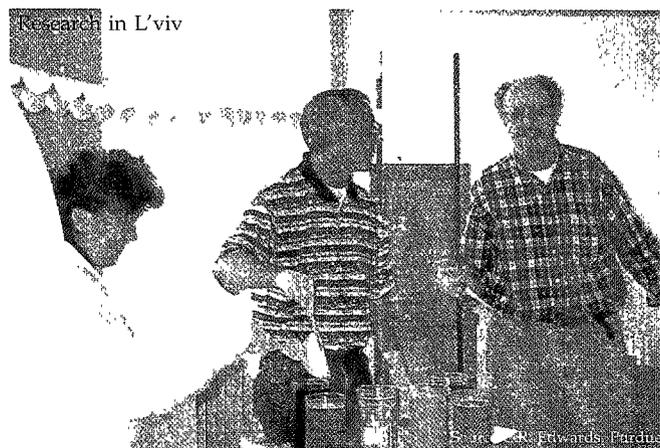
A set of chemicals that are most effective against CPB and LB were identified. Easy access to these chemicals will benefit farmers.



Source: Scott Baurer, Agricultural Research Service, United States Department of Agriculture (USDA)



- Variability in the levels of resistance by the Colorado Potato Beetle to various insecticides indicated differences in beetle biotypes from those found in the United States.
- This led to research in the USA.
- It was found that straw and black plastic mulches are effective in reducing CPB populations.



Areawide Pest Management

Information services research in L'viv
Designing a functional model for the Oblast
Plant Protection Service with proposed
fee-based financing

In 1997 and 1998 a survey conducted in L'viv
documented:

- 1) pest management information practices of the farmers
- 2) farmers' sources of pest and pesticide-related information and
- 3) willingness of farmers to pay for quality information about pest management

The survey revealed :

- 1) More than 50% of farmers found visits to the Pest Protection Station (PPS) a useful means of gathering pest management information.

A participatory workshop with stakeholders to create a plan for pest management information services in L'viv Oblast produced 3 major outputs:

- 1) A list of prioritized plant protection information needs
- 2) A list of prioritized activities to respond to the information needs, and
- 3) An action plan to fulfill the prioritized activities.



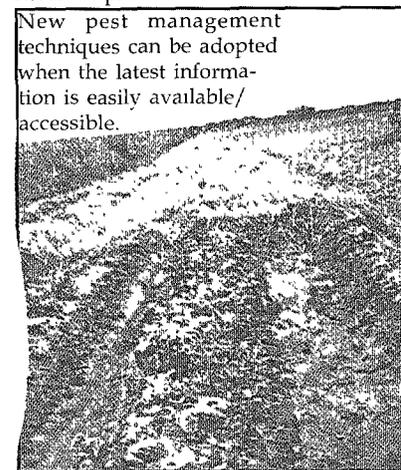
Source Keith Moore, Virginia Tech

- 2) Both specialists and individual farmers felt there is inadequate information available compared to their needs. They have to rely heavily on mass media and pesticide distributors for information.

- 3) Individual private farmers confirmed that they largely depend on the pesticide dealers for important decisions regarding pest management.

- 4) Stakeholders would pay a nominal monthly fee in order to receive improved and up-to-date pest management information.

Research plot in L'viv



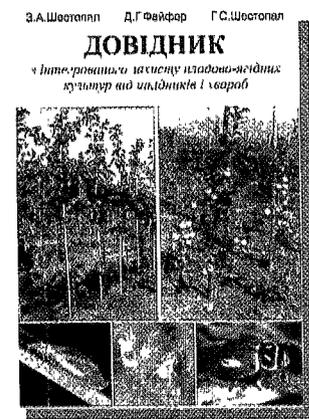
Source CR Edwards Purdue

Fee-based financing model

Information services research in L'viv
 Development and introduction of a guide for an integrated pest and disease management system for fruit orchards in the western regions of Ukraine.

The guide is the first of its kind that has been prepared in Ukrainian for a modern approach to pest and pesticide management. The book includes:

- General principles for fruit and vegetable protection*
- Population dynamics of pests and beneficial insects*
- Plant protection methods and their application*
- Toxic classes of chemicals used in pest management*
- Household and professional use of some chemicals*
- Systems of protection and disease control*



Cover page of pest management guidebook

Plant protection methods and their applications

- Characteristics of plant protection methods
- Application of plant protection methods



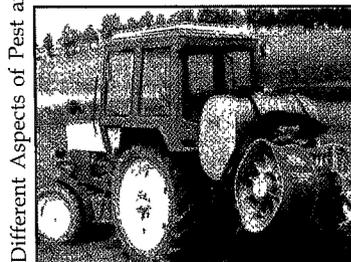
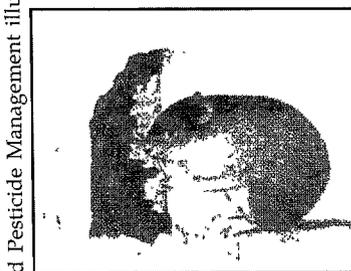
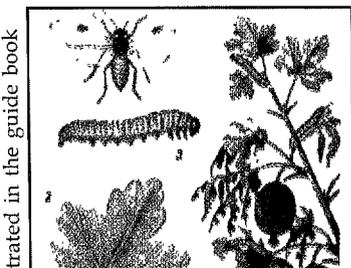
Each topic covered details in the following areas:

General principles for fruit and vegetable protection

- agro-technical protection methods
- physio-mechanical protection
- immunological protection
- chemical and
- biological protection

Population dynamics of pests and beneficial insects

- composition of insect populations
- population estimation techniques and
- methods of protection of natural enemies



Different Aspects of Pest and Pesticide Management illustrated in the guide book

Toxic classes

Effect of plant protection by different crops of products:

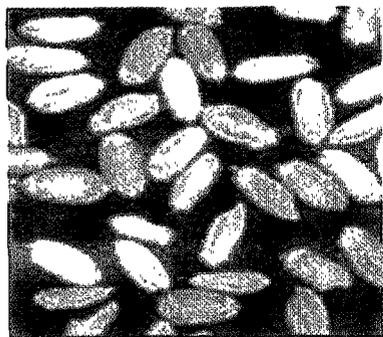
- (1) bacterial preparation,
- (2) pheromones,
- (3) insect growth regulators, and
- (4) chemicals.

Some selective, partially selective and new chemicals legally available in Ukraine for household or professional use were discussed.

System of protection and disease control for fruits and vegetables.

Programs for each group of fruits and vegetables grown in every season are discussed.

Pest Management Guidebook



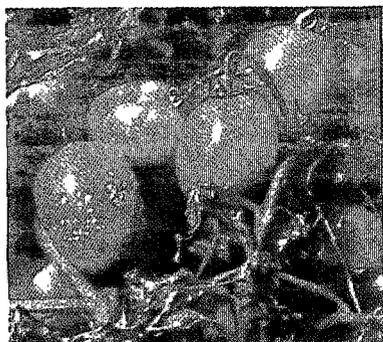
Source Jim Miller, North Dakota State University, Extension Service

Damage control of grain root rot. Co-principal investigators: Valentina Kotsur, Odessa State Agricultural Institute, Lazar T. Babayants, Odessa Breeding and Genetics Institute; and Herman Warren, Virginia Tech.

Application of an areawide pest management concept for the management of Colorado Potato Beetle *Leptinotarsa decemlineata* (Say), in potatoes. Co-principal investigators: Katerina Yatsoukh, Institute of Agriculture and Animal Biology, L'viv; and C. Richard Edwards, Purdue University.



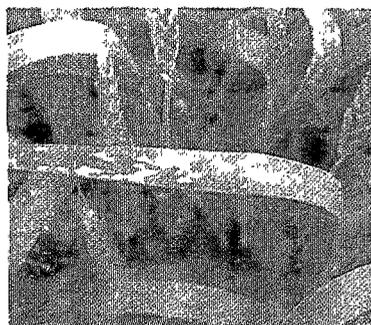
Source Scott Baurer, Agricultural Research Service, United States Department of Agriculture (USDA)



Source Mashlikova, Karionov, Lazareva and Miller 2000 Tomato disease management in the Steppe Zone of Ukraine (Ukrainian)

Development of integrated production systems for tomatoes that provide stable phytosanitary conditions.

Co-principal investigators: E.Lazareva, N.Kharitonov, E.Maslikova Dnipropetrovsk State Agricultural University; and Sally A. Miller Ohio State University.



Source Dudka and Lipps 1999 Disease control methods for winter wheat Nova Ideologia (Ukrainian)

Development of integrated production systems for wheat that provide stable phytosanitary conditions.

Co-principal investigators: E.Dudka, N.Pinchuk, K.Septa, T.Satarova, Institute for Grain Growing of the Ukrainian Science Academy of Agriculture, Dnipropetrovsk; and Patrick Lipps, Ohio State University

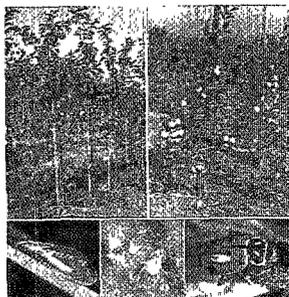


Source Keith Moore, Virginia Tech

Designing a functional model for the Oblast Plant Protection Service with proposed fee-based financing.

Co-principal investigators: I.M.Cholovska and Igor Dolinny, L'viv Plant Protection Service; Ed Rajotte and Charlie Pitts, Pennsylvania State University and Keith M. Moore, Virginia Tech.

З.А.Шестопал Д.Г.Фейффер Г.С.Шестопал
ДОВІДНИК
з інтегрованої захисту плодono-ягідних культур від шкідливих і хвороб



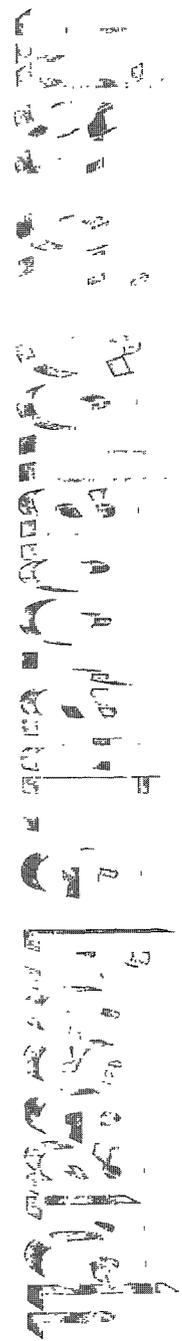
The guidebook in Ukrainian

Development and Introduction of a guide for an integrated pest and disease management system for fruit orchards in the western regions of Ukraine.

Co-principal investigators: Zinaida Shestopal, L'viv Branch of the Institute of Horticulture (Ukraine Academy of Agrarian Sciences) and Douglas Pfeiffer, Virginia Tech. This project capitalized on research already accomplished on orchard production in the western region of Ukraine and the State of Virginia, USA.

Six Collaborative Research Projects were conducted between 1997 and 1999:

- 2 in Dnipropetrovsk
- 3 in L'viv (3rd added in 1998)
- 1 in Odessa



The Forum



Discussion at the forum

Source: Sally Miller, Ohio State

The OIRD/Virginia Tech model for an Integrated Pest and Pesticide Management Training and Demonstration Center and for development of pesticide safety practices has increased the flow of practical information for farmers, farm workers and agricultural agents. The PPMP has replaced the extreme isolation that existed before.

In July 1999 a three-day PPMP Training and Research Progress Review Forum was organized in Kyiv. This Forum assessed the entire PPMP training program headed by OIRD/Virginia Tech. The PPMP participants presented their results and discussed the impact of their activities during the life of the project and beyond.

List of participants at the final PPMP Forum at Kyiv in July 1999

Institutes/Agencies from Ukraine

- Ukrainian Ministry of Agriculture
- State Commission on Testing and Registration of Plant Protection Products, Growth Regulators and Fertilizers
- Ukrainian Academy of Agrarian Sciences
- Ukrainian Crop Protection Association
- National Agricultural University

in addition to

Oblast-level institutes,
Universities,
Plant Protection Stations

Institutes/Agencies from U.S.A.

US Environmental Protection Agency
USAID
OIRD/Virginia Tech and its partners
Purdue University,
Pennsylvania State University, and
Ohio State University

PPMP for the first time initiated the development of collaborative relationships between the local services, agencies, research institutions, and agricultural universities within and across the oblasts in Ukraine.



Participants at the Forum

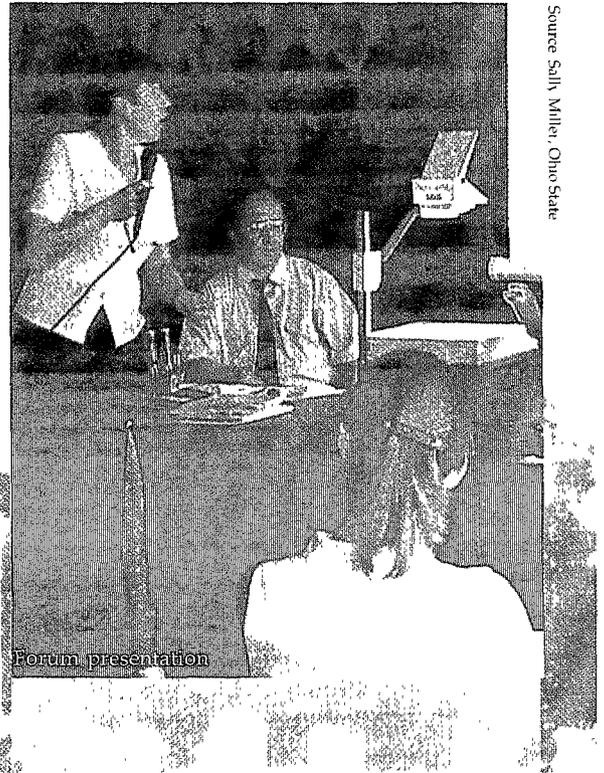
Source: Sally Miller, Ohio State

Lessons and Impact of the PPMP

A decentralized information system that complies with the international standards and is adapted to local conditions is most effective in promoting pesticide safety and improved farming practices.

Two models for the supply of pesticide safety and integrated pest management information to farmers have evolved.

- The L'viv Oblast Plant Protection Station has started operating as an effective, market-oriented public service agency.
- A second model based on a non-governmental organization, Green Light, in Dnipropetrovsk has developed a training program that operates under market conditions. It now provides contracted training services throughout Ukraine.



Source: Sally Miller, Ohio State

The second president of UCPA addressing at the Forum



Source: Sally Miller, Ohio State

Modernization of public research and extension bases are essential for pesticide safety and integrated pest management in Ukraine. The areas that need focus are: soil management, crop management, equipment safety and maintenance, and livestock management and waste disposal.

- Collaboration with US scientists, and an increased supply of computers and laboratory tools have boosted Ukrainian scientific research in the area of pest and pesticide management.

The Forum

Creation of the UCPA has raised the industry's awareness concerning the importance of pesticide safety and has led to improvements in the legal framework for pesticide storage, handling and use. In addition, UCPA has given the industry a forum for unified lobbying for further improvement towards a viable open market for pesticides.

Future programs need to address the household production sector that is the major source of fruit and vegetable production in Ukraine.



An audio-visual training session in Ukraine

Source: Sally Miller, Ohio State



Source: Sally Miller, Ohio State

A toast on PPMP project success by Dr. S.K. De Datta, Principal Investigator of PPMP and Director, OIRD/Virginia Tech

Topics presented at the Forum included:

- State of government and industry relations concerning safe and effective use of pesticides;
- A description of the U.S. Environmental Protection Agency's Seminar Series and Study Tour;
- An evaluation of Virginia Tech's Training-of-Trainers Program and its impact;
- A focus on pesticide registration decision-making, pesticide trials, and pesticide effects;
- Two new models for pesticide safety and integrated pest management training programs;
- A demonstration of the State Commission's Database System;
- Research presentations on a regional integrated protection system for wheat, tomatoes, potatoes, and orchards;
- A research presentation on improved services of the oblast Plant Protection Stations;
- A discussion on pesticide waste disposal; and
- A panel discussion on the future of pest and pesticide management in Ukraine.

The Forum

Background: Karinsky Palace where PPMP Forum

Source: Keith Miller, Virginia Tech

Our Partners from Ukraine

State Commission on Testing and Registration of
Plant Protection Products

Growth Regulators and Fertilizers

Central State Station for Soil Fertility and
Plant Protection

Ukrainian Crop Protection Association

Ukrainian Academy of Agrarian Sciences

Institute of Crops and Animal Husbandry of the
Western Region

Grain Growing Institute, Dnipropetrovsk

Dnipropetrovsk State Agricultural University

Lviv Plant Protection Station

Lviv State Agricultural Institute

Odessa Plant Protection Station

Odessa State Agricultural Institute

O I R D

The Office of International Research and Development at Virginia Tech

An Overview

The Office of International Research and Development (OIRD) is charged with forwarding Virginia Tech's international mission through management and support of collaborative projects in international research, education, and service. Since its reorganization in 1991, OIRD has coordinated and managed international contracts and grants in more than 40 countries throughout Asia, Africa, Latin America, the Caribbean, Russia and Eastern Europe. Through its highly experienced and multidisciplinary faculty, OIRD currently manages a portfolio of about 24 million dollars.

A List of 91 Projects

Selected new and ongoing projects since 1991

Title of the Project	Sponsor	Duration	Contract Amount
• Mali Farming Systems Research and Extension	USAID/SECID	03/86 - 03/94	3,042,326
• Zambia Agricultural Training Institution Development II (ZATPID II)	USAID/Robert Nathan Assoc.	07/87 - 06/93	2,500,000
• Senegal Reforestation Project	USAID/SECID	02/89 - 03/94	12,000,000
• SARSA II Core	USAID/Clarke Univ	10/90 - 09/94	645,000
• Association for Women in Development (AWID)	AWID	12/91 - 06/94	112,000
• Sustainable Agriculture Natural Resource and Environment Management Collaborative Research Support Program (SANREM CRSP)	USAID/University of Georgia	07/92 - 06/97	605,467
• Multipronged Approaches to Eliminate Crop Devastation by Parasitic Weeds (MERC)	USAID	09/93 - 09/97	2,999,997
• Integrated Pest Management (IPM) CRSP	USAID	09/93 - 09/98	7,500,000
• Support for Agriculture Restructuring in Albania (SARA)	USAID/Winrock International	12/93 - 12/98	2,549,691
• National Agriculture Research Project (NARP)	Consortium for Intl Development	1994 - 1997	8,000
• Moscow Technology Incubator Project - Russia	USAID	1994 - 1997	2,046,000
• Community-Based Natural Resource Management (CBNRM) in Senegal	USAID/SECID	10/94 - 09/01	20,583,428
• Integrated Pest Management and Consultative Network for Sub-Saharan Africa (ICN)	USAID	01/95 - 01/97	100,000
• Development of Core and Specialized Training Modules for World Bank Staff	The World Bank	07/95 - 12/96	68,000
• Nutrition and Household Food Security Analysis of PS II Data - Zambia	Social Recovery Fund/Zambia	09/95 - 08/96	57,560
• West Africa Natural Resource Management	USAID	09/95 - 09/02	2,950,000
• Inter-Collaborative Research Support Program			
• Pest and Pesticide Management Program (PPMP) - Ukraine	USAID	09/95 - 09/99	1,296,862
• US Workshop/Study Tour for Ukrainians	USAID/AFD		106,161
• FAO/IPM Apple Orchard Training	USDA/FAS	06/96 - 09/96	9,933
• Peanut Collaborative Research Support Program (Demand Analysis)	USAID/University of Georgia	08/96 - 07/01	215,184
• Peanut Collaborative Research Support Program (Household Model/WID)	USAID/University of Georgia	08/96 - 07/01	187,301
• Development of Biopesticides for Grasshopper and Locust Control in Sub-Saharan Africa	USAID Africa Bureau	09/97 - 09/02	1,999,640
• Sustainable Agriculture Natural Resource Management Collaborative Research	USAID/University of Georgia	09/98 - 09/03	733,644
• Support Program (SANREM CRSP Phase II)			
• Integrated Pest Management for Smallholder Estate Crops - Indonesia	Asian Development Bank	04/98 - 04/01	706,462
• BARC Research Management	IFDC	11/98 - 11/00	260,533
• Integrated Pest Management Collaborative Research Support Program (IPM CRSP Phase III) including Africa IPM Link	USAID Global Bureau part by USAID Africa Bureau and Albania Mission	09/98 - 09/03	12,389,355
• Greenhouse Gas Pollution Prevention	USAID/Louis Berger International Group	07/00 - 05/01	50,000
Total			\$ 75,722,544