

# **MSU Workplan for Central Asia Regional IPM Program**

## **The Collaborative Program**

USAID is sponsoring a Collaborative Research Support Program for Integrated Pest Management in Central Asia (IPM-CRSP). The project is designed to foster development of a comprehensive IPM initiative, using an ecologically based and multidisciplinary systems approach. Michigan State University, the University of California-Davis, and ICARDA serve as the host institutions for implementing this collaborative and participatory research-education program, designed to facilitate capacity building in IPM in Central Asia.

## **IPM Constraints Addressed**

Based on the Central Asia regional IPM Forum held in Tashkent Uzbekistan in May 2005, the stakeholders identified the following issues and constraints related to IPM.

1. The countries of Central Asia are transitioning from centrally-planned monoculture agricultural systems to more diversified systems to meet the challenges of local food security, environmental quality, and natural resources management. Cotton remains a dominant crop in many of these countries, but the importance of food crops such as wheat, potato, tomato, and fruit crops in the region is growing to enhance local food security and shift from the former policy of monoculture agriculture. As a result, the forum participants identified a need to conduct research on the impact of agricultural diversification on local biodiversity and dynamics of pests and beneficial organisms. This information and knowledge would be useful when re-designing agroecosystems to conserve biodiversity and enhance biologically based pest management. The current emphasis of IPM programs in Central Asia is the augmentation through mass rearing and release of bio-control agents by a network of insectaries known as 'biolaboratories'. There are no programs that promote conservation of natural enemies and biodiversity in the agricultural landscape. Therefore, there is an opportunity to enhance IPM practices via landscape ecology and biodiversity.

2. There are more than 800 biolaboratories in Uzbekistan alone that rear and provide bio-control agents to farmers. These laboratories have a narrow product line (4-5 species) and their efficiencies can be enhanced. These biolaboratories would also benefit from updated methodologies to improve their efficiencies. There is also a need to expand the laboratories' product lines to provide better services to farmers, address additional pests, and cover additional crops.

3. In the absence of a formal government-run extension system, NGOs, farmer organizations and local universities are providing farmer training, technology transfer and outreach services. There is a lack of ecologically-based IPM approaches in these outreach and farmer training programs. IPM educational packages need to be developed that can be integrated into farmer field schools and other outreach programs.

4. Although components of IPM programs are in place, there is a need to integrate these components into IPM packages and crop management programs. There is also a need for coordination among institutions and between countries to benefit from the already existing human resources and experiences. Communication and interaction with IPM specialists outside the region is lacking due to isolation, language barriers and limited financial resources. Therefore, there is need for collaborative projects and networking activities to foster interaction and exchange of knowledge and information. There is a need to develop and strengthen collaborative linkages nationally, regionally and internationally.

5. Activities of the CGIAR (ICARDA, CIP, CIMMYT) and other international agricultural research centers (AVRDC) are growing in the region and are serving as excellent partners for the regional IPM program. In addition, the local universities are active in providing IPM education. The government of Uzbekistan has encouraged universities to expand outreach services and education to farmers. The universities would benefit from access to IPM information from outside Central Asia through appropriate linkages and electronic media. The participants at the forum discussed the need for establishing a regional IPM Team that includes and meets the needs of various stakeholders.

## **Objective: 1. Conduct research on landscape ecology to enhance biodiversity and biological pest management.**

Increasing crop monocultures and decreasing landscape diversity are frequently accompanied by a reliance on agricultural pesticides to help suppress crop pests. The presence of diverse habitats in or near crops can be important in sustaining natural enemies of crop pests. In particular, plant pollen and nectar are frequently utilized by natural enemies for energy, reproduction, and to survive periods of prey scarcity. Landscape diversity can be increased by preserving, restoring or creating plant communities that provide needed resources to natural enemies. In the intensively farmed landscapes of Central Asia the latter is likely required while in parts of the region preservation or restoration may be appropriate. It is important to research the use of native plants for conserving natural enemy communities and enhance biological control of field crop pests in Central Asia.

## **Activity: Activity 1.1. Screening of native plants for attractiveness to natural enemies of pests.**

In collaboration with the Institute of Zoology and Parasitology in Tajikistan and the Kyrgyz Agrarian University in Kyrgyzstan, the IPM CRSP project is continuing to conduct experiments on screening native plants for attractiveness to natural enemies of pests in Tajikistan (24 species) and in Kyrgyzstan (10 species). In the both sites, experiments were randomized with 4 replicates for each plant species. From May to September 2008, arthropods were sampled and identified weekly. The data for this experiment is being analyzed to assess the attractiveness of native plants to various insects.

## **Activity: Activity 1.2. Introduction of successful local nectar plant into existing vegetables farming systems in collaboration with local farmers.**

In collaboration with the Department of Plant Protection of Tajik Academy of Agricultural Science, research plots on screening 8 species of nectar plants for their agronomic characteristics were established in Tajikistan (Table 1). In the first experiment, nectar plant strips were established between wheat and cotton crops where in the second experiment, nectar plant strip were established between vegetables and maize crops. Both experiments were conducted in a randomized block design with five replicate for each plant species. During the experiments, arthropods were sampled weekly from flowering plants. Insects were collected by standard entomological sweep net with five samples from each plant. Insects have been indentified by family and the data is being analyzed. An additional experiment was established to determine the impact of existing predators on tomato and cotton pest population with cage effects.

Table 1. List of plant species established at the nectar plant strip in Tajikistan, 2008.

##	Family	Genus and species	Common Name	Plant Type
1	Apiaceae (Umbelliferae)	<i>Anethum graveolens L.</i>	Dill	annual
2	Apiaceae (Umbelliferae)	<i>Coriandrum sativum L.</i>	Coriander	annual
3	Asteraceae (Compositae)	<i>Calendula officinalis L.</i>	Marigold	annual
4	Lamiaceae (Labiatae)	<i>Ziziphora interrupta Juz.</i>	Interrupta	forb
5	Lamiaceae (Labiatae)	<i>Ocimum basilicum L.</i>	Sweet basil	forb
6	Balsaminaceae	<i>Impatiens balsamina L.</i>	Balsam	forb
7	Asteraceae (Compositae)	<i>Pyrethrum carneum</i>	Pyrethrum	forb
8	Asteraceae (Compositae)	<i>Tagetes erecta L.</i>	African marigold	annual

In collaboration with the Tajik National TV-I, the Institute of Zoology and Parasitology and Department of Plant Protection of Tajik Academy of Agricultural Science a 20 minutes-film was developed and broadcast on TV to popularize the role of nectar plant in biological pest management. The general topic of the film was “Landscape ecology to enhance biodiversity and biological pest management”. Images from the research plots on nectar plant strips with interviews Dr. Nurali Saidov, Dr. Anvar Jalilov and Dr. Abdusattor Saidov were televised in two sequences on the National Tajik TV-I.

### **Activity: Activity 1.3. Publish brochures on nectar plant diversity and beneficial insects.**

In collaboration with various partners including universities, NGOs and local institutions in Central Asia, Dr. Nurali Sidov has published paper, extension bulletin and initiated the production of films highlighting the importance of landscape ecology and habitat management for biological control. In addition, he has translated the brochure "Sun Pest Management" into Tajik and 100 copies were distributed to farmers, plant protection and extension personnel in Tajikistan. For a complete list of these documents, please see the "Publications" section of this annual report.

## **Objective: 2. Enhance efficiency, products line, and crop usage of Central Asian biolaboratories**

The overall goal of this component is to work with Central Asian researchers, educators and farmers to identify, produce and introduce into vegetable production systems candidate entomophages for management of spider mites and insect pests which are not currently targets of those produced by Biolaboratories.

### **Activity: Activity 2.1. Study the condition of colonization and acclimatization of *Amblyseius cucumeris* on bran mites, spider mites and other prey in laboratory conditions**

This research component has been focusing on the study of colonization and acclimatization of *Amblyseius cucumeris* on bran mites, spider mites and other prey in laboratory conditions. *A. cucumeris* and *A. mckenziei* are commercially important as biological agents for controlling pest on cotton and vegetable crops. The reproduction cycle of predator mites has been understood. New methodology for rearing predator mite *A. cucumeris* has been determined in biolaboratories in Uzbekistan and Kyrgyzstan. Various experiments were conducted to assess the effectiveness of predator mites in colonizing spider mites under laboratory conditions. Results reveal that predator mites can be potential biological agent against spider mite on crops.

Favorable conditions for spider mite colonization were determined. Experiments on cotton showed that *A. mckenziei* was effective against *Tetranychus urticae*. It was established that the optimal ratio of predator mite application at pest density 300 - 400 per plant is 1:7. At high spider mite density *A. mckenziei* should be applied 2 times every 12 days at ratio of 1:50. In addition, studies have been conducted on developing methods for maintaining predator mite stock cultures during winter time. The survival ability of *A. cucumeris* in winter time at low and normal temperatures was determined in laboratory condition on *Acarus farris* as prey adding different complex pollens of wild plants and orchard trees as additional food sources. The experiment showed that survival and reproduction capacity of *A. cucumeris* during winter time is enhanced by a complex source of pollens.

## **Activity: Activity 2.2. Laboratory experiments on vegetable in Uzbekistan and Kyrgyzstan**

### **Effect of *Ambliseius mckenziei* (Acarina:Phytoseiidae) on *Thrips tabaci* (Thysanoptera: Thripidae) on onion crop in Uzbekistan and in Kyrgyzstan**

#### **Introduction**

At present, the area under onion and garlic production in Uzbekistan is expanding. This increased production requires effective measures for protecting the crops against pests and diseases. The most important insect pests of onion and garlic crops in Uzbekistan is *Thrips tabaci* Lindeman. Thrips damage to onions results in both loss of yield and reduction in storage quality of onion bulbs. Thrips are most damaging during the early bulb development stage. Infested plants may have leaves that are scarred (stippled appearance) and do not elongate properly resulting in twisted or crinkled leaves. With green onions, leaf scarring reduces marketability. According to our observations thrips come out of overwintering sites at the beginning of April, first occupying weeds and then moving into onion fields. The highest thrips population occurs in April, averaging 50 individuals per plant.

#### **Biological control of *Thrips tabaci***

*Neoseiulus (Amblyseius) mckenziei* (barkeri) Hughes (Acarina: Phytoseiidae) is an oligophagous predatory mite. It has been mass-reared with storage mites such as *Acarua farris* (Oudemans), as prey (Ramakers & van Lieburg, 1982) for control of thrips (*Thrips tabaci* Lindeman on cucumbers and peppers in many parts of the worlds (Hansen 1988; Ramakers *et al.*, 1989). In 1981 Beglyarov & Suchalkin (1983) introduced the predator in the former Soviet Union and in 1983 *A. mckenziei* colonization started in Central Asia. At present, in Kyrgyzstan biocenter, mass production of this predator is being commercially done for control of onion thrips and spider mites on various crops.

#### **Methodology of this study**

Biological control of *Thrips tabaci* using the predator *Amblyseius mckenziei* was studied during spring and summer time on onion in field plots that consisted of 3 strips and 30 plants for each predator release. *Amblyseius mckenziei* was successfully colonized on grain mites *Acarua farris* and plant pollens in 31 glass jars that were maintained in growth chamber at a temperature of  $25\pm 1^\circ\text{C}$  and relative humidity  $60\pm 10\%$ . *A. mckenziei* were introduced 2-3 times and different rates into different densities of *Thrips tabaci* ranging from 5 to 50 per square meter.

## Results

Results showed that the predator was effective at different pest densities up to  $50/\text{m}^2$ , with an efficiency of  $77.6\pm 3\%$  on the 17<sup>th</sup> day after the predator was released. A high predator efficiency of  $90.2 \pm 3\%$  was observed at the beginning of pest attack. This indicates that the predator can adequately prevent or suppress pest build up if applied early enough. The predator was more effective if released when the pest density was still low, predator: thrips ratio 1:3 at temperature of  $25^\circ\text{C}$ . When pest density is very high the predator can suppress pest if applied at a ratio of 1:1 three times every 12 days.

***A. cucumeris* feeding on whiteflies in tomato plant.** The effects of *A. cucumeris* release rate on *T. vaporariorum* populations were determined in both a laboratory and greenhouse studies.

For the laboratory study, *T. vaporariorum* were collected from tomato plants in an infested greenhouse, then placed on tomatoes grown in the laboratory on liquid medium in 31 jars. The predator and prey were released into the jars at ratios of 3:1, 1:1, and 1:2, with a *T. vaporariorum*-only control. Whitefly eggs were counted daily. Additional *A. cucumeris* were released at 5, 15, and 25 days following the initial release.

The greenhouse experiment was conducted in a  $60\text{ m}^2$  greenhouse on the Spring tomato crop. The treatments were established in separate strips with 20 plants in each strip, and four replicates. Four to 8 plants in each replicate were infested with *T. vaporariorum* at a rate of 10 adults per plant. *A. mckenziei* were released at the same time at predator:prey ratios of 3:1, 1:1, and 1:2, with a *T. vaporariorum*-only control. Additional *A. cucumeris* were released at 5, 20, and 30 days following the initial release. The whitefly population density was determined daily by counting the number of whitefly eggs in each strip.

The average number of whiteflies per plant at release ratios of 3:1, 1:1, and 1:2 were reduced relative to the no release control in both the laboratory and field studies for the 35 day post release period. However, whitefly egg densities continued to increase following the release at all release ratios and in the no release control. The 3:1 release ratio provided the best control in both the laboratory and field study.

## Activity: Activity 2.3. Literature review

Dr. Tashpulatova has finished searching for literature and references for additional

studies of *Amblyseius cucumeris* and its prey (grain mites) concerning development at low temperature and at different relative humidity regimes. Data on *Amblyseius* sp worldwide rearing and application in different crops against spider mites and thrips have been found. A small pocket book for farmers about predator mites and their preys as well as thesis about study *A. mckenziei* effect on *Thrips tabaci* on onions have been revised for publication. In addition, various papers have been published and a complete list can be found in the publication section of this annual report.

## **Objective: 3. Develop and implement IPM extension/outreach and university education programs**

Integrated pest management (IPM) is a comprehensive approach that utilizes all available tools and methods for the management of pests (insects, disease and weeds). IPM is a knowledge and information intensive. The goal of the IPM extension/outreach and educational programs is to:

- To further develop the capacity of ATC of RAS, Kyrgyzstan and other international NGOs in the region to become regional centers for training of trainers in Central Asia.
- Develop a pool of trainers that can support Farmer Field Schools (FFS) and other outreach activities.
- Using the Training of Trainers (ToT) approach, integrate new information, teaching tools and methodologies into existing IPM curriculum in universities.

### **Activity: Activity 3.1. Review, develop and Implement IPM Training program in the Central Asia Universities.**

To enhance the university education, Dr. Aitmatov has conducted an inventory and analyzed IPM education programs in Central Asia. Data on IPM training programs in Agricultural universities in Central Asia was collected from the Kyrgyz Agrarian University, Kazakh National Agrarian University, and Kuban State Agrarian University. It was observed that there are differences in IPM related training programs. For example, in Kazakhstan IPM training program focus more on grain crops, whereas in Kyrgyzstan in addition of grain they focus on vegetable and fruit crops. The IPM training of the Kyrgyz Agrarian University is almost a replicate of the Russian training program. Based on this assessment, an IPM training program has been developed for the Student Field School (SFS). The first teaching program on IPM –SFS was initiated in November 2007 and class started in March 2008. Fifteen students (3 female and 12 male) were selected for the SFS and some of them are working on various research topics including: Introduction of nectar plant into existing vegetables farm systems as method of conservation of natural enemies in agroecosystems, impact of mulching on soil microflora, resistant of different of wheat varieties to Cereal Leaf Beetles and design of landscape. Drs. Saidov and Aitmatov

are providing the supervision for these research projects. Six lecturers and scientists selected from the Agrarian University and Biology-Soil Institute of the Kyrgyz Academy of Sciences have undergone a one-month course on facilitating Farmer Field School and Training of Trainers.

The IPM CRSP Program Central Asia has been working with the Kyrgyz to develop an IPM teaching curriculum and provide support to IPM training programs organized by ATC. The Agrarian university (size=500 students) offers higher education diploma (a 4.5 year program) in agriculture/agronomy. In collaboration with IPM CRSP, the Kyrgyz has plans underway to start offering IPM specialization from Sept 2009. IPM courses will be developed to teach students in their 4<sup>th</sup> year as a specialization. Currently, as a pilot initiative towards this plan, six senior students are working on IPM research projects through CRSP project. These students were selected from a pool of 30 potential students. They will graduate with a degree in Agronomy and a specialization in IPM. The long-term goal is to establish a national IPM center in collaboration and partnership with the Kyrgyz Agrarian University, National Academy of Sciences, the Botanical Garden, Ministry of Agriculture (Department of Pesticides and Plant Protection, Department of Forestry, Dept. of Quarantine and Inspection), etc. The goal is to train the best IPM trainers. The task of this center will be to develop the curriculum on IPM and establish educational facilities such as laboratories, equipments, and IPM teaching and research infrastructure.

Since the government has no extension system, the ATC-Rural Advisory Service (RAS)—established by the World Bank in 1998- is providing extension services through Farmer Field Schools (small-scale—with each FFS having 10-15 farmers). The IPM CRSP Project in Central through the Extension and Outreach component provides support to IPM related activity initiated by ATC to train master trainers and develop education and training materials for the TOT courses.

### **Activity: Activity 3. 2. Publish brochures and leaflets on various IPM issues and update of the IPM directory**

Dr. Murat has published many extension bulletins for use by farmers. Various trainings were also held focusing on methodology of IPM technology transfer to Training of Trainers, Farmers Field School and Student Field School. In collaboration with the World Vegetable Center, AVRDC-CAC, the IPM CRSP project in Central Asia has published a brochure “Weed in vegetable crops in Central Asia”. The brochure “Sunn pest management” has been translated into Kyrgyz and 100 copies were distributed to farmers, plant protection and extension personnel in Kyrgyzstan. The brochure “The Botanical pesticides” has been published in Russian and Kyrgyz languages and 300 copies were distributed. A manual on “Strengthening Students’ research Capacity using Student Field School” was developed by the IPM



CRSP Project in Central Asia in collaboration with the ATC and provided to the Kyrgyz Agrarian University. The electronic catalogue on IPM specialist in the region has been completed with new data of scientists from Uzbekistan and Kyrgyzstan.

## **Objective: 4. Evaluate wheat nursery for resistance to cereal leaf beetle (CLB)**

In the last decade, cereal leaf beetle (*Oulema melanopus L.*) has become an important pest of wheat and barley in Central Asia region. The goal of this study is to conduct research on screening 60 wheat lines for resistance to cereal leaf beetle (CLB) and survey of Cereal leaf beetle parasitoids in Central Asia region.

### **Activity: Activity 4. 1. Screening of wheat varieties for resistance to Cereal leaf beetle (CLB)**

In collaboration with the Institute of Plant Protection and Quarantine a screening of wheat varieties for resistance to Cereal leaf beetle (CLB) was conducted. Experiment consists of 130 wheat entries (increased from wheat 60 lines) obtained from the Biodiversity and Integrated Gene Management Program (BIGMP) of ICARDA. The comparison of 130 wheat lines has shown different response to cereal leaf beetle infestation. Some lines have shown no infestation whereas other have shown low scale infestation. It should be noted that the first year of the trial, wheat lines were conducted on comparatively low CLB infestation. The low population of CLB presence in wheat field was due to dried weather in spring 2008.

## **Objective: 5. Develop and implement regionalization and globalization strategy**

We recognize the importance of networking and linkages among various stakeholders and institutions working on IPM within the region and globally to help facilitate the transfer of technology, information and knowledge. Our partners ICARDA and other international NGO's have well-established regional networks in central Asia, and will serve as excellent vehicles for regionalization and globalization.

### **Activity: Activity 5.1. Membership in the International Association of Plant Protection Sciences (IAPPS)**

The three IPM CRSP team members and 10 other IPM specialists from Uzbekistan, Tajikistan, Kyrgyzstan, Turkmenistan and Kazakhstan have been provided

membership in the International Association of Plant Protection Sciences (IAPPS).

**Activity: Activity 5.2. Facilitate participation in regional IPM meetings and forums organized by ICARDA, Winrock International and other NGOs.**

The three IPM CRSP team members regularly attend regional meetings/conferences to present the USAID IPM-CRSP project activities.

- In May 2007, Drs. Saidov, Aitmatov and Tashpulatova attended the IPM CRSP Workshop in the Philippines.

- Dr. Nurali Saidov participated in a one-month long IPM internship at MSU in June 2008.

**Activity: Activity 5.3. Publication of the proceedings of the Central Asia Regional IPM Forum held in May 2007 in Dushanbe, Tajikistan.**

A regional IPM Forum was held in Dushanbe, Tajikistan from May 27 – 29, 2007. The goal of this regional IPM Stakeholders Forum was to share the IPM experiences of the Central Asia regional IPM project with various stakeholders in the region and provide a platform for interactive discussions on IPM collaborative research, education, outreach and capacity building activities with local institutions. More than 50 participants representing government, national agricultural research institutes (NARs), international agricultural research centers (IARCs), and NGOs from Tajikistan, Uzbekistan, Kyrgyzstan and Kazakhstan attended this Forum. The U.S. Team was represented by the representatives from USAID-Washington, D.C., Michigan State University, Washington State University, and North Carolina State University.

Proceedings covering topics discussed during this IPM Forum was published in February 2008. The proceedings of this forum highlighting major IPM challenges in Central Asia and areas of intervention by national and international programs have been prepared. Copies of the proceedings were sent to the IPM Forum participants and distributed to various stakeholders in Central Asia including university libraries, National Agricultural Research Organizations and NGOs.

**Activity: Activity 5.4. Facilitate participation of IPM specialists from the Central Asia region in the MSU's International Agroecology, IPM and Sustainable Agriculture short course.**

One participant Dr. Zarifa Kadirova from Uzbekistan participated in an one-month

internship program at Michigan State University (MSU) and Washington State University (WSU). She spent two weeks at WSU learning about virus diagnostic in Dr. Naidu Rayapati's Laboratory. The two last weeks of her internship were spent at MSU where she attended the International Short Course IPM at MSU. The objective of the internship was to build human capacities of institutions in Central Asia.

## **Objective: 6. Conduct impact assessment of the regional IPM program**

Our regional IPM program will assess economic, environmental (including biodiversity), institutional, and gender impacts. Socio-economists in the region in collaboration with the three IPM CRSP research/outreach fellows will help implement the impact assessment activities in collaboration with team leaders based at MSU and Virginia Tech (Prof. George Norton, leader of the global theme on the IPM CRSP impact assessment). We will seek technical assistance from Dr. Richard Bernsten, Dr. Mywish Maredia and other specialists at MSU in assessing the socio-economic and gender impacts of this project.

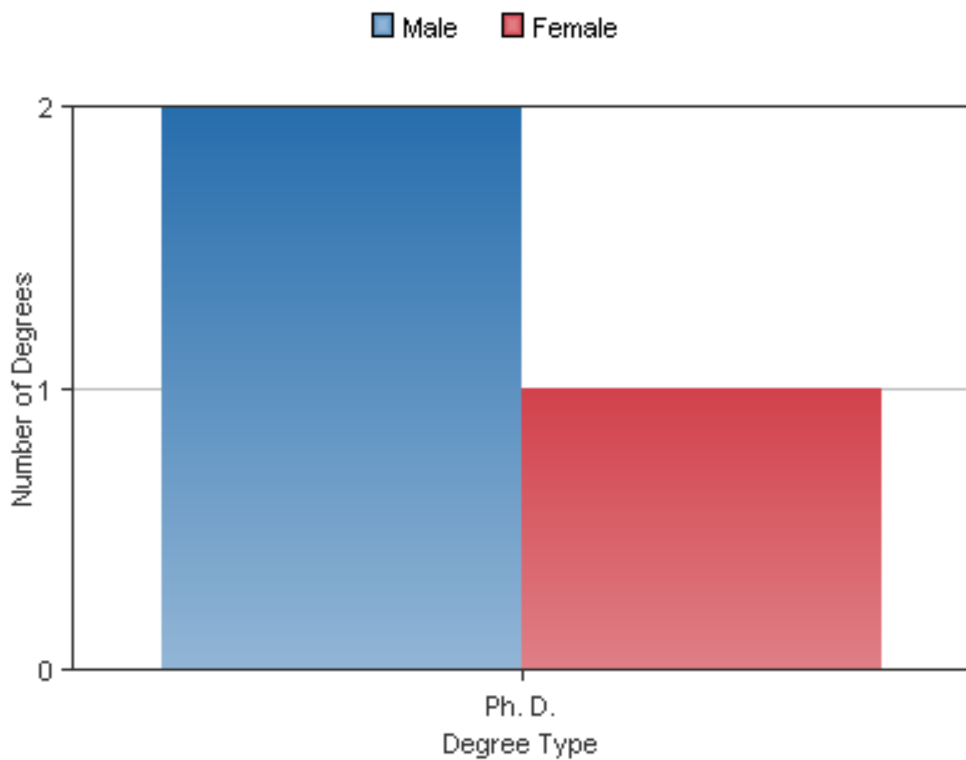
### **Activity: Activity 6.1. Initiate baseline survey of pest management practices in Kyrgyzstan and Uzbekistan or Tajikistan**

From July 20-31, 2008, Drs. Richard Bernsten and Mywish Maredia from the Department of Agricultural, Food and Resource Economics at Michigan State University traveled to Central Asia to conduct a baseline assessment of the IPM CRSP program in Central Asia. The objectives of the visit was to conduct a baseline assessment of the research, outreach and capacity building activities of the IPM CRSP project in Uzbekistan, Kyrgyzstan and Tajikistan to facilitate future impact assessment of project outputs and outcomes. The focus of baseline data/information collection in each of these countries was as follow:

- Uzbekistan: The status of biolabs, including 1) the availability of biocontrol agents; 2) mass rearing practices, and 4) the dissemination of bioagents by labs, government, and NGOs.
- Kyrgyzstan: The status of IPM-related training and outreach, including: 1) available training resources for academic programs; 2) inclusion of IPM in academic program curriculum; 3) status of farmer field schools, 4) availability of IPM training resources for outreach programs, and 5) inclusion of IPM material in extension programs.
- Tajikistan: The status of IPM CRSP activities related to the: 1) initiatives to collect native plants/species that are good sources of nectar for arthropod species, 2) introductions of native plants/species as sources of nectar for arthropod species; and 3) methods used to control pest (counterfactual).

General Impressions: The trip was very productive and informative. The research/extension fellows have a very small operating budget; but have been very productive, despite limited resources. The socio-economic team was extremely impressed with the research/extension fellows, their respective research programs, and the strength of relations that they have developed with their host-country colleagues. The project has generated numerous outputs, including publications, manuals and outreach materials.

## Training in Progress / Completed



Training Summary

	Male	Female
Bachelors	0	0
Masters	0	0
Ph. D.	2	1

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## **Degree Training**

Abdulaziz Davlatov (Ph. D.)  
Tavakal Mirzoev (Ph. D.)  
Kiyal Qosimova (Ph. D.)

## **Other Training**

Training of Research and Extension Fellows (Other)  
Undergraduate Research Projects Landscape Ecology (Research)  
Farmer Field School (Outreach)  
Farmer Field School (Field Day)  
Student Field School (Outreach)  
IPM Workshop (Workshop)  
Tomato Pest Management (Workshop)  
Seminar on Student Field School (Other)

## **Publications**

### **A. Papers and extension bulletins:**

K. M. Maredia and D. Baributsa (eds). 2008. Integrated Pest Management in Central Asia. Proceedings of the Central Asia Regional IPM Forum, Dushanbe, Tajikistan, May 2007.

K. M. Maredia and D. Baributsa. 2008. Ecologically-based Participatory and Collaborative Research and Capacity Building in Integrated Pest Management in Central Asia Region. In K. Maredia and D. Baributsa (eds). Integrated Pest Management in Central Asia. Proceedings of the Central Asia Regional IPM Forum, Dushanbe, Tajikistan, May 2007.

N. Saidov, D. Landis and M. Bohssini. 2008. A History of Habitat Management in the Former USSR and the Commonwealth of Independent States and Current Research in Central Asia. 2007. In K. Maredia and D. Baributsa (eds). Integrated Pest Management in Central Asia. Proceedings of the Central Asia Regional IPM Forum, Dushanbe, Tajikistan, May 2007.

B. Tashpulatova and F. Zalom. 2008. Enhancing the Efficiency and Product Lines of Biolaboratories in Central Asia. *In* K. Maredia and D. Baributsa (eds). Integrated Pest Management in Central Asia. Proceedings of the Central Asia Regional IPM Forum, Dushanbe, Tajikistan, May 2007.

M. Aitmatov, G. Bird, W. Pett and D. Baributsa. 2008. Development and Dissemination of IPM knowledge through Outreach and University Education Programs in Central Asia. *In* K. Maredia and D. Baributsa (eds). Integrated Pest Management in Central Asia. Proceedings of the Central Asia Regional IPM Forum, Dushanbe, Tajikistan, May 2007.

B. Tashpulatova. 2008. Integrated Pest Management in Uzbekistan. *In* K. Maredia and D. Baributsa (eds). *In* Integrated Pest Management in Central Asia. Proceedings of the Central Asia Regional IPM Forum, Dushanbe, Tajikistan, May 2007.

B. Tashpulatova. 2008. Integrated Pest Management in Uzbekistan. *In* K. Maredia and D. Baributsa (eds). *In* Integrated Pest Management in Central Asia. Proceedings of the Central Asia Regional IPM Forum, Dushanbe, Tajikistan, May 2007.

A. S. Saidov, N. S. Saidov, V. K. Nazirov. 2008. Pest Management Practices and Strategies in Tajikistan. *In* K. Maredia and D. Baributsa (eds). Integrated Pest Management in Central Asia. Proceedings of the Central Asia Regional IPM Forum, Dushanbe, Tajikistan, May 2007.

D. A. Landis, M. M. Gardiner, A. K. Fiedler, A. C. Costamagna and N. Saidov. 2008. Landscape Ecology and Management of Natural Enemies in IPM Systems. *In* K. Maredia and D. Baributsa (eds). Integrated Pest Management in Central Asia. Proceedings of the Central Asia Regional IPM Forum, Dushanbe, Tajikistan, May 2007.

N. Saidov and D. Landis. 2008. Evaluation of Flowering Plants to Attract Natural Enemies in Tajikistan (Russian). Bulletin of the Academy of Science of Tajikistan. *In press*.

N. Saidov, A. Jalilov, P. Geraedts and F. Zalom. 2008. Pocket book "Tomato pest and disease" (in Tajik). Published 500 copies through funding from the National Agricultural Advisory System (SENAS) in Tajikistan.

N. Saidov. September 2008. Landscape ecology and biological pest management. Agro-Advice, Quarterly electronic newsletter. Written for wider dissemination targeting various stakeholders such as authorities, local farmers, and NGO.

R. Mavlyanova, M. Aitmatov, N. Saidov and M. Shodmonov. 2008. Field guide "Weeds in vegetable crops" (in Russian). 36 p. 170 copies published.

M. Aitmatov, B.U. Masaidov and N. Saidov. 2008. Brochure on "Botanical pesticides to control vegetables and fruit pests" (in Kyrgyz and Russian). 46 pages. 100 copies published.

A. Murat, G. Bird and G. Kaseeva. 2008. Strengthening Student Research Capacity Through Student Field School. Article published in the Bulletin of the Kyrgyz Agrarian University. 6p. March 2008.

M. Aitmatov and N. Saidov. 2008. Translation of "Sunn Pest Management" brochure from English into Tajik and Kyrgyz. 100 copies published. Distributed to farmers in Tajikistan and Kyrgyzstan.

B. A. Tashpulatova, F. Zalom and J. T. Tumanov. 2008. Effect of *Amblyseius mckenziei* (Acarina:Phytoseiidae) on *Thrips tabaci* (Thysanoptera: Thripidae) on onion crop in Uzbekistan. Proceedings of the 1st International e-Conference on Agricultural BioSciences. Abstract ID: IeCAB08-145, <http://www.e-conference.elewa.org/agriculture>. June 2 - 16, 2008

B. A. Tashpulatova, F. Zalom and J. T. Tumanov. 2008. Usage of *Amblyseius cucumeris* (acar:phytoseiidae) to control of greenhouse whitefly *Trialeurodes vaporariorum* (westwood) (homoptera: aleyrodidae) on tomato plant. International conference "Actual directions in development of scientific research on potato and vegetable" Kaskelen (Kazakhstan), June 9-11, 2008, P. 50-53.

B. A. Tashpulatova, F. Zalom and J. T. Tumanov. 2008. Biological control of *Thrips*

*tabaci* (Thysanoptera: Thripidae) using *Amblyseius mckenziei* (Acarina:Phytoseiidae) on onion crop in Kyrgyzstan and Uzbekistan. Conference devoted to 50 years anniversary of Institute of Plant Protection and Quarantine – Kazakhstan, 6-8 November, 2008 (in press).

## **B. Abstracts:**

1. N. Saidov and D. Landis. 2008. Landscape Ecology and Biodiversity to Enhance Biodiversity and Biological Pest Management. Abstract accepted for oral presentation to Ninth International Conference on Dry Land Development: Sustainable Development in Dry Land-Meeting the Challenge of Global Climate Change, 7-10 November 2008, Alexandria, Egypt.
2. A. Saidov, N. Saidov, B. Nakhshiniev. 2008. Some aspects of climate change on fauna of Tajikistan. Abstract accepted for oral presentation to Ninth International Conference on Dry Land Development: Sustainable Development in Dry Land-Meeting the Challenge of Global Climate Change, 7-10 November 2008, Alexandria, Egypt.
3. Nurali Sh. Saidov and Douglas A. Landis. 2008. The Evaluation of Flowering Plants to Attract Natural Enemies in Tajikistan. The thesis sent to Scientific Conference dedicated to the 50<sup>th</sup> Anniversary of Kazakh Institute of plant protection and quarantine which will be held on November 6-8, 2008.

## **C. Posters:**

1. B. Tashpulatova and F. Zalom. Enhancing Efficiency and Expanding Product Lines of Central Asia Biolaboratories: Laboratory and Field Studies of the Predaceous Mites *Amblyseius cucumeris* and *Amblyseius mckenziei*, IPM CRSP Workshop on “Advancing Regional and Global IPM CRSP Programs”; May 19-21, 2008, Manila, Philippines.
2. N. Saidov and D. Landis. 2008. Landscape Ecology and Biodiversity to Enhance Biodiversity and Biological Pest Management. Presented during the IPM CRSP Workshop “Advancing Regional and Global IPM CRSP Programs”; May 19-21, 2008, Manila, Philippines.
3. M. Aitmatov and G. Bird. 2008. IPM Farmer Field School Extension and Outreach Programs in Central Asia. Presented during the IPM CRSP Workshop “Advancing Regional and Global IPM CRSP Programs”; May 19-21, 2008, Manila, Philippines.



# **Presentations**

Two power point presentations by Dr. Nurali Saidov at the “Organic Week workshop in Tajikistan” organized by the Oxfam GB in Tajikistan from 17-20 October 2007.

- Introduction to Organic Agriculture
- Pest management in organic crops.

K. Maredia and D. Baributsa. May 2008: Ecologically-based Participatory and Collaborative Research and Capacity Building in IPM in Central Asia Region, presentation during the IPM CRSP workshop, Manila, Philippines.