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. Highly educated and well-trained human resources are available, however, research facilities and infrastructure need to be upgraded and modernized. For example, 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 equipment and 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. 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. The participants are very eager to develop and strengthen collaborative linkages nationally, regionally and internationally.

4. 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.

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: Conduct research on landscape ecology to enhance biodiversity and biological pest management

A. Description
Increasing crop monocultures and decreasing landscape diversity are frequently accompanied by a reliance on agricultural pesticides to help suppress crop pests. The specific objectives of this research project are to adapt existing principles and practices of landscape management to enhance IPM for use in Central Asian agricultural landscapes, to research the use of native plants for conserving natural enemy communities and enhancing biological control of field crop pests in Central Asia and to investigate and implement the most promising landscape management techniques in partnership with governmental agencies, universities, NGOs and farmers in the region.

B. Expected impact
- Increased understanding and management of agroecosystems for enhancing biological control of pests and biodiversity.

Activity: Initiate collaborative research on landscape ecology in Central Asian agro-ecosystems

The three research fellows have completed their visits to MSU for developing a detailed plan for collaborative research:
- Dr. Nurali Saidov: Michigan State University with Dr. Douglas Landis
- Mr. Murat Aitmatov: Michigan State University with Dr. George Bird and Walter Pett
- Dr. Barno Tashpulatova: UC-Davis with Dr. Frank Zalom

As a result of this visit, a workplan for each component has been developed and activities are being implemented. Following his return to Central Asia, Dr. Sadiov led teams of collaborators to collect Central Asian native plants for propagation and future field testing. The expedition in Tajikistan occurred on 5-20 August, 2006 and included five scientists from, Tajik State National University, Institute of Zoology and Parasitology of the Academy of Sciences of Tajikistan and ICARDA. Participants covered 1200 km. of the Hissar and Khatlon regions and collected 32 local nectar plants (Table 1). The expedition in Kyrgyzstan included five scientists from the Botanical Research Institute of Academy of Sciences of Kyrgyz Republic and Bio-soil research Institute of Academy of Sciences of Kyrgyz Republic, and ICARDA. Participants covered 2000 km. of the Isiqkul, Talas and Jui regions and collected 30 local nectar plants (Table 2).

Table 1. List of plant species collected in Tajikistan, 2006.
Table 2. List of plant species collected in Kyrgyzstan, 2006.

##	Family	Genus and species	Common Name	Plant Type
1	Tamaricaceae	*Tamarix Sp.*	Tamarix	shrub
2	Rosaceae	*Rosa Sp.*	Dog rose	subshrub
3	Rosaceae	*Spirea Sp.*	Spirea	shrub
4	Lamiaceae (Labiatae)	*Origanum vulgare L.*	Oregano	forb
5	Lamiaceae (Labiatae)	*Ziziphora clinopodioides Lam.*	Interrupta	forb
6	Lamiaceae (Labiatae)	*Mentha sylvestris L.*	Horse mint	forb
7	Asteraceae (Compositae)	*Carthamus tinctorius L.*	Safflower	forb
8	Fabaceae(Papilionaceae)	*Glycyrrhiza glabra L.*	Licorice	forb
9	Malvaceae	*Alcea nudiflora (Lindle) Boiss.*	Alcea	forb
10	Liliaceae	*Eremurus Sp.*	Eremurus	forb
11	Alliaceae	*Allium Sp.*	Wild Allium	forb
12	Lamiaceae (Labiatae)	*Salvia deserta Schangin*	Clary sage, Europe sage	forb
13	Lamiaceae (Labiatae)	*Salvia officinalis L.*	Clary sage, Europe sage	forb
14	Malvaceae	*Althaea officina L.*	Althaea	forb
15	Asteraceae (Compositae)	*?ster novi-belgii L*	?ster	forb

16	Lamiaceae (Labiatae)	*Betonica foliosa Rupr.*	Betonica	forb
17	Onagraceae	*Epilobium hirsutum L.*	Epilobium	forb
18	Iridaceae	*Iris Sp.*	Iris	forb
19	Capparaceae (Capparidaceae)	*Capparis spinosa L.*	Caperberry, caperbush	shrub
20	Lamiaceae (Labiatae)	*Nepeta cataria L.*	Catnip	forb
21	Lamiaceae (Labiatae)	*Nepeta pannonica L.*	Catnip	forb
22	Lamiaceae (Labiatae)	*Hyssopus officinalis L.*	Hyssop	forb
23	Plantaginaceae (Scrophulariaceae)	*Linaria Sp.*	Linaria	forb
24	Asteraceae (Compositae)	*Echinops Sp.*	Echinops	forb
25	Lamiaceae (Labiatae)	*Leonurus turkestanicusV. Kreczetovicz & Kuprianova*	Leonurus	forb
26	Boraginaceae	*Echium vulgae*	Echium	forb
27	Lamiaceae (Labiatae)	*Thymus marchallianus Willd.*	Thymus	forb
28	Asteraceae (Compositae)	*Cychorium intybus L.*	Chicory	forb
29	Onagraceae	*Oenothera biensis L.*	Evening primrose	forb
30	Lamiaceae (Labiatae)	*Marrubium alternidens Rech.f.*	Marrubium	forb

##	**Family**	**Genus and species**	**Common Name**	**Plant Type**
1	Tamaricaceae	*Tamarix arceuthoides Bunge*	Tamarix	shrub
2	Rosaceae	*Rosa canina L.*	Dog rose	subshrub
3	Lamiaceae (Labiatae)	*Origanum tyttanthum Gontsh.*	Oregano	forb
4	Lamiaceae (Labiatae)	*Ziziphora interrupta Juz.*	Interrupta	forb
5	Lamiaceae (Labiatae)	*Mentha asiatica Boriss.*	Horse mint	forb
6	Asteraceae (Compositae)	*Carthamus tinctorius L.*	Safflower	forb
7	Fabaceae(Papilionaceae)	*Glycyrrhiza glabra L.*	Licorice	forb
8	Malvaceae	*Alcea nudiflora (Lindle) Boiss.*	Alcea	forb
9	Apiaceae (Umbelliferae)	*Dacus carota L.*	Wild carrot	forb
10	Liliaceae	*Eremurus Olgae Rgl.*	Eremurus	forb
11	Alliaceae	*Allium rosenbachianum Regel*	Showy Onion	forb
12	Alliaceae	*Allium Sp.*	Wild Allium	forb
13	Lamiaceae (Labiatae)	*Salvia sclarea L.*	Clary sage, Europe sage	forb
14	Apiaceae (Umbelliferae)	*Conium maculatum L.*	Poison hemlock	forb
15	Scrophulariaceae	*Verbascum songaricum Schrenk*	Mullein	forb
16	Fabaceae (Leguminosae, Papilionaceae)	*Astragalus sieversianus Pall.*	Milk-vetch	forb
17	Fabaceae (Leguminosae)	*Onobrychis pulchella Schrenk*	Onobrychis	forb
18	Apiaceae (Umbelliferae)	*Prangos bucharica B. Fedtsch.*	Prangos	forb
19	Liliaceae	*Tulipa Sp.*	Tulip	forb
20	Capparaceae (Capparidaceae)	*Capparis spinosa L.*	Caperberry, caperbush	shrub
21	Boraginaceae	*Lindelofia macrostyla (Bunge) M. Popov*	Lindelofia	forb

22	Lamiaceae (Labiatae)	*Eremostachys alberti Regel*	Eremostachys	forb
23	Asteraceae (Compositae)	*Pyrethrum parthenifolium Willd.*	Pyrethrum	forb
24	Asteraceae (Compositae)	*Achillea filipendulina Lam.*	Fernleaf yarrow	forb
25	Apiaceae (Umbelliferae)	Elaeosticta hirtula Regel at Schmalh.	Elaeosticta	forb
26	Campanulaceae	*Codonopsis clematidea (Schrenk) Clearke*	Asian bellflower	forb
27	Polygonaceae	*Polygonum coriarium Grig.*	Toron	forb
28	Apiaceae (Umbelliferae)	*Galagania fragrantissima Lipsky*	Shibit	forb
29	Guttiferae	*Hypericum scabrum L.*	Hypericum	forb
30	Fabaceae (Leguminosae)	*Lathyrus mulkak Lipsky*	Lathyrus	forb
31	Asteraceae (Compositae)	*Senecio renardii C. Winkl.*	Senecio	forb
32	Lamiaceae (Labiatae)	*Hyssopus seravschanicus (Dubjan)* Parij	Hyssop	forb

After the collection of these species, in collaboration with botanical and entomological researchers from the Tajik State National University and Institute of Zoology and Parasitology of the Academy of Sciences of Tajikistan, Dr Sadiov established research plots to test the attractiveness of 12 known and potential resources plants currently available in Central Asia (Table 3). A similar study was also initiated in Kyrgyzstan in 2006 with researchers from Botanical Research Institute of Academy of Sciences of Kyrgyz Republic and Bio-soil research Institute of Academy of Sciences of Kyrgyz Republic (Table 4). These initial tests revealed that *Anethum graveolens* L., *Coriandrum sativum* L., *Calendula officinalis* L., *Celosia cristata* L., *Foeniculum vulgare* Mill., *Impatiens balsamina* L. and *Ocimum basilicum* L. were the most attractive to insect natural enemies in the Tajikistan study and A. graveolens L., *C. sativum* L., *C. officinalis* L., *F. vulgare* Mill. and *O. basilicum* L. were most attractive in the Kyrgyzstan study. Representative natural enemy taxa collected at plants during bloom period in 2006 included: Vespidae, Sphecidae, Ichneumonidae, Braconidae, Chalcidoidea, Coccinellidae, Nabidae, Anthocoridae, Syrphidae and Tachinidae.

Table 3. List of plant species established at the research plot in Tajikistan, 2006.

##	Family	Genus and species	Common Name	Plant Type
1	Apiaceae (Umbelliferae)	*Anethum graveolens L.*	Dill	annual
2	Apiaceae (Umbelliferae)	*Coriandrum sativum L.*	Coriander	annual
3	Asteraceae (Compositae)	*Calendula officinalis L.*	Marigold	annual
4	Amaranthaceae	*Celosia cristata L.*	Cockscomb	forb
5	Asteraceae (Compositae)	*Tagetes erecta L.*	African marigold	annual
6	Apiaceae (Umbelliferae)	*Foeniculum vulgare Mill.*	Sweet fennel	forb
7	Balsaminaceae	*Impatiens balsamina L.*	Balsam	forb
8	Lamiaceae (Labiatae)	*Ziziphora interrupta Juz.*	Interrupta	forb
9	Asteraceae (Compositae)	*Aster Sp.*	Aster	forb
10	Amaranthaceae	*Celosia argentea L.*	Cockscomb	forb
11	Lamiaceae (Labiatae)	*Ocimum basilicum L.*	Sweet basil	forb
12	Asteraceae (Compositae)	*Helianthus annuus L.*	Common sunflower	forb

Table 4. List of plant species established at the research plot in Kyrgyzstan, 2006.

##	Family	Genus and species	Common Name	Plant Type
1	Apiaceae (Umbelliferae)	*Anethum graveolens L.*	Dill	annual
2	Apiaceae (Umbelliferae)	*Coriandrum sativum L.*	Coriander	annual

3	Asteraceae (Compositae)	*Calendula officinalis L.*	Marigold	annual
4	Asteraceae (Compositae)	*Tagetes erecta L.*	African marigold	annual
5	Apiaceae (Umbelliferae)	*Foeniculum vulgare Mill.*	Sweet fennel	forb
6	Solanaceae	*Petunia nana compacta*	Petunia	forb
7	Primulaceae	*Primula veris L.*	Primula	forb
8	Asteraceae (Compositae)	*Aster Sp.*	Aster	forb
9	Lamiaceae (Labiatae)	*Ocimum basilicum L.*	Sweet basil	forb
10	Asteraceae (Compositae)	*Helianthus annuus L.*	Common sunflower	forb

Objective: Enhance efficiency, products line and crop usage of Central Asian biolaboratories

A. Description
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.

B. Expected Impact
Increased efficiency and product lines of Biolaboratories in Central Asia region

Activity: Improving efficiency and expanded product lines of biolaboratories in the central Asia region

Dr. Tashpulatova and Dr. Zalom have identified predatory mites of the family Phytoseiidae for the initial studies since these are not currently reared in Uzbekistan. Depending on species, their target pest range includes spider mites, thrips and whiteflies. Some literature, written in Russian, on predator mite species present in Uzbekistan and past studies conducted there has been obtained and reviewed. Additional search for literature on predator mites and the establishment of Central Asia biolaboratories is planned during the winter. Dr. Tashpulatova visited UC Davis in May and June, 2006, to study identification, manipulation, and rearing of predator mites in California, and to determine which Phytoseiid species might be most applicable to conditions in Central Asia. She visited several commercial insectaries rearing the predators, and went to the field to view predator releases and mite sampling. It was determined that rearing methods used in California are not completely transferable to those in Central Asia because of the lack of availability of controlled conditions in environmental chambers or greenhouses necessary for mass-rearing some of the species. A few species can be reared without these requirements, and these have become the most promising candidates for initial studies. Preliminary studies were conducted in at UC Davis to determine methods by which the predators and prey mite colonies could be maintained. In the end, four Phytoseiid species were identified for further study, *Galendromus (Metaseiulus) occidentalis, Neoseiulus californicus*, *Amblyseius swirskii,* and *Amblyseius cucumeris*. All of these species are present in hot and fairly dry regions of the world, similar to areas of Central Asia, and all are either native to the Middle East and Central Asia, or are regarded by the EPPO Panel on Safe Use of Biological Control to be safe. A permit was obtained to transport these species to Uzbekistan to enable further laboratory work.

Following her return to Central Asia, Dr. Tashpulatova visited the Kyrgyzstan Republic Center of Biological Means Production for Plant Protection (RCBMPPP), where Center Director Janubay Tumanov, she was introduced to researchers rearing the predator mite *Amblyseius mckenzii*, which is being released for thrips control in onions. A collaboration has been established to further study this species as well as *A. swirskii,* and *A. cucumeris* which may be amenable to mass-rearing in the same manner using the prey mite *Acarus siro*, a common species found in Central Asian stored products. A study to compare rearing of all 3 predators on *A. siro* versus the mold mite, *Tyrophagus putrescentiae*, was conducted. Preliminary results indicate that *T. putrescentiae* may be the better prey species for rearing the *Amblyseius* species.

Objective: Develop and implement IPM extension/outreach and university education programs

A. Description
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 will be to:

- To further develop the capacity of ATC of RAS, Kyrgyzstan and Winrock International, Uzbekistan 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.

B. Expected impact
New and enhanced IPM training materials for IPM trainers and education providers.

Activity: Develop an inventory of IPM educational resources and a directory of IPM specialists in the region

Murat Aitmatov visited the laboratories of George Bird and Walter Pett at Michigan State University from June 1 through mid July 2006. At MSU, Murat Aitmatov developed a plan of work, budget, and evaluation metrics for the outreach/extension component . Dr. Aitmatov attended the MSU IPM short course from June 17-28, 2006. In addition, he visited the MSU Cooperative Extension offices in mid and southern Michigan, and had access to the MSU Library and their electronic databases.

After his return to Central Asia, Dr. Aitmatov has been working with partners in Tajikistan to develop electronic databases of all IPM consulting services and research organizations in country. This database will be shared with all of the above organizations and other Central Asia countries to allow for sharing of IPM information. In collaboration with Tajikistan Agrarian University, Dr. Aitmatov has been working to develop IPM training modules for their training of trainers for FFS. This work resulted in Tajik agrarian university selecting six trainers - teachers, from Institute of Zoology and Parasitology of the Academy of Sciences of Tajikistan, from Plant Protection and Quarantine Research Institute of Tajik Agricultural Academy of Sciences (TAAoS) and have provided o.2 ha demonstration site.

Activity: Initiate development of IPM training modules/materials that can be integrated into crop management training programs offered by the NGOs and government institutions

Progress not reported yet.

Objective: Develop and implement regionalization and globalization strategy

A. Description
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. Due to the limited resources, our initial focus will be on Uzbekistan and Kyrgyzstan. However, we will make all possible efforts and avenues to share the research results and IPM information to IPM stakeholders in the region beyond these two countries. Our two partners - ICARDA and Winrock International have well-established regional networks in central Asia, and they will serve as excellent vehicles for regionalization and globalization. We will use the following strategy to foster interactions, cooperation and linkages among various stakeholders.

B. Expected impact
Enhanced regional cooperation and building new linkages with the regional and global IPM community.

Activity: Membership in the International Association of Plant Protection Sciences (IAPPS)

Progress not reported yet.

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

Progress not reported yet.

Activity: Facilitate participation of IPM specialists from the region in the MSU's international Agroecology, IPM and sustainable agriculture short course

Drs. Nurali, Tashpulatova and Aitmatov attended the Intenational Short Course on on Agroecology, Integrated Pest Management (IPM) and Sustainable Agriculture in June 2006.
In December 2005, Mrs. Inobat Avezmuratova, the Deputy Director of Winrock International Farmer to Farmer program in Central Asia visited the Advisory Training Center of the Rural Advisory Services (ATC-RAS) in Kyrgyzstan. The ATC-RAS is a specialized non-governmental organization focusing on implementing various activities on Integrated Production Management applying the Farmer Field School (FFS). The purpose of the trip was to build linkages and share knowledge with existing NGOs working in the area of FFS and training the trainers (TOT). As a follow-up to this trip, Mrs. Avezmuratova attended the International Short Course in Agroecology, Integrated Pest Management and Sustainable Agriculture at Michigan State University in June 2006. During this course, she interacted with various extension specialists and researchers working in the area of technology transfer. Travel support to Kyrgyzstan and USA was paid by Michigan State University through the IPM-CRSP Project in Central Asia.

Objective: Conduct impact assessment of the regional IPM program

A. Description
Our regional IPM program will assess economic, environmental (including biodiversity), institutional and gender impacts. The project has identified two socio-economists in the region—Dr. Shuhrat Sattarov (Samarkand Agricultural Institute) and Ms. Nodira Khusanova (Human Resource Development Center, Tashkent, Uzbekistan) who will help us implement the impact assessment activities. They will work closely with the socio-economics 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 input from Dr. Collette Harris (formerly with the Virginia Tech University) and the Women in International Development (WID) office at MSU in assessing the gender impacts of the project.

B. Expected impact
Enhanced accountability of public investments in this project.

Activity: Initiate baseline survey of pest management practices in Uzbekistan and Kyrgyzstan

Progress not reported yet.

Training in Progress / Completed

No training numbers entered yet.

Publications

Directory of IPM Specialists available at the IPM-CRSP website:

http://www.oired.vt.edu/ipmcrsp/regional/IPM%20Directory%202006-Central%20Asia.pdf

Biological control demonstrations plots in field crop in Tajikistan, 2006

Nectar plants attract insect pollinators in demonstration plots in Tajikistan

Michigan State University
Agroecology, Integrated Pest Management
& Sustainable Agriculture Short Course
June 18-28, 2006

Three IPM CRSP researchers (Drs. Saidov, Aitmatov and Tashpulatova) and one Winrock Trainer (Ms. Avezmuratova) attended the IPM Course

Presentations

- Sadiov, N. “Agricultural Landscape Management for Enhancing Biological Pest control” (in Russian). August 30, 2006 Institute of Zoology and Parasitology of the Academy of Sciences of Tajikistan.

- Sadiov, N. "Biological Conservation through Habitat Management.” Talk presented at the Regional Workshop on "Assessing the importance of Colorado beetle and the emergence of new pest constraints in potato production system of Central Asia and the Caucasus" October 3-6, 2006 in Tashkent. Organized by The International Potato Center CIP, Li Lima, Peru.

- Maredia, K. and D. Baributsa. USAID IPM-CRSP Regional Integrated Pest Management Centers, 5th National IPM Symposium. St. Louis, Missouri. April 6, 2006.