

FTFNIPM Trip Report

Name of the Traveler: Rangaswamy Muniappan
Affiliation: Principal Investigator, FTFNIPM
Country Visited: Nepal
Places Visited: Kathmandu, Nepalgunj, Birendranagar, Tikapur, and Rampur

Purpose of the Visit:

To conduct workshops on management of fall armyworm; to review progress made on rearing of parasitoids of fall armyworm at NARC laboratories, Agricultural and Forestry University, Far Western University and Provincial laboratories; and evaluate current status of fall armyworm in Nepal.

Description:

I reached Kathmandu on March 8th around 9.00 pm. On 9th, at 9.00 am I met with iDE team and briefly reviewed the program prepared for my trip. At 10.00 am, the CRS team briefed me on security, general orientation, logistics, reporting formats and others at the CRS office. Afterwards we visited NARC at Khumaltar to meet with Dr. Ajay Bajracharya, Chief of Entomology; Department of Agriculture to meet with Dr. Hari Bdr KC, Acting DG; and Plant Quarantine and Pesticide Management Center to meet with Ms. Sabitri Baral, Chief and her staff. In the evening I traveled to Nepalgunj with Mr. Komal Pradhan, Mr. Lalit Sah, Mr. Nirmal Gadai and Mr. Sanket Parajuli.

On March 10th, Ms. Kalpana Dhital and Mr. Prabesh Koirala from iDE joined the team and we visited KISAN 2 office and interacted with them on FAW situation and management options. KISAN 2 is working with 200 private sector partners in eight districts addressing 23,000 farmers. Currently it is concentrating on fine rice and industrial maize. Then we visited Agricultural Knowledge Center and interacted with Mrs. Shrada Gyawali, Mr. Dipak Kumar KC, and Mr. Ram Prakash Ydesh. Later, we visited its Pesticide Residue Testing laboratory. In the afternoon, we visited Khajura Plant Protection Laboratory and met with Mrs. Ariza Shrestha and Mr. Rahul Pandey. About 8 months ago, this laboratory received a shipment of *Corcera cephalonica* eggs from NMRP, Rampur but the eggs did not hatch. It has not taken any further action to start the culture since then.

On March 11th we visited 'Smart Farmers' Cooperative' and interacted with the members on FAW management. Then, we walked to one of their maize fields and showed them FAW egg masses and the parasitoids *Telenomus remus* and *Trichogramma* sp. ovipositing on the eggs. Afterwards we visited Prime Minister's Agricultural Modernization Project and met with Mr. Rakesh Kumar Ojha and discussed about current FAW situation. He mentioned that he has

authorization to release two laksh rupees for emergency pest management activities. Then we visited Rapti Sonari Maize Seed Cooperative and interacted with the members and explained available options for FAW management. They mentioned that the cutworms, *Agrotis ipsilon* and *Myrthemia separata* are problems in young maize plants. We also visited one of their maize fields and found several pupae of a *Cotesia* sp. parasitoid that parasitizes young FAW larvae.

On March 12th we conducted a workshop on FAW management at the Kalptaru Hotel and there were 47 participants including government officials, NGOs, and farmers. Agenda of this workshop is given in Appendix A. I gave a PowerPoint presentation on Fall Armyworm Management Options. We also set up a microscope for the participants to view FAW egg mass, newly emerged larvae and parasitoid *Trichogramma* sp. In the afternoon we traveled to Birendranagar.

On March 13th we visited maize farms at Gurbakot municipality where farming is done mostly by women. Maize plants were about one foot in height and there was no FAW infestation. FAW population is yet to reach this area as the temperatures are still cooler in this part. Cutworms *Agrotis ipsilon* and *Myrthemia separata* were considered as problems by the farmers. We had discussion on FAW management with a group of about a dozen women. Later, we visited Pabithra Seed Center which has 1,230 members who produce seeds. It markets 30 to 40 tonnes of maize seeds in a year. We discussed about FAW management with Mr. Meshel Kuna, manager of the center and recommended seed treatment with a systemic insecticide. He was amicable for the recommendation and he asked us to explore details on the formulations that could be used for treatment of commercial maize seeds and their availability in Nepal. Then we visited a small-scale maize farmer. His field was clean and there was no FAW infestation. He was aware of using pheromone lures for monitoring insect pests.

On March 14th at 9.30 am, we met with Mr. Chhatra Bahadur Shahi, an agrovet and discussed with him on various IPM tools that he is marketing. He mentioned an organic formulation “Herbogen” to be effective against FAW. He markets botanical, biological and chemical pesticides. His observation was that FAW incidence is decreasing in the last couple of years. Around 11.00 am we visited Mr. Chitra Bdr Rokaya, Chief, ADD, Karnali Province and discussed about FAW situation and its management options. Later, we visited the Provincial Plant Protection Laboratory which was practically empty except a few Petri dishes of *Trichoderma* kept in the refrigerator.

In the afternoon, we conducted a workshop on FAW management at the Hotel Namaste. An agenda of this workshop is given in Appendix B. I gave a PowerPoint presentation on Fall Armyworm Management Options. There were 37 participants including government officials,

NGOs, agrovets and farmers. We set up a microscope for the participants to observe egg masses and larvae of FAW, and parasitoid pupae.

On March 15th we traveled from Surket to Tikapur and on the way we visited an agrovet and a company being started for production compost with different bioagents that produce nutrients for large scale marketing. We recommended incorporating *Trichoderma* in it.

At Sapti Bazar, we examined a maize field and collected several pupal colonies of the parasitoid *Cotesia* sp. that attacks later stages of FAW larvae.

At 3.30 pm we met with the officials of the municipality, Mr. Sushil Nyeupane of Far Western University and his students. After a brief discussion with them, we visited the university farm and a nearby private farm where maize was grown. Both fields were free of FAW.

On March 16th we visited Far Western University campus and met with Mr. Kiran Bhatta, Head of the Department of Plant Protection, Mr. Sushil Nyeupane, Assistant Professor of Entomology, some faculty members and students. I gave a PowerPoint presentation on FAW management options. Five undergraduate students presented their thesis proposals to us. Later we visited the Entomology Lab where they had a cage with adults of *Cotesia* sp. emerged from field collected FAW larvae. They also showed us their field experiments started a couple of weeks ago.

We traveled from Tikapur to Nepalgunj and took the evening flight to Kathmandu.

On March 17th we attended to the preparations for the field trip to Rampur on March 20th and the workshop on March 22nd.

On March 18th I attended to preparation of the Volunteer Report.

March 19th – Sunday. Report preparation continued.

March 20th – In the morning, I traveled to Bharatpur with Dr. Lynn Schneider, Mr. Nirmal Gadal, Mr. Komal Pradhan, and Mr. Lalit Sah. At 9.00 am we met with Mr. Robin Adhikari and discussed about biopesticide products produced and marketed at the Agricare facility. He gave a tour of the facility. At 10.45 am, we visited National Maize Research Program facility at Rampur and we were received by Dr. Chitra Bahadur Kunwar, Director of the station. Dr. Ghanashyam Bhandari, Entomologist gave a PowerPoint presentation of his work on rearing of the FAW parasitoids and later we toured his laboratory and field facilities. At 1.25 pm, we visited Agriculture and Forestry University. Dr. Punya Prasad Regmi, Vice Chancellor and his administrative team gave us a briefing on various activities carried out at the University. Later

we visited Dr. Sunder Tiwari's Entomology laboratory. Dr. Tiwari presented fall armyworm research at his laboratory and three of his Masters' students presented their research proposals.

March 21st – In the morning, we returned to Kathmandu and at 10.30 am met with Dr. Markandeya Gorantla of ATGC and Mr. Gurbinder Singh Gill of Agribusiness Associates at the Himalaya Hotel. Prepared for the next day's workshop.

March 22nd – Conducted the “Fall Armyworm (FAW) in Nepal: Current Status & Future Strategy for Sustainable Management” workshop. There were about 60 participants (Appendix C). I gave a PowerPoint presentation entitled, “Fall Armyworm Management Options for Nepal”. I also displayed FAW parasitoids in a microscope and arranged pheromone lures on a table for the participants to view.

March 23rd - At 11.00 am I met with Mr. Nirmal Gadai and Mr. Prachanda Kattel of CRS, Ms. Saroja Thapa, Mr. Komal Pradhan, and Mr. Lalit Sah of iDE for an exit briefing. I gave copies of the books “Arthropod Pests of Horticultural Crops in Tropical Asia” and “IPM Packages for Tropical Crops to the CRS representatives for placing them in the CRS library. I handed over 10 packets of *Agrotis segetum* pheromone lures to Ms. Kalpana Dhital. Also, I gave four vials of FAW parasitoids preserved in alcohol to Mr. Lalit Sah to be handed over to Mr. Sushil Nyeupane so that he can take them to the ICAR laboratory at Bengaluru for identification

At 2.00 pm, Mr. Komal Pradhan, Mr. Lalit Sah and I met with Dr. Shreemat Shrestha, Director, Crops and Horticulture Research of NARC and Mr. Sudeep Upadhyaya of NARC Entomology Center. At 4.00 pm, I gave pheromone lures of *Tuta absoluta* and diamondback moth to Mr. Lalit Sah and pheromone lures and gel formulations of melon fly and Oriental fruit fly to Mr. Sudeep Upadhyaya of NERC.

March 24th –Updated Volunteer's Report. Left the hotel to the airport for the return journey at 5.00 pm.

March 25th – Returned to Blacksburg at 7.00 pm.



Fig. 1: FAW Workshop at Kathmandu



Fig. 2. Participants of the workshop viewing FAW caterpillars in a microscope.



Fig. 3: Participants of the workshop.

Appendix A

Provincial level Workshop on “FAW in Nepal: Current Status and Future Strategy for Sustainable Management”

Program Agenda

Date: March 12, 2023, Sunday

Venue: Venue: Hotel Kalpataru, Nepalgunj

MC: Kalpana Dhital, FTFNIPM/iDE Nepal

Time	Activities	Responsible person	Remarks
8:30:00 AM-9:00 AM	Breakfast	All	
9:00 AM-9:15 AM	Registration	Mr. Prabesh Koirala, FTFNIPM/iDE Nepal	
9:15 AM-9:30 AM	Introduction	All	
9:30 AM-9:40 AM	Welcome and objective of program	Mr. Komal Pradhan, FTFNIPM/iDE	
	Presentation		
9:40 AM-10:00 AM	Presentation of FTFNIPM program on FAW and biological control	Mr. Lalit Sah, FTFNIPM/iDE	
10:00 AM-10:30 AM	FAW damage status, Management and future strategy	Mrs. Uma Shankar Poudel PPO, /PPL, Nepalgunj, Lumbini Province	
10:30 AM-11:30 AM	Biological control of FAW in Nepal and others Asian countries	Dr. Rangaswamy Muniappan	
11:30 AM -12:30 PM	Discussion	All	
12:30 PM-1:00 PM	Few words (AKC,PPL,PMAMP,NARC,FTF projects and others)		
1:00 PM-1:10 PM	Vote of Thanks	Nirmal Gadai/F2F,CRS	
1:10 PM-1:20 PM	Closing Remarks	Chairperson	
1:20 PM-2:00 PM	Lunch		

Appendix B

Provincial level Workshop on

“FAW in Nepal: Current Status and Future Strategy for Sustainable Management”

Program Agenda

Date: March 14, 2023, Wednesday

Venue: Venue: Hotel Namaste, Birendranagar, Surkhet

MC: Kalpana Dhital, FTFNIPM/iDE Nepal

Time	Activities	Responsible person	Remarks
1:00 PM-1:30 PM	Tea, cookies /Registration	All	
1:30 PM-1:45 PM	Chairperson: Chitra Bahadur Rokaya, ADD, Surkhet Chief Guest: Dr. Lekh Raj Dahal Secretary, MoLMAC, Karnali Province Special Guest: Mr. Pushpa Raj Poudel (PMAMP, Chief-Karnali Guests: Dr. Rangaswamy Muniappan, PI, FTFNIPM/VT, USA	All	
1:45 PM-2:00 PM	Welcome and objective of program	Mr. Komal Pradhan, COP, FTFNIPM/iDE Nepal	
	Presentation		
2:00 PM-2:30 PM	Presentation of FTFNIPM program on FAW and biological control	Mr. Lalit Sah, FTFNIPM/iDE Nepal	
2:30 PM-3:00 PM	FAW current Status, Management and future strategy in Karnali Province	Mr. Yam Bahadur Rana (Crop Development Officer, ADD, Birendranagar Surkhet)	
2:30 PM-3:30 PM	Biological control of FAW in Nepal and others Asian countries	Dr. Rangaswamy Muniappan, PI, FTFNIPM/VT, USA	
3:30 PM-4:00 PM	Open discussions	All	

4:00 PM-4:30 PM	Few words (MOLMAD, DOAD, PMAMP, Integrated Agri. Lab. and others)		
4:30 PM-4:40 PM	Vote of Thanks	Kalpana Dhital, FTFNIPM/iDE	
4:40 PM-4:50 PM	Closing Remarks	Secretary, MoLMAC, Karnali Province	
4:50 PM- 5:30 PM	Tea/Snacks	All	

Appendix C

National Workshop on “FAW in Nepal: Current Status and Future Strategy for Sustainable Management”

Program Agenda

Date: March 22, 2023, Wednesday

Venue: Himalaya Hotel, Kupandole, Lalitpur

MC: *Shradha Bhatta/iDE Nepal*

Time	Duration	Topics	Point Person
8:00-9:00	60 minutes	Registration and followed by Breakfast	Roshnee Thapa, iDE Nepal
		Inauguration session	
9:00-9:10	10 minutes	Chairperson: Dr. Hari Bahadur KC, Acting DG, DOA Chief Guest: Dr. Govind Prasad Sharma, Secretary, MOALD Special Guest: Ms. Sabitri Baral, Chief, PQPMC, Dr. Shreemat Shrestha, Director, Crop & Horticulture Director, NARC, Khumaltar Guests: Dr. Rangaswamy Muniappan/ Mr. Gurbinder Singh Gill/ Dr. Markandeya Gorantla, ATGC, Hyderabad, India	All

9:10-9:20	10 minutes	Welcome and objective of the program	Komal Pradhan, COP, FTFNIPM/iDE Nepal
9:20- 9:40	20 minutes	Opening Remarks - Saroja Thapa, Director - Global Operations, Asia, iDE - Sabitri Baral, Chief, PQPMC	
9:40- 10:20	40 minutes	Key note Speaker: Fall armyworm: spread, biology, and management options”	Rangaswamy Muniappan, VT, USA
10:20-10:40	20 minutes	Fall Armyworm Management: Current Country status and its Managements in Nepal	Sabitri Baral, and Debraj Adhikari, PQPMC
10:40-10:50	10 minutes	Few Words from Dr. Shreemat Shrestha, Director, Crop and Horticulture, NARC Dr. Govinda Prasad Sharma, Secretary, MoALD	Dr. Govinda Prasad Sharma, Secretary, MOALD
10:50-11:00	10 minutes	Closing of Inaugural session with Closing Remarks by Chairperson	Chairperson, Dr. Hari Bahadur KC (Act. DG, DOA
11:00-11:30	30 minutes	Tea Break	
		Technical Sessions:	
11:30-11:40	10 minutes	Chairing of technical Session: Dr. Shanta Karki/ DDG, DOA	Dr. Shanta Karki, DDG, DOA
11:40-11:55	15 minutes	Collaborative efforts for management of Fall armyworm in Nepal	Lalit Sah, FTFNIPM/iDE
11:55-12:15	20 minutes	Fall armyworm: Biological control (NERC and NMRP)	Ajaya Shree Ratna Bajracharya, NERC, Khumaltar and Ghanashyam Bhandari, NMRP, Rampur
12:15–12:35	20 minutes	Fall armyworm: Biological control (University perspective)	Sundar Tiwari, AFU, Rampur and Sushil Neupane, FWU, Tikapur
12:35-13:00	25 minutes	Plenary Discussion	All participants
13:00-14:00	60 minutes	Lunch Break	
14:00-14:20	20 minutes	Pheromones for trapping and mating disruption for FAW management	Markandeya Gorantla, ATGC, India
14:20-14:40	20 minutes	Fall armyworm: Biological control (University perspective)	Sushil Nyaupane, FWU, Tikapur
14:40-15:20	40 minutes	Business case development study findings and recommendation	Gurbinder Singh Gill, Agribusiness Associates, USA
15:20-15:50	30 minutes	Plenary Discussions	All Participants
15:50-16:00	10 minutes	Vote of thanks	Nirmal Gadai, Project Country Director, F2F/ CRS