

IPM Innovation Lab Trip Report

Country(s) Visited: Ethiopia

Dates of Travel: June 29 to July 12, 2019

Travelers' Names and Affiliations: Dr. Wondi Mersie, Virginia State University (VSU)

Purpose of Trip: to assess the implementation of the Parthenium Project objectives and plan activities for the coming rainy season.

Specific objectives of the trip were to:

- (i) To assess the progress of rearing the leaf-feeding beetle *Zygogramma bicolorata* and the stem-boring weevil, *Listronotus setosipennis* at Wollenchiti and Guder, Ethiopia.
- (ii) To meet staff from the rearing facilities at Guder and Wollenchiti to determine the major challenges faced in 2019 and discuss solutions.
- (iii) To monitor the establishment of the two biocontrol agents at sites around Arba Minch where they were released in 2018.
- (iv) To start rearing *Zygogramma* at Arba Minch Plant Clinic Center.
- (v) To identify potential field sites for bioagent release during the coming rainy season.

Sites Visited: Arba Minch Plant Clinic Center, Arba Minch Agricultural Research Center, Guder and Wollenchiti biocontrol rearing facilities, EIAR's Melkassa Agricultural Research Center and *Parthenium* fields around the town of Bishofitu

Description of Activities/Observations:

Itinerary:

June 29: Traveled to northern Virginia to spend the night for the morning flight.

June 30: Fly from U.S.A. to Addis Ababa, Ethiopia.

July 1: Arrived in Addis Ababa, Ethiopia.

July 2: Flew to Arba Minch around mid-day. At Arba Minch Mersie was joined by Parthenium Project staff, Asmeret G/Michael, Kassa Urgi, Million Abebe, Shitaye Edessa

and Tesfay Amare who traveled by car from Adama. The Parthenium Project team drove to Arba Minch Plant Health Clinic Center where they met Biya Tadesse and Yemane Wolde Yohanes. The whole group then travelled to Amibara Commercial Farm. There they released 8500 *Zygogramma* and 3000 *Listronotus* adults on two-acre parthenium infested field.

July 3: In the morning, the whole group gathered at the Plant Health Clinic Center to work on the greenhouse that houses rearing cages for *Zygogramma*. The group cleaned the area around the greenhouse, moved debris from inside and started to install benches.

In the afternoon, Asmeret G/Michael, Kassa Urgi, Million Abebe, Tesfay Amare and Wondi Mersie traveled to the sites where *Zygogramma* and *Listronotus* were released in 2017 and 2018. They divided themselves into two groups to record the presence of *Zygogramma* adult, larvae and eggs in 0.5 m by 0.5 m quadrats randomly thrown in the field. The dispersal of *Zygogramma* adults from the spot of release was also measured in meters. This was repeated at three different sites around Arba Minch where *Zygogramma* was released in the previous two years.

July 4: Yemane Wolde Yohanes and Wondi Mersie met Germaw Dolisso, Director of the Araba Minch Agricultural Research Center, which is part of the Southern Agricultural Research Institute. The Center provided land in 2018 for release of the biocontrol agents and the Director indicated that he would continue to collaborate with the Parthenium Project in the coming season. The Director was also asked to instruct staff not to disturb the fields where *Zygogramma* was released. Yemane and Wondi also traveled to Chano Mille Sub-Research Station located about 15 miles outside of Arba Minch. There they secured fields where biocontrol multiplication tents will be installed to rear *Zygogramma*. They also revisited the Amibara Commercial Farm to discuss about future collaborations with the Manager.

The other members of the team continued to work on the greenhouse at the Plant Health Clinic Compound. The installation of benches was completed; new mesh was put around the greenhouse, all cracks were sealed and parthenium seedlings were transplanted into pots. In addition, two individuals were hired for the coming three months to help in growing parthenium plants in pots and maintain the facility clean. The facility is now ready to receive *Zygogramma* culture for rearing.

July 5: All team members traveled to Chano Mille Sub-Research Station to set-up tents that will house *Zygogramma* adults while they reproduce before they are taken to other sites. This involves digging holes, installing wooden poles, transplanting parthenium seedlings and covering the 1 m by 1 m area with nylon mesh that will keep *Zygogramma* inside. Two such tents were installed in plots adjacent to a pond. In two weeks, 200 *Zygogramma* adults will be released in each tent. Once the *Zygogramma* adults lay eggs on the parthenium plants they will be transferred to new tents so that they continue to reproduce. The group later returned to the Plant Health Clinic Center and held a meeting. The tasks in the coming weeks were discussed and assignments were given to each team member. Everyone agreed that the coming weeks are crucial in the implementation of the Parthenium Project objectives and each member pledged to do her/his best to carry out the assigned tasks. The meeting ended around noon and the Parthenium Project staff left for Adama. Wondi Mersie returned to his hotel room to respond to emails.

July 6: Wondi Mersie returned to Addis Ababa.

July 7: Wondi Mersie worked in his hotel room.

July 8: Wondi Mersie traveled to Guder to visit the biocontrol rearing facility and confer with Parthenium Project staff working there including Shitayee Edessa, Asmeret T/Mariam, Demertu Ebssa, Bekele Gelana and Woldesamayet Beyssa. Mersie talked to each Project staff member and listened to the challenges they faced in multiplying and maintaining *Zygogramma* and *Listronotus*. Two of the walking-cages require immediate repair. It was agreed to start the repair during the week of July 22. The rearing of both biocontrol agents is going well and staff have managed to produce high quality parthenium stock.

Mersie also visited the niger seed (*Guizotia abyssinica*) field established to test the safety of *Zygogramma* to this important oil seed crop under field condition. The field plots are managed by Fula Gelana who is hired for the summer to establish and maintain the field trial. Five niger seed varieties in three replications have been planted in a randomized complete block design. The niger seed varieties were intercropped with parthenium which is supplemented with transplant. *Zygogramma* will be released on the niger seed plots once the parthenium has enough foliage. Another field trial with the same layout and niger seed varieties as well as parthenium is being established but the plots will not receive *Zygogramma*. Niger seed plants will be assessed for any damage by *Zygogramma* and yield will be measured at the end of the season.

Mersie also met Dr. Mulugeta Negari, the former dean of the College of Agriculture at Ambo University. The discussion focused on the upkeep of the biocontrol rearing facility at Guder.

Mersie returned to Addis Ababa in the afternoon.

July 9: Traveled to Wollenchiti to visit the biocontrol rearing facility. Held a meeting with staff to discuss the challenges and progress made at the rearing site. The primary challenge in 2019 has been lack of rain in the previous months. Now it has started to rain at Wollenchiti and parthenium should become readily available in the coming weeks. Staff will be able to transplant large numbers of parthenium seedlings that are emerging. Adequate supply of parthenium stock is critical for rearing large numbers of both *Zygogramma* and *Listronotus*. Staff are expected to produce large numbers of both biocontrol agents for release in the coming weeks.

Wondi Mersie with Shitaye Edessa traveled to Melkassa Agricultural Research Center of Ethiopian Institute of Agricultural Research located outside the town of Adama. In 2018, both *Zygogramma* and *Listronotus* were released in the compound of the Center. Mersie and Edessa visited all the sites where the bioagents were released. In two of the sites no parthenium was found so it was difficult to detect either biocontrol agent. At one site next to a small pond, *Zygogramma* adult, larvae and eggs were found on several parthenium plants. Some of the parthenium plants showed extensive feeding symptoms. Every attempt will be made to protect these *Zygogramma*-infested parthenium plants from being cut by grounds crew.

Wondi Mersie with Shitaye Edessa then traveled to Bishofitu to visit farms and parthenium-infested fields around this town. Rain this year started relatively late in Central Ethiopia so parthenium was at the seedling stage around Bishofitu. One future release site for *Zygogramma* at Farmers Training Center (FTC). This Center serves as a training ground, meeting place and demonstration site for area farmers. It belongs to the district Agricultural Bureau. Its compound is fenced and *Zygogramma* will be released in the coming weeks. *Listronotus* will also be released in another similar FTC compound around the town of Mojo. Both sites will be used to demonstrate the utilization of biocontrol agents to control parthenium.

July 10: Spent the day answering emails and making phone calls to partners asking them to intensify their collaboration in the coming critical weeks.

July 11: Mersie flew back from Addis Ababa to Washington DC.

Suggestions, Recommendations, and/or Follow-up Items:

Suggestions and recommendations were provided on how to produce quality parthenium stock for rearing the bioagents on a regular basis. Staff have been instructed to seed and transplant parthenium every week. They are also asked to fertilize and water the potted parthenium seedling on regular bases to produce quality stock for rearing.

Recommendations were also made on how to increase the number of adult *Zygogramma* and *Listronotus* reared at each site.

List of Contacts Made:

Name	Title/Organization	Contact Info (address, phone, email)
Wondi Mersie	Principal Investigator, Parthenium Project, Virginia State University	Virginia State University, Petersburg VA USA; wmersie@vsu.edu 804-524-5631
Million Abebe	Former Parthenium Project Staff	Million is assisting the Parthenium Project during the months of July and August
Yemane Wolde Yohanes	Field Technician, Araba Minch Plant Health Clinic Center	Araba Minch Plant Health Clinic Center, Arba Minch, Ethiopia. Tel:0916854324 . Yemane.Wolde@yahoo.com
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Mulalem Mersha	Director, Araba Minch Plant Health Clinic Center	Araba Minch Plant Health Clinic Center, Arba Minch, Ethiopia Tel: 0966895147 Mulu.mersha@yahoo.com
Germaw Dolisso	Director, Arba Minch Agricultural Research Center	Arba Minch Agricultural Research Center
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Tesfaye Amare	Faculty at Ambo University	Assisting the Parthenium Project during the months of July and August. tesfayshire@gmail.com
Fula Gelana	Laboratory Technician at Ambo University	Assisting the Parthenium Project in July and August. Fula2012@gmail.com
Demertu Ebssa,	Technician at Guder rearing site	
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