Project Update: August 2020

Executive summary

Pollinators play an essential role for ecosystem health and biodiversity maintenance. However, they are declining worldwide. Previous works suggests that habitat heterogeneity can support great biodiversity. In landscapes managed for agriculture, a useful strategy to conserve pollinators may be to integrate local and landscape factors that promote an increase in agroecosystems heterogeneity. The purpose of this project is to analyse the quality and quantity of the pollination service delivered by wild pollinators to horticultural seed crops of family farmers in a semi-arid zone of Argentina based on the wild plants at field edges, landscape heterogeneity and pollinator diversity.

Grant award notice: 25 February 2020
Transfer of funds: 19 March 2020
Access to funds: 24 April 2020

In early March 2020, Argentina began to take measures due to the Covid-19 pandemic. It involved absolute quarantine with a gradual relaxation of activities. Despite this, the project continued its course, but with some limited activities.

Tasks performed and preliminary results

Before receiving the funds, from December 2019 to March 2020, three students from the Agronomic Engineering at National University of San Juan (UNSJ) and I did fieldwork. We measured plants and pollinator abundance and richness in the selected agroecosystems (Fig. 1) and recorded interactions to build ecological plant-pollinators interaction networks. Also, we treated the flowers of the crops with free entomophile pollination, hand-pollination, wind-pollination and pollinator exclusion. We measure seed set, seed weight and seed germination rate. Also, we flew a drone above the agroecosystems to take pictures and calculate landscape variables (Fig. 2).

We found all crops evaluated (pumpkin, chicory, cabbage, onion and radish) are high dependent on pollinators. Also, we found a positive relationship between diversity of flowers on crops edges and: a) pollinators diversity; and b) crop pollination service. Moreover, we found that ecological interaction network metrics as closeness centrality is positive correlated to entomological pollination service. We found crops that occupy central positions in their networks have a higher pollination service than those that occupy peripheral places. These results indicate that simple agroecosystem management practices, as edge crop maintenance, improve biodiversity and crop pollination service.

Community scope

Because of Covid-19 I could not develop face-to-face workshops with farmers and beekeepers, but I participated on webinars:

(Spanish) Native bees:
https://www.youtube.com/watch?v=Z8gZe3oLvEA,

Agroecology and the production and consumption of honey:
https://www.youtube.com/watch?v=qgnMne3_2VI&t=2659s&pbjreload=101,

Valle de Uco honey week:
https://www.facebook.com/intaaer.tunuyan.9/videos/267105614661508

In these webinars INTA and CONICET researchers talked about the importance of native bees and agroecology practices for food production and for biodiversity and natural landscapes conservation. Also, I participated on a virtual class for agronomic engineering students at UNSJ where I taught them about the value of native bees on the pollination of crops and native plants and the importance of their conservation. During the fieldwork, I worked with six undergraduate students at UNSJ. They learned about field techniques, sampling protocols, plants and insect collection and preparation, and logistic organisation (Fig. 3 a, b, c). I learned how to teach and lead a group. Moreover, I presented an abstract with the preliminary results of the project at XXIX Reunión Argentina de Ecología 2020, which was delayed to 2021 because of Covid-19. Finally, I participated on a radial note where I talked about the relationship between food production and natural landscape conservation

(https://www.mixcloud.com/lamielenturadio/entrevista-la-miel-en-tu-radio-lc-cs-b%C3%A1sicas-mariana-allasino-inta-san-juan-e-inta-proapi/)

Project next steps

In the next months I will start landscape images analysis. In the next spring and summer I will finish data collection and I will take more landscape images. Once all the data has been collected, I will analyse the data and will work on two manuscripts to share the results with the research community. Additionally, I am planning on giving a series of workshops for FECOAGRO farmers and beekeepers to share the results. In this workshops, I will show farmers the pollinators I captured so they can see the biodiversity they have in their farms. Finally, I would like to make a pamphlet on the importance of native bees and the maintenance of wild plants on agroecosystems for farmers, beekeepers and the general public.

Percentage of funds executed

To date I have executed a 70% of the total amount received.

Fig. 1. Halictidae on *Convolvulus bonariensis*

Fig 2. Flaying the drone above a pumpkin crop.

Fig. 3a. Lidia and Natalia, students at UNSJ, and me working on a cabbage crop for seed.

Fig. 3b. Alexis, student at UNSJ, doing fieldwork on a cabbage crop for seed.

Fig. 3c. Sol, Tania and Melani, students at UNSJ, working with the collected insects.