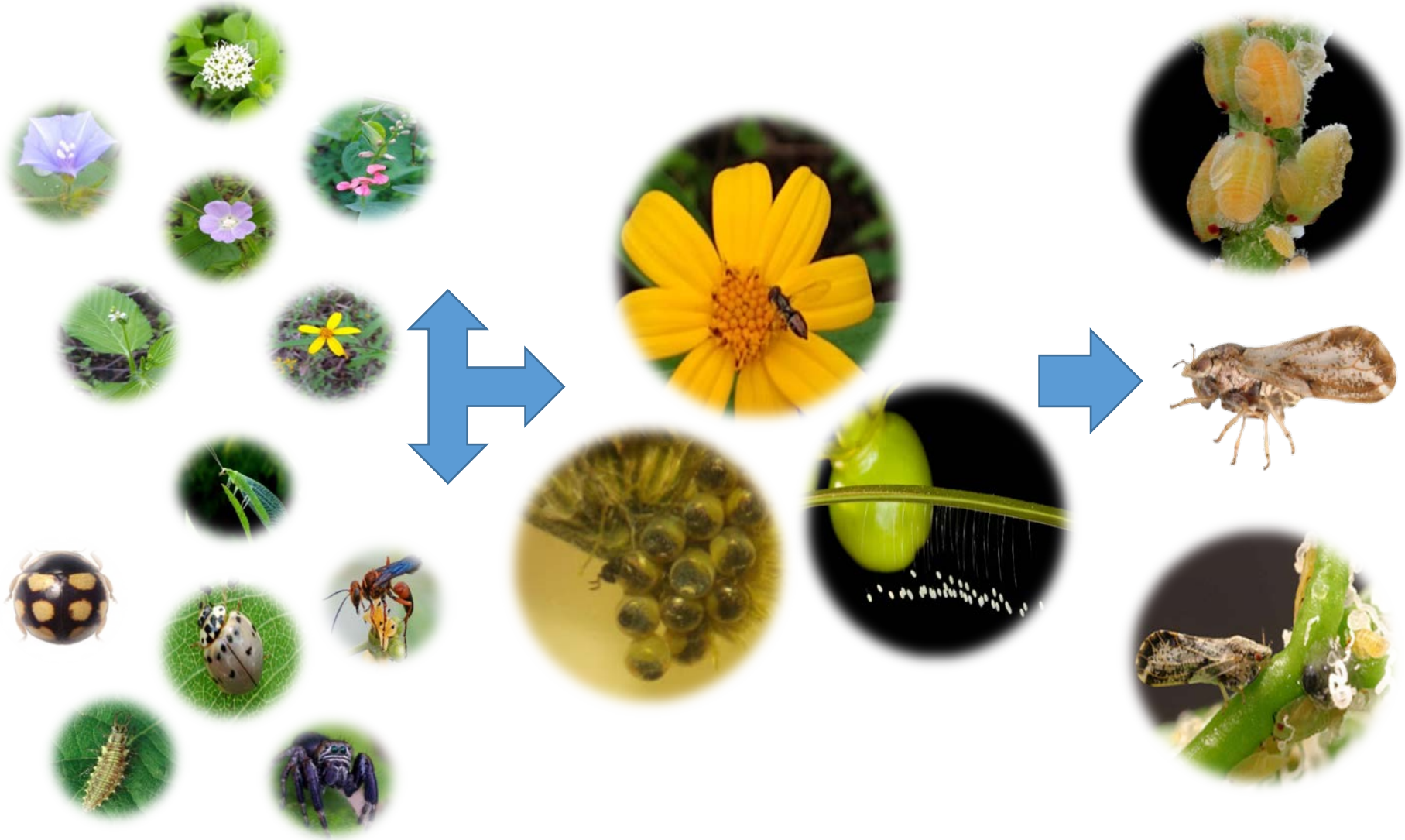
Promoting functional biodiversity for *Diaphorina citri* control.

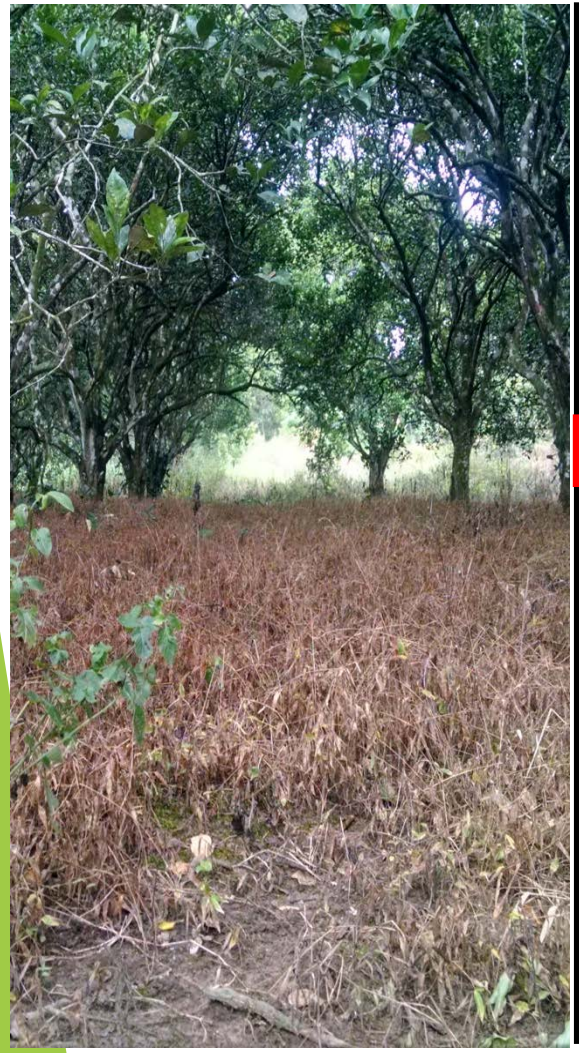
This project is supported by the **Coop Sustainability Fund.**

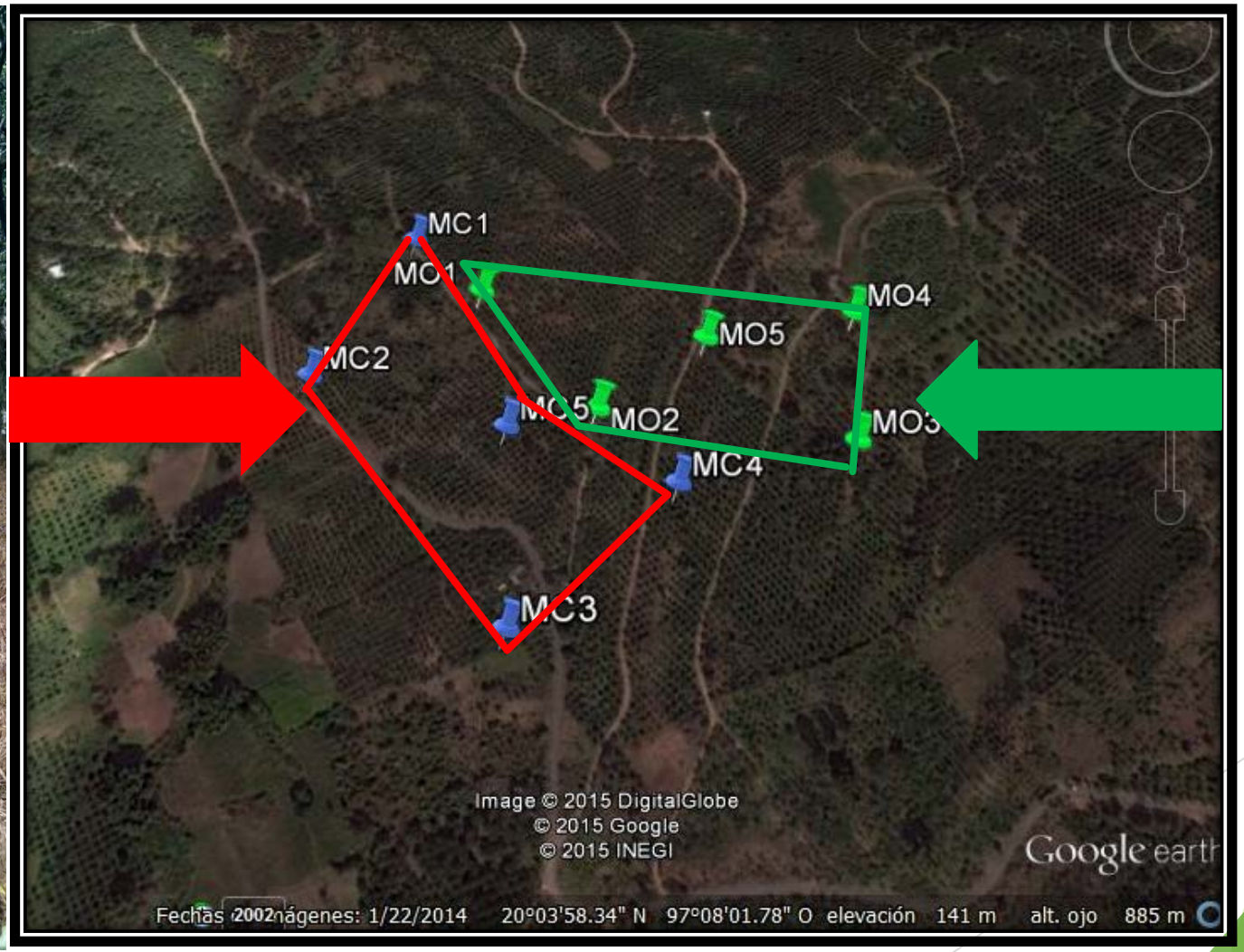
Nürnberg 14.02.2020

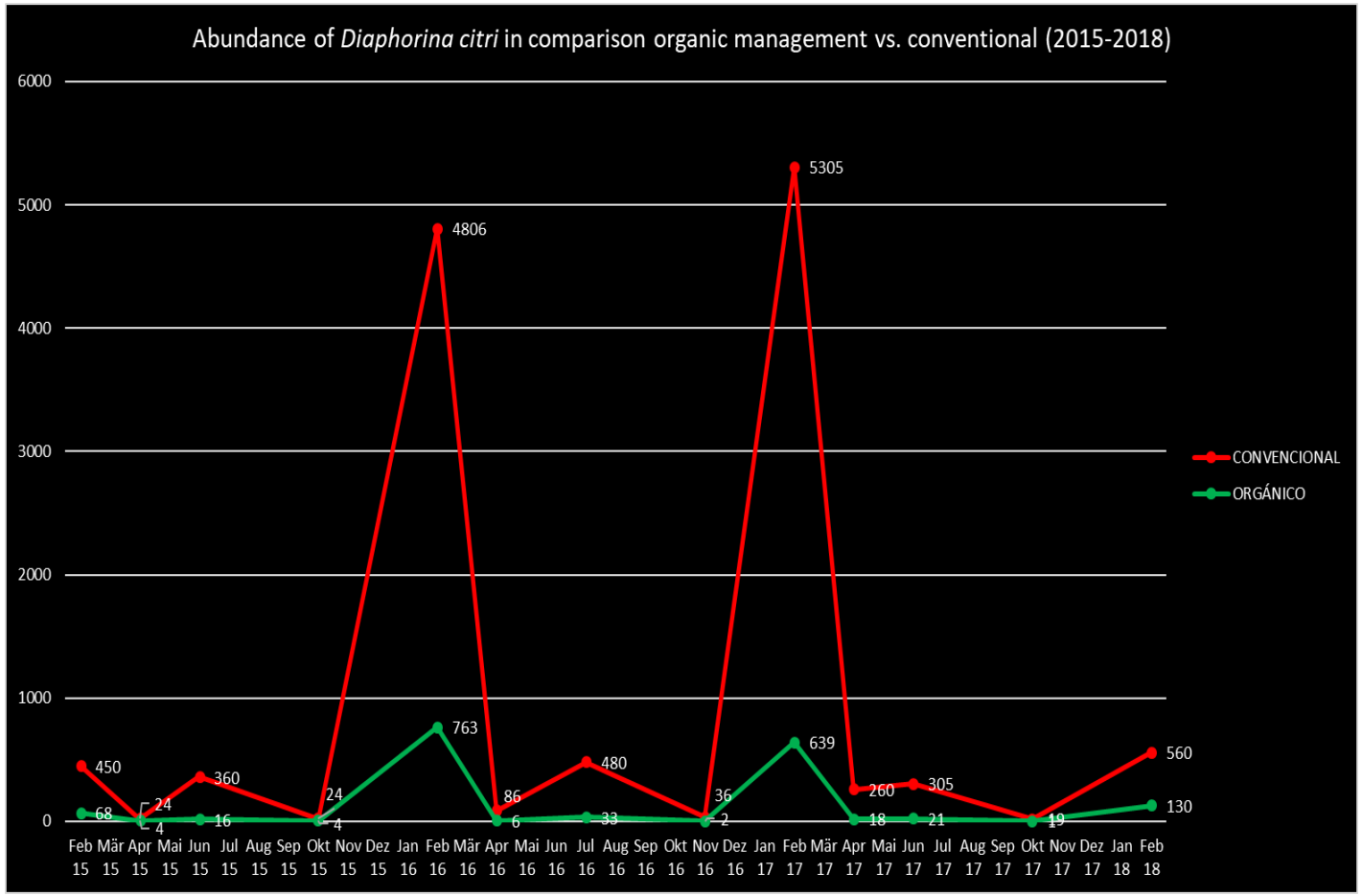
What is the role of biodiversity in the control of *Diaphorina citri*?



1. Results of the comparative study in Conventional and Organic orchards

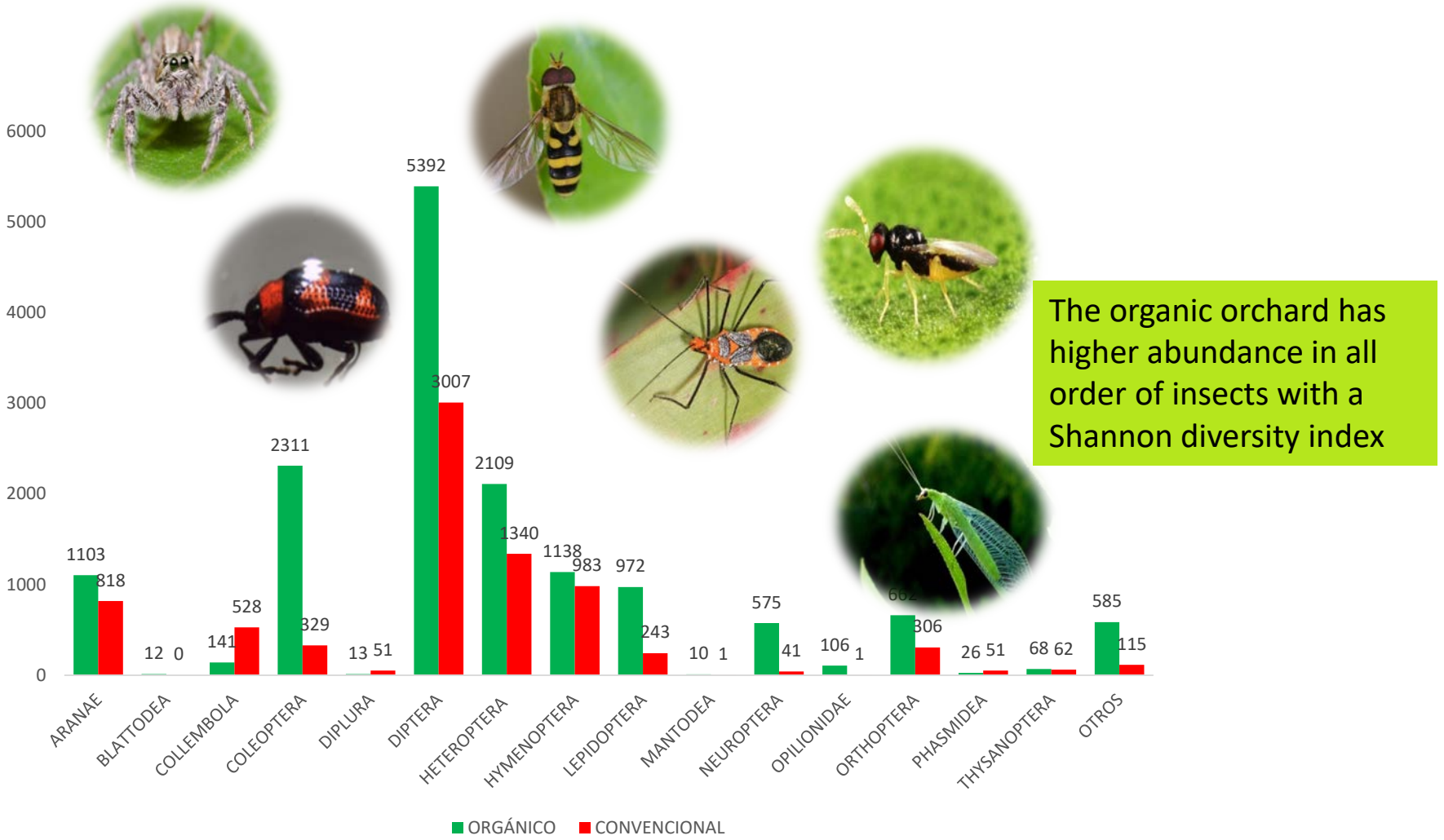






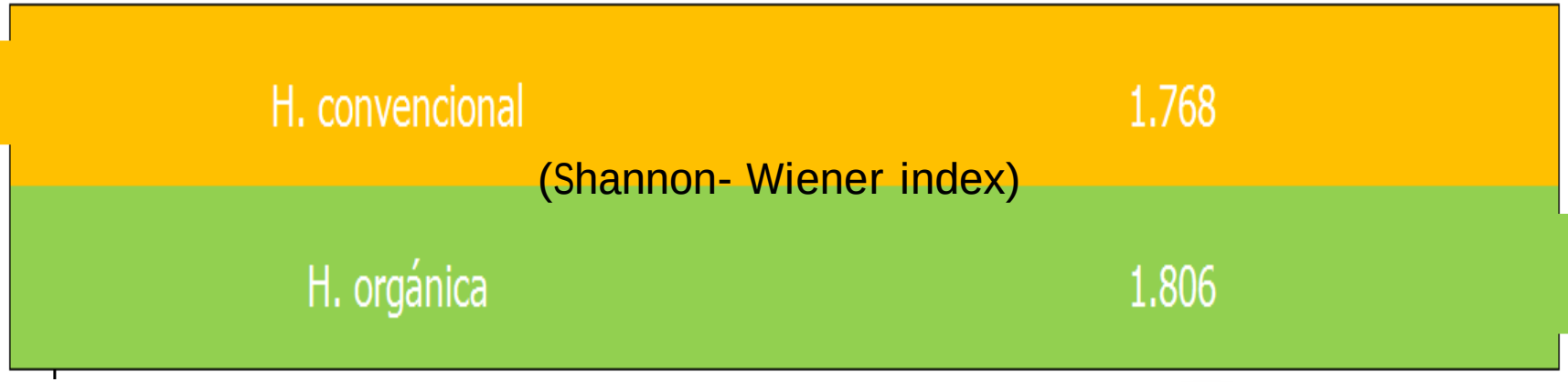
There was 700% more than Diaphorina in the conventional orchard at the time of tree sprouting.

Abundance of total orders of insects and other arthropods in comparison Organic management vs. Conventional (2015-2018)



The organic orchard has higher abundance in all order of insects with a Shannon diversity index

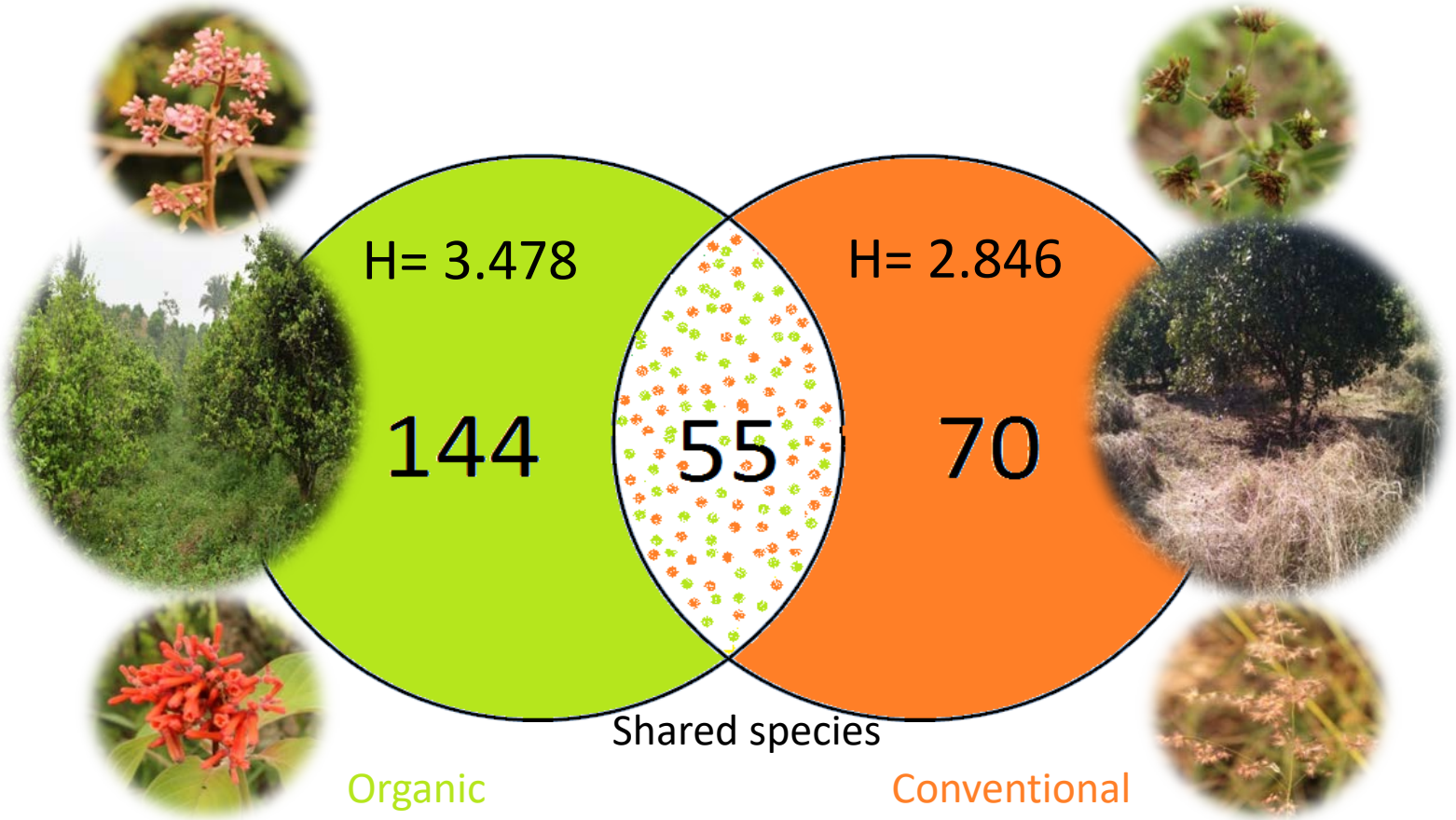
The biodiversity of insects is greater in the organic orchard, than in conventional



Beetles and lacewings are the most abundant predators of *Diaphorina citri*, in the organic orchards.

Total species of weeds and Shannon´s diversity index in the comparison organic management vs. Conventional handling

In the organic orchard there are almost double the species of weeds compared to the conventional orchard



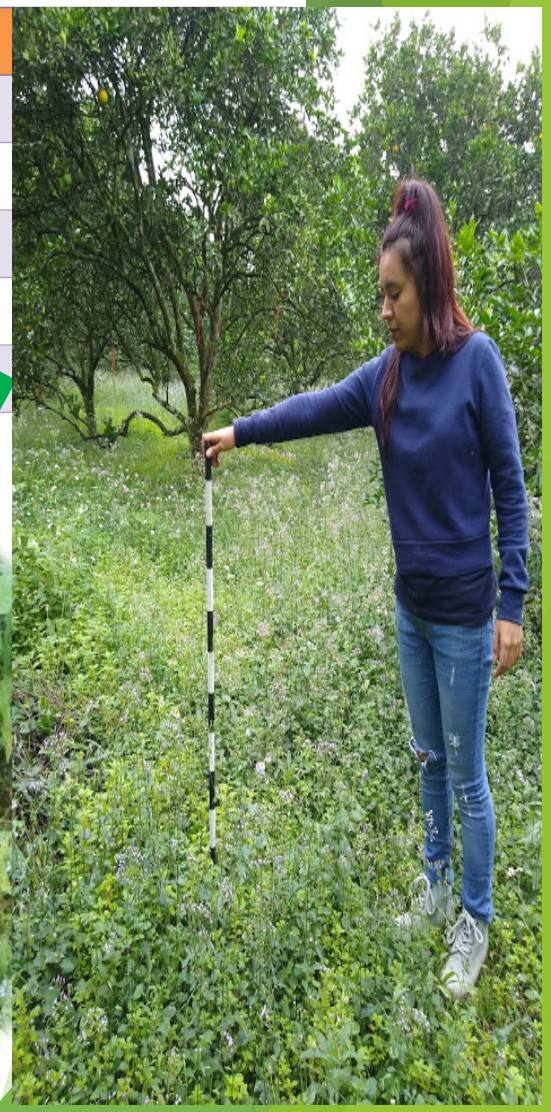
The biodiversity of weeds is greater in the organic orchard, than in conventional.

H. convencional	2.846
H. orgánica	3.478

(Shannon- Wiener index)

Structural diversity of weeds

Especies con:	Convencional	Orgánico
Hoja ancha	42	82
Gramíneas	14	23
Hoja ancha trepadoras	11	35
Epífitas	3	4
Total:	70	144

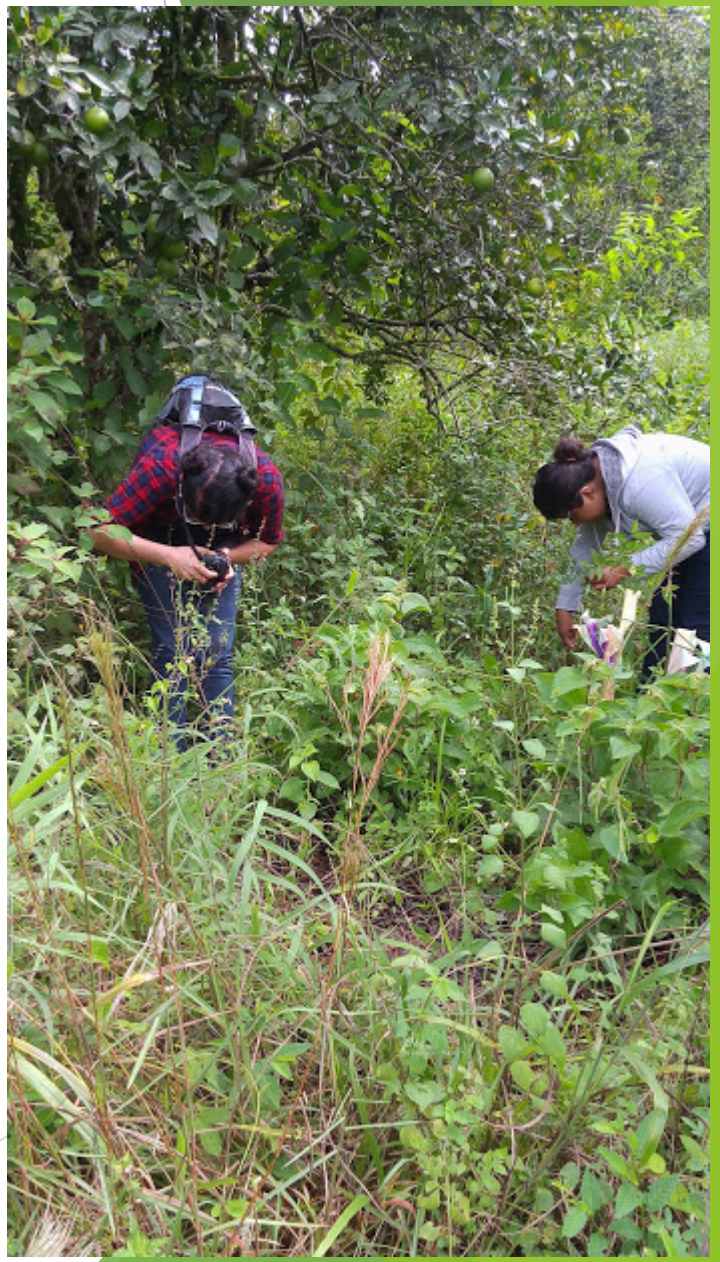


More large and broad-leaved plants that offer more resources to insects, e.g., breeding and roosting sites and alternative food such as pollen and nectar

Conclusions

- More diversity of plants, more insects and less *Diaphorina citri* population in organic orchards.

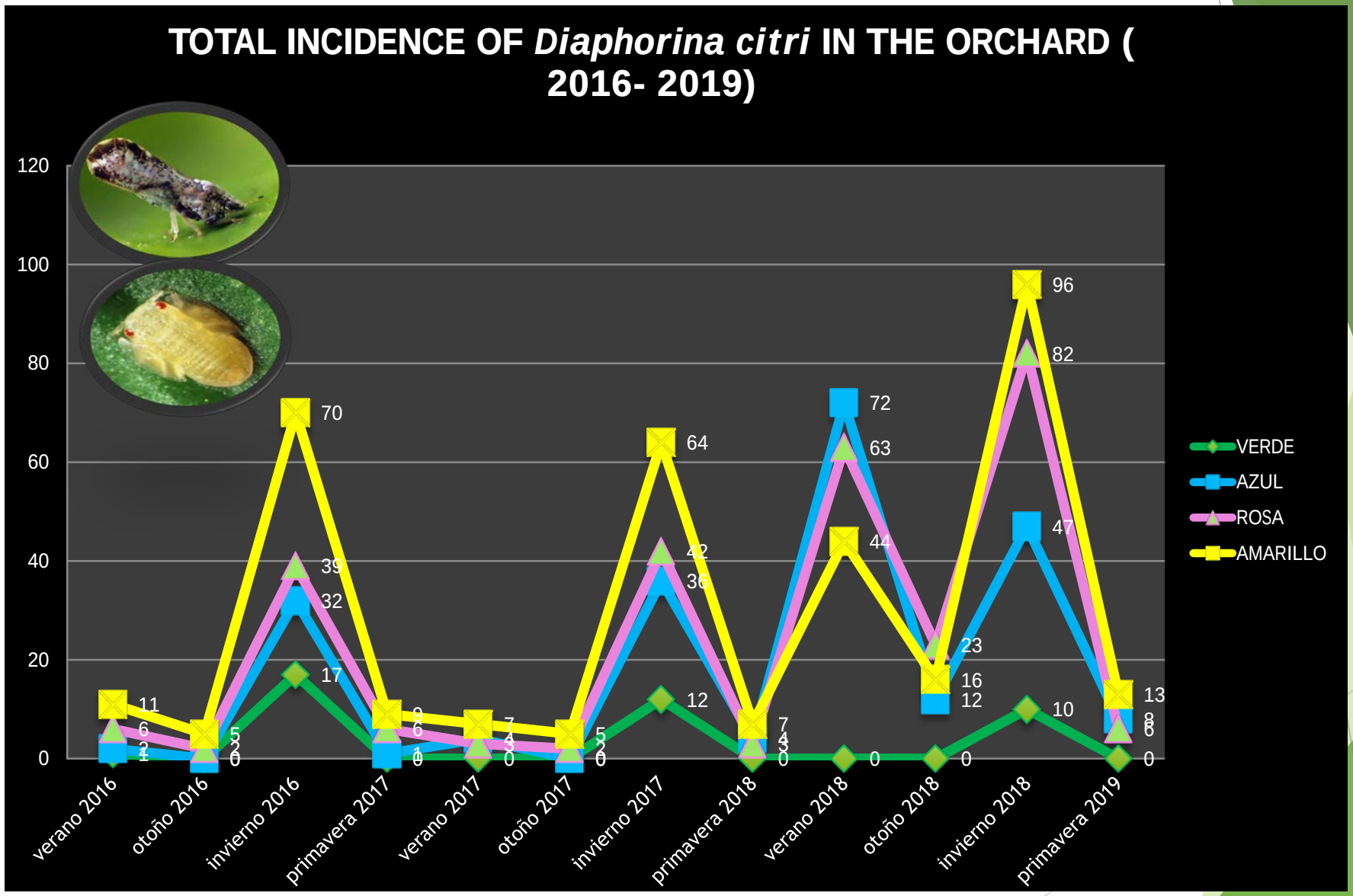
- Organic management promotes the biological diversity of insects and weeds, which allows the orchard to be more resistant to pest proliferation, therefore, biological control is active and effective against *Diaphorina citri*.



2. Results of the Long-term experimental orchard

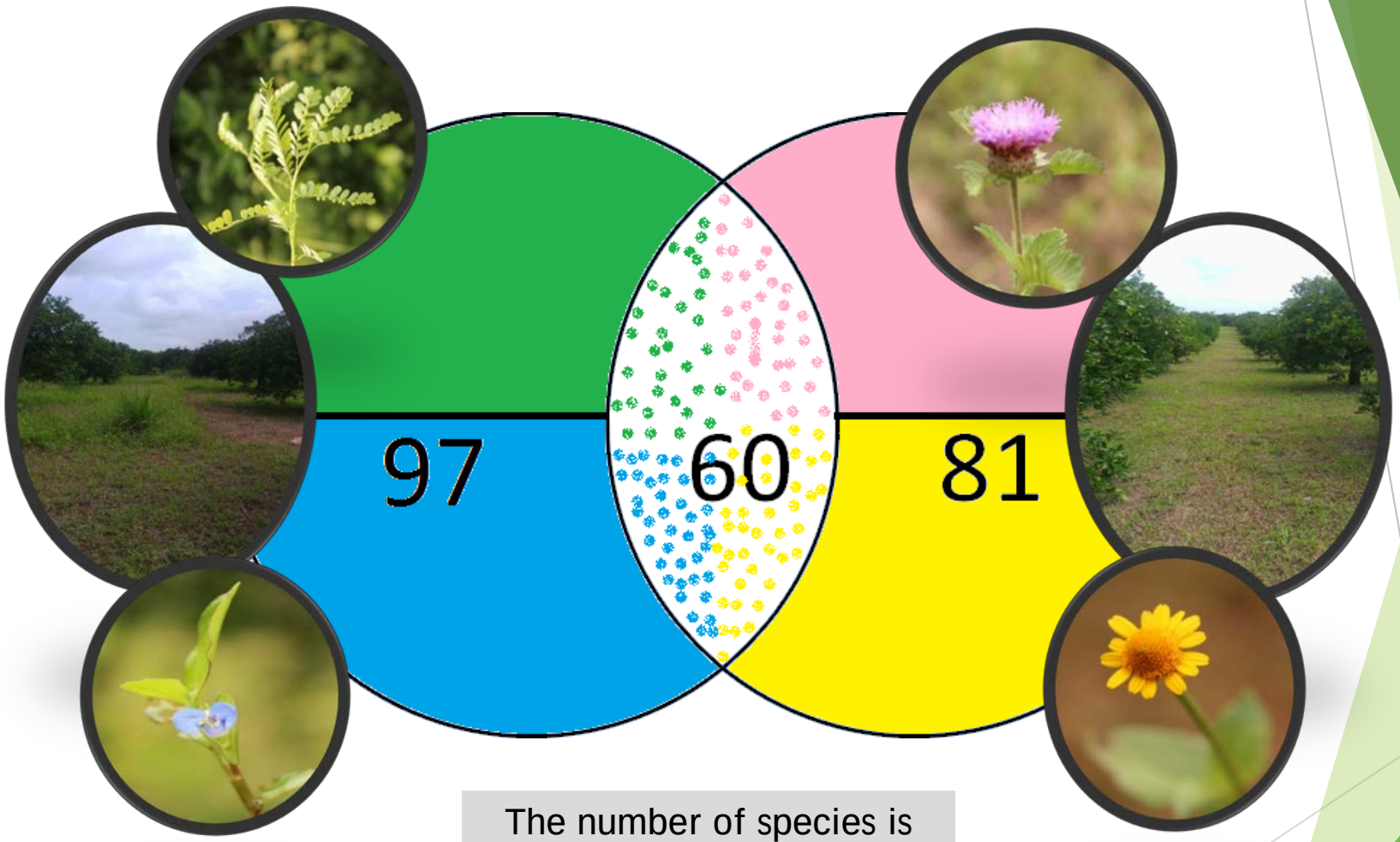
To understand the impact of estructural diversity in organic management

Organic orchard with different cutting of weeds



pink = low cutting without input, **yellow** = low cutting with input, **blue** = alternate cutting without input, **green** = alternate cutting with input.

Total species of weeds in the alternate cut and low cut



The number of species is not statistically different

The value of biodiversity in plants is similar

Alternate cutting = 2.082

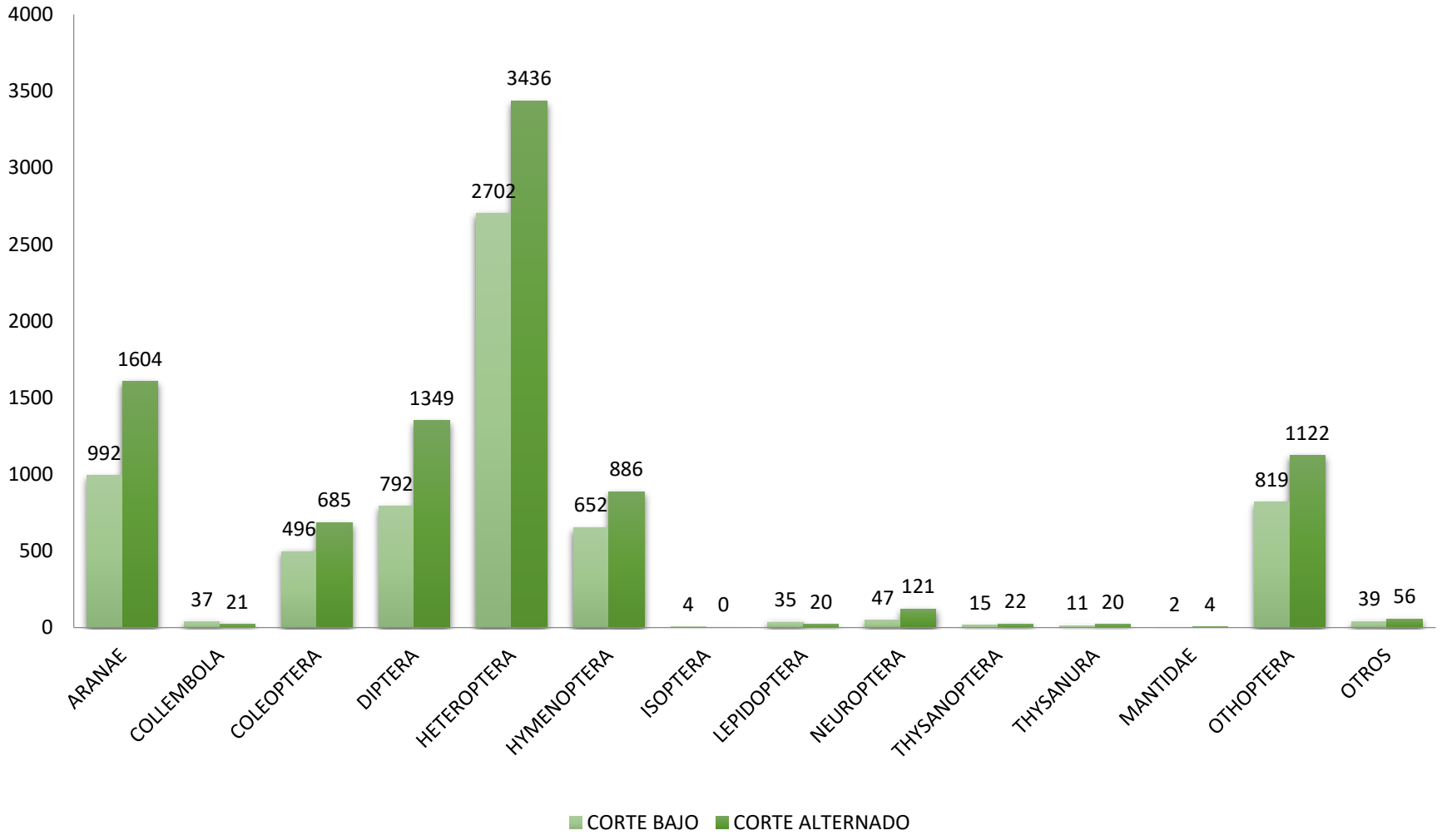
Low cut = 1.953

Structural diversity and habitat heterogeneity

Alternate cutting (10 -80 cm)

Low cutting = (5 -10 cm)

Abundance of orders of insects and other arthropods by type of weed management low cutting and alternate cutting , period (2016-2019).



Diversity index of insect diversity for each cutting type

Alternate cutting = 2.954

Low cutting = 1.802

Conclusion

The results obtained suggest that the organic management and in particular with alternate cut of the weeds increases the biological control, since it favors the abundance and diversity of insects (beneficial insects) and structural diversification of the orchards.

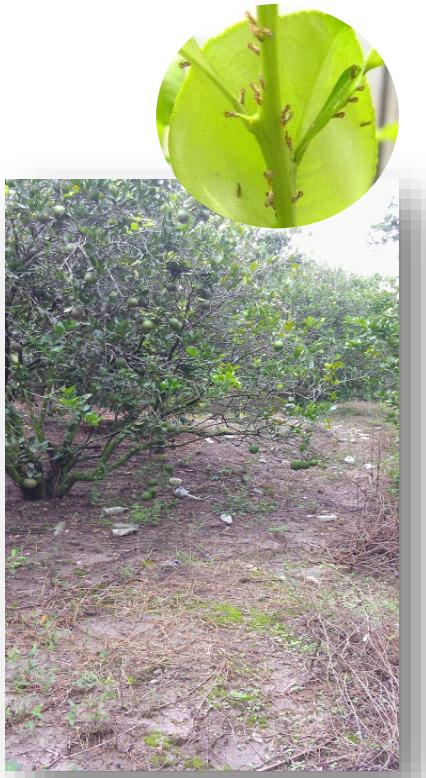
3. Results of a network of pilot farms

To learn about the impact of biodiversity in systems with high abundance of Diaphorina citri, we worked on four pilot farms

Alternate cutting

Low cutting

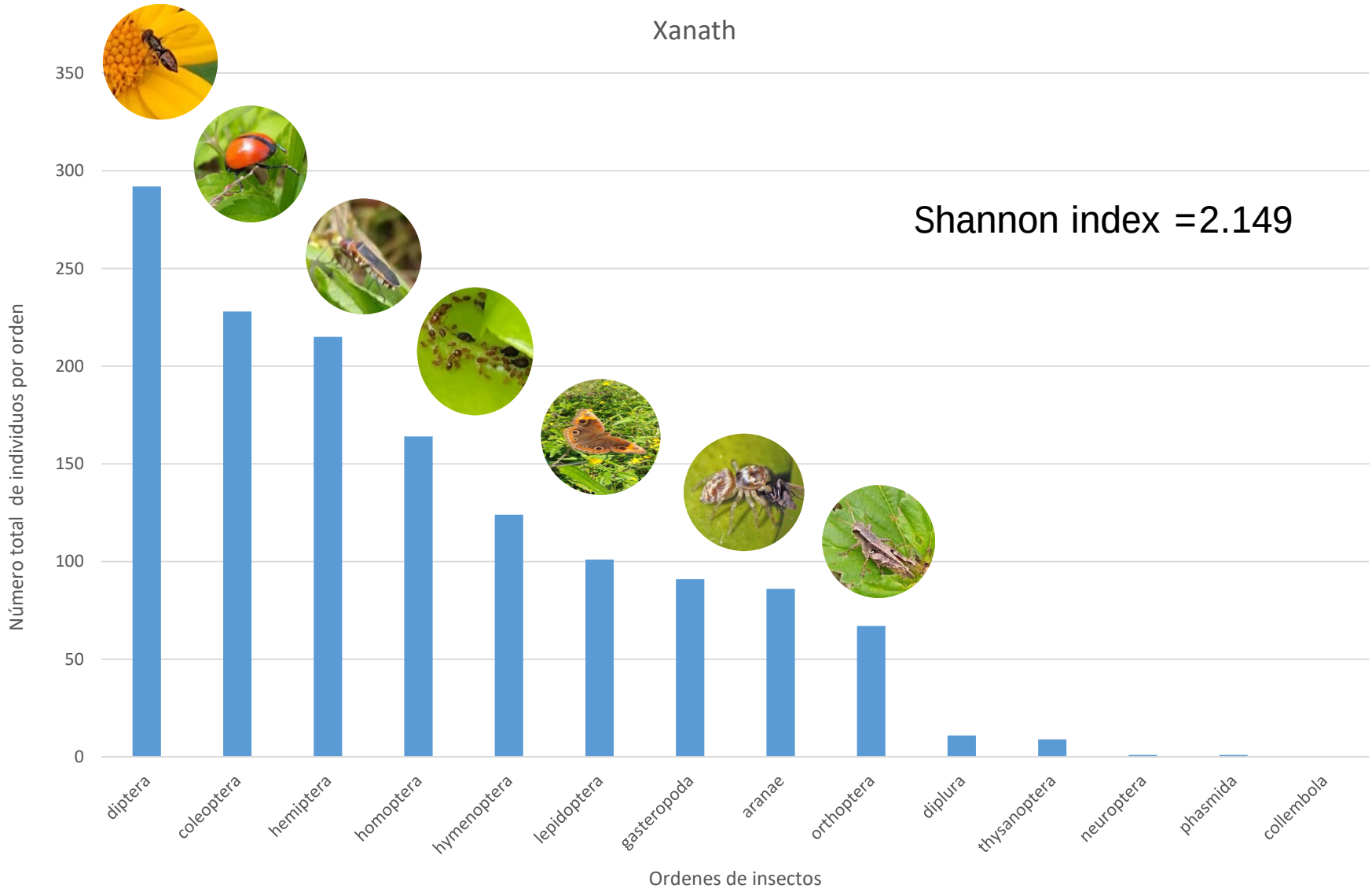
Producer management



Conventional management

Abundance of *Diaphorina citri* in pilot farm Xanath (2018-2020)

Insect richness and diversity on the pilot farm



Huerta	La Fortuna				El Gran Chaparral				Xanath			
Tipo de corte y manejo	Cal	Cba	Cpr	Con	Cal	Cba	Cpr	Con	Cal	Cba	Cpr	Con
Incidencia de *D. citri*	526	781	902	2184	925	1118	1236	2309	1072	2586	2831	3563
Índice de diversidad de arvenses	2.758				2.487				2.281			
Índice de diversidad de insectos	1.782				1.736				2.149			

In all farms, alternate cutting involved lowest incidence with D. citri.

What is currently being done

We are analyzing the effect of biodiversity in orchards with high abundance of *Diaphorina citri* and presence of HLB to know if diversity favors orchard resistance.

In orchards where the cover is mainly grasses, we want to know how plowing causes the activation of the seed bank and the replacement by broadleaf plants and increases structural diversity.

Thank you very much for your the attention!

This project is supported by the
Coop Sustainability Fund.