

Rearing of *Leptomastix dactylopii* for pest control in organic citrus orchards

Problem

The parasitoid *Leptomastix dactylopii* may help to control the mealybug *Planococcus citri*, a major pest of citrus. Even so, the natural enemy is not commercially available in all regions.

Solution

The parasitoid can be reared on-farm, allowing farmers to perform multiple releases over the year. Here we describe a rearing protocol developed to obtain many parasitoids with low-cost materials.

Benefits

Farmers can promptly react to mealybug infestations and perform multiple releases of parasitoids in a short time, bypassing the high delivery cost.

Practical recommendation

- Wash ripe pumpkins in a bleach solution (5%) for 10 minutes, then thoroughly rinse with tap water and dry in the open air.
- Field-collect a colony of mealybugs and rear on pumpkins held on stands inside a room (Picture 1, $26 \pm 2^\circ\text{C}$, $45 \pm 5\%$ humidity). Either gravid females, eggs, or crawlers may be used as inoculum.
- Once pumpkins are infested, obtain/ purchase a colony of *L. dactylopii* (Picture 2) and rear inside cages placed in another room ($45 \pm 5\%$ humidity). The temperature must not exceed 28°C .
- Cages (Picture 3) may be homemade (i.e., following online DIY tutorials)² or be bought (i.e., online stores)⁴.
- Place pumpkins infested by 2nd-3rd instar mealybugs (15-20 days after egg hatching) inside the cages.
- New parasitoids emerge 12-16 days after a pumpkin is placed into the cage (Picture 2).
- Fill a plastic tube with water, plug it with cotton, and place it in the cage as a water source. Apply little drops of pure honey in the cage to feed adult parasitoids. Renew the tube and the honey once a week.
- Collect adult parasitoids from the rearing with an aspirator (Picture 4)¹Fehler! Verweisquelle konnte nicht gefunden werden. and release them into the infested orchards. Alternatively, open the entire cage in the field after removing the infested pumpkins.
- It is important to preserve a colony of parasitoids for further releases. The time between releases (i.e., two weeks) allows the insects to thrive and reach numbers compatible with pest control action.
- It is important to keep the mealybugs rearing and the parasitoids in two different rooms. Operators should never enter the mealybug room after being in the parasitoid room.

Applicability box

Theme

Crop production, Environment and society.

Keywords

Crop production, biological control, citrus.

Context

Global, Mediterranean basin.

Application time

During the cropping season, at least 7-10 days after the last treatment (especially if Spinosad is used).

Required time

From two weeks to one year, depending on parasitoid release and pest infestation rates.

Period of impact

Less than one year

Equipment

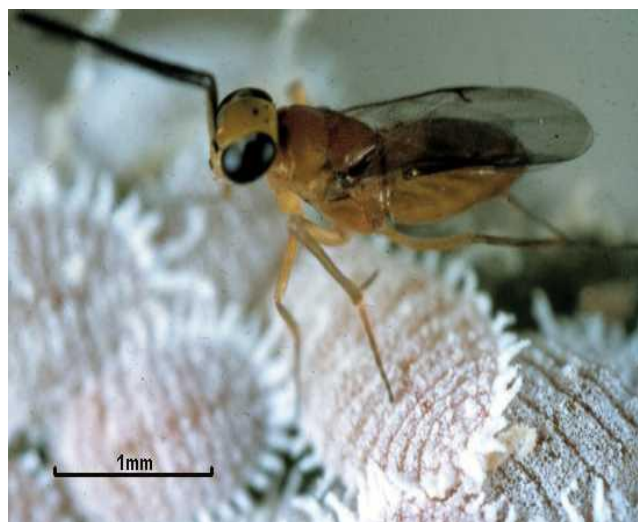
Two separate rooms, cages, stands, insect aspirator

Best in

Low-input management cropping systems, especially where the ground cover is managed as "ecological infrastructure". In fact, flowers favour adult parasitoids.



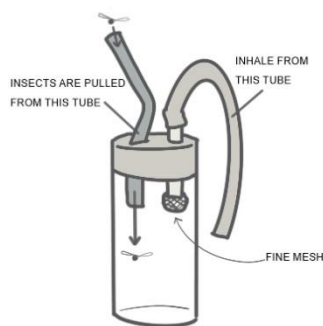
Picture 1: A typical mealybug rearing. Photo: Mani, M., Shivaraju, C., Kulkarni, N.S. (2014)³.



Picture 2: *Leptomastix dactylopii* on mealybugs. Photo: Mike Copland.



Picture 3: Cages may be purchased online. Cages of 30x30x30 cm are suitable for the parasitoid and cost around 15-30 € depending on the site. Photo: theprayingmantis.co.uk.



Picture 4: example of a homemade mouth aspirator used to collect the parasitoids. Photo: Sabina Avosani (CIHEAM Bari).

Further information

Video

- [Video of Parasitoid Releases](#). InCampagna Sicilia (IT)

Further reading

1. [How to Make an Insect Collection Device Called a Pooter](#) (includes a video)
2. [DIY insect cages](#)
3. [The Grape Entomology](#). M. Mani, C. Shivaraju, Narendra S. Kulkarni 2014

Weblinks

4. [Where to buy devices](#) Vermandel Entomology
 5. [Where to buy the starting colony](#) Koppert
- Check the [Organic Farm Knowledge platform](#) for more practical recommendations.

About this practice abstract

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