

BioPerminutus

Coccidoxenoides perminutus



BioPerminutus (*Coccidoxenoides perminutus*) is a parasitic wasp that prefers to parasitize first instar (crawlers) yet has been shown to also parasitize second and third instars.

TARGET PESTS

Citrus mealybug (*Planococcus citri*) & Vine mealybug (*Planococcus ficus*)



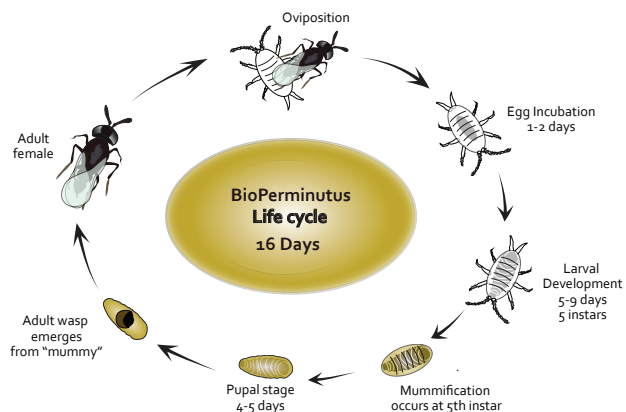
Mealybug damage on citrus and grapes

CROPS

Citrus, vineyards, field and fruit crops.

LIFE CYCLE

C. Perminutus lays one egg per host. The egg feeds on the innards of the host, eventually killing it. Females are able to deposit 10-20 eggs per day for the first 2 days, thereafter 80-150 eggs per day depositing an average of 239 eggs in their lifespan. About 16 days after an egg is laid inside the mealybug crawler an adult *C. Perminutus* wasp emerges from the pupa and is immediately ready to lay eggs. This is because no mating is required for the reproduction.



DESCRIPTION

Adults are black with translucent wings and are very small, about 3mm long.

TEMPERATURE & DEVELOPMENT

The rate of development of *C. Perminutus* is dependant on temperature and relative humidity. They are most effective at a temperature between 20-30°C and a relative humidity of between 50-90%. At temperatures below 20°C and low light intensity they are considered less active or inactive depending on the temperature. The parasitic wasps regularly walk at low temperatures and parasitism continues to take place, but at a much lower rate than what occurs at higher temperatures.



THE PRODUCT

- Carboard box, containing 1,500 / 3,000 "mummies" of parasitized mealybug mummies.



BioPerminutus



APPLICATION

- BioPerminutus is shipped in insulated, chilled boxes. Packaging must be kept intact until placed in the field.
- Keep the product at room temperature. Do not refrigerate
- The parasitoid wasp should be released within 24 hours of receipt.



- Release BioPerminutus in the early morning or late afternoon, when the temperature is milder.
- Puncture the sticker in the center of the box exposing the exit hole.
- Place the package in a shady place, protected from rain or dew, preferably close to a mealybug-infested spot.
- Following their emergence, the wasps will fly out of the package and disperse in between the plants.
- Do not sprinkle the mummies actively from the container. Once parasitic wasps begin to emerge, they will be attracted to the exit hole by sunlight.
- DO NOT EXPOSE TO DIRECT SUNLIGHT

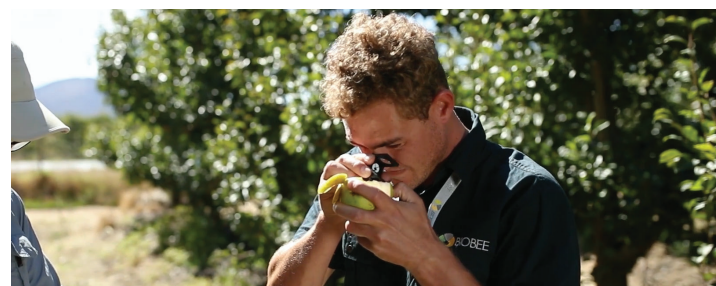
STORAGE

- BioPerminutus can be stored for a maximum of 3 days if necessary, under recommended conditions.
- If the parasitic wasps cannot be immediately released, the cardboard boxes must be stored in their original packaging, in a dark place, at temperatures between 20°C-26°.
- Do not store inside chemical store.

RELEASE RATES AND TIMING

Rates will vary depending on the crop and infestation level. BioPerminutus are best released in spring and early summer, before mealybug populations are allowed to build up to economically harmful levels.

Scouting and monitoring is crucial.



BIOLOGICAL PEST CONTROL

The effectiveness of BioPerminutus can be assessed two weeks after the release (depending on weather conditions). Biological pest control continues throughout the growing season, as successive generations of *Coccidoxenoides perminutus* continue to control the mealybugs, providing a long-term solution. BioPerminutus can be combined with BioCryptolaemus, BioAnagyrus and BioNephus. These two natural enemies complement each other in controlling mealybug infestations and can coexist in the same environment.

GENERAL COMMENTS

Before combining BioPerminutus with any chemical pesticide in the crop, please consult your BioBee Technical Representative.