Animal pests

Mealybugs

Biology

Mealybugs belong to the scales family (Coccina). However, they have no armours like other scales, the adult animals are powdered with a white waxy secrete. The edges of the body are covered with thorns and wax threads, occasionally very long, especially at the hind body. They usually lay eggs, but in favourable conditions some species are mainly viviparous.

Two species are relevant on orchids.

Planococcus citri Risso: 3-5 mm long, oval, dark yellow to yellowish-brown, powdered with wax excrements, short and thick filaments on body edges. They live very polyphagous, and leave marked honeydew excrements. The yellow eggs are placed in mealy masses on the hind body, optimal temperatures around 24°C.

The longtailed mealybug (Pseudococcus longispinus Targ.-Tozz. [= Pseudococcus adonidum L.]): 3-5 mm long, reddish to orange, oval mealybug. Characteristic is the length of the tail threads (filaments) that are about as long as its body. Extremely marked honeydew excrements. These animals originate from tropical regions all over the world and have become the major pest in orchid cultivation over the last years. Massive populations are often found under the leaves, on blossom stalks and blossom leaves and other plant parts where they cannot really find food, e.g. pot rims, boxes, shelves, greenhouse parts, substrates, transport boxes etc.

They quickly spread in the stands. In contrast to other species, the females do not produce any egg packets. Multiplication is done by ovoviviparity, i.e. the larvae develop and emerge in their mothers' body, living larvae are then released. The 1 st larvae stadium, the extremely small crawlers, soon leave their mothers' body and spread all over the plant stand. Shortly after starting to eat, they cover their bodies with a white wax-like cover, which gives them a mealy appearance. That larvae stadium is by far the most mobile one and needs the longest development period. On temperatures of 25-27°C the development of L1-L3 takes about 30- 35 days. After the first moult, male and female animals can be distinguished. The females die after giving birth to the young animals. With a size of 1.5 mm, the male mealybug is smaller than the female. The body is divided into segments and in contrast to the female's body, it shows an insect-like habitus. From the 2 nd larvae stadium on, the male animals form a longish cocoon-like shape made of wax excrements. In it, they develop to become a winged adult insect. They do not need any food, because they are inactive during the metamorphosis stage. The optimum temperature for Pseudococcus longispinus is at 25-27°C; in these temperatures, they produce the maximum of eggs and the larvae stadium progresses the fastest. The animals die in temperatures above 35°C. In general, more females than males are produced, only at 27°C the percentage of females -males is the same. In case of danger, the females can excrete a liquid which may stick to the mouth tools of smaller predatory insects and makes them unable to eat. Pseudococcus reacts less to pesticides than other species. When using biological plant protection, it is vital to determine exactly the respective species, because some commercially produced beneficial animals, especially parasitic wasps, only parasitise certain mealybug species.

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Damage

Severe damage caused by honeydew and subsequent settling of black rot. In cases of massive mealybug infestation, the leaves are deformed, growth of the plants is severely inhibited and the places where the insects suck are surrounded by yellow to red spots. Masses of mealybugs are often found under the leaves, on blossom stalks and blossoms. They hide very well, on Phalaenopsis and Paphiopedilum the animals often sit deep in the leaf sheath. It was observed that often, especially during blossom induction in orchids, which is caused by a drop in temperature, masses of mealybugs occur. This propagation is probably due to the fact that the plants are stressed and are therefore more susceptible to pests and diseases. One reason why the mealybugs are often found at the blossom stalk or on the blossoms is probably the increased concentration of amino acids in these plant parts.

Control

Long-term plant protection has to be considered for chemical control of mealybugs. There is no knockdown effect as for example in aphid control.

The first step to prevent infestation is a careful check of the imported material. This has to be checked thoroughly, especially the leaf axils and the shoot tips. Pests entering the greenhouse without being noticed can hide for several months until visible damage is seen on the plants. As long as infestation is restricted to just a few individual plants, these should be destroyed. But if symptoms show on several plants or minor infestation becomes a problem, chemical control can no longer be avoided.

The most favourable time for chemical control is when the young animals leave the eggs. In this phase best results can be achieved with insecticides. Mealybugs can be controlled relatively well as long as there is no „waxwool“ formation. As, however, all stadiums are found on the plants at the same time, i.e. there are constantly new young animals, repeated treatment has to be carried out in intervals of 10–14 days. The older the larvae get, the more difficult treatment becomes. As soon as the woolly wax cocoons are formed and the pest is protected, insecticides considerably lose effectiveness. Most systemic products, too, do not achieve good results in this phase. Oil-containing products have a better effect then, but they should not be applied too often, as with regular application of oils Phalaenopsis may develop phytotoxity.

Control of P. longispinus by spraying is most effective in high temperatures and relatively high humidity. Observations show that fewer mealybugs were found in the mornings when temperatures were relatively low, as the animals were hiding. As soon as the temperature started rising and the relative air humidity increased markedly, most mealybugs were found relatively unprotected on top of the leaves and put up their antennae, probably trying to get cool.

The male mealybugs increased their flight activity in assimilation lighting. Blueboards could be placed below lights to catch the males. Placing UV lamps is also recommended. Control of the male mealybug makes sense, because without them, this pest cannot reproduce.

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Biological plant protection

Leptomastix dactylopii: A small 3 mm long parasitic wasp, very effective to control Planococcus citri. The animals are of yellow-brown colour and are able to jump. High temperatures of at least 24-27 °C are needed for them to develop quickly. In these temperatures a sufficient number of eggs are laid into the third nymph stadium and in adult mealybugs. Much light is required, application in the summer would be ideal. Pseudococcus is not parasitised by the parasitic wasp.

Leptomastidea abnormis: yellow-brown, only about 2 mm long. They only parasitise Planococcus citri. Temperatures of 20-24 °C are ideal for the development of the parasitic wasp. As these animals do not require much light, they can also be applied in autumn and spring.

Cryptolaemus montrouzieri: The Australian Mealybug destroyer is 4 mm long, orange with black wing covers. The larvae are about 13 mm long and powdered with white waxy material. Cryptolaemus is a predatory insect feeding on all known mealybug species. It is especially helpful because it can also be used to control marked infestation. Usually this beetle does not fully complete its development in the greenhouse. It is not interested in Pseudococcus longispinus as it prefers other mealybug species. As the young larvae of the ladybug prefer to feed on eggs and the females are only viviparous, the reason for low control success is a lack of feed. However, it is able to sufficiently control Planococcus citri.

Anagyrus fusciventris: A small parasitic wasp that parasitises individual Pseudococcus longispinus that subsequently turn yellowish. It is difficult to determine its success, as parasitised stadiums are difficult to find in the stand. In high initial infestation, these animals are not very effective. Good results can be obtained in small populations, but the wasps are difficult to get from dealers and are relatively expensive.

Chrysoperla carnea: Lacewing flies are predatory insects with a broad prey spectrum. It is said that they are also able to control Planococcus citri. Lacewing fly larvae are applied to orchid stands in comb systems in 14-day intervals. They enter the small shafts where mealybugs sit in their early stadium of development. Chrysoperla also feeds on Pseudococcus and is able to keep populations low for some time. However, in case of massive infestation, their density and the intervals are insufficient. When the plants form flower stalks, the lacewing flies do not move up to them. Pseudococcus prefers those places on the buds and forms colonies on the developing blossoms.

Episyrphus balteatus: Syrphid larvae are also polyphagous. The larvae, in buckwheat glumes, are spread onto orchids. The larvae feed on mealybugs, but immediately hide in safe places. The relatively large amount of buckwheat glumes can be a nuisance. They do not remain on the leaves, but when the plants are watered, they can also get into the heart of the plants where they may cause secondary rot.
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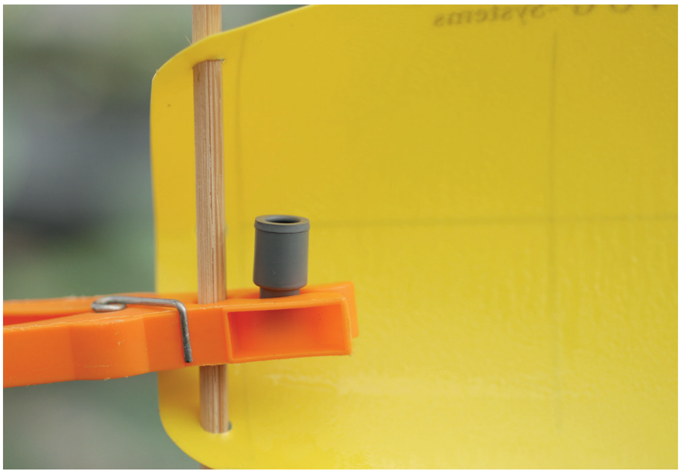

Pheromon capsule against longtailed mealybug (Pseudococcus longispinus)

longtailed mealybug (Pseudococcus longispinus) below pot

longtailed mealybug (Pseudococcus longispinus)

longtailed mealybug (Pseudococcus longispinus)

longtailed mealybug (Pseudococcus longispinus)

longtailed mealybug (Pseudococcus longispinus) with hyphae (© Häming)

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