

## Breadfruit (fluted scale) mealybug (184)

### Common Name

Breadfruit mealybug, Egyptian fluted scale, Egyptian mealybug, Egyptian cottony cushion scale.

### Scientific Name

*Icerya aegyptiaca*

### Distribution

Asia, Africa, Oceania. It is recorded from Australia, Federated States of Micronesia, Kiribati, Marshall Islands, Palau, and Northern Mariana Islands. Waterhouse<sup>1</sup> writes ... "[there is] serious doubt on the correct identification of its presence in Vanuatu, French Polynesia and American Samoa. It seems that it was confused with the related *Icerya seychellarum*". It is likely absent from Fiji, and that specimens in the British Museum were from Kiribati.

### Hosts

Breadfruit principally, but also avocado, banana, citrus, jackfruit, mango, soursop, taro, and many others, including ornamentals. Occasionally, the mealybug occurs on giant taro, *Pandanus*, and young coconuts.

### Symptoms & Life Cycle

The scale is a major pest in Kiribati and atolls of the Federated States of Micronesia. On breadfruit, the mealybugs are found along the midribs and larger veins on the undersides of the leaves and also on the fruit. They suck the sap from the leaves, and heavy infestations cause the leaves to dry up and die.

There are only females: males are unknown. Females lay eggs (70 to 200, depending on temperature) into an egg sac (called an ovisac) that is attached to the tip of the abdomen. The eggs are oval, yellowish-orange. They hatch releasing orange nymphs or larvae; these are active and known as 'crawlers'. They settle down after a day and become covered in wax.

There are two more moults producing the second and third larvae which are yellow to orange, covered in a white mealy substance mixed with wax, and have 21 white waxy processes, about 2.5 mm long, around their bodies. When adult, these white waxy processes are 3-4 mm long (Photo 1), the body is deep orange, oval, with black legs and antennae; the latter have 11 segments (Photo 2).

The mealybug is spread by the crawlers moving to other leaves or by being blown in the wind to other plants.

### Impact

Yield is reduced by as much as 50% due to the loss of leaves, and even mature trees may be killed. Additionally, the mealybugs make honeydew and when this falls onto the leaves, sooty mould fungi grow on it, turning the leaves black and blocking photosynthesis.

### Detection & inspection

Look for mealybugs with orange-red bodies, black legs and antennae, covered by thick layers of white wax, fringed with wax processes that are shorter on the head and thorax, whereas those at the rear cover an ovisac, giving a fluted appearance. Look for yellowish-orange eggs inside the ovisac.



Photo 1. Adult breadfruit mealybugs, *Icerya aegyptiaca*, showing the long white waxy fringe around the body.



Photo 2. Underside of adult breadfruit mealybug, *Icerya aegyptiaca*, to show the legs and antennae.

## Management

### NATURAL ENEMIES

Predatory ladybeetles, *Rodolia* species, are the most important natural enemies. *Rodolia cardinalis* was introduced into Micronesia (including Kiribati where the breadfruit mealybug is a problem), but was not successful, even though it had controlled *Icerya purchasi* on citrus elsewhere. It is thought to have died out. Greater success has been achieved with *Rodilia pumila* which has been introduced on most of the high islands, and has successfully controlled *Icerya*. However, on atolls its success has been limited. It seems that *Rodilia pumila* dies out once the mealybug population is reduced to a very low level. The reason for this may be because *Rodilia pumila* is a specific predator of *Icerya* and its relatives and when populations are low it cannot obtain enough food for its development. To overcome the 'boom and bust' cycle of predator and mealybug seen on atolls, Waterhouse, in *Biocontrol Pacific Prospects* Supplement 2, suggests the introduction of parasitoids.

Note that ants may need to be removed if the natural enemies are to be effective in controlling mealybug populations.

### CULTURAL CONTROL

- Prune infested stems, branches and fruits and burn them.
- Apply mulch, manure or synthetic fertilizers to assist plant vigour.
- Destroy ant nests with boiling water, without damaging the plants infested with the mealybug; without the ants, parasitoids and predators will bring about natural control of the scale insect.
- For trees, prune low branches and remove weeds to stop ants reaching leaves and fruits.

### CHEMICAL CONTROL

Use horticultural oil (made from petroleum), white oil (made from vegetable oil), or soap solution on breadfruit infested with mealybugs (see **Fact Sheet no. 56**).

- White oil:
  - 3 tablespoons (1/3 cup) cooking oil in 4 litres water.
  - 1/2 teaspoon detergent soap.
  - Shake well and use.
- Soap:
  - Use soap (pure soap, not detergent).
  - 5 tablespoons of soap in 4 litres water, **OR**
  - 2 tablespoons of dish washing liquid in 4 litres water.

Commercial horticultural oil can also be used. White oil, soap and horticultural oil sprays work by blocking the breathing holes of insects causing suffocation and death. Spray the undersides of leaves as the oils must contact the insects. The addition of malathion is useful against scales insects. Note the following:

- A second application of soap or oils may be necessary after 3-4 weeks.
- Use synthetic pyrethroid insecticides to kill ants if they are present attracted to the honeydew; these insecticides may also be tried against mealybugs, as they are likely to be effective against the crawlers - crawlers are the young active nymphs which spread infestations to new plants and/or new gardens.

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*When using a pesticide, always wear protective clothing and follow the instructions on the product label, such as dosage, timing of application, and pre-harvest interval. Recommendations will vary with the crop and system of cultivation. Expert advice on the most appropriate pesticides to use should always be sought from local agricultural authorities.*

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<sup>1</sup>Waterhouse DF (1993) *Icerya aegyptiaca* (Douglas). *Biological Control Pacific Prospects - Supplement 2*. ACIAR Monograph No. 20. Brown Prior Anderson, Burwood, Victoria; and from CABI (2020) *Icerya aegyptiaca* (breadfruit mealybug). Crop Protection Compendium. (<https://www.cabi.org/cpc/datasheet/28426>). Photo 1 Alessandra Rung, California Department of Food & Agriculture, Bugwood.org. Photo 2 Peter Ooi, Department of Agriculture & Food Sciences, Faculty of Science, Universiti Tunku Abdul Rahman, Jalan University, Malaysia.

Produced with support from the Australian Centre for International Agricultural Research under project PC/2010/090: *Strengthening integrated crop management research in the Pacific Islands in support of sustainable intensification of high-value crop production*, implemented by the University of Queensland and the Secretariat of the Pacific Community.

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