

## Citrus aphids (249)

### Common Name

Brown and black citrus aphids. There is confusion in these names with brown and black given to both species of *Toxoptera* by different authors. CABI has the common names as follows:

*Toxoptera aurantii* is the camellia aphid, and *Toxoptera citricida* as the black citrus aphid. Some accounts give the common name for *Toxoptera citricida* as the black/brown aphid!

In this fact sheet *Toxoptera citricida* is the brown citrus aphid, and *Toxoptera aurantii*, the black citrus aphid.

### Scientific Name

*Toxoptera* species. *Toxoptera citricida*, brown citrus aphid (CABI-black citrus aphid); *Toxoptera aurantii*, black citrus aphid (CABI-camellia aphid).

### Distribution

The brown citrus aphid (*Toxoptera citricida*) is present in Asia, Africa, North and South America, Europe, Oceania. It is recorded from Australia, Cook Islands, Fiji, Papua New Guinea, Samoa, Solomon Islands, and Tonga.

The black citrus aphid (*Toxoptera aurantii*) occurs in Southeast Asia, Africa, North (Florida, Hawaii) and South America, Caribbean, Europe (restricted), Oceania. It is present in Australia, Federated States of Micronesia, Fiji, French Polynesia, Guam, New Caledonia, Northern Mariana Islands, Papua New Guinea, Samoa, Solomon Islands, Tonga, and Vanuatu.

### Hosts

The brown citrus aphid (*Toxoptera citricida*) occurs on citrus, and perhaps close relatives. There are unconfirmed reports of colonies on new growth of plants in several families. The black citrus aphid (*Toxoptera aurantii*) occurs on over 120 hosts, including citrus, cocoa, coffee, *Hibiscus*, maize, *Vanda* orchids and tea.

### Symptoms & Life Cycle

Adult wingless aphids vary in colour; some are black, others brownish-black or reddish brown (Photo 1). It is difficult to tell the two species apart in the field; a microscope is needed to see the colour patterns on the antennae and legs, as well as differences in other organs.

The reddish-brown nymphs mature in 6-8 days at 20-25°C (Photo 2). The nymphs pass through four stages before they become adults. The adults start giving birth soon after they are mature, producing 5-7 nymphs a day, and 50 in a life time. They exist in two forms: winged and wingless. Most adults in the colonies on young leaves are wingless; winged forms develop when aphid numbers are high (or the leaves are old and less nutritious) (Photo 3). The winged aphids leave the colony soon after they are mature. They can travel up to 30 kms.

Populations of the aphids increase very quickly compared to other species, because of their simple life cycle. In most parts of the world, there are only females, and these give birth to nymphs which are all female. The reproduction rate is so fast that several thousand aphids could be produced within 3 weeks from one female aphid, if none of them were destroyed by natural enemies.

### Impact

The aphids damage citrus in three ways.

- First, colonies of nymphs and adults develop at the shoot tips. The aphids have long piercing mouthparts which they use to suck the young leaves causing them to curl, shrivel and become stunted.
- Secondly, they spread *Citrus tristeza virus* (and other viruses), sometimes called quick decline virus; this causes a serious disease of citrus worldwide (**see Fact Sheet no. 250**). *Toxoptera citricida* is important because it transmits *Citrus tristeza virus* so efficiently, better than other aphids. There are two type of *Citrus tristeza virus* strains that are economically important: (i) one causes a decline in citrus budded onto sour orange; (ii) the other causes stem pitting of grapefruit and sweet orange on any rootstock.
- Thirdly, the aphids produce honeydew as they feed; this is a sweet watery fluid that is attractive to ants, but when it falls onto leaves it is colonised by sooty mould fungi and the leaves turn black.

Of the different ways that these aphids cause damage, it is their ability to spread *Citrus tristeza virus* that is the most serious. Direct damage from infesting shoot tips is usually minor. It is more serious in nurseries than in the field.

One of the most devastating citrus crop losses ever reported came after the introduction of the brown citrus aphid into Brazil and Argentina: 16 million citrus trees grafted on sour orange rootstock were killed by *Citrus tristeza virus*.



Photo 1. Citrus aphids, *Toxoptera* sp., infesting a new flush of leaves.



Photo 2. Shiny black adult citrus aphids, *Toxoptera* sp., and reddish-brown nymphs on the back of a citrus leaf. Note the two syrphid larvae, predators of aphids.



Photo 3. A winged citrus aphid, *Toxoptera* sp. in the foreground.

## Detection & inspection

Look for large colonies of aphids, with dark brown to black adults, 1-5-2 mm in length, and reddish-brown nymphs, on the flushes of citrus.

## Management

### NATURAL ENEMIES

Several kinds of natural enemies exist, including parasites, predators and pathogens. These usually keep populations low. The most common are ladybird beetles (adults and larvae), syrphid fly (hoverfly) larvae (Photo 2), lacewing larvae, and tiny parasitic wasps that lay their eggs in the adult aphids. The wasp larvae develop in the aphids eating the inside parts and turning the aphids into empty shells, called 'mummies'.

However, it is not known how good the predators and parasites are in lowering the populations of brown and black citrus aphids and reducing either direct damage or, more importantly, the spread of *Citrus tristeza virus*.

### CULTURAL CONTROL

Not a useful method of managing this aphid.

### CHEMICAL CONTROL

If ants are present, kill them with boiling water, without damaging the crop plants, or use synthetic pyrethroids. Without ants, predators and parasites will bring about natural control.

- If insecticides are necessary, use any of the following on aphids:
  - White oil (vegetable 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 products of horticultural oil contain petroleum oil; follow the instructions on the product label. Make sure the oil can be used on the crops of interest, otherwise, it may damage the foliage.
- These sprays work by blocking the breathing holes of insects causing suffocation and death. Spray the underside of leaves, as the oils must contact the aphids.

Alternatively, use:

- Plant-derived products, such as neem, derris, pyrethrum and chilli (with the addition of soap).
- Note, a variety of *Derris*, brought many years ago to Solomon Islands from Papua New Guinea, is effective as a spray. It contains rotenone, an insecticide, so it should be used with caution. There may be varieties of *Derris* (fish poisons) in your country that can be tried.
- Synthetic pyrethroids are likely to be effective against aphids (and also ants), but will kill natural enemies, too.

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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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Information from CABI (2020) *Toxoptera citricida* (black citrus aphid). Crop Protection Compendium. (<https://www.cabi.org/cpc/datasheet/54271>); and Aphids in citrus (2020) Agriculture and Food. Department of Primary Industries and Regional Development. Western Australia. (<https://www.agric.wa.gov.au/citrus/aphids-citrus>); Martin KW, et al (2012) Citrus Pests Black citrus aphid. USDA, University of Florida. (<https://idtools.org/id/citrus/pests/factsheet.php?name=Black%20citrus%20aphid>); and from CABI (2020) *Toxoptera aurantii* (camellia aphid). Crop Protection Compendium. (<https://www.cabi.org/cpc/datasheet/54270>).

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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