

Cowpea aphid (356)

Common Name

Cowpea aphid, groundnut aphid, bean aphid, black legume aphid.

Scientific Name

Aphis craccivora

Distribution

Asia, Africa, North, South and Central America, the Caribbean, Europe, Oceania. It is recorded from Australia, Fiji, Guam, Kiribati, Marshall Islands, New Zealand, Papua New Guinea, Samoa, Solomon Islands, Tonga, and Tuvalu.

Hosts

Cowpea (*Vigna unguiculata* spp. *unguiculata*), French bean (*Phaseolus vulgaris*), lentil (*Lens culinaris*), lucerne (*Medicago sativa*), mungbean (*Vigna mungo*), peanut (groundnut) (*Arachis hypogaea*), pigeon pea (*Cajanus cajan*), Vicia bean, yard-long bean (*Vigna unguiculata* spp. *sesquipedalis*).

Symptoms & Life Cycle

Damage is done, (i) directly by nymphs and adults sucking sap from young shoots, flowers and pods as well as injecting a toxin that causes stunting, (ii) indirectly by spreading viruses, and (iii) indirectly by producing honeydew which blankets leaves and is colonised by the black fungal growth of sooty moulds.

On peanuts, direct damage by aphids feeding on shoots causes stunted growth, curled and distorted leaves, and wilting. On cowpea, infestations cause similar damage: there is stunting, reduced growth and shrivelled pods.

Indirect damage occurs as this aphid spreads over 30 plant viruses, of which a number are important, for example: *Alfalfa mosaic virus*; *Bean common mosaic virus*; *Bean yellow mosaic virus*; *Cucumber mosaic virus*; *Groundnut rosette virus*; *Papaya ringspot virus*; *Peanut mottle virus*; *Peanut mild mottle*; *Peanut stunt virus*; *Peanut stripe virus*; *Watermelon mosaic virus*; *Zucchini yellow mosaic virus*.

Indirect damage also occurs as honeydew is excreted from the bodies of nymphs and adults as they suck sap, falling onto leaves below. Colonisation by sooty mould fungi reduces the ability of leaves to exchange gases and to photosynthesis.

In the tropics, females do not lay eggs, they give birth to living young, without fertilisation; there are no males. There are four nymph stages. Nymphs are slate grey, but not shiny as the adults. Initially, the aphids are without wings, but as the colony develops and there is overcrowding (Photo 1), less food or, perhaps, less favourable climate, winged forms occur. Adults are glossy, dark brown or black, with two erect tubes at the rear (Photo 2). They live from 5 to 15 days.

Populations of the cowpea aphid are susceptible to periods of heavy rain, especially those on young plants. Spread of the aphid occurs on the wing, and in air currents that can transport them over long distances.

Impact

Aphis craccivora is one of the most common aphids in the tropics. It is important on food legumes, peanut (groundnut) and cowpea, in particular, but also on French beans (*Phaseolus* species) mungbean (and other *Vigna* species), pigeon pea, chickpea, alfalfa and several others. However, financial losses are not well recorded for any crop.

On peanuts, yield losses of up to 50% occur in parts of Africa if shoots become infested during early stages of growth. On cowpea, and again in Africa, direct damage results from early aphid infestations, causing reduced numbers of pods and seeds per pod. Elsewhere, heavy infestations have been reported (e.g., chickpea in Pakistan, lentil in India, and cowpea in Egypt), as well as 2 to 4-fold increases in yield where pesticides have been used to compare crops with and without aphid infestations (e.g., greengram in India).

Of the many viruses spread by *Aphis craccivora*, groundnut rosette virus, which is a complex of at least five viruses (plus so-called helper viruses and satellite RNA) is one of the most important. Plants develop mottles and mosaic leaf symptoms, on distorted and stunted shoots. If infections occur when plants are young, they may fail to develop pods. Because of its association with the disease, the aphid is considered the most important pest of peanuts in Africa.

Detection & inspection

Look for the adults clustered on the shoots, up to 2.5 mm long, with whitish legs, and wingless. Look for the nymphs that are roundish, dark or dusty brown. Note, distribution of the aphid may be patchy in a field, with some plants infested others not.



Photo 1. Colonies of the cowpea aphid, *Aphis craccivora*.



Photo 2. Adult cowpea aphid, *Aphis craccivora*.

Management

NATURAL ENEMIES

Ladybird beetles (e.g. *Cheilomenes sexmaculata* and *Coccinella septempunctata*), hoverfly larvae (syrphids) and larvae of lacewings, are important insect predators of aphids. Spiders, too, are important predators. Several parasitoid wasps are recorded on *Aphis craccivora* of which *Trioxys indicus* (a braconid) is widely distributed, and there are also species of *Lysiphlebus* and *Diaeretiella*. *Trioxys* is known for tolerance to hot weather. There is an important hyperparasite of this wasp (*Alloxysta pleuralis*), so care is needed if *Trioxys* is to be introduced.

Note, ants tend aphids for their honeydew. By doing so, they protect the aphids from the activities of parasites and predators. To manage aphids, it is important to remove the ants, so that biological control can operate.

CULTURAL CONTROL

Before planting:

- Do not plant down-wind from crops with aphids. Some aphids have wings, but they are not strong fliers, and are more likely to be blown in the wind onto new crops.
- Do not plant next to crops that are already infested with the cowpea aphid.
- Remove weeds especially those known to be alternative hosts of *Aphis craccivora* (e.g., *Medicago* species (medic), *Melilotus* species (sweet clover), *Trifolium* species (clover), *Euphorbia* species (spurge), *Boerhavia* species, as well as volunteer legumes. Remove weeds from within and also outside the crop.
- Inspect crops often and regularly; destroy leaves heavily infested with aphids by hand (or if necessary spot spray with insecticides - see below).
- Mulch the crop. With some mulches, aphids find it more difficult to distinguish the crop plants from bare ground.

After harvest:

- Collect, burn or bury the remains of crops after harvest.

RESISTANT VARIETIES

There are resistant varieties of chickpeas, peanuts and cowpeas bred for resistance to virus diseases.

CHEMICAL CONTROL

If ants are present, find the nest, and if not too close to the plant with aphids, destroy the nest with boiling water. Without ants, predators and parasites may bring about natural control.

- If necessary to use an insecticide to control the aphids, use white oil (made from vegetable oils), soap solution, or horticultural oil (made from petroleum) (**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; the oils must contact the insects. A second application of soap or oils may be necessary after 3-4 weeks. Home-made preparations are ideal for small numbers of plants, but commercial products are probably the only practical solution when crop areas are large.
- Note that aphid distribution may be patchy; if that is the case, and they are not on every plant, then, spot spray the infested plants.

Alternatively, use:

- Plant-derived products, such as neem, derris, pyrethrum and chilli (with the addition of soap). Note, varieties of *Derris* exist in Papua New Guinea and Solomon Islands that contain 2-3% rotenone, and are effective insecticides. However, they should be used with caution. (For methods of preparation, **see Fact Sheet no. 56**.)
- Synthetic pyrethroids are likely to be effective, but will also kill natural enemies. However, they can be used to kill ants, which often tend aphids for their honeydew, and protect them from effective control by predators and parasitoids.

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 CAB International (2017) Crop Protection Compendium. (<https://www.cabi.org/cpc/datasheet/6192>); and *Aphis craccivora* Wikipedia. (https://en.wikipedia.org/wiki/Aphis_craccivora); and from Godfrey LD, et al. (2017) Alfalfa Cowpea Aphid UC/IPM. Agriculture & Natural Resources, University of California. (<http://ipm.ucanr.edu/PMG/r1301511.html>). Photo 1 Mani Mua, SPC, Sigatoka Research Station, Fiji. Photo 2 Whitney Cranshaw, Colorado State University, Bugwood.org.

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