



Pacific Pests, Pathogens & Weeds - Fact Sheets

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Cotesia species (287)

Relates to: **Biocontrol**



Photo 1. *Cotesia vestalis* inside its silken cocoon, close to the remains of a dead diamondback moth larva.



Photo 2. Adult, *Cotesia vestalis*.



Photo 3. Adult, *Cotesia vestalis*.

Common Name

Cotesia

Scientific Name

Cotesia vestalis; previously *Cotesia plutellae*. The wasp belongs to the family Braconidae.

Distribution

Worldwide. Widely distributed in sub-tropics and tropics (not reported from Africa). Asia and south Asia, North (Hawaii) and South America (restricted), the Caribbean, Europe, Oceania. It has been introduced in Fiji and Papua New Guinea.

Prey

Diamondback moth, *Plutella xylostella*.

Symptoms & Life Cycle

Cotesia vestalis is a larval parasite that attacks diamondback moth. The wasp usually lays one egg in small larvae (second larval stage preferred). The egg hatches, and the larva feeds inside its hosts. After 6-10 days - depending on temperature - and three moults, the fully grown *Cotesia* larva emerges, spins a silk cocoon around itself and pupates on the leaf near the dead or dying body of the diamondback moth larva (Photo 1). Five days later, the adult emerges, and lives for 2-3 weeks, depending on availability of nectar (Photos 2&3). During that time the female lays some 200 eggs.

Impact

Cotesia plutellae is an effective parasitoid against diamondback moth in the hot lowlands of the tropics and sub-tropics. In monetary terms its impact on diamondback moth, a pest estimated to cost the world economy US\$4-5 billion annually, can be considerable. In most countries in Asia and the Pacific, *Cotesia* cannot manage populations of diamondback moth alone, but the wasp can make a significant contribution. Good control of diamondback moth is possible when *Cotesia* is present, and selective insecticides (such as Bt) are used.

Detection & inspection

Look for a wasp 2.5 mm long. Alternatively, look for its creamy-white cocoon which is more easily seen; it is 2-3.5 mm long, and attached to leaves of brassica crops.

Management as Biocontrol Agents

DANGERS FROM USING PESTICIDES

Cotesia plutellae parasitism rates of diamondback moth can be high, but they are variable. On its own the wasp cannot prevent damage to brassica crops, and so farmers use insecticides against the moth. The wasp is killed by broad-spectrum insecticides and the use of these chemicals should be avoided as in addition to killing the wasp their repeated use results in populations of diamondback moth with resistance to the product.

Resistant diamondback moth and destruction of its natural enemies (e.g., the parasitoid *Diadegma* in cooler regions, and predators such as spiders, lacewings and predatory beetles everywhere), results in serious crop damage.

In order to preserve *Cotesia*, an IPM - Integrated Pest Management Strategy - is used. Crops are monitored for signs of the pest, and *Cotesia* is preserved by using an insecticide made from bacteria called *Bacillus thuringiensis*, or Bt. This insecticide kills larvae of diamondback moth, especially young ones, but does relatively little harm to *Cotesia*.

However, continuous use of Bt can also result in the selection of populations of diamondback moth resistant to this insecticide. Therefore, Bt should be used only when required (when the number of caterpillars on plants is high enough to cause crop damage). It should be rotated with other insecticides which are effective against diamondback moth, but less harmful to the wasp.

Note, because *Cotesia* can attack and kill insecticide-resistant and insecticide-susceptible diamondback moth larvae, it can help prevent resistance to insecticides developing.

AUTHORS Mike Furlong and Grahame Jackson

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