

3:194 *Aphidius colemani* Parasitoid of aphids

Parasitoid wasp: Hymenoptera: Aphidiidae

NOMENCLATURE: **Approved name:** *Aphidius colemani* Viereck. **Other names:** Aphid parasitoid. Formerly known as: *Aphidius platensis* (Bréthes); *Aphidius transcaspicus* (Telenga).

SOURCE: This parasitic wasp was thought to have originated in India, but the species *Aphidius platensis* and *A. transcaspicus* were re-classified as junior synonyms of *A. colemani* and this extended its geographical range from Central Asia to the Mediterranean. The wasp has been introduced into Australia, Africa, Central America, California, England, Norway and the Netherlands. Traditionally, *Aphidius matricariae* Haliday was the principal commercial agent, but recently, strains selected from commercial colonies for their superior performance against *Aphis gossypii* Glover were shown to be *Aphidius colemani* contaminants and this species has generally superseded *A. matricariae*.

PRODUCTION: *Aphidius colemani* is reared on *Aphis gossypii* Glover or *Myzus persicae* (Sulzer) under controlled glasshouse conditions. Mummies of known age are collected, packaged in bottles or vials and despatched to the customer.

TARGET PESTS: Aphids. The primary hosts are *Myzus persicae*, *Myzus nicotianae* Blackman and *Aphis gossypii*. *Aulacorthum solani* (Kaltenbach) and *Rhopalosiphum padi* (Linnaeus) are also parasitised.

TARGET CROPS: Glasshouse-grown vegetable crops, such as tomatoes, cucumbers, peppers, aubergines and ornamentals. Also effective in interiorscapes.

BIOLOGICAL ACTIVITY: **Biology:** Female adults lay single eggs within an aphid. Parasitised aphids continue to feed and can transmit viruses. After egg hatch, the wasp larva progresses through four stages inside the aphid before pupating within the aphid's body, the mummy stage. On pupating, the parasitoid larva spins a silk cocoon within the aphid cuticle. The cuticle of the aphid host then hardens and the body swells, providing a protective case from which the adult wasp emerges. The adult leaves the mummy through a small, round hole cut in the dorsum of the mummified host. **Predation:** Female wasps can parasitise 100 to 200 aphids within 7 days, although this will vary with host. The presence of *Aphidius colemani* will often disturb the aphid colony, leading to the production of an aphid alarm pheromone that causes aphids to migrate from or fall off the leaf.

Egg laying: Females mate within one day of emergence and begin to lay eggs within a few hours of mating. Fertilised females can lay both unfertilised eggs, that develop into males, and fertilised eggs, that develop into females. Females can lay viable eggs without mating, but these always develop into males. **Duration of development:** It takes between 13 and 15 days from parasitism or egg laying to adult emergence. It is usual for the mummy to exist for 5 to 6 days at 20 °C. **Efficacy:** Particularly effective against *Aphis gossypii*, *Myzus persicae* and *Myzus nicotianae*, although it will parasitise over 40 different aphid species. Very effective searchers that work well against small, well-dispersed populations. Can be

affected by hyperparasitic wasps. **Key references:** 1) E B Hågvar & T Hofsvang. 1991. Aphid parasitoids (Hymenoptera, Aphidiidae): Biology, host selection and use in biological control, *Biocontrol News and Information*, **12(1)**, 13–41. 2) P Stary. 1988. Aphidiidae. In *Aphids: their Biology, Natural Enemies and Control*, A K Minks & P Harrewijn (eds.), Vol. B, pp. 171–84, Elsevier, Amsterdam, The Netherlands. 3) P M J Ramakers. 1989. Biological control in greenhouses. In *Aphids: their Biology, Natural Enemies and Control*, A K Minks & P Harrewijn (eds.), Vol. C, pp. 199–208, Elsevier, Amsterdam, The Netherlands.

COMMERCIALISATION: **Formulation:** Most frequently sold as freshly-collected aphid mummies of known age with no carrier or with wood chips in bottles with a feeder ring in the cap. Sometimes supplied as newly-emerged adult wasps. Some manufacturers produce rearing systems which contain aphids that act as a food source for *Aphidius colemani*, but do not prey on glasshouse crops. Such a system is 'Cereal Aphids' from Biobest, which contains barley infested with cereal aphids, *Rhopalosiphum padi*. **Tradenames:** 'Aphiline c' (Syngenta Bioline), 'Aphiline CE Mix' (50% *Aphidius colemani* and 50% *Aphidius ervi*) (Syngenta Bioline), 'Aphiline CA Mix' (50% *Aphidius colemani* and 50% *Aphelinus abdominalis*) (Syngenta Bioline), 'Aphiline Ace Mix' (50% *Aphidius colemani*, 25% *Aphidius ervi* and 25% *Aphelinus abdominalis*) (Syngenta Bioline) and (Rincon-Vitova), 'Ahipar' (Koppert), 'Aphisure (c)' (Biological Crop Protection), 'Aphid Destroyer' (Nature's Alternative Insectary), 'Aphidius System' and 'Aphidius Mix System' (Biobest), 'Aphidius aphid parasite' (M&R Durango), 'Aphidius colemani' (IPM Laboratories), (Harmony), (Praxis), (Neudorff) and (Rincon-Vitova), 'Aphidius' (Sautter & Stepper), 'AAP 2539' (BioSafer).

APPLICATION: Release near infested areas early in the season. Less effective at high aphid population. Release throughout the infested area by allowing parasitoids to escape from the shipping vial. Treat every other week at a rate of between 2 and 3 wasps per square metre. *Aphidius colemani* can be used at lower rates as a preventive treatment.

PRODUCT SPECIFICATIONS: **Purity:** Aphid mummies with no non-parasitised aphids. Absence of hyperparasitoids is essential. Percentage hatch should be greater than 70%. Adults of known age with no hyperparasitoids. **Storage conditions:** Maintain at 5 to 10 °C and do not expose to direct sunlight. **Shelf-life:** Use as soon as possible and within 5 days, if received within one day of despatch and stored under recommended conditions. Adults must be released immediately. Release in the early morning or in the late evening when glasshouse vents are closed.

COMPATIBILITY: Do not use yellow sticky traps, as these attract *Aphidius colemani*. Blue sticky traps can be used. Ants will reduce the effectiveness of *A. colemani*.

MAMMALIAN TOXICITY: There have been no reports of acute or chronic toxicity, eye or skin irritation or allergic or other adverse reactions to *Aphidius colemani* in research, production or horticultural staff.

ENVIRONMENTAL IMPACT AND NON-TARGET TOXICITY: *Aphidius colemani* has no effects on non-target organisms and no adverse environmental effects are expected from its use. It is specific to aphids.