



Designation: E 2199 – 02

Standard Specification for *Encarsia formosa* Gahan (Hymenoptera:Aphelinidae)¹

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1. Scope

1.1 This specification covers information on and the test method for determining the purity and number of adults released in shipments of *Encarsia formosa*, parasite of the greenhouse whitefly, *Trialeurodes vaporariorum* Westwood.²

2. Referenced Documents

2.1 *ASTM Standards*:³

E 2200 Specification for Information Included With Packaging of Multi-cellular Biological Control Organisms

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *life stage when shipped*—immature.

3.1.2 *name of product*—*Encarsia formosa* Gahan

3.1.3 *preferred host prey*—greenhouse whitefly, *Trialeurodes vaporariorum* (Westwood)

4. Classification

4.1 *Phylum*—Arthropoda.

4.2 *Class*—Insecta.

4.3 *Order*—Hymenoptera.

4.4 *Family*—Aphelinidae.

4.5 *Genus*—*Encarsia*.

4.6 *Species*—*formosa*.

TEST METHOD—Determining the Purity and Number of Adults Released in Shipments of *E. formosa* on Cards

5. Summary of Test Method

5.1 This test method describes a method of counting the number of *E. formosa* released from cards.

¹ This specification is under the jurisdiction of ASTM Committee E35 on Pesticides and Alternative Control Agents and are the direct responsibility of Subcommittee E35.30 on Natural Multi-Cellular (Metazoan) Biological Control Organisms.

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² Steinberg, S., and Dale, J., "Designing and Implementing Quality Control of Beneficial Insects: Towards More Reliable Biological Pest Control," Sting, Newsletter on Biological Control in Greenhouses, No. 18, July 1998, pp. 18-19.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

5.2 The number of *E. formosa* adults released from parasitized whitefly scales attached to cards will be determined by examining a minimum of 1000 parasitized scales and estimating total number of live *E. formosa* and 95 % Confidence Limits (C.L.) per shipment. In each container, live contaminants will be identified and recorded.

6. Significance and Use

6.1 The biological control of greenhouse whitefly by *E. formosa* depends on accurate release numbers of adult parasites. Accurate packaging and maintenance of purity and viability of *E. formosa* shipments is, therefore, essential for the effective management of this pest. This test method may be performed by the producers and end-users.

7. Materials

7.1 Dissecting microscope or headband magnifier (7 to 10 \times).

7.2 45 mm diameter by 90 mm deep, clear plastic vial with snap top.

7.3 Fine pointed No. 5/0 paint brush.

8. Test Unit

8.1 A single shipment of *E. formosa* is considered a test unit.

9. Pre-Test Conditions

9.1 If samples must be held before testing, hold them between 10 and 15°C, RH 60 to 90 %, for a maximum of 24 h.

10. Sampling

10.1 Specify the number of adults that should emerge from individual cards as indicated on the package before conducting the test. Randomly select enough cards per shipment to make up a minimum of 1000 parasites per test unit.

11. Sample Preparation and Treatment

11.1 Close each individual *E. formosa* card in a 45 mm diameter by 90 mm deep, clear plastic vial. Cut a circle of yellow double-sided sticky trap card the same size as the inside diameter of the lid and attach it to the underside of the lid before closing the vial. During the test, hold the samples upright in a brightly lit area, such as a greenhouse, but out of direct sunlight, at between 20 and 25°C and RH 60 to 90 %