Designation: E2754 – 10

Standard Specification for *Delphastus catalinae* (Horn) (Coleoptera:Coccinellidae)[1]

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1. Scope

1.1 This specification covers information on and the test method for determining the purity, sex ratio, and number of live adults present in commercial containers of *Delphastus catalinae* (Horn), a predator of whitefly.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E2200 Specification for Information Included with Packaging of Multi-Cellular Biological Control Organisms (Withdrawn 2010)[3]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *viability*—qualitative assessment of activity of beetles after warming.

3.1.2 *life stage when shipped*—adult.

3.1.3 *name of product—Delphastus catalinae* (Horn).

3.1.4 *preferred host prey*—most species of whitefly including, *Trialeurodes vaporariorum*, *Bemisia tabaci*.

4. Classification

4.1 *Phylum*—Arthropoda.

4.2 *Class*—Insecta.

4.3 *Order*—Coleoptera.

4.4 *Family*—Coccinellidae.

4.5 *Genus*—Delphastus.

4.6 *Species*—catalinae.

5. Physical Properties

5.1 *Number*—Shipments of *D. catalinae* must have a minimum number of live adult beetles as specified on container or accompanying literature.

5.2 *Sex Ratio—D. catalinae* has a male:female sex ratio of 1:1.

5.3 *Sex Identification*—Color of both sexes is mostly reddish-brown, male head and legs yellow; female similar to male except head reddish-yellow. See Gordon[4] for a more detailed description.

6. Summary of Test Method (Determining the Viability, Purity, Sex Ratio, and Numbers of Living Adults in Containers of *D. catalinae*)

6.1 The number of live beetles, sex ratio, and presence of other live insects or mites will be determined by counting and examining individual containers from shipments of *D. catalinae*.

7. Significance and Use

7.1 The biological control of whitefly with *D. catalinae* depends on accurate release rates of predators. Accurate packaging, and maintenance of purity, sex ratio, and viability of shipments is critical to this success. This test will be typically employed by producers and users of the product to assess the number of live biological control agents delivered.

8. Materials

8.1 Dissecting microscope or magnifier (10×).

8.2 Fine (#1) paint brush or forceps.

8.3 Funnel.

8.4 Holding container.

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

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[2] 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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

[4] Gordon, R.D., South American Coccinellidae (Coleoptera) Part III: Taxonomic Revision of the Western Hemisphere Genus *Delphastus Casey*, *Frustula entomol.*, Vol 17, No. 3, 1994, pp. 100–101.

8.5 Aspirator (Mod. 1135A).[5]

9. Test Unit

9.1 A single container of *D. catalinae* is considered a test unit. In large shipments, a minimum of three containers per shipment should be chosen randomly.

10. Pre-Test Conditions

10.1 If samples must be held before testing, hold containers with *D. catalinae* out of direct sunlight between 10 and 12°C for a maximum of 24 h prior to testing.

11. Sample Preparation and Treatment

11.1 Cool samples to 5 to 10°C for 1 to 2 h prior to testing to reduce activity of beetles.

12. Counting Procedure

12.1 To count the total number of beetles, gently tap a portion of the beetles from the container onto an 8×11 sheet of white paper placed on a flat surface under bright light at room temperature (18 to 21°C) and immediately start counting actively moving beetles, brushing them as they are counted into a second bottle using a funnel or an insect aspirator. Store the live, counted beetles in a second container. Repeat the process until all the beetles are counted. While counting the beetles, remove any packing materials and identify and record the presence of any live arthropods other than adult *D. catalinae* beetles. Record live and dead beetles. Retain the live beetles if the sex ratio is required. In multiple bottle shipments, check three bottles.

13. Sex Ratio

13.1 Normal sex ratio is 50 % female.

13.2 Count males and females using handling technique above. The sex is determined by the color of the head: males have a yellow head and yellow legs, females have a reddish-yellow head. The head is most easily seen on live beetles as it is extended when they are walking. See Gordon[4] for a more detailed description.

14. Interpretation of Results

14.1 The average number of live beetles found in the containers counted should equal or exceed the number indicated on the package label. There should be no live arthropods present other than adult *D. catalinae* beetles. The sex ratio should be 50 ± 5 % female. In multiple bottle shipments, three bottles should be checked. If two out of three bottles fail the standard, the shipment is below standard.

15. Precision and Bias

15.1 Precision and bias for this test method not been determined.

16. Keywords

16.1 beetles; Coccinellidae; Coleoptera; counting method; *Delphastus catalinae* (Horn); sex ratio; viability

[5] The sole source of supply of the apparatus known to the committee at this time is www.bioquip.com. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.