



Standard Specification for *Podisus maculiventris* (Say) (Hemiptera: Pentatomidae)¹

This standard is issued under the fixed designation E 2644; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers information on and the test method for quantification of commercial containers of the predatory bug *Podisus maculiventris* (Say) (Hemiptera: Pentatomidae), predator of lepidopteran and coleopteran larvae.

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

E 2200 Specification for Information Included with Packaging of Multi-Cellular Biological Control Organisms

3. Terminology

3.1 *life stage when shipped*—immature.

3.2 *name of product*—*Podisus maculiventris* (Say)

3.3 *carrier*—shredded paper, wood shavings or vermiculite

3.4 *preferred host prey*—lepidopteran and coleopteran larvae.

4. Classification

4.1 *Phylum*—Arthropoda.

4.2 *Class*—Insecta.

4.3 *Order*—Hemiptera.

4.4 *Family*—Pentatomidae.

4.5 *Genus*—*Podisus*.

4.6 *Species*—*maculiventris*.

5. Summary of Test Method (Determining Number of *P. maculiventris* per Container)

5.1 This test method describes a method of counting the number of *P. maculiventris* packaged in vermiculite, shredded paper or wood shavings carrier.

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.

Current edition approved Oct. 1, 2008. Published October 2008.

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.

5.2 The number of living *P. maculiventris* will be determined by examining a minimum of three containers and determining the mean value. In each container, live contaminants will be identified and recorded.

6. Significance and Use

6.1 The efficacy of lepidopteran and coleopteran larval predation by *P. maculiventris* depends on accurate release numbers of insects and absence of live product contaminants. Accurate packaging and maintenance of purity and viability of *P. maculiventris* shipments is, therefore, essential for the effective management of the target pest. This test method is intended for use by producers and users of the specified biological control agent. It is complementary to the quality guidelines for *Podisus maculiventris* that were developed by the International Organization of Biological Control and published in Lenteren, J.C. van (ed.), 2003.³

7. Materials

7.1 Plastic tray.

7.2 A hand counter.

7.3 A wire screen of 0.25 cm grid size in frame.

7.4 Clear snap-top plastic bottles (30 dram recommended).

8. Test Unit

8.1 A single container with *P. maculiventris* is considered a test unit. For large shipments, a minimum of three containers per shipment are to be randomly selected from the shipping box.

9. Pre-Test and Test Conditions

9.1 Store containers with *P. maculiventris* between 5 to 10°C, relative humidity 60 to 90 %, for a minimum of 1 h and maximum of 24 h prior to examination. Test to be conducted under normal lighting at room temperature 15 to 20°C.

³ van Lenteren, et al., "Guidelines for Quality Control of Commercially Produced Natural Enemies," *Quality Control and Production for Biological Control Agents—Theory and Testing Procedures*, J.C. van Lenteren, Ed., CABI Publishing, 2003, pp. 278–279.

10. Sampling

10.1 Specify the number of insects expected in each test unit as indicated on the package before commencing test.

11. Counting Procedure

11.1 *Counting*—To accurately count the total number of insects, gently tap the bottom of container on a hard surface to remove all insects clinging to the lid. Empty the entire contents of the bottle onto the wire screen to separate vermiculite from insects and/or to remove any other packing material. Tapping the container and collecting tray on a hard surface will cause the insects to drop to the bottom of the containers to prevent escape during the counting procedure. Begin counting the number of living, active *P. maculiventris* by hand, sorting one by one from one side of the counting tray into a second container while tallying with the hand counter. For ease in counting, use several clear snap-top plastic bottles to contain insects during the counting procedure.

11.2 *Purity*—During the counting procedure, record any live arthropod contaminants.

12. Calculation

12.1 The following formula is used to estimate the mean number of insects per test unit:

$$x = \frac{\Sigma}{n} \quad (1)$$

where:

x = mean number of insects per test unit,
 Σ = sum of counts of each test unit, and
 n = total number of samples examined.

12.2 *Interpretation of Results*—The mean value of the three test units should be equal to or greater than the number specified on the package.

12.3 No contaminants should be present.

12.4 If any of above conditions are not met, the shipment is considered below standard.

13. Precision and Bias

13.1 The precision and bias of these test methods have not been determined.

14. Keywords

14.1 *Podisus maculiventris*; predatory bug; purity; quantity

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