



Designation: E 657 – 95

Standard Test Method for Comparative Acute and Long-Term Oral or Gustatory Avian Repellency¹

This standard is issued under the fixed designation E 657; 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.

INTRODUCTION

The development of laboratory test methods for measuring the aversive response of birds to various gustatory chemical repellents has been slow and sporadic. Although single- and multiple-choice methods have been adapted or designed to study the acute aversion induced by chemical repellents, none have been specifically designed to delineate the results of repeated repellent exposure on the intensity or duration of the aversive response. This is a simple laboratory technique to test this response in a variety of avian species.

1. Scope

1.1 This test method covers the evaluation of the intensity and duration of the aversive response of birds to chemical repellents.

1.2 No published methodology exists for determining the intensity and duration of an aversive response caused by a chemical bird repellent.

1.3 Because the feeding habits of birds conflict with man's need for food, many control methods have been devised to minimize the competition between birds and man. Chemical repellents applied to planted seeds and ripening crops represent one method of bird damage control.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

E 551 Test Methods for Developing Effective Bird Control Chemicals²

E 555 Practice for Determining Acute Oral LD50 for Testing Vertebrate Control Agents²

3. Summary of Test Method

3.1 The strength and duration of an aversive response induced by a chemical repellent is measured by monitoring the repellent test performance of birds over a period of time.

3.2 The measurement of performance for oral or gustatory avian repellents is based on the degree of acceptance or rejection displayed by the same birds, over time, when the agent is offered as a component of their normal or preferred food.

3.3 This test method describes the use of a single-choice test procedure that can be repeated, over time, to monitor repellent effects.

4. Equipment, Supplies, and Environmental Conditions

4.1 Test cages or other facilities used in all tests should be designed to allow free movement of the test bird and free access to food and water.

4.1.1 Test cages should have solid sides, and minimum dimensions of 17.5 cm wide by 25 cm long by 17.5 cm deep for birds with a total length of ≤ 17.5 cm. Cages for larger birds should be proportionately larger in all dimensions.

4.1.2 Metal 14 by 18-mesh hardware cloth should be securely attached to the inside floor surface so that no food will be lost through the bottom of the cage; or a means should be provided so that food and feces can be collected and readily separated.

4.1.3 Food containers should not cover more than 10 % of the available floor space, be capable of holding a minimum of 100 g of food, and be attached to the cage so that they cannot be easily upset or food spilled outside the cage.

4.1.4 Water should be provided, ad libitum, from a self-contained, 50-ml (minimum capacity) external waterer.

4.2 The test food should be a single, readily available, normal or preferred food of the test species.

4.2.1 Food particles should be of uniform size and weight ($\bar{X} \pm 25\%$). Particles should weigh between 0.03 to 0.1 % of the weight of the test bird.

4.2.2 Food particles should have no external coverings (hulls, etc.) not consumed by the bird.

¹ This test method is under the jurisdiction of ASTM Committee E-35 on Pesticides and is the direct responsibility of Subcommittee E35.17 on Vertebrate Control Agents.

Current edition approved Nov. 10, 1995. Published January 1996. Originally published as E 657 – 78. Last previous edition E 657 – 78 (1989)^{ε1}.

² Annual Book of ASTM Standards, Vol 11.05.

4.3 *Application of Test Chemicals to Food:*

4.3.1 Chemicals soluble in acetone are dissolved in 10 ml of acetone in a 450-ml round glass jar to which 100 g of test food is added. The surfaces of the individual particles are coated by swirling the food particles in the jar and venting in a hood or well-ventilated area, until the acetone is completely evaporated.

4.3.2 Chemicals insoluble in acetone are pulverized in a mortar and pestle with 10 ml of acetone and added directly to the food in a 450-ml jar. Dispersal of the chemical is handled as in 4.3.1.

4.3.3 This method of application (4.3.1 or 4.3.2) cannot be used for test concentrations in which the chemical contributes more than 2 % of the total weight (food and chemical).

4.4 Environmental conditions should be stable from test to test to provide comparability.

4.4.1 Lighting should be continuous (24 h per day) in the test room and should be of approximately equal intensity in all test cages.

4.4.2 Temperature should be maintained within the range of 15 to 25°C.

4.4.3 Relative humidity should be maintained between 30 and 70 %.

5. Bird Selection

5.1 Test birds should be captured from wild environments.

5.2 Test birds should be subadults or adults but not juveniles (less than 6 months old). The age and weight of test birds will vary, but emaciated or injured specimens should not be tested. General condition should be determined by a competent individual.

5.3 Birds with known previous exposure to toxic or experimental chemicals should not be used, except for chemicals administered to maintain bird health; however birds should not be treated for a period of at least 2 weeks prior to testing.

5.4 Birds destined for testing should be maintained in communal cages for a minimum of 2 weeks to acclimate them to captivity.

5.5 Diet and general condition should be stable for 1 week before the test. The diet should contain at least 20 % of the food item that will be used in the tests.

6. Procedure

6.1 *Pre-Exposure Conditioning:*

6.1.1 Individually cage birds (4.1) and offer 25 untreated food particles over an 18-h test period. (For extremely small food particles (<10 mg) additional particles may be used at the discretion of the investigator.)

6.1.2 Use at least six birds (three male and three female, if possible) for each chemical and treatment level tested.

6.1.3 Record the identification number or mark of the bird (leg band, wing clip, etc.) and the number of food particles consumed or partially consumed.

6.1.4 Repeat this conditioning test three additional times, with not less than 2 nor more than 3 days between successive tests.

6.1.5 During the 2 or 3 days between successive tests, return birds to their communal cages and allow free access to food (5.5) and water.

6.2 *Repellent Exposure:*

6.2.1 Individually cage birds (4.1) and offer 25 treated food particles over an 18-h test period (same time period used in 6.1.1).

6.2.2 Record the bird number or mark and number of food particles consumed or partially consumed.

6.2.3 Repeat this exposure to the test chemical five additional times with a minimum of 2 and a maximum of 3 days between successive exposures.

6.2.4 Between successive test periods, return birds to their communal cages and allow free access to food (5.5) and water.

6.2.5 Record death, sickness, or unusual behavioral changes of birds, but do not replace dead or sick birds.

6.3 *Postexposure Monitoring:*

6.3.1 Individually cage birds (4.1) and offer 25 untreated food particles for an 18-h test period (same as in 6.1.1 and 6.2.1).

6.3.2 Record the bird number or mark and number of food particles consumed or partially consumed.

6.3.3 Continue this postexposure monitoring period for a minimum of 6 weeks after repellent exposure. Repeat the test twice weekly (minimum of 2 days and maximum of 3 days between individual tests) for at least 2 weeks, and weekly for the remaining 4 weeks.

6.3.4 Between successive test periods, return birds to their communal cages and allow free access to food (5.5) and water.

6.3.5 Record the dead or sick birds, but do not replace them.

7. Presentation of Data

7.1 Prepare a table showing the original data for each bird, treatment, and test period.

7.2 Prepare a summary table showing the composite results by bird species, number of birds used, treatment, and test period. The data in this table should be in terms of percentage of food eaten or some other useful expression.

7.3 It may be useful to prepare tables that further consolidate the data, perhaps by test sequence (pre-exposure, repellent exposure, postexposure), species, or other combination.

8. Analysis of Data

8.1 Data by species and treatments may be compared by using multivariate analysis of variance with repeated measures, followed by a statistical separation of the means.

8.2 Data can also be analyzed by other computerized statistical techniques that allow separation of means for individual test periods, species, and treatments.