Rule Change Proposal No. 16

PURPOSE

Add to the Rules basic guidelines for laboratory herbicide trait testing of seedlings, which include minimum number of seeds to test, check samples and an equation to calculate trait seed percentages.

PRESENT RULE: None

PROPOSED RULE: New Rule

3.8 Herbicide Trait Testing– The purpose of herbicide trait testing is to determine the percentage of normal seedlings expressing the herbicide trait within an herbicide trait seed lot. A list of testing method references is published in McDonald, M.B, Gutormson, T.J. and E.B. Turnipseed. 2001. Seed Technologist Training Manual. Chapter 14. Society of Commercial Seed Technologists. 435 pp. Questions regarding testing methods may also be addressed to the chair of the AOSA GMO Committee or the AOSA Cultivar Purity Testing Committee.

a. Definition of Herbicide Trait Test – A laboratory test to determine the percentage of normal seedlings of an herbicide tolerant cultivar expressing tolerance to a specific herbicide. (Seedling tolerance to specific herbicides has been incorporated into certain cultivars of several species; the incorporation of an herbicide trait into a cultivar allows that cultivar to tolerate an herbicide, which would normally cause death or inhibit growth to plants of that species. The incorporation of these herbicide traits into cultivars has been accomplished by traditional breeding and transgenic methods).

b. Number of seeds to test – The minimum number of seeds to test when conducting an herbicide trait test is 400.

c. Checks samples – known seeds of both trait and non-trait check samples shall be included with each replicate of an herbicide trait test (in addition to the 400 seed of the kind under consideration). Inclusion of these check samples within each replicate assures the analyst that the active ingredient of the herbicide is present. The non-trait seeds shall be evaluated for non-trait symptoms before evaluating seedlings from the sample under consideration. The trait check seeds shall demonstrate normal growth.

d. Calculating Trait Percentages – Determining the percentage of normal seedlings containing the trait can be obtained in the following manner:
1) Evaluate the sample under consideration and record the number of seedlings expressing normal growth as defined by the AOSA Rules for Testing Seeds and the Seedling Evaluation Handbook, Contribution No. 35 to the Handbook on Seed Testing.
2) Record the number of seedlings, which would produce normal seedlings if their growth were not suppressed due to the lack of the herbicide trait (non-trait seedlings).
3) Once the number of normal trait seedlings and non-trait seedlings have been determined, use the following equation to calculate the percentage of normal seedlings containing the herbicide trait:

$$100 - [\text{Normal non-trait seedlings}/ (\text{Normal trait seedlings} + \text{Normal non-trait seedlings}) \times 100] = \% \text{ Normal seedlings with herbicide tolerant trait}$$

Example: 6 Normal non-trait seedlings and 354 Normal trait seedlings were obtained in a 400 seed test. The calculations would be as follows:
o $100 - [6/(354+6) \times 100]$
o $100 - [6/360 \times 100]$
o $100 - 1.66$
o 98.34% of the Normal (trait and non-trait) seedlings contained the desired herbicide trait.

SUPPORTING EVIDENCE

Herbicide trait testing is widely used in seed testing laboratories, yet no basic testing guidelines exist in the Rules. This proposal is submitted to provide these basic testing guidelines.

We suggest to seed testing associations, seed laboratory personnel and other interested parties that specific methods could be maintained as a website reference page. Such a reference site would be easy to access and allow updating as new methods arise. We also suggest that test method or laboratory validation be considered as the process to achieve uniformity instead of selecting a single testing method.

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