

ISTA 3.2.1 (b) (on pure seed) "Achenes and similar fruits, schizocarps and mericarps, with or without perianth and regardless of whether they contain a true seed, unless it is readily apparent that no true seed is present."

FSA 201.48 h (on pure seed) "Diseased seeds except ergot, smut balls and other fungus bodies which are to be classed as inert matter."

FSA 201.51.1.a.5 (on inert seeds) "Seed units of grasses in which caryopses are replaced by nematode galls or by fungus bodies such as smut balls or ergot sclerotia."

FSA 201.51.1.c.1 (on inert seeds) "Nematode galls, including galls enveloped by the lemma and palea of grass florets."

FSA 201.51.c.2 (on inert seeds) "Fungus bodies, such as ergot and other sclerotia and smut balls."

We feel that an appropriate test of "readily determined" is if the seed unit must be mechanically opened or subjected to prolonged scrutiny to determine infection, then the seed should be classed as "pure seed" or "weed seed". If the seed unit is abnormal in color, or if ergot or other replacement tissue can be seen between the lemma and palea of the floret, or if the shape of the floret makes it obvious that the seed unit is infected, it should be classed with inert material.

Tentative Rules for Testing Coated Seeds

The following procedures were approved as "tentative rules" by the AOSA Executive Board and the Rules Committee at their 1980 annual meeting in Iowa.

The purpose of "tentative" rules is to give the membership an opportunity to apply new methods before final adoption and to find any weaknesses which may exist.

In order to give these methods the broadest exposure possible, they will be included in the next printing of the rules.

These procedures were submitted by Doris Baxter, USDA Seed Laboratory, P. O. Box 1641, Sacramento, California 95808 on behalf of the AOSA Coated Seed Subcommittee, phone (916) 440-3134.

Tentative Rules For Testing Coated Seed

2.13 Coated seed purity procedures

- a. Definition: Coated seed is a seed unit covered with any substance which changes the size, shape, or weight of the original seed. Seeds coated with ingredients such as, but not limited to, rhizobia, dyes, and pesticides are excluded.

(1) Uniformly coated seed.

That unit which is covered to a specific size and shape and is free flowing for precision planting. Kinds involved include, but are not limited to, vegetable, flowers, tobacco, and sugar beet seeds.

(2) Non-uniformly coated seed.

That unit which is partially or wholly covered to add weight or to serve as a carrier. Kinds involved include, but are not limited to, legumes, grasses, and other field crops.

b. Sampling:

- (1) Size of submitted sample: The minimum size for samples of coated units to be submitted for a pure coated unit test shall be that of 7500 units. The minimum size for samples of coated units to be submitted for noxious weed seed examination shall be that of 30,000 units. When only a germination test is requested, a minimum of 1000 units shall be submitted.

- (2) Forwarding and receipt of official samples: Samples of coated seed shall be forwarded in firmly packed crush-proof and moistureproof containers.

c. Size of working sample:

- (1) Single components: Due to variation in weight of coating materials, the size or weight of the working sample shall be determined separately for each lot. The weight of the working sample shall be determined by weighing 100 completely coated units and calculating the weight of 2500 coated units for the pure coated units test and 10,000 coated units for the noxious weed seed determination test.

- (2) Mixtures: The working weight shall be determined in the following manner:

- (a) Calculate the weight of the working sample to be used for the mixture under consideration as though the sample were not coated by following sections 2.3d (1) or (2).
- (b) Determine the amount of coating material on 100 coated units by weighing the coated units. Then use methods described in section 2.13 g. (3), (4), and (5). Calculate the percentage of coating material using the following formulas:

$$\text{Wt. of CMI} = \text{Wt. of 100 c.u.} - \text{Wt. of 100 de-coated u.}$$
$$\% \text{ of CMI} = \text{Wt. of CMI} \div \text{Wt. of 100 c.u.} \times 100\%$$

- (c) The weight of the working sample shall be the product of the weight calculated in (a) multiplied by 100% divided by 100% minus the percentage of coating material calculated in (b).

Example

Where the weight calculated in (a) = 5 grams and the percentage of coating material calculated in (b) = 30%:

$$\frac{5 \text{ grams} \times 100\%}{(100\% - 30\%)} =$$

$$\frac{5 \text{ grams} \times 100\%}{70\%} =$$

$$\frac{5}{.7} =$$

7.1 grams

To determine that this formula is accurate (provides a working sample of coated seed sufficient to provide the weight of seed that would be tested if the seed were not coated), multiply the working weight by the percentage of coating material and subtract this product from the working weight:

$$7.1 \text{ grams} \times 30\% = 2.13 \text{ grams of coating (round off to 2.1 g)}$$

$$7.1 \text{ minus } 2.1 = 5 \text{ grams of seed}$$

- d. Obtaining the working sample:
Coated seed shall be divided by placing the sample in a pile and thoroughly mixing. Divide the pile into halves until a sample of the desired weight remains. See section 2.2. The distance of fall should not exceed 25 cm. to avoid damage to the coated units; therefore, a mechanical divider should not be used.
- e. The purity analysis of uniformly coated seed:
(1) Separation of component parts: The working sample shall be weighed in grams to four significant figures and shall be separated into four parts, or five parts if determination of percentage of coating material is required:
- i. pure coated units;
 - ii. uncoated crop seed (including the kind under consideration)
 - iii. inert matter;
 - iv. uncoated weed seed; and, if required,
 - v. coating material inert (CMI).

- (2) Pure coated units shall include:
 - i. entire coated units regardless of whether or not they contain a seed;
 - ii. broken and damaged coated units in which more than half the surface of the seed is covered by coating material, except when it can be seen that, either the seed is not of the species stated by the sender, or there is no seed present.
 - (3) Uncoated crop seed shall include:
 - i. free seeds of any crop species, refer to sections 2.7 and 2.8;
 - ii. broken coated units containing a crop seed that is recognizably not of the species stated by the sender;
 - iii. broken coated units of the species stated when the coating material covers half or less of the surface of the seed.
 - (4) Inert matter shall include:
 - i. loose coating material;
 - ii. broken coated units in which it is obvious there is no seed;
 - iii. any other material defined as inert matter in section 2.10.
 - (5) Uncoated weed seed shall include:
 - i. free seeds of any weed species, refer to section 2.9;
 - ii. broken coated units containing a weed seed.
 - (6) Coating material inert (CMI) shall be the weight of the coating material washed off if de-coating the sample is necessary. Refer to section 2.13 g. (5). Loose coating material shall not be included in this weight. Refer to 2.13 g. (2).
- f. The purity analysis on non-uniformly coated seed:
- (1) The working sample shall be sieved to remove any non-adhering coating material from the coated units.
 - (2) Separation of component parts: Weigh in grams to four significant figures and separate into four parts, or five parts if determination of percentage of coating material is required:
 - i. kind or cultivar to be considered pure seed;
 - ii. other crop seed;
 - iii. inert matter;
 - iv. weed seed; and, if required,
 - v. coating material inert (CMI)
 - (3) Remove the coating material from the coated units, dry the seed, and calculate the amount of coating material. Refer to section 2.13 g. (3), (4), and (5).

- (4) Separate the de-coated seed into component parts following sections 2.7 through 2.10. Sections 2.7 g. (2) and (3), 2.11 and 2.12 shall not be followed. Weigh each component and add the weight of the non-adhering coating material, determined in section 2.13 f. (1), to the inert matter component.
 - (5) In calculating the percentage of the components, the coating material may be reported as required.
- g. Procedure to be used when the weight of the coating material or a purity analysis on de-coated seed is required:
- (1) Obtain the working sample as in sections 2.13c. (1) and (2), and weigh.
 - (2) Any loose coating material shall be sieved, weighed, and added to the inert matter.
 - (3) Remove the coating material from the seed by shaking in a fine sieve immersed in water or in a solvent. A sieve of 1.00 mm above a sieve of 0.5 mm is recommended (ISTA Rules). Or use the method of removing coating material which involves washing coated seed with a dilute sodium hydroxide (NaOH) solution (pH8-8.4) and vacuum dry the seed after washing with methyl alcohol. Refer to Journal of Seed Technology, Vol. 2, No. 1, pages 81-85.
 - (4) Spread on blotters or filter paper in a shallow container. Dry overnight.
 - (5) Separate the de-coated seed into component parts. Refer to sections 2.7 through 2.10. Sections 2.11 and 2.12 shall not be followed. Weigh each component and calculate percentages on the total weight of de-coated seed. If the coating material percent is required, the CMI is the difference between the original weight of the working sample and the sum of the weights of the other four components.
- h. Noxious weed seeds:
A noxious weed seed examination shall be made by examining approximately 30,000 units which have been de-coated.
- i. Identification and cultivar determination:
To determine the kind of seed under consideration, 100 coated units from the pure coated unit portion of the purity test shall be washed and identified. For cultivar determination a minimum of 400 coated units shall be washed and examined.

Germination Tests

4.8 Special procedures and alternate methods for germination

- k. Coated Seed:
- (1) Germination tests on coated seed units and on de-coated seed shall be tested in accordance with section 4.10.
 - (a) Coated seed units from uniformly coated seed, from non-uniformly coated seed units of single component samples, and non-uniformly color coded seed units in mixtures shall be placed on the substratum in the condition in which they are received without rinsing, soaking, or any other pretreatment.

- (b) Non-uniformly coated seed units in mixtures, such as small legumes, which have not been color coded shall have the coating material removed in such a manner as to not affect the germination capacity of the seeds. Plant the same day the units are de-coated.
- (2) The moisture level of the substratum is important. It may depend on the water-absorbing capacity of the coating material. A retest may be necessary before satisfactory germination of the sample is achieved.
- (3) Phytotoxic symptoms may be evident when germinating coated seeds in paper substrata. In such cases a comparative test or retest in sand or soil may be necessary.

* * * * *

Vigor Test Subcommittee

M. B. McDonald, Jr.

The AOSA Vigor Test Subcommittee continued its examination of vigor tests over the last year. Two projects were initiated. The "referee" program for corn and soybeans to evaluate vigor test standardization was continued by Dr. James Tao, Seed Standardization Branch, and was reported in the last edition of this Newsletter. The AOSA Vigor Test Subcommittee unanimously agreed that the "referee" programs conducted over the last four years have generally supported the conclusion that the vigor tests examined are approaching standardization. In view of this progress, it was recommended that a Vigor Test Handbook be developed.

To accomplish this objective, an ad hoc Educational Committee consisting of Chairperson Dr. Kim Joo, Northrup King, and members Drs. Clark, Delouche, Johnson, Scheitzer, and Mr. George Spain was formed. These individuals were charged with developing a thorough Introduction to the Vigor Test Handbook to inform readers of the proper use, importance, and interpretation of vigor tests by the seed industry. Additionally, Dr. Joo has established guidelines dates by which each component of the Introduction must be completed. The first step of this process was to develop an outline of the topics to be covered. This has now been completed and is provided as Appendix 1 of this report. The AOSA Vigor Test Subcommittee solicits other potential topics from AOSA members which may have been inadvertently omitted from this outline. Accompanying the topics are recommended authors. Dr. Joo is presently in the process of compiling these segments, and editing them into a cohesive report.

Following the Introduction will be recommended vigor test procedures. Individuals who have agreed to revise and update these procedures include: