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Seed Academy

Grass Seed Testing Services

GRASS GERMINATION

METHODS

Testing is conducted according to the Association Official Seed Analysts (AOSA), International Seed Testing Association (ISTA) Rules for Testing seeds or Canada Methods and Procedures (Canada M&P) based on customer need. Each germination test consists of four hundred randomly selected pure seeds. Media utilized is top of paper (TP) and duration is dependent upon species.

WHAT IS REPORTED

Percentages of normal seedlings, abnormal seedlings, and dead seeds. Abnormalities and fungal species present are reported in comments.

VALUE OF RESULTS

The standard germination test is required by the Federal Seed Act (FSA) for labeling. The report of analysis will contain germination percentage and date of test utilized for labeling.

GRASS PURITY & NOXIOUS WEED EXAMINATIONS

METHODS

Purity and Noxious weed seed examination or Other Seed determination can be conducted using the Association Official Seed Analysts (AOSA) Rules for Testing Seed or International Seed Testing Association (ISTA) testing methods. Samples are physically examined for inert, weed and crop seeds.

WHAT IS REPORTED

Pure seed, inert matter and other seed percentages by weight. For AOSA Rules other seeds are reported as other crop seed and common weed seeds per Handbook 29 classification.

Noxious weeds seeds in specific state(s) or the entire lower 48 states are reported.

VALUE OF RESULTS

Purity and noxious results are required on the seed bag label.

GRASS TETRAZOLIUM TEST

METHODS

Tetrazolium tests are conducted on a 200 seed sample. Seeds are typically imbibed for 16 hours and bisected through the embryo or pierced then soaked in 0.1% or 1% tetrazolium solution.

WHAT IS REPORTED

A percentage of viable seed (normal staining embryos and any dormant seeds).

VALUE OF RESULTS

Tetrazolium is a quick estimate of germination and can be useful in determining viability of hard seeds.

FIGURE 1. Big bluestem germination after 14 days on blue blotters, note saprophytic fungal development on seed seed units.

FIGURE 2. Noxious weed examination to detect weeds in noxoious in lower 48 states of North America.

FIGURE 3. Cross section of Beardless Wildrye seed showing the layers within the seed coat.

TABLE 1. Comparison of Native Grass Testing methods on three species and two to four different testing methods.

Species/Method	Prechill (days)	Germ. (days)	Dormancy Breaking	Viability of firm, ungerminated at conclusion of 400 seed germ	Statement on Report of Analysis
SWITCHGRASS					
AOSA Table 6A	14	14	PC, Light, Alt Temp, KNO_3	TZ at 28th day of firm remaining	"In accordance with AOSA Rules"
AOSA Table 6A	0	14	Light, Alt Temps, KNO_3	TZ at 14th day of firm remaining	"In accordance with AOSA Rules"
AOSA 6.9p	0	14	Light, Alt Temps	TZ at 14th day of firm remaining	"14 day germ test conducted using no dormancy breaking methods"
NOT AOSA (Section 15.m)	0	14	Light, Alt Temps, KNO_3 and/or GA_3 or other.	NA/ separate 200 seed TZ used and TZ% minus 14 day germ% = Dormant %	"Germination test was **not** conducted in accordance with AOSA Rules"
BIG BLUESTEM					
AOSA 6A & 6.9p	0	14	Light/Alt Temps	TZ at 14th day of firm remaining	"In accordance or no dormancy breaking"
NOT AOSA (Section 15.m)	0	14	Light, Alt Temps, KNO_3 and/or GA_3 or other.	NA/ separate 200 seed TZ used and TZ% minus 14 day germ% = Dormant %	"Germination test was **not** conducted in accordance with AOSA Rules"
LITTLE BLUESTEM					
AOSA 6A & 6.9p	0	14	Light/Alt Temps	TZ at 14th day of firm remaining	"In accordance or no dormancy breaking"
NOT AOSA (Section 15.m)	0	14	Light, Alt Temps, KNO_3 and/or GA_3 or other.	NA/ separate 200 seed TZ used and TZ% minus 14 day germ% = Dormant %	"Germination test was **not** conducted in accordance with AOSA Rules"

Species Sold on a Pure Live Seed (PLS) Basis: Hundreds of species are sold on a PLS basis, many are considered native species. PLS is calculated as % Pure Seed x % Total Viable (Germ + Dormant) = PLS %. How these PLS valued species are tested can have a significant monetary influence of the value of a seed lot. Reducing variation within the AOSA Rules for Testing Seeds methods and/or having the respective laboratories report their methods, can help explain some of variation in PLS % seen from different laboratories on the same seed lot.

Annually, testing methods change within the AOSA Rules. In the late 1980's, the AOSA Rangegrass Committee submitted proposals which reduced the length of testing for 28–60 days to 14–28 days for many native grasses. The lengthy tests time frames had existed prior to the use of Tetrazolium (TZ) testing to determine the viability of firm ungerminated seeds. Prior to TZ, analysts often prolonged tests hoping for germination and often the dormant seeds became colonized by saprophytic fungi leading to loss of viability. Shortening test length and adopting section 6.9p "No Dormancy Breaking Treatments" within the AOSA Rules has reduced variability in PLS determinations. However, variation still exists due to pure seed determination, components of test methods and the actual test methods. In Table 1. Three species are compared, Switchgrass with four different test methods and Big and Little bluestem with two test methods, respectively. Three official methods exist for Switchgrass, two with dormancy breaking (prechilling and KNO_3) and one with no dormancy breaking and all three having "post-germ TZ" to determine dormant seed percentage. The fourth method used by a few laboratories, combines the results of a 200 seed "pre-germ TZ" test and a four hundred seed germination tests to arrive at total viable seed percentages. Though this method is not in accordance with the AOSA Rules (section 15.m of the AOSA Rules requires use of a statement to that fact on the report of analysis), it does remove the source of variation due to pure seed determination. Since the analyst must cut pure seed units submitted for the pre-germ TZ, as they are preparing seeds for TZ staining, they can remove any inert seed units from consideration of viability. If inert pure seed units are submitted to a germination test with a "post-germ TZ" method, those inert units often appear as "not firm seeds" at completion of the test and are considered nonviable and can result in a lower total viable seed percentage.