Rule Change Proposal No. 12

PURPOSE

To remove the "Fresh and Dormant instructions" from "Additional Directions" for *Andropogon gerardii* (Big Bluestem) in Table 3.

PRESENT RULE

Kind of Seed	Substrata	Temp. ˚C	First Count Days	Final Count Days	Additional Directions
Andropogon gerardii big bluestem	P,TS	20-30	7	14	Light; KNO_3. Fresh and dormant: Prechill at 5˚C for 2 weeks. Ungerminated seeds: see sec. 4.2e and 4.9k.

PROPOSED RULE

Kind of Seed	Substrata	Temp. ˚C	First Count Days	Final Count Days	Additional Directions
Andropogon gerardii big bluestem	P,TS	20-30	7	14	Light. Ungerminated seeds: see sec. 4.2e and 4.9k.

SUPPORTING EVIDENCE

Big bluestem is a native indeterminate flowering warm-season grass which produces varying fruit sizes (seed units), some of which are commonly dormant at harvest. This dormancy dissipates over one to three years resulting in slow establishment of field plantings (Coukos 1944 and Byers 1973). Warm season grasses are normally planted into warm soil conditions (20-25˚C) compared to cool-season grasses which can be planted in fall (dormant) or spring seedings. It is apparent that seed dormancy of warm season grasses exists at normal planting dates so the use of "Fresh and dormant" treatments in seed testing laboratories has been questioned. Most warm season grasses are sold on a Pure Live Seed (PLS) basis which includes germinated and dormant seeds. Therefore, breaking dormancy in the laboratory is not important in the pricing of these seeds, nor does it necessarily represent the expected field emergence potential of the seed lot. Prior to wide spread use of Tetrazolium (TZ) testing for dormancy/viability determination, dormancy breaking by prechilling was one of the only techniques available to analysts to determine if nongerminating seed units were viable. Now with common use of TZ testing on a number of native species, the practice of prechilling to aid in determining total viability of the seed lot is of less importance.

The proposed change is supported by the Native Seed Working Group's study of five seed lots during the spring/summer of 2001. Each laboratory received seed from five seed lots, the experimental design and data forms. Testing was conducted using four true replicates of 100 seeds grouped into four separate blocks, each block containing only one of each seed lot and treatment combinations. Responses of five big bluestem seed lots were evaluated across two moistening agents (water and 0.2% KNO_3) and three prechill durations (0, 7 and 14 days). After the prechill duration consecutive germination counts were made at 7, 14, and 21 days for each seed lot tested. Data was collected and submitted back to Amanda Patin, Mid-West Seed Services, Inc. She amended the data into a database and statistically analyzed the data presented.

Eight laboratories participated in this study and their respective germination test responses for 960 observations are presented in Table 1. Overall, viable seed mean values across laboratories were very comparable. Laboratory three did show significantly lower values and laboratory four had the highest means.

Table 1. Mean germination, dormant seed, viable seed and Tetrazolium (TZ) response from eight laboratories averaged across five seed lots, two moistening agents and three prechill durations. N=960.

Lab	7 Day Germ	14 Day Germ	21 Day Germ	Dormant	Viable	TZ+
	---------- Mean % ----------					
1	65 E	73 C	74 C	3 A	77 B	80 A
3	48 B	64 A	65 A	9 E	74 A	95 C
4	74 G	79 E	80 F	5 D	85 E	79 A
5	70 F	77 D	78 E	4 CD	82 D	*
7	59 C	73 C	75 CD	3 B	78 C	87 B
8	42 A	71 B	76 D	3 AB	79 C	86 B
10	63 D	73 C	75 CD	4 C	79 C	80 A
11	58 C	70 B	72 B	4 CD	76 B	85 B
LSD (0.05)	1.792	1.304	1.245	0.5405	1.259	1.127

*** Missing data**
+ N=140

Data in Table 2 shows that dormancy did vary somewhat across the five seed lots with seed lot two having the highest dormant seed percentage. Viability determined by germination and prechill treatment combinations was lower than viability determined by TZ alone, the viability ranged from 1 to 10 percentage points different.

Table 2. Mean germination, dormant seed, viable seed and Tetrazolium (TZ) response of five seed lots evaluated with two moistening agents and three prechill durations across eight laboratories. N=960.

Seed Lot	7 Day Germ	14 Day Germ	21 Day Germ	Dormant	Viable	TZ*
	---------- Mean % ----------					
1	55 B	73 C	75 D	1 A	76 C	77 A
2	58 C	71 B	72 B	10 D	82 D	88 C
3	61 D	72 CB	73 C	1 A	74 B	83 B
4	71 E	82 D	84 E	6 C	90 E	92 D
5	54 A	65 A	67 A	5 B	72 A	82 B
LSD (0.05)	1.417	1.031	0.9845	0.4273	0.9951	1.889

* N=140

Comparison of prechill treatments found that the seven day prechill produced a 1% and 3% higher viable seed mean than of the 14 day and zero day prechill treatments (Table 3). It is important to note that the length of the tests were 21, 28, and 35 days for 0, 7, and 14 day prechill treatments, respectively. Eliminating the prechill treatment along with a 14 day germination would likely provide viable seed means similar to a seven day prechill. Based on pure statistics the differences of 77 to 80% are real; however within applied seed testing these values would be considered equivalent responses. Additionally, the AOSA tolerances for two separate tests would consider these results equal; this is the rationale we use to conclude prechilling can be dropped from the AOSA testing method.

Table 3. Mean germination, dormant seed and viable seed response of three prechill durations evaluated with two moistening agents and five seed lots across eight laboratories. N=960.

Prechill	7 Day Germ	14 Day Germ	21 Day Germ	Dormant	Viable
	---------- Mean % ----------				
No Prechill	46 A	66 A	68 A	9 C	77 A
7 Day	61 B	76 B	77 B	3 B	80 C
14 Day	72 C	77 C	78 B	1 A	79 B
LSD (0.05)	1.098	0.7984	1.261	0.3310	0.7708

Moistening agent means were very similar between water and KNO_3 suggesting that KNO_3 may not be as important for breaking dormancy in warm season grasses.

Table 4. Mean germination, dormant seed and viable seed response of two moistening agents evaluated with three prechill durations and five seed lots across eight laboratories. N=960.

Moistening Agent	7 Day Germ	14 Day Germ	21 Day Germ	Dormant	Viable
	---------- Mean % ----------				
Distilled H2O	58 A	73 A	74 A	5 B	79 B
0.2 % KNO3	62 B	73 A	74 A	4 A	78 A
LSD (0.05)	0.8961	0.6519	0.6227	0.2702	0.6293

LITERATURE CITED

Byer, K.L. 1973. Evaluation of methods of reducing seed dormancy in switchgrass, Indiangrass, and big bluestem. Thesis South Dakota State University. 40p.

Coukos, D.J. 1944. Seed dormancy and germination in some native grasses. J. Amer. Soc. Agron. 36:337-345.

SUBMITTED BY

Native Seed Working Group: Colorado State Seed Laboratory, Hulsey Seed Laboratory Inc., Mid-West Seed Services, Inc., Minnesota Department of Agriculture State Seed Laboratory, Nebraska Crop Improvement Association Laboratory, Nebraska State Seed Laboratory, South Dakota State Seed Laboratory, and Texas Department of Agriculture-Giddings Seed Laboratory.

Please submit questions to:
Tim Gutormson, RST
Mid-West Seed Services, Inc.
236 32nd Ave.
Brookings, SD, 57006
ph 605-692-7611 timg@mwseed.com.

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