

Rule Change Proposal No. 14

PURPOSE

To remove the “Fresh and Dormant instructions” from “Additional Directions” for *Sorghastrum nutans* (Indiangrass) in Table 3.

PRESENT RULE

Kind of Seed	Substrata	Temp. °C	First Count Days	Final Count Days	Additional Directions
<i>Sorghastrum nutans</i> indiangrass	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
<i>Sorghastrum nutans</i> indiangrass	P,TS	20-30	7	14	Light; Ungerminated seeds: see sec. 4.2e and 4.9k.

SUPPORTING EVIDENCE

Indiangrass 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 seedlings. 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 Indiangrass seed lots were evaluated across two moistening agents (water and 0.2% KNO₃) 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.

Six laboratories participated in this study and their respective germination test responses from 720 individual observations are presented in Table 1. Overall, viable seed mean values across laboratories were very comparable. Laboratory four had the highest means.

Table 1. Mean germination, dormant seed, viable seed and Tetrazolium (TZ) responses from six laboratories averaged across five seed lots, two moistening agents and three prechill durations. N=720

Lab	7 Day Germ	14 Day Germ	Mean				TZ ⁺
			21 Day Germ	Dormant	Viable		
----- % -----							
1	55 D	66 DE	67 CD	8 B	75 D	77 A	
3	32 A	47 A	48 A	27 D	76 ED	83 C	
4	58 E	67 E	68 D	9 C	77 E	78 AB	
7	49 C	65 CD	67 CD	6 A	72 C	84 C	
8	36 B	56 B	59 B	9 C	69 A	79 B	
11	37 B	63 C	65 C	5 A	71 B	80 B	
LSD (0.05)	1.598	1.559	1.534	0.7807	1.444	1.990	

* N=120

Data in Table 2 shows that dormancy did vary somewhat across the five seed lots with seed lot five 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 2 to 14 percentage points different.

Table 2. Mean germination, dormant seed, viable seed and Tetrazolium (TZ) responses of five seed lots evaluated with two moistening agents and three prechill durations across six laboratories. N=720

Seed Lot	7 Day Germ	14 Day Germ	Mean				TZ*
			21 Day Germ	Dormant	Viable		
----- % -----							
1	37 B	51 B	53 B	5 A	58 A	72 B	
2	31 A	46 A	48 A	10 C	58 A	66 A	
3	55 D	72 D	74 D	6 B	80 B	82 C	
4	56 D	71 D	73 D	9 C	82 C	90 D	
5	44 C	62 C	64 C	24 D	88 D	91 D	
LSD (0.05)	1.130	1.423	1.401	1.178	1.318	1.816	

* N=120

Comparison of prechill treatments found that the seven day prechill viable seed mean was equal to the 14 day while 3% higher than 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 71 to 74% 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 six laboratories. N=720

Prechill	Mean				
	7 Day Germ	14 Day Germ	21 Day Germ	Dormant	Viable
	----- % -----				
No Prechill	34 A	50 A	52 A	19 C	71 A
7 Day	46 B	63 B	65 B	9 B	74 B
14 Day	53 C	69 C	70 C	5 A	74 B
LSD (0.05)	1.130	1.102	1.085	0.5521	1.021

Moistening agent means were very similar between water and KNO₃ suggesting that KNO₃ 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 with three prechill durations and five seed lots across six laboratories. N=720

Moistening Agent	Mean				
	7 Day Germ	14 Day Germ	21 Day Germ	Dormant	Viable
	----- % -----				
Distilled H ₂ O	44 A	61 A	62 A	11 B	74 A
0.2 % KNO ₃	45 B	60 A	62 A	11 A	73 A
LSD (0.05)	0.9228	0.9001	0.8858	0.4507	0.8336

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

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