RULES PROPOSALS 1992

AOSA Rules Committee
David F. Svik, Chairman

The following proposals for changes or additions to the "AOSA Rules for Testing Seeds" have been reviewed and approved by the Rules Committee for further consideration by the AOSA members at the 1992 annual meeting. Approval does not mean that the Committee or the members endorse these proposals to the Rules.

Six proposals are presented here as required by the Constitution so the membership may review and evaluate them 90 days in advance of the 1992 AOSA meeting. Please evaluate these proposals carefully. The name and address of the author(s) are noted if you wish to contact them for additional information or have comments.

Comments concerning any of these proposals should also be made in writing to the Rules Chairman prior to the June meeting. Additional comment time will also be available during the Open Rules Committee meeting held prior the AOSA business meeting in June. Extensive changes to these proposals are possible at the Open Rules meeting but are not encouraged by the Rules Committee.

Please Note: Only a limited number of copies of these proposals will be available at the Open Rules meeting. We recommend that you bring your copy of this Newsletter with you to the AOSA meeting.

PROPOSAL No. 1

Revised the wording of Section 4.2e to require the viability evaluation of firm ungerminated seeds.

PRESENT RULE

4.2 e. Dormant seed. - Viable seeds, other than hard seeds, which fail to germinate when provided the specified germination conditions for the kind of seed in question. Viability of ungerminated seeds of all species listed in Tables 3, 4, and 5 may be determined by an appropriate method or combination of methods. The percentage dormant seeds, if present, may be reported in addition to the percentage of germination. Refer to section 4.9k. If the presence of dormant seeds is suspected but not determined the statement "viability of ungerminated seeds not determined" should be written on the germination analysis report.

PROPOSED RULE

4.2 e. Dormant seed. - Viable seeds, other than hard seeds, which fail to germinate when provided the specified germination conditions for the kind of seed in question. Viability of ungerminated seeds of all species listed in Tables 3, 4, and 5 shall be determined by an appropriate method or combination of methods. The percentage dormant seeds, if present, shall be reported in addition to the percentage of germination. Refer to section 4.9k.

SUPPORTING EVIDENCE

This change would promote complete analysis of viable seeds and increase uniformity in reporting germination and dormancy on rangegrass and other species possessing seed dormancy.

SUBMITTED BY

Rangegrass Analysis Subcommittee
Tim Gutormson, Chairman,
Phone: 515-294-6826.

PROPOSAL No. 2

Reduce final count to 14 days and reduce prechill to 14 days for buffalograss (Buchloe dactyloides) in Table 3.

PRESENT RULE

				Additional Directions	
Substrata	Temp C	First Count Days	Final Count Days	Specific requirements	Fresh and dormant seed
P,TB,TS	20-35	7	28[d]	Light, KNO_3	Prechill at 5 C for 6 weeks; test additional 14 days.

PROPOSED RULE

				Additional Directions	
Substrata	Temp C	First Count Days	Final Count Days	Specific requirements	Fresh and dormant seed
P,TB,TS	20-35	7	14[d]	Light, KNO_3	Prechill at 5 C for 2 weeks

SUPPORTING EVIDENCE

A buffalograss germination study conducted by the Rangegrass Analysis Subcommittee in 1991 is attached.

SUBMITTED BY

Rangegrass Analysis Subcommittee
Tim Gutormson, Chairman,
Phone: 515-294-6826

BUFFALOGRASS GERMINATION STUDY

JUNE 1991

RANGEGRASS ANALYSIS SUBCOMMITTEE

This study was conducted to evaluate alternative germination testing methods which would shorten testing time and provide comparable seed lot viabilities. Presently the AOSA method for buffalograss requires a 42-day 5 C prechill followed by a 14-day 20-35 C germination test for a total testing time of 56 days.

Four Texoka buffalograss seed lots were tested. Seed lots 1 and 2 were produced in 1990 and lots 3 and 4 were produced in 1989. Laboratory personnel were instructed to conduct a purity analysis to obtain pure seed for germination testing. The following six testing methods were used:

1. 0 day prechill, 28 day germination, 0.2% KNO_3
2. 14 day prechill, " " " , " "
3. 28 day prechill, " " " , " "
4. 42 day prechill, " " " , " "
5. 0 day prechill, " " " , distilled water
6. 0 day prechill, " " " , 500 ppm GA_3

Methods in common to all treatments.
1. Germination temperature - 20-30 or 20-35 C.
2. Prechill temperature - 5 C.
3. Substrate - "P" is preferred for this study.
4. Light - 8 hours per day during high temperature.
5. Conduct seedling evaluations every 7 days up to 28 days.
6. Determine the viability of ungerminated seeds.
7. Plant 4 replicates of 100 seed per treatment.

Sixteen laboratories returned results and 14 laboratories completed all six methods. The size of the project required analysis as two separate studies with 7 laboratories in each. The results of these analyses are presented in Tables 1 and 2. Treatments without prechill were significantly lower in 7-day germination than prechill treatments. The longer prechill treatments produced the highest 7-day germination. Germination after 7 days dropped sharply regardless of treatment. Reduction in the germination and/or prechill testing time appears appropriate. The inability of GA_3 to promote germination indicates that the dormancy is primarily a physical restriction.

TABLE 1. COMPARISON OF SIX GERMINATION METHODS ON THE VIABILITY PARAMETERS OF FOUR BUFFALOGRASS SEED LOTS TESTED BY LABORATORIES 1 TO 7.

	GERMINATION							
	DAYS							
TREATMENTS	7	14	21	28	TOTAL	DORMANT SEED	SPEED OF GERM. INDEX	VIABLE
0D PC/KNO_3	33	8	3	3	47	39	38	86
14D PC/KNO_3	62	5	1	1	69	17	65	86
28D PC/KNO_3	75	5	1	0	81	4	78	85
42D PC/KNO_3	79	3	1	0	83	3	81	86
0D PC/WATER	22	4	2	2	31	54	26	85
0D PC/GA_3	25	5	4	2	36	48	29	84
LSD ($P \leq 0.05$)	1.5	1.0	0.5	0.4	1.3	1.0	1.3	1.1

TABLE 2. COMPARISON OF SIX GERMINATION METHODS ON THE VIABILITY PARAMETERS OF FOUR BUFFALOGRASS SEED LOTS TESTED BY LABORATORIES 8 TO 16.

	GERMINATION							
	DAYS							
TREATMENTS	7	14	21	28	TOTAL	DORMANT SEED	SPEED OF GERM. INDEX	VIABLE
0D PC/KNO_3	35	6	2	3	46	35	39	81
14D PC/KNO_3	61	4	1	1	67	15	64	82
28D PC/KNO_3	69	6	1	0	76	7	72	83
42D PC/KNO_3	62	8	1	1	72	10	67	82
0D PC/WATER	20	5	2	2	29	48	24	77
0D PC/GA_3	27	5	2	2	36	42	30	78
LSD ($P \leq 0.05$)	1.9	0.9	0.4	0.4	1.7	1.2	1.7	1.7

PROPOSAL No. 3

Addition of Alopecurus arundinacea (creeping foxtail) to the Rules.

PROPOSED RULE

1) Include in Table 1 (Weights for working sample of agricultural, vegetable and herb, and tree and shrub seeds) the following:

Kind of Seed	Minimum weight for purity analysis	Minimum weight for noxious-weed seed examination	Approximate number of seeds per gram	Approximate number of seeds per ounce
Alopecurus arundinacea	1.5 g	15 g	1736	49,129

2) Include in Table 3. (Methods of testing for laboratory germination, Agricultural Seeds.

				Additional Directions	
Substrata	Temp C	First Count Days	Final Count Days	Specific requirements	Fresh and dormant seed
P	15-30	7	21	Light; KNO_3	

SUPPORTING EVIDENCE

Attached.

SUBMITTED BY

Nebraska State Seed Laboratory, Dave Svik, Manager
Rangegrass Analysis Subcommittee, Tim Gutormson, Chairman
Phone: 515-294-6826

SUPPORTING EVIDENCE

Purity and noxious working weights were determined from four seed lots produced in 1991 under four separate environments.

The germination data collected for this proposal was obtained from a two-year study conducted by the Nebraska State Seed Laboratory and the Rangegrass Analysis Subcommittee.

The 1990 study included five after-ripened creeping foxtail seed lots which were supplied by the Nebraska State Seed Laboratory. Germination testing was conducted as follows: four subsamples of 100 seeds per treatment or 400 seed tests; substrate: petri dishes or boxes; 0.2% KNO_3 as the substrate moistening agent; light present during high temperature regime; temperatures of 15-25, 15-30, and 20-30 C; first count at 7 days, final count at 21 days. Five laboratories participated in this study.

Germination of the five seed lots was not significantly different across two of the temperature regimes and slightly better for 20-30 compared to 15-25 C (Table 1.). This indicates that after-ripened seed germinates well across a range of temperatures.

Table 1. Mean percentage 21-day germination of 5 creeping foxtail seed lots when averaged across 5 laboratories with 0.2% KNO_3 as the substrate moistening agent.

Germination Regimes (C)	Mean 21-day Germination Percentage
15-25	75
15-30	76
20-30	78
LSD $P \geq 0.05$	2.0

The second year of the study involved testing 3 freshly harvested (1991) creeping foxtail seed lots obtained from Montana, North Dakota and South Dakota seed fields. Laboratories were sent the seed and instructed to conduct the study by following the same methods as described above. Water was added as an additional substrate moistening agent for comparison with 0.2% KNO_3.

Seven laboratories participated in this study and each laboratory was considered a replicate and all data was analyzed as a randomized complete block design.

Germination counts were conducted up to 21-days and counts were classified as C1 (usually 7 days), C2 (10-15 days), and C3 (21-day), since evaluation times varied with each laboratory.

Germination at C1 was not significantly different ($P \geq 0.05$) between 15-25 and 15-30 C but was significantly lower for 20-30 C (Table 2). The 15-30 regime provided a significantly higher C2 and Total germination compared to the other regimes. Germination at C3 was higher for 20-30 C compared and abnormal seedling percentages also showed the 15-30 C temperature to be optimal.

Table 2. Comparison of three germination temperature regimes, 3

seed lots and two substrate moistening agents on the viability of creeping foxtail.

Temperature Regimes (C)	Germination C1	C2	C3	Total	Abnormal Seedlings	Dead Seeds
			%			
15-25	40	22	5	67	1	31
15-30	36	33	6	75	2	23
20-30	22	21	9	52	2	46
LSD P≥0.05	6.1	4.0	1.8	5.7	0.5	5.7

Water as the substrate moistening agent provided significantly ($P \geq 0.05$) lower germination responses and higher dead seed percentages than 0.2% KNO_3 (Table 3).

Table 3. Effect of two substrate moistening agents averaged across three temperature regimes and three seed lots on viability parameters of creeping foxtail.

Substrate Moistening Agents	Germination C1	C2	C3	Total	Abnormal Seedlings	Dead Seeds[1]
			%			
Water	25	24	7	56	2	42
0.2% KNO_3	40	26	7	73	2	25
LSD P≥0.05	5.0	3.3	1.5	4.6	0.4	4.7

[1] Dormancy determinations were not requested.

The data presented here indicates that a germination temperature of 15-30 C with 0.2% KNO_3 as the substrate moistening agent provides the most rapid and complete germination of both dormant and after-ripened creeping foxtail seed. These findings support recommendations made by Kinch in 1974. A 21-day germination test seems to be sufficient for the seed lots used in this study.

Literature Cited

R. C. Kinch. 1974. Germination of Garrison Creeping Meadow Foxtail. AOSA Newsletter. 48(4):22-24.

PROPOSAL No. 4

Add KNO_3 under additional directions for testing fresh and dormant seed for crambe (Crambe abyssinica) in Table 3.

PRESENT RULE

				Additional Directions	
Substrata	Temp C	First Count Days	Final Count Days	Specific requirements	Fresh and dormant seed
T,B	20;25	4	7		

PROPOSED RULE

				Additional Directions	
Substrata	Temp C	First Count Days	Final Count Days	Specific requirements	Fresh and dormant seed
T,B	20;25	4	7		KNO_3

SUPPORTING EVIDENCE

The proposed change would add KNO_3 under the heading of "Fresh and dormant seed" in Table 3.

During the 1991 testing season dormant crambe seed was encountered in routine testing. This prompted a study to determine how this dormancy could be released during laboratory testing. A portion of that work is presented here as supporting evidence for the proposed rule change.

Meyer and Indy varieties of crambe seed from 1990 and 1991 production were selected and tested within 60 days of the 1991 harvest. The 1990 produced seed was stored at 5-6 C for 12 months prior to testing.

Towel moistening agents composed of 0.2% KNO_3, 0.05% GA_3 and distilled water were tested. Germination studies were conducted in accordance with the AOSA Rules (rolled towels, 20 C, 4 and 7-day counts) with the exception of towel moistening agents.

Towels moistened with KNO_3 provided a significant increase in 4-day germination, total germination, and speed of germination over distilled water (Table 1). Dormant seed percentages were also significantly lowered when KNO_3 was used as the towel moistening agent. There were no significant differences in 7-day and seed lot viability percentages between the two moistening agents.

Table 1. Mean percentage of 4-, 7-d and total germination, dormant seed, seed lot viability and germination rate index of two towel moistening agents when comparing four crambe seed lots.

Towel Moistening Agents	Germination 4-d	7-d	Total	Dormant	Seed Lot Viability	Germ Rate Index
			-----%-----			
Dist. Water	50	7	57	16	73	52.9
0.2% KNO_3	61	8	69	1	70	64.7
LSD ($P \geq 0.05$)	2.1	1.0	2.0	1.8	2.0	3.3

The study was repeated with the addition of Gibberellic acid (GA_3) as a third towel moistening agent.

Gibberellic acid and KNO_3 provided significantly higher 4-day and total germination percentages compared to distilled water (Table 2). Germination at 7 days was similar for all treatments. Dormant seed percentages were significantly higher for distilled water compared to the other moistening agents. Seed lot viability was significantly different across all treatments with distilled water producing the highest percentage. KNO_3 and GA_3 produced significantly faster rates of germination compared to distilled water.

Table 2. Mean percentage of 4-, 7-d and total germination, dormant seed, seed lot viability and germination rate index of three towel moistening agents when compared across four crambe seed lots.

Towel Moistening Agents	Germination 4-d	7-d	Total	Dormant	Seed Lot Viability	Germ Rate Index
			-----%-----			
Dist. Water	56	9	65	12	78	61.1
0.2% KNO_3	64	10	74	2	76	69.2
0.05% GA_3	64	8	72	0	72	67.9
LSD ($P \geq 0.05$)	1.7	1.0	1.8	0.8	1.8	1.6

SUBMITTED BY

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PROPOSAL No. 5

Addition of T as substratum for Flowering flax in Table 4.

PRESENT RULE

Kind of Seed	Substrata	Temp. °C.	First Count Days	Final Count Days	Additional Directions
Linum grandiflorum Desfontaines Flowering flax	TB	15	5	12	KNO_3 will help new crop seed

PROPOSED RULE

Kind of Seed	Substrata	Temp. °C.	First Count Days	Final Count Days	Additional Directions
Linum grandiflorum Desfontaines Flowering flax	TB,T	15	5	12	KNO_3 will help new crop seed

SUPPORTING EVIDENCE

The Flowering flax germination blotter vs rolled towel referee in 1990-1991 from AOSA Region I showed that a rolled towel substrate was the most effective treatment to reduce variation between laboratories. Two samples were planted both on blotters and rolled towel by five official laboratories. Sample 1 averaged 2% lower on rolled towel but obtained a reduced range of germination between labs from 29% on blotters to 15% in rolled towels or a 48% reduction in laboratory differences. Sample 2 averaged 5% lower on rolled towel but obtained a reduced range of germination between labs from 12% on blotters to 10% on rolled towels or a 17% reduction in laboratory differences. The differences in average germination by substrate for both samples was within the germination tolerances of the Rules for a mean germination of 70 to 79% and 80 to 89%. Combined sample germinations averaged 82% on blotters and 79% in rolled towels for a 3% difference by substrate. Range of germination differences was reduced from 32% on blotters to 18% in rolled towels or by 44% across samples and laboratories by using a rolled towel substrate.

AOSA REFEREE

TABLE I. SAMPLE GERMINATIONS ON BLOTTER AND ROLLED TOWEL SUBSTRATES FROM FIVE LABORATORIES

	SAMPLE 1										SAMPLE 2									
SUBSTRATE	BLOTTER					ROLLED TOWEL					BLOTTER					ROLLED TOWEL				
LABS	1	2	3	4	x̄	1	2	3	4	x̄	1	2	3	4	x̄	1	2	3	4	x̄
2	84	78	86	79	82	88	80	79	87	84	80	87	88	86	85	70	76	79	82	77
6	50	63	66	62	60	79	77	73	71	75	81	82	76	79	80	88	87	87	80	86
7	90	86	88	93	89	81	78	81	84	81	85	83	81	83	83	75	76	78	77	77
8	86	86	84	85	85	69	66	69	72	69	91	92	87	91	90	88	85	85	90	87
9	77	80	74	72	76	71	73	66	69	70	91	94	91	92	92	81	76	83	76	79
AVERAGE =					78					76					86					81

Prior to the AOSA Referee in 1990-1991, the Idaho State Seed Laboratory tested three Flax samples both on blotters and in rolled towel. The analysts found the seedlings more elongated and easier to evaluate especially if there was a question on a root abnormality. Results showed no difference by substrate within samples and in the average across the three samples.

TABLE 2. Idaho State Seed Laboratory

FLOWERING FLAX GERMINATION PERCENTAGES

SAMPLE	BLOTTER	ROLLED TOWEL
1	55	52
2	56	57
3	82	81
AVERAGE	64	63

SUBMITTED BY:

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PROPOSAL No. 6

KIND OF SEED (Scientific and common name):

Rosmarinus officinalis L.

Rosemary

PRESENT RULE (If this is a new rule, state "new rule"):

P 15 7 28 Light -------

PROPOSED RULE (Type exactly as is should appear in the rules):

P 15, 15-25 7 28 Light Moisten substrate with 500 ppm GA_3. Low germination may be due to the presence of unfilled seeds. (see sec 2.7-f)

SUPPORTING EVIDENCE OR REASONS FOR THE PROPOSED RULE (In this space, summarize your reasons for making the proposed change or addition. As supporting evidence, attach 9 copies of summarized research data, literature citations, photocopies of published papers, and any other information helpful to the Rules Committee in making a decision):

Laboratory tests show increased germination at 15-25 °C
Some samples have low germination because of unfilled seeds.
Good response to GA_3 when sample is dormant.

SUBMITTED BY: (Name, address, and phone number)

Aleta Meyr and Nancy Vivrette Ransom Seed Laboratory Carpinteria, CA 93014-0300
(805) 684-3427

DATE:

1991

Ransom Seed Laboratory 1991 Rosemary Rule Change

15°C versus 15-25°C

Lot number	15°C	15°C H_2O	15°C GA_3	15-25°C	15-25°C H_2O	15-25°C GA_3
	% Germination			% Germination		
A	5		3	11		8
B	35		27	18		31
C	19		16	23		18
D	58		66	38		43
E	3		11	25		25
F	3		-	12		10

15-25°C H_2O versus 15-25°C GA_3

Lot Number	% Germination	Range	% Germination	Range
G	12		10	
H	28	(23-36)	36	(33-39)
I	26	(25-26)	19	(5-23)
J	27		21	(13-29)
K	34		42	(40-43)
L	50	(49-51)	53	(51-55)
M	27	(24-29)	26	(22-30)
N	32	(30-34)	28	(26-29)
O	27	(25-28)	24	(23-25)
P	20		29	
Q	36	(37-55)	34	(31-36)