

## **RULE PROPOSALS - 2000**

AOSA Rules Committee

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The following twenty-two proposals for changes in or additions to the AOSA Rules have been reviewed and approved by the Rules Committee for further consideration by the AOSA membership at the 2000 meeting. Please note that approval does not mean that the committee or the members endorse these proposals.

These proposals are published in this issue of *The Seed Technologist Newsletter* so that they may be evaluated prior to the annual meeting. The names and addresses of the authors are included. Please contact them if you need additional information. You may also submit written comments to the Rules Chair prior to the meeting. Although comment time will be available during the Open Rules meeting, extensive changes to the proposals will not be made during the meeting. Since only a limited number of copies of the proposals will be available at the Open Rules meeting please bring your copy of this Newsletter with you.

## RULE CHANGE PROPOSAL No. 1

**PURPOSE:** To provide an official testing procedure for conducting seed counts of corn and soybeans.

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**PRESENT RULE:**

**New Rule** (Approved by the AOSA Executive Board as a tentative rule for soybean)

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**PROPOSED RULE:**

**Seed count test for soybean (*Glycine max*) and corn (*Zea mays*)**--The following method shall be employed when using a mechanical seed counter to determine the number of seeds contained in a sample.

- a. *Samples*--Samples for testing shall be of at least 500 grams and received in moisture proof containers. Samples shall be retained in moisture proof containers until the weight of the sample prepared for purity analysis is recorded.
- b. *Seed counter calibration*--The seed counter shall be calibrated daily prior to use.
  - (1) Prepare a calibration sample by counting 10 sets of 100 seeds. Visually examine each set to insure that it contains whole seeds. Combine the 10 sets of seeds to make a 1,000 seed calibration sample. The seeds of the calibration sample should be approximately the same size and shape as the seeds in a sample being tested. If the seeds in a sample being tested are noticeably different in size or shape from those in the calibration sample, prepare another calibration sample with seeds of the appropriate size and shape. Periodically re-examine the calibration samples to insure that no seeds have been lost or added.
  - (2) Carefully pour the 1,000 seed calibration sample into the seed counter. Start the counter and run it until all the seeds have been counted. The seeds should not touch as they run through the counter. Record the number of seeds as displayed on the counter read out. The seed count should not vary more than + or - 2 seeds from 1,000. If the count is not within this tolerance, clean the mirrors, adjust the feed rate and/or reading sensitivity. Rerun the calibration sample until it is within the + or - 2 seed tolerance. If the seed counter continues to fail the calibration procedure and the calibration sample has been checked to ensure that it contains 1,000 seeds, do not use the counter until it has been repaired.
- c. *Sample preparation*--Immediately after opening the moisture proof container, mix and divide the submitted sample to obtain a sample for purity analysis and record the weight of this sample in grams to four significant figures. Conduct the purity analysis to obtain pure seed for the seed count test.
- d. *Conducting the test*--After the seed counter has been calibrated, test the pure seed portion from the purity test and record the number of seeds in the sample.
- e. *Calculation of results*--Calculate the number of seeds per pound to the nearest whole number for using the following formula:

$$\text{Number of seeds per pound} = \frac{453.6 \text{ g/lb} \times \text{no. of seeds counted in d}}{\text{weight (g) of sample analysed for purity}}$$

- f. *Tolerances for results from different laboratories*--Multiply the labeled seed count or first seed count test result by 4% for soybean samples and 2% for corn (round, flat or plateless) samples. Express the tolerance (the number of seeds) to the nearest whole number. Consider the results of 2 tests in tolerance if the difference, expressed as the number of seeds, is equal to or less than the tolerance.

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## SUPPORTING EVIDENCE

The AOSA membership approved a motion at the 1995 meeting directing the president to appoint a special committee to address various seed count issues. This Proposed Rule is the result of four years of referee tests conducted by the AOSA Seed Count Committee as well as data submitted by Committee members.

Eleven laboratories took part in the 1995 - 1996 seed count referee test. Information about this referee test including a summary of the test results was published as a Report of the AOSA Seed Count Committee in both the AOSA Newsletter (September 1996; pg. 51-53) and the Seed Technologist Newsletter (September 1996; pg. 28-30).

Fifteen laboratories took part in the 1996 - 1997 seed count referee test. A summary of the referee test was published as a Report of the AOSA Seed Count Committee in the Seed Technologist News (February 1998; pg. 16-20).

A tentative rule proposal entitled "Seed Count Rule for Soybeans" was approved by the AOSA Executive Board at the 1998 AOSA meeting. The proposal was submitted as a tentative rule because the AOSA Seed Count Committee felt that seed analysts should have an opportunity to become familiar with the new testing procedure and suggest possible modifications before it becomes a permanent rule. The tentative rule proposal and supportive evidence was published in the Seed Technologist News (February 1998; Proposal #1).

A Report of the 1998 Open AOSA Seed Count Committee Meeting was published in the Seed Technologist Newsletter (September 1998; pg. 30-31). In this report seed analysts are asked to try the tentative rule and suggest improvements or indicate where the tentative rule needs clarification before it is submitted as a permanent rule. Information was also included about a referee test of round, flat, and plateless corn samples and an evaluation of composite seed samples planned for 1998 - 1999.

The Report of the AOSA Seed Count Committee for 1998 - 1999 was submitted for publication in the September issue of the Seed Technologist News. This report contains a summary of the results of the referee test of round, flat, and plateless corn samples from nineteen laboratories. In addition, a summary of seed count tests of round, flat, and plateless composite samples as well as composite soybean samples submitted by seven seed laboratories are included. Each seed laboratory obtained and tested five composite samples from each of two seed lots of the four

types of seeds mentioned above. Also included are the results of studies conducted by several laboratories that show that weight and moisture loss can be greatly reduced by keeping corn and soybean samples in sealed plastic bags until seed count tests are conducted. The results of a seed count referee test of three soybean samples submitted by a committee member are also included.

The proposed seed count rule differs from the tentative seed count rule in the following areas.

- The proposed rule was expanded to include round, flat, and plateless corn samples.
- A sample must be retained in a moisture proof container until the weight of the sample cut down for purity analysis is recorded. This would allow the sample to be cut down for purity analysis, the weight recorded, and the purity analysis and seed count to be conducted at a later date.
- One 500 gram sample is used for the seed count test instead of two 250 gram samples.
- The formula used to calculate the number of seeds per pound is simplified by removing “% pure seed.” In addition, the denominator of the formula is “weight of sample analysed for purity,” not “weight tested” for the seed count.
- The tolerance for soybean is increased from 2% to 4% and the tolerance for corn is established as 2%.
- The tolerances are applied to either the labeled seed count or the seed count of a first test.

The modifications to the tentative rule were made based on additional referee test data and suggestions by seed analysts using the tentative rule.

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**DATE OF PROPOSAL**

September, 1999

## RULE CHANGE PROPOSAL No. 2

**PURPOSE:** To change the minimum weight for noxious weed seed examination in Table 1 for *Apium graveolens* from 25 grams to 12 grams, and the purity examination weight from 1 gram to 1.2 grams.

### PRESENT RULE:

Table 1. Weights for working samples

Kind of seed	Minimum weight for purity analysis <sup>a</sup>	Minimum weight for noxious-weed seed or bulk examination	Approximate number of seeds per gram <sup>b</sup>	Approximate number of seeds per ounce <sup>c</sup>
<i>Apium graveolens</i> L. var. <i>dulce</i> (Miller) Persoon and var. <i>rapaceum</i> (Miller) Gaudin celery and celeriac	1	25	2500	71,470

### PROPOSED RULE:

Table 1. Weights for working samples

Kind of seed	Minimum weight for purity analysis <sup>a</sup>	Minimum weight for noxious-weed seed or bulk examination	Approximate number of seeds per gram <sup>b</sup>	Approximate number of seeds per ounce <sup>c</sup>
<i>Apium graveolens</i> L. var. <i>dulce</i> (Miller) Persoon and var. <i>rapaceum</i> (Miller) Gaudin celery and celeriac	1.2	12	2094	59,365

### SUPPORTING EVIDENCE

Presently the AOSA rules for celery ask for a noxious weed seed examination working sample weight of 25 grams (approximately 62,500 seed units) to be examined. The proposed rule for celery asks for a noxious weed seed examination working sample weight of 12 grams (approximately 25,128 seed units) to be examined. The seed count data of 42 samples of *Apium graveolens* (Celery) from 1998 and 1999 shows that 12 grams (approximately 25,128 seed units) is closer to the recommended working sample weight of 25,000 seed units (see Chart 1). Also ISTA has a minimum noxious weed seed examination working sample weight of 10 grams. The present rule of 25 grams for the noxious weed seed examination is excessive and time consuming. The proposed rule saves time in doing the noxious weed seed examination plus comes closer to the recommended working sample weight of 25,000 seed units and ISTA's noxious weed seed examination weight (10 grams). In principle, the purity working sample weight should be

one tenth the noxious exam weight, i.e. the purity working sample should contain 2,500 seeds. Consequently a change from 1 g to 1.2 gram for the purity working sample weight is proposed.

Chart 1. Seed count data of 42 samples of *Apium graveolens* (Celery) from 1998 and 1999

<u>Sample number</u>	<u>Seeds per lb.</u>	<u>Seeds per oz.</u>	<u>Seeds per gram</u>	<u>Seeds per 12 grams</u>
1	1,056,850	66,053	2,330	27,960
2	787,090	49,193	1,735	20,820
3	1,050,730	65,671	2,316	27,792
4	782,339	48,896	1,725	20,700
5	894,498	55,906	1,972	23,664
6	895,381	55,961	1,974	23,688
7	1,055,375	65,961	2,327	27,924
8	741,540	46,346	1,635	19,620
9	1,108,234	69,265	2,443	29,316
10	826,681	51,668	1,822	21,864
11	763,251	47,703	1,683	20,196
12	811,449	50,716	1,789	21,468
13	639,143	39,946	1,409	16,908
14	916,364	57,273	2,020	24,240
15	686,545	42,909	1,514	18,168
16	925,903	57,869	2,041	24,492
17	669,224	41,827	1,475	17,700
18	1,247,524	77,970	2,750	33,000
19	1,050,000	65,625	2,315	27,780
20	1,278,107	79,882	2,818	33,816
21	1,099,636	68,727	2,424	29,088
22	842,809	52,676	1,858	22,296
23	1,012,726	63,295	2,233	26,796
24	969,852	60,616	2,138	25,656
25	981,393	61,337	2,164	25,968
26	812,612	50,788	1,791	21,492
27	1,032,787	64,549	2,277	27,324
28	943,428	58,964	2,080	24,960
29	1,494,071	93,379	3,294	39,528
30	1,228,602	76,788	2,709	32,508
31	1,299,713	81,232	2,865	34,380
32	1,154,786	72,174	2,546	30,552
33	999,119	62,445	2,203	26,436
34	927,039	57,940	2,044	24,528
35	809,566	50,598	1,785	21,420

<u>Sample number</u>	<u>Seeds per lb.</u>	<u>Seeds per oz.</u>	<u>Seeds per gram</u>	<u>Seeds per 12 grams</u>
36	1,206,704	75,419	2,660	31,920
37	705,443	44,090	1,555	18,660
38	732,085	45,755	1,614	19,368
39	759,163	47,448	1,674	20,088
40	976,744	61,047	2,153	25,836
41	805,827	50,364	1,777	21,324
42	914,516	57,157	2,016	24,192
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Average	949,877	59,367	2,094	25,129

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**DATE OF PROPOSAL**

October 1, 1999

## RULE CHANGE PROPOSAL No. 3

**PURPOSE:** To amend instructions for paired tests to include non-woody species and multiple prechill treatments.

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### PRESENT RULE:

Section 4.9l (3) *Paired Tests*: 400 seeds (four 100 seed replicates) shall be used for each test condition (with or without prechill). *See Note* under section 4.6. For some tree and shrub species (as categorized by AOSA Handbook No. 25: Uniform Classification of Weed and Crop Seeds) in Table 3, dormancy may vary by geographic origin or year of collection. Paired tests (with and without prechill) are recommended for some species. These are designated in the “Additional Directions” column of Table 3 by the term “Paired tests.” In some cases where reliable information exists on variations in prechill requirements, this information is also supplied.

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### PROPOSED RULE:

Comparison with present rule (deleted words stroked out, added words underlined):

Section 4.9l -(3) *Paired Tests*: 400 seeds (four 100 seed replicates) shall be used for each test condition (with or without prechill). *See Note* under section 4.6. For ~~some tree and shrub species (as categorized by AOSA Handbook No. 25: Uniform Classification of Weed and Crop Seeds) in Table 3~~ many broadly adapted species, dormancy may vary by geographic origin or year of collection. Paired tests (~~with and without~~ employing no prechill and/or prechill treatments of different durations) are recommended for some species. These are designated in the “Additional Directions” column of Table 3 by the term “Paired tests.” ~~In some cases w~~ Where reliable information exists on variations in prechill requirements, this information is also supplied.

Proposed rule as it would appear in the Rules:

Section 4.9l (3) *Paired Tests*: 400 seeds (four 100 seed replicates) shall be used for each test condition (with or without prechill). *See Note* under section 4.6. For many broadly adapted species, dormancy may vary by geographic origin or year of collection. Paired tests (employing no prechill and/or prechill treatments of different durations) are recommended for some species. These are designated in the “Additional Directions” column of Table 3 by the term “Paired tests.” Where reliable information exists on variations in prechill requirements, this information is also supplied.

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### SUPPORTING EVIDENCE

The intent of this rule change is to expand the provision for paired tests to include non-woody species. The requirement that species selected for paired tests be limited to those which demonstrate considerable collection site- or collection year-related variation in dormancy remains unchanged. The rule change also clarifies the appropriateness of paired tests employing two prechill treatments of different duration in contrast to paired tests consisting of a single



prechill treatment and a no-prechill control.

The extent of within-species variability in seed dormancy among broadly-adapted Intermountain species is explored in a manuscript submitted for publication in *Seed Technology* (Kitchen, In press). The manuscript was reviewed by the Rules Committee and copies are available from the author. In this review eight forbs, two grasses, and 10 shrubs are listed as examples of species with high within-species variability in seed dormancy. The extent of dormancy variation and possible paired test protocols are explained for six of those species.

**LITERATURE CITED:**

Kitchen, S.G. In Press. Intraspecific variability in germination behavior and seed testing protocols: the challenge of Intermountain species. *Seed Technology*.

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**DATE OF PROPOSAL**

October 2, 1999

## RULE CHANGE PROPOSAL No. 4

### PURPOSE:

Addition of *Penstemon eatonii*--firecracker penstemon and *Penstemon palmeri*--Palmer penstemon to Table 1 of the Rules.

### PRESENT RULE:

New rule. These species are listed in Section 4.10 Table 3 but not Section 2.4 Table 1.

### PROPOSED RULE:

Table 1. Weights for working samples

Kind of seed	Minimum weight for purity analysis <sup>a</sup>	Minimum weight for noxious-weed seed or bulk examination	Approximate number of seeds per gram <sup>b</sup>	Approximate number of seeds per ounce <sup>c</sup>
	Grams	Grams	Number	Number
<i>Penstemon eatonii</i> A. Gray firecracker penstemon	3.5	35	735	20,900
<i>Penstemon palmeri</i> A. Gray Palmer penstemon	2	20	1,250	35,500

### SUPPORTING EVIDENCE

Seed weight data obtained for eight replications of 100 seeds per seed-lot as called for in the ISTA seed weight determination method. A sufficient number of seed-lots representing a known range in seed size was used for each species.

### SUBMITTED BY

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**DATE OF PROPOSAL**

October 5, 1999

**Table 1** *Penstemon eatonii*

Weight per 100 seeds

Lot No.	1	2	3	4	5	6	7	8	mean	s.d.
1	0.1624	0.1559	0.1635	0.1669	0.1577	0.1603	0.1612	0.1678	0.1620	0.0041
2	0.1292	0.1445	0.1299	0.1239	0.1423	0.1437	0.1414	0.1446	0.1374	0.0083
3	0.1434	0.1347	0.1540	0.1504	0.1481	0.1483	0.1523	0.1453	0.1471	0.0061
4	0.1496	0.1231	0.1235	0.1152	0.1235	0.1333	0.1227	0.1199	0.1264	0.0107
5	0.1419	0.1367	0.1438	0.1419	0.1597	0.1399	0.1393	0.1418	0.1431	0.0070
6	0.0996	0.1102	0.1090	0.1083	0.1087	0.1055	0.1015	0.1049	0.1060	0.0038
7	0.1290	0.1335	0.1224	0.1234	0.1298	0.1316	0.1283	0.1261	0.1280	0.0038
8	0.1452	0.1511	0.1503	0.1509	0.1458	0.1465	0.1480	0.1519	0.1487	0.0027
9	0.1249	0.1275	0.1266	0.1279	0.1181	0.1231	0.1287	0.1248	0.1252	0.0034
10	0.1302	0.1360	0.1335	0.1336	0.1397	0.1317	0.1365	0.1293	0.1338	0.0035
								mean	0.1358	

**Table 2** *Penstemon palmeri*

Weight per 100 seeds

Lot No.	1	2	3	4	5	6	7	8	mean	s.d.
1	0.0762	0.0787	0.0782	0.0766	0.0776	0.0773	0.0811	0.0793	0.0781	0.0016
2	0.0772	0.0789	0.0794	0.0788	0.0774	0.0776	0.0767	0.0774	0.0779	0.0010
3	0.0894	0.0879	0.0849	0.0887	0.0839	0.0883	0.0870	0.0863	0.0871	0.0019
4	0.0690	0.0729	0.0690	0.0688	0.0700	0.0707	0.0694	0.0689	0.0698	0.0014
5	0.0979	0.0984	0.1018	0.0960	0.0969	0.0930	0.0947	0.0941	0.0966	0.0028
6	0.0760	0.0736	0.0726	0.0716	0.0718	0.0710	0.0718	0.0762	0.0731	0.0020
7	0.0963	0.0929	0.0937	0.0921	0.0932	0.0946	0.0924	0.0895	0.0931	0.0020
8	0.0994	0.0978	0.0919	0.0904	0.0942	0.0950	0.0917	0.0923	0.0941	0.0032
9	0.0843	0.0874	0.0878	0.0901	0.0879	0.0886	0.0870	0.0867	0.0875	0.0017
10	0.0666	0.0695	0.0627	0.0684	0.0648	0.0630	0.0620	0.0667	0.0655	0.0028
11	0.0815	0.0815	0.0790	0.0794	0.0795	0.0754	0.0862	0.0816	0.0805	0.0031
12	0.0628	0.0640	0.0642	0.0663	0.0646	0.0646	0.0649	0.0620	0.0642	0.0013
13	0.084	0.083	0.081	0.080	0.083	0.082	0.080	0.083	0.082	0.0015
14	0.076	0.083	0.079	0.078	0.079	0.076	0.075	0.078	0.078	0.0025
								mean	0.0805	

## RULE CHANGE PROPOSAL No. 5

**PURPOSE OF PROPOSAL:** To add “sand” as a primary testing substrate method for sunflower germination tests.

**PRESENT RULE:**

Kind of Seed	Substrata	Temp. C°	First Count	Final Count
<i>Helianthus annuus</i>	T, B	20	4	7

**PROPOSED RULE:**

Kind of Seed	Substrata	Temp. C°	First Count	Final Count
<i>Helianthus annuus</i>	T, B, S	20	4	7

**SUPPORTING EVIDENCE**

Sunflower seeds commonly have fungal spores loosely attached to their seed coats, especially *Rhizopus spp.* (*Rhizopus* head rot of sunflowers). The mycelium growth of this fungus can cause decay when it contacts radicle and hypocotyl tissue. In 1993, the Seed Analyst of the Midwest proposed adding an alternative method for *Helianthus annuus* which used a germination temperature of 20°C. Their reasoning for this proposal was due to a problem of *Rhizopus* mycelium competing with the sunflower seedling, which often resulted in a decayed seedling when germinating at 20-30°C. The germination and mycelium growth of *Rhizopus spp.* is favored between 25°C and 35°C (Mark Anfinrud, Interstate Payco, personal communication), at 20°C the growth of the mycelium is suppressed. Another method effective in suppressing fungal growth has been the use of sand as a germination substrate. To evaluate sand as a primary germination method, six laboratories (Interstate Payco, Mycogen, Mid-West Seed Service, Cargill, North Dakota State Seed Dept., and South Dakota State University Seed Laboratory) were sent eleven seed lots of sunflowers. Four of the laboratories were able to conduct both towel and sand tests and those results are compared below in Table 1. The response of each seed lot to the two germination methods are presented in Table 2. The overall average germination by method is presented in Table 3.

**Table 1.** Comparison of mean normal seedling percentage of sunflowers when germinated in towels and sand by four laboratories on 11 seed lots.

Laboratory	Mean Normal Seedling Percentage	
	Towels	Sand
1	84	86
2	84	84
3	91	87
4	86	86
LSD P=0.05	1.52	1.45

**Table 2.** Mean normal seedling percentage of 11 sunflower seed lots averaged across two germination methods and four seed laboratories.

Seed Lot	Mean Normal Seedling Percentage	
	Towels	Sand
1	91	90
2	87	80
3	93	90
4	72	77
5	87	80
6	96	97
7	98	95
8	76	78
9	79	80
10	97	99
11	73	78
LSD P=.05	2.51	2.41

**Table 3.** Comparison of mean normal seedling percentage of towel and sand germination methods averaged across 11 seed lots and four laboratories.

Method	Normal Seedling Percentage
Towels	86
Sand	86
LSD P=.05	0.74

**Literature Cited:**

Rules Proposal #4. 1993. AOSA Newsletter. Vol. 67(2) 24-27.

**SUBMITTED BY**

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**DATE OF PROPOSAL**

October 12, 1999

## RULE CHANGE PROPOSAL No. 6

### Purpose of Proposal

Addition of minimum working weights for purity analysis, noxious weed seed and bulk examinations, and seed counts to Table 1 (Weights for Working Samples) for *Carum carvi* L., caraway.

### Present Rule

New rule.

### Proposed New Rule

Table 1. Weights for working samples

Kind of seed	Minimum weight for purity analysis <sup>a</sup>	Minimum weight for noxious-weed seed or bulk examination	Approximate number of seeds per gram <sup>b</sup>	Approximate number of seeds per ounce <sup>c</sup>
<i>Carum carvi</i> L. caraway	8	80	333	9,434

### Supporting Evidence

Caraway is a member of the Apiaceae and as such the seed units are described under Sec.2.6e. Seed counts were conducted by the Purity Subcommittee following the procedure outlined in Appendix 4 of the AOSA rules. Please refer to the data below. The mean purity weight based on 9 samples tested was 7.8 grams. This figure was rounded to the nearest whole number. The noxious weed seed or bulk exam weight was calculated at ten times this value. By comparison the purity working weight in the ISTA Rules is 8 grams.

Lot # <small>*8 reps of 100, **/16 reps of 100</small>	Mean Wt. (gm) per 100 seed	Mean # Seed/gm	Mean # Seed/oz	Minimum Purity Working Wt. (gm)	Minimum Noxious Working Wt. (gm)
3060**	0.394	254	7201	9.9	99
6VC10-A**	0.216	463	13126	5.4	54
84140*	0.326	307	8703	8.2	82
2952*	0.268	373	10575	6.7	67
27117*	0.326	307	8703	8.2	82
6VC10*	0.269	372	10546	6.7	67
118846*	0.301	332	9412	7.5	75
796 1473*	0.372	269	7626	9.3	93
796 1635*	0.314	318	9015	7.9	79
Mean	0.31	333	9434	7.8	78

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**Date:** October 12, 1999

## RULE CHANGE PROPOSAL No. 7

### Purpose of Proposal

Addition of minimum working weights for purity analysis, noxious weed seed and bulk examinations, and seed counts to Table 1 (Weights for Working Samples) for *Foeniculum vulgare* Miller, fennel.

**Present Rule:** New rule.

### Proposed New Rule

Table 1. Weights for working samples

Kind of seed	Minimum weight for purity analysis <sup>a</sup>	Minimum weight for noxious-weed seed or bulk examination	Approximate number of seeds per gram <sup>b</sup>	Approximate number of seeds per ounce <sup>c</sup>
<i>Foeniculum vulgare</i> Miller fennel	11	110	261	7,412

### Supporting Evidence

Fennel is a member of the Apiaceae and as such the seed units are described under Sec.2.6e. Seed counts were conducted by the Purity Subcommittee following the procedure outlined in Appendix 4 of the AOSA rules. Please refer to the data below. The mean purity weight based on 11 samples tested was 10.5 grams. This figure was rounded to the nearest whole number. The noxious weed seed or bulk exam weight was calculated at ten times this value. By comparison the purity working weight in the ISTA Rules is 18 grams. Individual seed units (i.e., mericarps and schizocarps) of fennel vary considerably in size and weight, therefore a wide range of sizes were considered in this study of commercial seed lots.

Lot # <small>*8 reps of 100, **16 reps of 100</small>	Mean Wt. (gm) per 100 seed	Mean # Seed/gm	Mean # Seed/oz	Minimum Purity Working Wt. (gm)	Minimum Noxious Working Wt. (gm)
115562a*	0.404	248	7031	10.1	101
115562b*	0.388	258	7314	9.7	97
115562c*	0.368	272	7711	9.2	92
6461*	0.305	328	9299	7.6	76
5548**	0.505	198	5613	12.6	126
H05173-4**	0.349	287	8136	8.7	87
784 1646*	0.243	412	11680	6.1	61
893 1595*	0.643	156	4423	16.1	161
893 1734*	0.501	200	5670	12.5	125
784 1616**	0.282	355	10064	7.1	71
893 1425**	0.617	162	4593	15.4	154
Mean	0.419	261	7412	10.5	105

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**Date:** October 12, 1999

Revised December 7, 1999



## RULE CHANGE PROPOSAL No. 8

### Purpose of Proposal

Addition of minimum working weights for purity analysis, noxious weed seed and bulk examinations, and seed counts to Table 1 (Weights for Working Samples) for *Melissa officinalis* L., balm or lemon balm. Addition of the common names lemon balm to Table 3, and balm to Handbook 25.

### Present Rule:

Table 3. Methods of testing for laboratory germination

---

Kind of Seed

---

*Melissa officinalis* L.  
balm

---

Handbook 25

*Melissa officinalis*  
---balm, lemon

### Proposed New Rule:

Table 1. Weights for working samples

Kind of seed	Minimum weight for purity analysis <sup>a</sup>	Minimum weight for noxious-weed seed or bulk examination	Approximate number of seeds per gram <sup>b</sup>	Approximate number of seeds per ounce <sup>c</sup>
<i>Melissa officinalis</i> L. balm balm, lemon	1.5	15	1713	48,563

---

Table 3. Methods of testing for laboratory germination

---

Kind of Seed

---

*Melissa officinalis* L.  
balm  
balm, lemon

---

Handbook 25

*Melissa officinalis*  
---balm  
---balm, lemon

## Supporting Evidence

Lemon balm is a member of the Lamiaceae and as such the seed units are described under Sec.2.6f. Seed counts were conducted by the Purity Subcommittee following the procedure outlined in Appendix 4 of the AOSA rules. Please refer to the data below. The mean purity weight based on 15 samples tested was 1.5 grams. The noxious weed seed or bulk exam weight was calculated at ten times this value. By comparison the purity working weight in the ISTA Rules is two grams.

This proposal also recommends the name lemon balm be added to the rules as a common name for *Melissa officinalis* since this common name is included in Handbook 25 and further, that the common name balm be added to Handbook 25 because this common name appears in Table 3 of the AOSA rules.

## References

Huxley, A., M. Griffiths, and M. Levy (Eds.). 1992. The New Royal Horticultural Society Dictionary of Gardening. The Macmillan Press Ltd.

Liberty Hyde Bailey Hortorium. 1976. Hortus Third. Macmillan Publishing Company, New York.

Lot # <small>*78 reps of 100, **716 reps of 100</small>	Mean Wt. (gm) per 100 seed	Mean # Seed/gm	Mean # Seed/oz	Minimum Purity Working Wt. (gm)	Minimum Noxious Working Wt. (gm)
2954*	0.058	1724	48875	1.5	15
H12015-3*	0.058	1724	48875	1.5	15
126406*	0.049	2041	57862	1.2	12
2954*	0.058	1724	48875	1.5	15
14458*	0.057	1754	49726	1.4	14
309-07-W1*	0.0618	1618	45870	1.5	15
766 1414*	0.065	1538	43602	1.6	16
847 1707*	0.061	1639	46466	1.5	15
926 9577*	0.058	1724	48875	1.5	15
926 8304*	0.057	1754	49726	1.4	14
926 7174*	0.059	1695	48053	1.5	15
926 4169*	0.057	1754	49726	1.4	14
926 4044*	0.059	1695	48053	1.5	15
926 3863*	0.058	1724	48875	1.5	15
926 2901*	0.063	1587	44991	1.6	16
Mean	0.059	1713	48563	1.5	15

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## RULE CHANGE PROPOSAL No. 9

### Purpose of Proposal

Addition of minimum working weights for purity analysis, noxious weed seed and bulk examinations, and seed counts to Table 1 (Weights for Working Samples) for *Nepeta cataria* L., catnip.

### Present Rule

New rule.

### Proposed New Rule

Table 1. Weights for working samples

Kind of seed	Minimum weight for purity analysis <sup>a</sup>	Minimum weight for noxious-weed seed or bulk examination	Approximate number of seeds per gram <sup>b</sup>	Approximate number of seeds per ounce <sup>c</sup>
<i>Nepeta cataria</i> L. catnip	1.5	15	1707	48,387

**Supporting Evidence** Catnip is a member of the Lamiaceae and as such the seed units are described under Sec.2.6f. Seed counts were conducted by the Purity Subcommittee following the procedure outlined in Appendix 4 of the AOSA rules. Please refer to the data in Table 1 below. The mean purity weight based on 17 samples tested was 1.5 grams. The noxious weed seed or bulk exam weight was calculated at ten times this value. By comparison the purity working weight in the ISTA Rules is 2 grams.

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Table 1.

Lot # <small>*8 reps of 100, **16 reps of 100</small>	Mean Wt. (gm) per 100 seed	Mean # Seed/gm	Mean # Seed/oz	Minimum Purity Working Wt. (gm)	Minimum Noxious Working Wt. (gm)
3864*	0.056	1786	50633	1.4	14
96-55-BJ800*	0.071	1408	39917	1.8	18
4636*	0.067	1493	42327	1.7	17
E)2147-1*	0.059	1695	48053	1.5	15
JAO8095*	0.053	1887	53496	1.3	13
SB08045*	0.05	2000	56700	1.3	13
CB05124*	0.069	1449	41079	1.7	17
41652*	0.052	1923	54517	1.3	13
2 WCI*	0.059	1695	48053	1.5	15
1 WCI *	0.057	1754	49726	1.4	14
916 1659*	0.052	1923	54517	1.3	13
916 0721*	0.059	1695	48053	1.5	15
916 JSS2*	0.061	1639	46466	1.5	15
916 4143*	0.06	1667	47259	1.5	15
916 5759*	0.06	1667	47259	1.5	15
916 4934*	0.06	1667	47259	1.5	15
916 6615*	0.06	1667	47259	1.5	15
Mean	0.059	1707	48387	1.5	15

## RULE CHANGE PROPOSAL No. 10

### Purpose of Proposal

To change the seed unit definitions for *Lolium x hybridum*, intermediate ryegrass and *Festuca pratensis*, meadow fescue.

### Present Rule

2.6 Seed unit. - The seed unit is the structure usually regarded as a seed in planting practices and in commercial channels. The seed unit may consist of one or more of the following structures:

- b. Seed units in the grass family (for descriptions and illustrations of grass seed units, see AOSA Newsletter 70(1):49-59, 1996) including the following:

- (9) For *Lolium multiflorum*, *L. perenne* and *Festuca arundinacea* refer to section 2.10.a.(4).

2.10 Inert matter. -

- a. Seeds and seed like structures from crop plants.

- (4) For *Lolium multiflorum*, *L. perenne* and *Festuca arundinacea*, empty florets extending to the tip of the fertile floret (excluding the awn) or beyond and glumes shall be removed and classed as inert matter. For all other species of grasses, glumes and empty florets shall be classed as inert matter except as stated under pure seed in sections 2.7g and h.

### Proposed Rule

2.6 Seed unit. - The seed unit is the structure usually regarded as a seed in planting practices and in commercial channels. The seed unit may consist of one or more of the following structures:

- b. Seed units in the grass family (for descriptions and illustrations of grass seed units, see AOSA Newsletter 70(1):49-59, 1996) including the following:

- (9) For *Lolium multiflorum*, *L. perenne*, *L. x hybridum*, *Festuca arundinacea*, and *F. pratensis* refer to section 2.10.a.(4).

2.10 Inert matter. -

- a. Seeds and seed like structures from crop plants.

- (4) For *Lolium multiflorum*, *L. perenne*, *L. x hybridum*, *Festuca arundinacea*, and *F. pratensis* empty florets extending to the tip of the fertile floret

(excluding the awn) or beyond and glumes shall be removed and classed as inert matter. For all other species of grasses, glumes and empty florets shall be classed as inert matter except as stated under pure seed in sections 2.7g and h.

### **Supporting Evidence**

A recent referee project (Meyer 1999) demonstrated the insignificant impact on percent pure seed by the tedious and time consuming practice of removing sterile structures attached to the rachilla that are less than the length of the fertile floret in the above mentioned species. Under this proposal purity testing methods for intermediate ryegrass and meadow fescue would be consistent with testing methods for other similar species. The manuscript of the referenced paper submitted to *Seed Technology* has been reviewed by the Rules Committee and is available from the author on request.

### **Reference**

Lionakis Meyer, D.J. 1999. Comparison of Two Methods of Purity Testing for *Festuca pratensis* Hudson and *Lolium x hybridum* Haussknecht. *Seed Technology*, in press.

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## RULE CHANGE PROPOSAL No. 11

### Purpose of Proposal

To more accurately describe the seed units in commercial channels for some species of Dipsacaceae (e.g., *Scabiosa atropurpurea* L., annual mourning-bride, and *Scabiosa caucasica* (Marschall) Bieberstein, perennial scabiosa).

### Present Rule

- 2.6c Dry indehiscent fruits in the following plant families: Aceraceae, Asteraceae, Betulaceae, Brassicaceae, Casuarinaceae, Chenopodiaceae, Fabaceae, Fagaceae, Geraniaceae, Juglandaceae, Magnoliaceae, Nyctaginaceae, Nyssaceae, Oleaceae, Platanaceae, Polygonaceae, Rosaceae, Simaroubaceae, Ulmaceae, Valerianaceae;
- 2.6g “Seed balls” or portions thereof in multigerm beets (*Beta vulgaris*), and fruits with accessory structures such as occur in the Chenopodiaceae, and New Zealand spinach (*Tetragonia tetragonioides*). Refer to sections 2.7i and 2.10a(9). Refer to sections 2.7j and 2.10a(10) for forage kochia (*Kochia prostrata*).

### Proposed Rule

- 2.6c Dry indehiscent fruits in the following plant families: Aceraceae, Asteraceae, Betulaceae, Brassicaceae, Casuarinaceae, Chenopodiaceae, Dipsacaceae, Fabaceae, Fagaceae, Geraniaceae, Juglandaceae, Magnoliaceae, Nyctaginaceae, Nyssaceae, Oleaceae, Platanaceae, Polygonaceae, Rosaceae, Simaroubaceae, Ulmaceae, Valerianaceae;
- 2.6g “Seed balls” or portions thereof in multigerm beets (*Beta vulgaris*), and fruits with accessory structures such as occur in the Chenopodiaceae, *Scabiosa* spp. and New Zealand spinach (*Tetragonia tetragonioides*). Refer to sections 2.7i and 2.10a(9). Refer to sections 2.7j and 2.10a(10) for forage kochia (*Kochia prostrata*).

### Supporting Evidence

Seed units for members of the Dipsacaceae listed in the AOSA Rules for Testing Seeds have not been adequately described in the rules. The fruits of *Scabiosa atropurpurea* L. (annual mourning-bride) and *Scabiosa caucasica* (Marschall) Bieberstein (perennial scabiosa) are achenes. Each individual fruit usually remains surrounded by a tubular involucrel with expanded, fan-like, many-veined limb, and is crowned with a persistent five-bristled calyx-limb. This proposed description is similar to the pure seed definition given in the ISTA Rules.

### ISTA PSD 6

Achene, with or without involucrel, calyx or beak, unless it is obvious that no seed is present.  
Piece of achene larger than one-half the original size, unless it is obvious that no seed is present.

Seed, with the pericarp/testa partially or entirely removed.

Piece of seed larger than one-half the original size, with the pericarp/testa partially or entirely removed.

### **References**

Abrams, L. & R.S. Ferris. 1960. Illustrated Flora of the Pacific States. Vol. 4., Bignoniaceae to Compositae. Stanford University Press, Stanford, CA.

ISTA. 1996. International Rules for Seed Testing. Seed Sci. & Technol. 24, Supplement. 335 pp.

Miller, A. (ed.). 1996. Seeds of Cultivated Flowers. Front Range Seed Analysts, Fort Collins, CO.

Schermann, S. 1966. Magismeret II. Akadémiai Kiadó, Budapest, Hungary. 209 pp.

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## RULE CHANGE PROPOSAL No. 12

### Purpose of Proposal

To more accurately describe the seed units in commercial channels for some members of the Fabaceae (e.g., *Medicago*, *Melilotus*, *Kummerowia*, and *Lespedeza*).

### Present Rule

2.6 Seed Unit - The seed unit is the structure usually regarded as a seed in planting practices and in commercial channels. The seed unit may consist of one or more of the following structures:

- 2.6d. One and two-seeded pods of small seeded legumes, burs of the bur clovers, and pods of peanuts. (This does not preclude the shelling of small-seeded legumes for purposes of identification.) Pods of legumes normally containing more than two seeds, when occurring incidentally in the working sample, should be hulled if the kind is usually hulled when marketed;

### Proposed Rule

2.6 Seed Unit - The seed unit is the structure usually regarded as a seed in planting practices and in commercial channels. The seed unit may consist of one or more of the following structures:

- 2.6d. One and two-seeded pods of small seeded legumes and burs of the bur clovers, with or without attached calyxes and bracts, and pods of peanuts. (This does not preclude the shelling of small-seeded legumes for purposes of identification.) Pods of legumes normally containing more than two seeds, when occurring incidentally in the working sample, should be hulled if the kind is usually hulled when marketed;

### Supporting Evidence

The calyx and subtending bracts often remain attached to the mature pod in genera such as *Medicago*, *Melilotus*, *Kummerowia*, and *Lespedeza*. When the fruits of these genera are marketed and these structures are attached they would be difficult and time consuming to remove in the laboratory test. In some cases these structures are necessary for species identification. The PSD 22 (*Kummerowia*, *Lespedeza*) in the ISTA rules recognizes these structures as part of the seed unit. ISTA PSD 21 (*Melilotus*)

Pods, with seed(s)

Seed, provided a portion of the testa is attached.

Piece of seed larger than one-half the original size, provided a portion of the testa is attached.

etc.

ISTA PSD 22 (*Kummerowia, Lespedeza*)

Pod, with or without calyx or bracts, with one seed.

Seed, provided a portion of the testa is attached.

Piece of seed larger than one-half the original size, provided a portion of the testa is attached.

### **References**

Delorit, R.J. and Gunn C.R. 1986. Seeds of Continental United States Legumes (Fabaceae). Agronomy Publications, River Falls, Wisconsin.

ISTA. 1996. International Rules for Seed Testing. Seed Sci. & Technol. 24, Supplement. 335 pp.

Musil, A.F. 1963. Identification of Crop and Weed Seeds. Agriculture Handbook No. 219. U.S. Dept. of Agriculture, Washington, D.C. 171 pp. + plates.

Schermann, S. 1966. Magismeret II. Akadémiai Kiadó, Budapest, Hungary. 209 pp.

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## RULE CHANGE PROPOSAL No. 13

### Purpose of Proposal

To more accurately describe the seed units in commercial channels for some species of Malvaceae (e.g., *Lavatera trimestris* and *Alcea rosea*).

### Present Rule

2.6 Seed Unit - The seed unit is the structure usually regarded as a seed in planting practices and in commercial channels. The seed unit may consist of one or more of the following structures:

- e. Schizocarps and mericarps in the Apiaceae and Tropaeolaceae.
- f. Intact fruits, whether or not they contain a seed, of species belonging to families other than Poaceae, in which the seed unit is a dry, indehiscent fruit (refer to section 2.6c., d, e, and f). Refer to section 2.10a(9) for the classification of visibly empty fruits and to section 2.10a(11) for classification of the pericarp (fruit wall) in antelope bitterbrush (*Purshia tridentata*).

2.10 Inert matter. - ...

- a. Seeds and seed like structures from crop plants.
  - (9) Broken seed units of Chenopodiaceae and fruit portions or fragments of monogerm beets (*Beta vulgaris*), New Zealand spinach (*Tetragonia tetragonioides*), buffalograss (*Buchloe dactyloides*), Job's tears (*Coix lacryma-jobi*), and families in which the seed unit may be a dry, indehiscent one-seeded fruit which visibly does not contain a seed. Refer to sections 2.6b(6), 2.6b(10), 2.6g, 2.7f, 2.7g(1) and 2.7i.

### Proposed Rule

2.6 Seed Unit - The seed unit is the structure usually regarded as a seed in planting practices and in commercial channels. The seed unit may consist of one or more of the following structures:

- e. Schizocarps and mericarps in the Apiaceae and Tropaeolaceae, and fruit segments in the Malvaceae.
- f. Intact fruits or fruit segments, whether or not they contain a seed, of species belonging to families other than Poaceae, in which the seed unit is a dry, indehiscent fruit (refer to section 2.6c., d, e, and f). Refer to section 2.10a(9) for the classification of visibly empty fruits and to section 2.10a(11) for classification of the pericarp (fruit wall) in antelope bitterbrush (*Purshia tridentata*).

2.10 Inert matter. - ...

- a. Seeds and seed like structures from crop plants.
  - (9) Broken seed units of Chenopodiaceae and fruit portions or fragments of monogerm beets (*Beta vulgaris*), New Zealand spinach (*Tetragonia tetragonioides*), buffalograss (*Buchloe dactyloides*), Job's tears (*Coix lacryma-jobi*), and families in which the seed unit may be a dry, indehiscent fruit or fruit segment, which visibly does not contain a seed. Refer to sections 2.6b(6), 2.6b(10), 2.6g, 2.7f, 2.7g(1) and 2.7i.

### Supporting Evidence

In some species of Malvaceae the fruit consists of a ring of loosely coherent carpels which separate from a persistent central column at maturity (Zomlefer 1994). For *Lavatera trimestris* and *Alcea rosea* the fruit may be described as schizocarpic

achenes or schizocarpic carcerules (Radford 1974), also called a camarium (Spjut 1994), which separate at maturity into dry, indehiscent fruit segments (Hickman 1993) or fruitlets (Spjut 1994). Therefore, seed units of these two species often consist of seeds surrounded by an indehiscent fruit segment. Terminology for the fruit and fruit segments in Malvaceae varies among authors. To add to the confusion ISTA utilizes the term mericarp to describe fruit segments in the Malvaceae. The definition and usage of the term mericarp again varies among authors. Therefore the broader generic term "fruit segment" is recommended to be used here. This seed unit description will not apply to *Gossypium* spp. (cotton) or *Abelmoschus esculentus* (okra) because these species have capsule-type fruits and seed units of true seeds only.

ISTA PSD 16

Mericarp, unless it is obvious that no seed is present

Piece of mericarp larger than one-half the original size, unless it is obvious that no seed is present.

Seed, with the pericarp/testa partially or entirely removed.

Piece of seed larger than one-half the original size, with the pericarp/testa partially or entirely removed.

### References

Hickman, J.C. ed. 1993. The Jepson Manual: Higher Plants of California. University of California Press. 1400 pp.

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Miller, A. (ed.). 1996. Seeds of Cultivated Flowers. Front Range Seed Analysts, Fort Collins, CO.

Radford, A.E., et al. 1974. Vascular Plant Systematics. Harper & Row, Publishers, New York, NY. 891 pp.

Spjut, R.W. 1994. A Systematic Treatment of Fruit Types. Memoirs of the New York Botanical Garden, Vol. 70:1-182.

Zomlefer, W.B. 1994. Guide to Flowering Plant Families. The University of North Carolina Press, Chapel Hill, N.C.

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## RULE CHANGE PROPOSAL No. 14

### Purpose of Proposal

To more accurately describe the seed units in commercial channels for *Mimosa pudica* and *Desmodium tortuosum* (Fabaceae).

### Present Rule

2.6 Seed unit. - The seed is the structure usually regarded as a seed in planting practices and in commercial channels. The seed unit may consist of one or more of the following structures:

- d. One and two-seeded pods of small seeded legumes, burs of the bur clovers, and pods of peanuts. (This does not preclude the shelling of small-seeded legumes for purposes of identification.) Pods of legumes normally containing more than two seeds, when occurring incidentally in the working sample, should be hulled if the kind is usually hulled when marketed;

2.10 Inert matter. - ...

- a. Seeds and seed like structures from crop plants.

- (11) The thin pericarp (fruit wall), if present on seeds of antelope bitterbrush (*Purshia tridentata*) and northern sweetvetch (*Hedysarum boreale*).

### Proposed Rule

2.6 Seed unit. - The seed is the structure usually regarded as a seed in planting practices and in commercial channels. The seed unit may consist of one or more of the following structures:

- d. One and two-seeded pods of small seeded legumes, burs of the bur clovers, pods of peanuts, and one-seeded fruit segments of *Mimosa pudica*. (This does not preclude the shelling of small-seeded legumes for purposes of identification.) Pods of legumes normally containing more than two seeds, when occurring incidentally in the working sample, should be hulled if the kind is usually hulled when marketed;

2.10 Inert matter. - ...

- a. Seeds and seed like structures from crop plants.

- (11) The thin pericarp (fruit wall), if present on seeds of *Purshia tridentata*, *Hedysarum boreale*, and *Desmodium tortuosum*.

### Supporting Evidence

The fruit of *Desmodium tortuosum*, as well as that of *Hedysarum boreale*, are loments, which by definition break apart into one-seeded indehiscent segments. These two species are typically marketed as true seed.

For consistency in purity testing a clarification is recommended where by the seed unit of *Desmodium tortuosum* would consist only of the true seed.

*Mimosa pudica* fruit also break into one-seeded indehiscent segments, however, this species is typically marketed with the pericarp segments intact. Based on the opening statement of Section 2.6, where the seed unit is defined as the structure usually regarded as the seed in planting practices and in commercial channels it is therefore recommended that the pericarp of these one-seeded fruit segments not be removed in the purity test. It should be noted that this definition for *Mimosa pudica* is in direct conflict with the Pure Seed Definition utilize by ISTA (see below).

#### ISTA PSD 10

Seed, with or without testa.

Piece of seed larger than one-half the original size, with or without testa.

Fabaceae, Brassicaceae, Cupressaceae, Pinaceae, Taxaceae, Taxodiaceae: seeds and pieces of seed without testa are regarded as inert matter.

For Fabaceae: Separated cotyledons are regarded as inert matter irrespective of whether or not the radicle-plumule axis and/or more than half of the testa may be attached.

#### References

Delorit, R.J. and Gunn C.R. 1986. Seeds of Continental United States Legumes (Fabaceae). Agronomy Publications, River Falls, Wisconsin.

ISTA. 1996. International Rules for Seed Testing. Seed Sci. & Technol. 24, Supplement. 335 pp.

Miller, A. (ed.). 1996. Seeds of Cultivated Flowers. Front Range Seed Analysts, Fort Collins, CO.

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## RULE CHANGE PROPOSAL No. 15

### Purpose of Proposal

Correction of the Handbook 25 species classification for *Parthenium argentatum*, guayule.

### Present Rule

<u>Scientific /Common Name</u>	<u>Family</u>	<u>Spp.</u> <u>Class</u>	<u>Classification</u>						
			<u>contaminating</u>						
			<u>A</u>	<u>F</u>	<u>H</u>	<u>R</u>	<u>S</u>	<u>T</u>	<u>V</u>
<i>Parthenium argentatum</i> --guayule	(Asteraceae)	C	C	C	C	C	C	C	C

### Proposed Rule

<u>Scientific /Common Name</u>	<u>Family</u>	<u>Spp.</u> <u>Class</u>	<u>Classification</u>						
			<u>contaminating</u>						
			<u>A</u>	<u>F</u>	<u>H</u>	<u>R</u>	<u>S</u>	<u>T</u>	<u>V</u>
<i>Parthenium argentatum</i> --guayule	(Asteraceae)	S	C	C	C	C	C	C	C

### Supporting Evidence:

In the 1993 revision of Handbook 25 (Larsen, et al. 1993) the spp. class for *Parthenium argentatum* (guayule) was listed as "C". The symbol "C" is not available for use in the "spp. class" category. This oversight was discovered during the 1999 revision, however this type of change requires a formal rules change by the AOSA membership. *Parthenium argentatum* is a silver-gray perennial shrub native to north-central Mexico and southern Texas. Selected cultivars of this species were grown during wartime in the southwestern United States as a potential emergency source of natural rubber.

### References

Larsen, A.L., J.H. Wiersema, and T. Handwerker. 1993. Uniform Classification of Weed and Crop Seeds. Contribution No. 25 to the Handbook on Seed Testing. Association of Official Seed Analysts.

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**Date:** October 12, 1999

## RULE CHANGE PROPOSAL No. 16

### Purpose of Proposal

Correction of Handbook 25 common name with associated nomenclatural update.

### Present Rule

<u>Scientific /Common Name</u>	<u>Family</u>	Spp. <u>Class</u>	<u>Classification</u> <u>contaminating</u>						
			<u>A</u>	<u>F</u>	<u>H</u>	<u>R</u>	<u>S</u>	<u>T</u>	<u>V</u>
<i>Alnus viridis</i> --American alder --green alder	(Betulaceae)	S	W	W	W	W	C	W	W

### Proposed Rule

<u>Scientific /Common Name</u>	<u>Family</u>	Spp. <u>Class</u>	<u>Classification</u> <u>contaminating</u>						
			<u>A</u>	<u>F</u>	<u>H</u>	<u>R</u>	<u>S</u>	<u>T</u>	<u>V</u>
<i>Alnus viridis</i> subsp. <i>crispa</i> --American green alder --green alder	(Betulaceae)	S	W	W	W	W	C	W	W
<i>Alnus viridis</i> subsp. <i>viridis</i> --European green alder --green alder	(Betulaceae)	S	W	W	W	W	C	W	W

### Supporting Evidence

During the 1999 revision of Handbook 25 a nomenclature change for *Alnus sinuata* (Regel) Rydb., Sitka alder, resulted in the listing of a subspecies of *Alnus viridis*; *A. viridis* (Vill.) Lam. & DC. subsp. *sinuata* (Regel) A. Love & D. Love. This prompted the need add to the existing listing of *A. viridis* in the classification section of the handbook the typical subspecies (i.e., *A. viridis* subsp. *viridis*). Unfortunately the common names associated with *A. viridis* subsp. *viridis* were not listed in the handbook and the name American alder was an incorrect name for this subspecies. The accepted common names for *A. viridis* subsp. *viridis* are European green alder and green alder. American green alder is the accepted common name for another subspecies of *A. viridis*, that being *A. viridis* subsp. *crispa* (Aiton) Turrill. The common name green alder also applies to this subspecies. *A. viridis* subsp. *crispa* is native to North America and *A. viridis* subsp. *viridis* is native to Europe and introduced in North America.

In order to accommodate the editorial nomenclature change a rule change proposal was required to correct the common names associated with the new nomenclature.

It should be noted that the common name European alder refers to *Alnus glutinosa* (L.) Gaertn.



## **References**

Rehder, A. 1940. Manual of Cultivated Trees and Shrubs Hardy in North America. 2nd ed. The Macmillan Co., New York.

USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). [Online Database] National Germplasm Resources Laboratory, Beltsville, Maryland. Available: [www.ars-grin.gov/cgi-bin/npgs/html/](http://www.ars-grin.gov/cgi-bin/npgs/html/)

Young, J.A. and C.G. Young. 1992. Seeds of Woody Plants in North America. Dioscorides Press, Portland, Oregon.

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**Date:** October 12, 1999

## RULE CHANGE PROPOSAL No. 17

### Purpose of Proposal

Correct confused nomenclature and associated common names for *Machaeranthera canescens* (Pursh) A. Gray and *Machaeranthera pinnatifida* (Hook.) Shinnners.

### Present Rule

<u>Scientific /Common Name</u>	<u>Family</u>	<u>Spp.</u> <u>Class</u>	<u>Classification</u> <u>contaminating</u>						
			<u>A</u>	<u>F</u>	<u>H</u>	<u>R</u>	<u>S</u>	<u>T</u>	<u>V</u>
<i>Machaeranthera canescens</i> --aster, hoary --goldenweed, ironplant	(Asteraceae)	W	W	W	W	W	W	W	W

Appendix B:

316960 *Machaeranthera canescens* (Pursh) A. Gray  
104415 *Machaeranthera pinnatifida* (Hook.) Shinnners

### Proposed Rule

<u>Scientific /Common Name</u>	<u>Family</u>	<u>Spp.</u> <u>Class</u>	<u>Classification</u> <u>contaminating</u>						
			<u>A</u>	<u>F</u>	<u>H</u>	<u>R</u>	<u>S</u>	<u>T</u>	<u>V</u>
<i>Haplopappus spinulosus</i> * <i>Machaeranthera pinnatifida</i> (see)									
<i>Machaeranthera canescens</i> --hoary-aster	(Asteraceae)	W	W	W	W	W	W	W	W
<i>Machaeranthera pinnatifida</i> --goldenweed, spiny --ironplant, cutleaf	(Asteraceae)	W	W	W	W	W	W	W	W

Appendix B:

104264 *Haplopappus spinulosus* (Pursh) DC. = *Machaeranthera pinnatifida* (Hook.) Shinnners  
316960 *Machaeranthera canescens* (Pursh) A. Gray  
104415 *Machaeranthera pinnatifida* (Hook.) Shinnners

### Supporting Evidence

In the 1993 revision of Handbook 25 (Larsen, et al. 1993) *Machaeranthera pinnatifida* appeared in Appendix B but was inadvertently omitted from the classification section of the handbook. In addition, the synonymy for *Haplopappus spinulosus* in the 1993 revision was incorrect citing *Machaeranthera canescens* as the accepted name. The correct synonymy is as follows (USDA, ARS, GRIN database):

*Machaeranthera canescens* (Pursh) A. Gray [= *Machaeranthera spinulosa* Greene]  
*Machaeranthera pinnatifida* (Hook.) Shinnners [= *Haplopappus spinulosus* (Pursh) DC.]

As a result of the confusion of the nomenclature it appears there was also confusion over the common name for *Machaeranthera canescens* (USDA, ARS, GRIN database). The following are suggested common names for the two species under consideration:

*Machaeranthera canescens* = hoary-aster

*Machaeranthera pinnatifida* = spiny goldenweed or cutleaf ironplant

In an attempt to temporarily fix this problem in the 1999 revision *Haplopappus spinulosus* was dropped from the classification section because it could not be referred to the accepted name of *Machaeranthera pinnatifida* which has not yet been added to this section. Interestingly, the correct synonymy (i.e., *H. spinulosus* = *M. pinnatifida*) appeared in Appendix B of the 1993 revision. In anticipation that this problem would be corrected by a rules change proposal, the Rules Committee chair recommended that *Machaeranthera pinnatifida* remain listed in Appendix B, as in the 1993 revision.

This proposal further recommends *Haplopappus spinulosus* be added back to the classification section and appendices as a synonym of *Machaeranthera pinnatifida* since many common floras still utilize the old name (Welsh, et al. 1987, Cronquist et al. 1994).

## References

- Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, P.K. Holmgren. 1994. Intermountain Flora, vascular Plants of the Intermountain West, U.S.A. Vol. 5, Asterales. The New York Botanical Garden, New York.
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## RULE CHANGE PROPOSAL No. 18

### Purpose of Proposal

Addition of *Myosotis sylvatica* Ehrh. ex Hoffm. [=*M. alpestris* hort.], wood or garden forget-me-not to Handbook 25 as a means to correct the misapplication of *Myosotis alpestris* F.W. Schmidt, alpine forget-me-not to common cultivated varieties.

Present Rule            New rule.

### Proposed Rule

Scientific /Common Name	Family	Spp. Class	Classification						
			contaminating						
			A	F	H	R	S	T	V
<i>Myosotis sylvatica</i> --forget-me-not, garden --forget-me-not, wood	(Boraginaceae)	F	W	C	W	W	W	W	W

Appendix B:

24818 *Myosotis sylvatica* Ehrh. ex Hoffm.

404704 *Myosotis alpestris* hort. = *Myosotis sylvatica* Ehrh. ex Hoffm.

### Supporting Evidence

In the 1993 revision of Handbook 25, *Myosotis alpestris* F.W. Schmidt, alpine forget-me-not, was included. However, from the literature it is unclear how much this species is in cultivation. Hortus Third states that it is not in cultivation, and that all material grown under this name is actually *Myosotis sylvatica* Ehrh. ex Hoffm. It is not clear where the usage of *M. alpestris* in Handbook 25 originated, but it was probably based on misidentified material that was actually *M. sylvatica*.

*Myosotis alpestris* F.W. Schmidt, alpine forget-me-not (nomen number 316758), would remain as a separate entry in the classification section and associated appendices.

### References

Liberty Hyde Bailey Hortorium. 1976. Hortus Third. Macmillan Publishing Company, New York.

USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). [Online Database] National Germplasm Resources Laboratory, Beltsville, Maryland. Available: [www.ars-grin.gov/cgi-bin/npgs/html/](http://www.ars-grin.gov/cgi-bin/npgs/html/)

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## RULE CHANGE PROPOSAL No. 19

### Purpose of Proposal

To correct the omission of *Taeniatherum caput-medusae* (L.) Nevski subsp. *asperum* (Simonk.) Melderis from the classification table of the 1993 revision of Handbook 25 and to add the synonym *T. asperum* (Simonk.) Nevski to the handbook.

### Present Rule

Classification section:  
None.

Appendix B:

102801 *Taeniatherum caput-medusae* (L.) Nevski subsp. *asperum* (Simonk.) Melderis

### Proposed Rule

<u>Scientific /Common Name</u>	<u>Family</u>	<u>Spp.</u> <u>Class</u>	<u>Classification</u> <u>contaminating</u>						
			<u>A</u>	<u>F</u>	<u>H</u>	<u>R</u>	<u>S</u>	<u>T</u>	<u>V</u>
<i>Taeniatherum caput-medusae</i> subsp. <i>asperum</i> --medusahead --medusahead rye	(Poaceae)	W	W	W	W	W	W	W	W

*Taeniatherum asperum*

\**Taeniatherum caput-medusae* subsp. *asperum* (see)

Appendix A:

medusahead  
medusahead rye

= *Taeniatherum caput-medusae* subsp. *asperum*

= *Taeniatherum caput-medusae* subsp. *asperum*

Appendix B:

100819 *Taeniatherum asperum* (Simonk.) Nevski = *Taeniatherum caput-medusae* (L.) Nevski subsp. *asperum* (Simonk.) Melderis

102801 *Taeniatherum caput-medusae* (L.) Nevski subsp. *asperum* (Simonk.) Melderis

### Supporting Evidence

In the 1993 revision of Handbook 25 (Larsen, et al. 1993) *Taeniatherum caput-medusae* subsp. *asperum* and associated synonym appeared in Appendix B but were inadvertently omitted from the classification section of the handbook. In anticipation that this problem would be corrected by a rules change proposal, the Rules Committee chair recommended that *Taeniatherum caput-medusae* subsp. *asperum* remain listed in Appendix B, as in the 1993 revision.

This proposal further recommends *Taeniatherum asperum* (Simonk.) Nevski be added to the classification section and appendix B as a synonym of *Taeniatherum caput-medusae* subsp. *asperum* since some state seed laws still utilize the old name (Farmer 1999).

## **References**

Farmer, J.E. (ed). 1999. State Noxious-Weed Seed Requirements Recognized in the Administration of the Federal Seed Act. USDA, AMS, LS. Available: [www.ams.usda.gov/lsq/seed/lq-sd.htm](http://www.ams.usda.gov/lsq/seed/lq-sd.htm).

Larsen, A.L., J.H. Wiersema, and T. Handwerker. 1993. Uniform Classification of Weed and Crop Seeds. Contribution No. 25 to the Handbook on Seed Testing. Association of Official Seed Analysts.

USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). [Online Database] National Germplasm Resources Laboratory, Beltsville, Maryland. Available: [www.ars-grin.gov/cgi-bin/npgs/html/](http://www.ars-grin.gov/cgi-bin/npgs/html/)

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**Date:** October 12, 1999, revised December 23, 1999

## RULE CHANGE PROPOSAL No. 20

### Purpose of Proposal

The following species are all presently listed in Handbook 25 as "W" under "spp. class.". Currently, all of these species are being tested in the laboratory. The purpose of this rule proposal is to give each of these species an appropriate classification other than "W" when being tested as the pure seed component.

### Present Rule, followed by Proposed Rule:

Agrostis exarata --bentgrass, spike	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Allium praecox --onion, wild	(Liliaceae)	W	W C W W W W W
	<b>Proposed</b>	R	W C W W W W W
Ambrosia psilostachya --ragweed, perennial --ragweed, western	(Asteraceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Atriplex polycarpa --no common name	(Chenopodiaceae)	W	W W W W W W W
	<b>Proposed</b>	R,S	W W W W W W W
Briza maxima --quakinggrass, big	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	F,R	W W W W W W W
Bromus rubens --brome, red --chess, foxtail	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Claytonia perfoliata --lettuce, miner's	(Portulacaceae)	W	W W W W W W W
	<b>Proposed</b>	H,R	W W W W W W W
Cotula coronopifolia --brass-button	(Asteraceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Croton setigerus --turkey-mullein	(Euphorbiaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Cucurbita foetidissima --calabazilla --gourd, buffalo --gourd, wild	(Cucurbitaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W

Deschampsia danthonioides --hairgrass, annual	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Distichlis spicata var. spicata --saltgrass, coastal --saltgrass, seashore	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Distichlis spicata var. stricta --saltgrass, desert --saltgrass, inland	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Erodium botrys --filaree, broadleaf	(Geraniaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Grindelia integrifolia var. macrophylla --gumweed, prostrate	(Asteraceae)	W	W W W W W W W
	<b>Proposed</b>	F,H,R	W W W W W W W
Gutierrezia sarothrae --snakeweed, broom --broomweed	(Asteraceae)	W	W W W W W W W
	<b>Proposed</b>	H,R	W W W W W W W
Heliotropium curassavicum --heliotrope, salt --heliotrope, seaside	(Boraginaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Hordeum brachyantherum subsp. brachyantherum --barley, meadow --barley, wild	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Hordeum brachyantherum subsp. californicum --barley, California	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Lotus unifoliolatus --deervetch --trefoil, prairie	(Fabaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Marrubium vulgare --horehound, white	(Lamiaceae)	W	W W W W W W W
	<b>Proposed</b>	H,R	W W W W W W W
Melinis repens --natalgrass	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	F,R	W W W W W W W
Pennisetum setaceum --fountaingrass	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	F	W W W W W W W



Polypogon monspeliensis --rabbitfootgrass	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Senecio flaccidus var. flaccidus --groundsel, Douglas	(Asteraceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Trichostemma lanceolatum --bluecurls --vinegarweed	(Lamiaceae)	W	W W W W W W W
	<b>Proposed</b>	F,R	W W W W W W W
Trifolium medium --clover, zigzag	(Fabaceae)	W	W W W W W W W
	<b>Proposed</b>	A,R	W W W W W W W
Typha latifolia --cattail, common	(Typhaceae)	W	W W W W W W W
	<b>Proposed</b>	F,R	W W W W W W W
Urtica dioica --nettle, stinging	(Urticaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Vulpia microstachys var. pauciflora --fescue, Pacific	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Vulpia myuros --fescue, rattail	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W
Vulpia octoflora --fescue, six-weeks	(Poaceae)	W	W W W W W W W
	<b>Proposed</b>	R	W W W W W W W

### Supporting Evidence:

*Agrostis exarata* is a perennial grass native to the western US from Alaska to Mexico. It is considered to be excellent forage for cattle, horses and elk, and is useful for meadow hay and grazing. It is also being used commercially for revegetation. (4,5,6,11,13)

*Allium praecox* is a perennial bulb native to southern California. It is currently being used commercially for revegetation/restoration projects in California. It is also listed as "C" under the "F" contaminating classification. (2,6,11)

*Ambrosia psilostachya* is a perennial from rhizome-like roots, native to North America. Considered unpalatable to livestock, it has been used for medicinal purposes by Native Americans. Currently it is being used commercially for revegetation/restoration projects. (6,11,13)

*Atriplex polycarpa* is a shrub native to the southwestern US and northern Mexico. It is considered valuable for grazing and is being used commercially for revegetation and restoration. (5,6,10,11)

*Briza maxima* is an annual grass native to Europe and naturalized along the Pacific coast of the US. It is planted mainly for its ornamental value, but also may be used for revegetation purposes. It is considered poor for forage. (2,4,6,7,10,11)

*Bromus rubens* is an annual grass native to Europe and naturalized across North America. It is widely used for erosion control as well as for ground cover and pasture. (1,4,6,10,11,13)

*Claytonia perfoliata* is an annual herb native from western North America to Central America. It is grown or collected as an herb for salads, and is also used for revegetation and restoration. (2,5,6,11,15)

*Cotula coronopifolia* is an herbaceous perennial native to southern Africa. It is common in saline and freshwater marshes along the California coast; it is used for revegetation projects. (2,6,10,11)

*Croton setigerus* is an annual herb native to arid parts of the Pacific States. Considered toxic to livestock, it is currently being used for revegetation and restoration projects. (2,6,10,11,15)

*Cucurbita foetidissima* is an herbaceous vine native to the western United States. The gourd is not edible but is sometimes used ornamentally or for containers. The plant is considered a good groundcover and is currently being used for revegetation and restoration projects. (2,6,11,15)

*Deschampsia danthonioides* is an annual grass native to the western United States and is found in moist places. It is considered poor as range forage but is being used commercially for revegetation/restoration projects. (4,6,11)

*Distichlis spicata* is a perennial rhizomatous grass native to North America. It tolerates salt and alkali. Valuable as range forage, it is used in revegetation and restoration projects. (4,6,11,13)

*Erodium botrys* is an annual herb native to southern Europe and naturalized in disturbed sites in North America. It is considered valuable on annual rangeland and is currently being sold commercially. (6,11,13)

*Grindelia integrifolia* is a perennial broadleaf native to coastal regions from Alaska to southern California. It is currently being used commercially for revegetation/restoration projects; it is also used medicinally and as an ornamental. (2,6,8,10,11)

*Gutierrezia sarothrae* is a perennial broadleaf native to central and western North America. It is considered as poor forage and as an indicator of overgrazing. Used medicinally, it is also used for revegetation/restoration projects. (2,5,6,11,13)

*Heliotropium curassavicum* is a fleshy perennial native from the southwestern US to tropical Americas and is found on saline soils. It is currently being sold for use in revegetation/restoration projects. (2,6,11)

*Hordeum brachyantherum* (both subsp) is a perennial grass: subsp. *brachyantherum* is native to western US, Mexico and Eurasia while subsp. *californicum* is native to California and Oregon. This species has been described as an ideal nurse crop and as valuable forage when young; it is used for erosion control, groundcover, and pasture. (1,3,4,5,6,7,10,11)

*Lotus unifoliolatus* is an annual legume native to North America and is found in many habitats. It is commercially available for revegetation and restoration projects. (5,6,11,15)

*Marrubium vulgare* is a weedy perennial herb native to Europe and naturalized worldwide. An old time medicinal herb, it was formerly used for flavoring candy. Currently it is being used for revegetation purposes. (2,6,8,11,14,15)

*Melinis repens* (syn. *Rhynchelytrum repens*) is a perennial grass native to South Africa and naturalized in the United States. It is used for soil stabilization, as a meadow grass and as an ornamental. (2,6,7,10,11)

*Pennisetum setaceum* is a perennial grass native to Africa and naturalized in California. It is planted for its ornamental value, used in floral arrangements and planted along roadsides. (1,2,6,7,10,11,14)

*Polypogon monspeliensis* is an annual grass native to Europe, naturalized in North America and found in moist places. It is considered valuable for forage and is used commercially for revegetation projects. (2,4,6,7,11)

*Senecio flaccidus* is a perennial subshrub native to the arid western United States. It is considered to be useful for light browse, but poisonous to some stock. It has also been used medicinally in the past, and is currently sold for revegetation and restoration. (5,6,11,13)

*Trichostemma lanceolatum* is an annual herb native to California, Oregon, and Baja California. It is used horticulturally in wild or rock gardens; commercially it is sold for restoration/revegetation. (2,6,11)

*Trifolium medium* is a perennial clover grown in England and naturalized in the New England States. It is commercially grown for hay, pasture, or soil improvement. (9,11)

*Typha latifolia* is a perennial common to marshes, ponds, and lakes and is native to temperate North America, Eurasia, and Africa. Its leaves are used in basketry and chair seats; its flower stalks are used in flower arrangements. This species is currently being planted for restoration projects in wetlands. (2,5,6,10,11,12,15)

*Urtica dioica* is a perennial herb native to North America and Eurasia. Historically used for

cloth, dye, and medicine, it is sold commercially today for restoration projects in California. (6,8,10,11)

*Vulpia microstachys* is an annual grass native to the Pacific States and Baja California. It is commercially available for revegetation and restoration projects and is currently included in the California Crop Improvement seed certification program. (3,6,11,15)

*Vulpia myuros* is an annual grass probably native to Europe and naturalized worldwide. It is used commercially for erosion control, ground cover, and pasture. (1,6,10,11)

*Vulpia octoflora* is an annual grass native to California and widespread throughout the western hemisphere and Europe. It is considered useful for early spring forage and is currently sold for revegetation and restoration work. (6,11,13,15)

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**Date of Proposal:**

August 30, 1999

## RULE CHANGE PROPOSAL No. 21

### PURPOSE:

To add arugula and rocketsalad as common names for *Eruca sativa* in Table 3 of the AOSA Rules and to add arugula as a common name in AOSA Handbook No. 25.

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### PRESENT RULE

**AOSA Rules for Testing Seeds. Table 3. Methods of testing laboratory germination.**

#### Kind of Seed

*Eruca sativa* Miller  
roquette

**AOSA Handbook No. 25 - Uniform Classification of Crop and Weeds (1999)**  
Classification Section, p. 52:

	Spp.	A	F	H	R	S	T	V
<i>Eruca sativa</i>	V	W	W	W	W	W	W	W
--rocketsalad								
--roquette								

Appendix A, p. A37:

<u>Common Name</u>	<u>Scientific Name</u>
rocketsalad	= <i>Eruca sativa</i>
roquette	= <i>Eruca sativa</i>

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### PROPOSED RULE

**AOSA Rules for Testing Seeds. Table 3. Methods of testing laboratory germination.**

#### Kind of Seed

*Eruca sativa* Miller  
arugula; rocketsalad; roquette

**AOSA Rules for Testing Seeds. Appendix 3. Common Name List with Equivalent Scientific Names.**

#### Common Name ---- Scientific Name

arugula ---- *Eruca sativa*  
rocketsalad ---- *Eruca sativa*  
roquette ---- *Eruca sativa*

**Handbook No. 25 - Uniform Classification of Crop and Weeds (1999)**

Classification Section

	<b>Spp.</b>	<b>A</b>	<b>F</b>	<b>H</b>	<b>R</b>	<b>S</b>	<b>T</b>	<b>V</b>
<i>Eruca sativa</i>	V	W	W	W	W	W	W	W
--arugula								
--rocketsalad								
--roquette								

Appendix A:

**Common Name**

arugula  
rocketsalad  
roquette

**Scientific Name**

= *Eruca sativa*  
= *Eruca sativa*  
= *Eruca sativa*

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**SUPPORTING EVIDENCE**

Industry labeling information indicates that the common name arugula is one of the names being most often associated with this genus and species when the seed is offered for sale. Rocketsalad and roquette are also being used as common names. Three seed catalogs, as well as GRIN and John Wiersema's new book, include arugula with the other common names for *Eruca sativa*. (Note that no changes have been made to the germination methods or species classification.)

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W. Atlee Burpee & Co. 1998. Burpee Seeds and Plants 1999. p.93.

Wiersema, J.H. and B. Leon. 1999. World Economic Plants: A Standard Reference. Boca Raton (FL): CRC Press LLC. 749 p.

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**DATE OF PROPOSAL:**

October 7, 1999



## RULE CHANGE PROPOSAL No. 22

### Purpose of Proposal

This proposal is to change the germination final count for Kentucky Bluegrass from 28 days to 21 days.

### Present Rule

Table 3. Methods of testing for laboratory germination.

Kind of Seed	Substrata	Temperature C°	First Count Days	Final Count Days	Additional Directions
Poa pratensis Kentucky Bluegrass	P	15-25	10	28	Light; KNO <sub>3</sub> . Fresh and dormant: Prechill at 10°C for 5 days.

### Proposed Rule

Table 3. Methods of testing for laboratory germination.

Kind of Seed	Substrata	Temperature C°	First Count Days	Final Count Days	Additional Directions
Poa pratensis Kentucky Bluegrass	P	15-25	10	21	Light; KNO <sub>3</sub> . Fresh and dormant: Prechill at 10°C for 5 days. On slow germinating lots, final count may be extended to 28 days.

### Supporting Evidence

Data was requested from the major labs in the Bluegrass production area. Three labs submitted one year's germination results for Kentucky Bluegrass. Samples ranged from new crop to update germinations on carry over crop. The supporting data is charted per seven-day interval count.

A total of 361 results are shown in Chart 1. The average germination for 28 days is 83.11%, for 21 days the average is 81.82%, a difference of 1.29%.

Many Kentucky Bluegrass contracts require an 80% minimum germination. Chart 2 shows a total of 285 remaining results after removing those lots that did not make 80% germination. The average germination for 28 days is 88.28%, for 21 days the average is 86.95, a difference of 1.33%.

Lower quality lots do not make a difference in the overall average between 21 and 28 days germination period.

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**Date of Proposal**

October 15, 1999

**Chart 1.**

**Kentucky Bluegrass germination results from  
Agri Seed Testing, Oregon State Seed Lab and Washington State Seed Lab**

TEST NUMBER	DAYS PC"D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
1	7	22.50	64.50	76.75	80.00
2	7	20.25	70.25	81.00	87.25
3	4	59.75	89.75	91.00	93.25
4	-	43.50	66.75	75.75	77.25
5	-	35.75	64.00	86.25	88.50
6	-	31.75	59.50	82.00	83.00
7	-	26.00	48.00	85.50	90.00
8	-	69.50	87.25	91.50	92.50
9	-	44.25	70.00	79.25	81.25
10	-	63.50	80.50	87.75	88.25
11	-	65.75	85.75	91.00	92.25
12	-	76.50	87.00	91.25	91.25
13	-	33.75	55.75	80.75	82.00
14	-	47.00	67.75	76.25	78.00
15	-	47.75	69.50	78.75	79.00
16	-	26.00	68.75	81.75	82.00
17	7	89.00	89.75	90.50	90.50
18	7	91.25	92.25	92.50	92.50
19	7	85.50	87.75	88.75	88.75
20	7	26.25	71.50	88.00	89.75
21	7	26.00	74.00	90.75	92.75
22	7	51.50	89.50	92.75	93.00
23	7	56.00	80.50	89.50	90.50
24	7	53.50	81.75	89.75	91.25
25	7	26.25	90.75	92.25	92.75
26	7	81.25	91.75	92.75	93.25
27	7	82.00	90.25	92.50	93.00

TEST NUMBER	DAYS PC"D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
28	7	18.75	88.50	92.50	93.00
29	7	87.25	92.50	92.50	92.50
30	7	42.00	74.25	82.50	89.50
31	7	53.00	77.75	86.75	93.00
32	7	34.25	89.75	92.00	92.00
33	7	58.50	87.50	89.50	91.75
34	7	59.50	78.25	85.75	89.00
35	7	16.50	89.25	93.75	94.25
36	7	9.00	69.25	76.75	80.00
37	7	63.75	87.25	90.75	92.00
38	7	46.75	68.75	83.00	86.25
39	7	80.00	88.00	88.75	88.75
40	7	77.00	83.75	84.25	84.75
41	7	79.50	86.00	86.00	86.25
42	7	78.75	86.25	86.50	86.75
43	7	80.50	86.75	87.25	87.50
44	7	80.25	85.25	85.75	86.00
45	7	43.25	62.00	75.50	85.50
46	7	7.75	64.25	71.75	78.25
47	7	3.00	46.50	66.50	82.50
48	7	22.25	77.00	87.00	90.75
49	7	37.25	57.75	64.50	69.75
50	7	29.00	73.00	80.50	82.25
51	7	83.50	89.25	90.00	91.00
52	7	61.25	76.50	77.75	79.75
53	7	74.50	82.75	89.75	90.25
54	7	78.00	88.25	89.25	89.50
55	7	12.00	72.75	85.00	91.75
56	7	4.25	71.25	77.50	81.75
57	7	8.25	87.00	94.75	95.00
58	7	41.00	77.25	86.00	90.50
59	7	19.25	69.75	74.75	75.50
60	7	8.25	74.75	86.25	88.00
61	7	36.75	78.25	89.50	92.25
62	7	44.25	78.00	85.75	88.25
63	7	70.25	83.00	87.75	93.75
64	7	55.25	78.25	91.00	94.50
65	7	73.25	84.25	84.75	85.00
66	7	72.25	85.50	92.50	93.75
67	7	72.50	85.00	89.50	90.75
68	7	56.25	75.25	83.00	89.50
69	7	12.50	84.50	90.00	90.25
70	7	6.25	86.25	90.75	91.00
71	7	16.75	85.75	91.50	91.75
72	7	53.75	71.50	75.75	80.00
73	7	65.75	83.00	84.25	86.50
74	7	70.00	83.50	91.00	94.25
75	7	14.50	77.25	85.25	86.00
76	7	16.75	77.25	85.00	85.75
77	7	46.00	62.25	71.25	78.25
78	7	33.25	89.75	92.75	93.00
79	7	76.25	85.50	88.25	89.50
80	7	48.50	64.50	80.25	85.75

TEST NUMBER	DAYS PC'D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
81	7	47.00	67.25	82.25	89.50
82	7	78.25	85.75	87.75	88.00
83	7	46.75	70.50	86.25	90.50
84	7	51.75	76.50	84.25	86.75
85	7	20.25	73.50	81.50	83.00
86	7	31.25	76.25	82.50	83.50
87	7	64.00	76.25	84.25	85.75
88	7	66.25	77.25	82.50	83.50
89	7	65.50	75.25	81.00	82.50
90	7	38.50	65.00	81.25	85.50
91	7	59.00	66.75	69.75	91.00
92	7	62.75	75.00	90.75	93.00
93	7	69.25	75.00	83.75	85.75
94	7	78.50	86.75	90.00	92.00
95	7	17.25	91.00	93.75	94.25
96	7	22.75	84.00	90.50	93.25
97	7	11.00	83.25	89.00	90.00
98	7	52.25	65.75	83.00	88.00
99	7	25.00	82.75	89.75	91.00
100	7	54.00	66.50	78.50	86.00
101	7	62.00	70.00	74.75	83.75
102	7	61.75	73.00	74.75	75.25
103	7	46.25	64.00	70.75	74.50
104	7	14.00	58.50	68.00	71.00
105	7	55.50	68.75	80.25	82.75
106	7	43.00	70.75	87.00	91.50
107	7	26.50	87.25	92.50	92.75
108	7	84.00	89.50	91.00	91.50
109	7	76.25	80.00	81.00	82.00
110	7	74.50	82.00	83.75	86.25
111	7	74.00	81.00	83.50	87.50
112	7	62.75	71.75	80.50	85.75
113	7	21.00	88.50	94.00	94.50
114	7	53.50	83.00	90.25	92.50
115	7	60.75	76.75	81.75	82.50
116	7	46.75	65.50	83.25	88.25
117	7	42.00	55.25	64.00	66.75
118	7	27.50	89.25	91.50	92.25
119	7	39.50	66.00	78.50	87.75
120	7	71.50	85.50	92.75	94.75
121	7	78.00	82.75	83.50	83.50
122	7	65.50	71.50	73.00	73.00
123	7	87.50	92.00	92.75	93.25
124	7	53.25	66.75	77.25	81.25
125	7	52.50	64.50	69.25	71.00
126	7	36.75	48.00	65.75	71.00
127	7	37.00	86.00	90.75	90.75
128	7	83.25	87.75	90.25	90.50
129	7	66.75	83.25	84.00	86.25
130	7	66.75	81.75	83.50	83.75
131	7	85.75	93.00	93.25	93.00
132	7	66.75	77.25	78.50	79.00
133	7	59.50	79.75	80.75	80.75

TEST NUMBER	DAYS PC"D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
134	7	64.50	80.00	81.50	81.50
135	7	74.75	91.50	92.50	93.50
136	7	63.00	81.75	84.25	85.25
137	7	72.75	87.75	88.25	89.25
138	7	53.75	82.00	82.25	83.50
139	7	52.00	79.00	80.75	84.50
140	7	61.25	88.25	90.25	90.25
141	7	72.50	85.00	85.00	86.00
142	7	71.50	84.75	86.00	87.25
143	7	85.25	91.50	92.25	92.50
144	7	70.75	82.75	82.75	82.75
145	7	55.75	64.50	66.00	66.50
146	7	24.50	47.50	51.75	54.50
147	7	75.75	93.25	94.25	94.50
148	7	62.50	89.25	89.50	89.75
149	7	78.50	85.50	86.50	86.50
150	7	74.75	81.50	83.50	83.75
151	7	60.25	90.00	90.75	91.00
152	7	82.00	85.75	86.25	86.75
153	7	66.75	87.00	89.75	90.75
154	7	72.25	80.00	81.00	90.50
155	7	81.75	87.50	88.75	89.25
156	7	77.50	84.00	85.75	86.50
157	7	67.75	78.50	80.50	81.25
158	7	33.75	56.00	60.75	63.00
159	7	56.00	84.00	87.00	87.50
160	7	74.75	91.75	92.50	92.50
161	7	74.00	91.50	92.00	92.25
162	7	22.25	39.50	40.75	42.00
163	7	27.25	46.50	47.75	50.25
164	7	67.75	83.25	84.50	85.00
165	7	67.50	88.00	88.00	88.25
166	7	55.75	79.50	81.25	81.50
167	7	67.25	93.75	94.50	94.50
168	7	30.75	41.00	42.75	43.25
169	7	87.00	92.75	93.00	93.00
170	7	91.00	95.50	95.50	95.75
171	7	31.50	81.25	82.75	83.00
172	7	57.75	81.00	81.75	82.75
173	7	51.50	78.75	80.75	81.00
174	7	72.25	85.25	86.75	87.75
175	7	74.00	86.25	87.75	89.75
176	7	47.00	83.00	84.75	85.25
177	7	71.25	86.50	87.00	87.75
178	7	39.00	79.75	85.50	88.50
179	7	44.00	65.00	68.75	69.00
180	7	74.50	90.00	91.75	92.25
181	7	60.25	84.25	85.50	86.25
182	7	51.75	80.50	83.00	83.00
183	7	62.00	86.25	87.00	88.50
184	7	33.75	47.75	48.50	49.75
185	7	46.50	77.00	79.50	80.50
186	7	81.75	94.50	94.50	94.50

TEST NUMBER	DAYS PC'D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
187	7	57.00	80.75	83.00	83.50
188	7	48.75	80.25	82.75	84.50
189	7	66.25	86.75	87.50	88.00
190	7	60.50	72.25	73.50	74.00
191	7	36.00	65.50	69.25	71.50
192	7	47.25	78.00	79.00	79.75
193	7	62.00	87.75	88.50	88.75
194	7	79.75	82.00	83.50	83.75
195	7	78.50	83.00	83.25	83.50
196	7	50.00	63.75	66.50	66.50
197	7	68.25	79.25	80.75	81.50
198	7	79.25	86.00	86.75	86.75
199	7	37.00	65.50	67.00	67.75
200	7	15.75	23.00	25.25	25.50
201	7	20.50	25.75	26.25	26.50
202	7	72.00	80.25	80.25	80.25
203	7	74.00	89.00	91.00	91.00
204	7	73.50	90.50	92.50	93.00
205	7	75.00	88.00	90.50	91.50
206	7	66.50	86.00	87.50	88.00
207	7	68.00	83.00	85.50	85.50
208	7	62.75	85.25	88.75	89.25
209	7	73.00	85.50	87.50	88.00
210	7	69.50	84.75	89.00	89.00
211	7	73.00	88.50	92.50	93.50
212	7	71.50	84.00	85.50	86.00
213	7	76.00	89.75	90.25	90.50
214	7	54.75	89.00	90.50	90.75
215	7	53.50	91.25	93.25	93.25
216	7	63.75	82.25	88.75	89.50
217	7	68.50	78.00	81.00	82.00
218	7	65.50	78.75	80.75	81.25
219	7	75.25	81.75	82.00	82.25
220	7	84.50	88.00	88.25	88.25
221	7	83.00	87.50	87.75	87.75
222	7	71.50	86.50	88.50	88.50
223	7	75.00	83.50	83.50	85.00
224	7	68.75	81.75	84.50	85.75
225	7	69.50	83.00	85.50	85.50
226	7	65.75	81.75	84.25	85.00
227	7	54.25	72.00	73.50	74.00
228	7	42.75	67.75	75.00	77.75
229	7	74.50	89.00	91.00	92.00
230	7	76.50	85.25	86.75	87.00
231	7	73.25	88.25	88.50	88.75
232	7	78.00	88.75	89.25	89.25
233	7	82.75	89.50	90.25	90.50
234	7	60.50	85.50	87.50	88.00
235	7	38.00	50.75	51.50	51.50
236	7	70.50	77.75	78.25	78.25
237	7	72.50	80.00	80.50	81.00
238	7	66.00	88.25	89.00	89.50
239	7	88.25	95.00	95.25	95.25

TEST NUMBER	DAYS PC'D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
240	7	48.00	65.25	67.50	68.00
241	7	66.50	86.75	88.50	89.00
242	7	71.75	88.25	88.75	88.75
243	7	47.00	76.50	81.25	82.50
244	7	73.50	89.25	92.25	92.50
245	7	61.25	79.00	81.25	85.50
246	7	59.00	73.25	74.25	74.25
247	7	62.50	74.75	77.00	77.50
248	7	26.25	44.75	46.00	46.75
249	7	44.75	82.00	83.75	84.25
250	7	79.25	89.25	89.50	89.75
251	7	51.00	86.75	89.00	89.00
252	7	56.75	75.75	77.50	78.75
253	7	79.75	92.75	93.00	93.00
254	7	56.50	82.00	83.25	83.75
255	7	61.00	78.75	80.25	80.50
256	7	53.00	70.75	71.50	72.50
257	7	66.00	89.00	90.00	90.00
258	7	50.00	71.00	72.50	72.50
259	7	77.25	88.75	90.75	91.25
260	7	64.75	87.25	90.75	91.25
261	7	71.75	86.25	88.25	88.75
262	7	69.25	83.00	84.00	84.50
263	7	40.25	53.75	54.75	55.00
264	7	85.25	92.50	93.25	93.50
265	7	83.50	91.25	92.00	92.00
266	7	76.75	92.00	93.50	93.50
267	7	80.00	89.50	89.75	89.75
268	7	52.50	84.25	90.25	91.25
269	7	26.75	43.00	45.75	45.75
270	7	23.75	30.25	31.00	31.25
271	7	63.25	79.50	85.00	85.75
272	7	71.25	83.50	84.00	84.25
273	7	59.75	80.50	81.25	82.50
274	7	58.75	83.25	84.00	84.25
275	7	56.50	74.25	76.75	78.50
276	7	72.50	82.00	83.00	83.00
277	7	68.00	85.25	87.75	88.25
278	7	75.75	86.25	87.00	87.25
279	7	84.00	92.50	93.00	93.00
280	7	61.25	80.50	84.00	85.00
281	7	24.00	44.75	46.25	47.50
282	7	14.25	28.50	29.50	30.50
283	7	70.00	91.00	92.00	93.75
284	7	83.50	88.25	90.00	90.50
285	7	76.00	90.50	92.25	92.75
286	7	63.00	80.75	87.25	88.25
287	7	55.00	89.25	91.50	92.50
288	7	42.25	59.00	60.50	60.75
289	7	75.50	89.50	92.00	92.50
290	7	62.50	78.75	78.75	79.50
291	7	62.75	71.00	72.75	72.75
292	7	70.50	87.00	88.25	88.25

TEST NUMBER	DAYS PC''D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
293	7	84.25	90.00	90.25	90.25
294	7	58.75	68.75	70.25	70.25
295	7	81.25	91.00	92.00	92.00
296	7	88.25	93.75	93.75	93.75
297	7	23.25	42.25	45.25	46.50
298	7	72.50	85.25	86.00	86.25
299	7	60.50	70.00	71.00	71.00
300	7	47.00	69.75	73.00	73.50
301	7	74.25	80.25	81.00	81.00
302	7	85.50	90.75	90.75	91.25
303	7	78.50	90.50	91.00	91.00
304	7	78.00	88.25	90.00	91.00
305	7	57.75	85.75	87.00	87.00
306	7	76.00	84.00	84.50	85.50
307	7	65.75	82.50	85.75	86.50
308	7	67.50	86.00	88.50	88.50
309	7	71.50	92.50	93.50	94.00
310	7	62.75	78.50	83.25	85.00
311	7	59.00	81.75	89.75	91.50
312	7	68.00	82.25	84.50	85.00
313	7	65.25	82.00	83.75	85.25
314	7	74.00	88.50	90.00	90.50
315	7	43.25	48.00	49.75	49.75
316	7	51.25	66.50	68.00	68.00
317	7	70.50	78.50	79.00	79.00
318	7	78.50	92.75	92.75	92.75
319	7	44.50	61.25	64.50	66.25
320	7	45.00	56.25	56.25	56.25
321	7	47.50	54.25	54.50	54.50
322	7	54.25	63.75	64.50	64.50
323	7	22.50	35.00	36.75	36.75
324	7	29.00	38.00	38.75	39.00
325	7	46.75	64.50	67.00	67.25
326	7	70.50	83.50	84.00	84.00
327	7	48.25	80.25	87.00	88.25
328	7	71.75	87.00	87.25	87.50
329	7	72.50	84.00	86.00	86.50
330	7	77.50	88.50	88.50	88.50
331	7	83.75	90.50	90.75	90.75
332	7	77.75	88.50	89.50	89.50
333	7	84.50	90.50	90.75	91.00
334	7	44.50	86.50	89.50	91.00
335	7	79.50	90.25	90.25	90.25
336	7	78.00	86.00	86.25	86.25
337	7	85.75	91.25	91.75	91.75
338	7	77.75	87.75	88.75	89.00
339	7	80.75	91.25	91.75	92.00
340	7	79.25	84.25	84.50	84.50
341	7	80.75	87.25	87.50	87.50
342	7	62.75	75.00	75.25	75.25
343	7	60.00	69.25	69.75	69.75
344	7	44.50	50.75	51.25	51.75
345	7	50.75	61.25	63.50	63.50



TEST NUMBER	DAYS PC'D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
346	7	59.50	71.25	72.00	72.25
347	7	24.75	52.50	60.00	63.75
348	7	19.25	34.00	36.50	37.25
349	7	44.75	64.00	65.75	66.25
350	7	15.50	28.25	31.50	34.25
351	7	79.50	87.00	87.50	87.75
352	7	42.00	85.50	86.50	87.00
353	7	77.50	84.50	85.50	87.00
354	7	78.00	90.00	91.50	91.50
355	7	83.50	89.50	89.50	90.00
356	7	78.00	81.75	82.50	82.50
357	7	67.75	85.25	85.75	85.75
358	7	66.50	78.50	78.75	78.75
359	7	27.50	56.25	64.75	69.25
360	7	74.75	83.50	84.50	84.50
361	7	77.50	87.00	87.00	87.00
<b>Total of 361 Samples</b>		<b>20,977.00</b>	<b>28,224.75</b>	<b>29,537.25</b>	<b>30,004.50</b>
<b>Average of 361 samples</b>		<b>58.11</b>	<b>78.18</b>	<b>81.82</b>	<b>83.11</b>

Chart 2.

**Kentucky Bluegrass germination results from  
Agri Seed Testing, Oregon State Seed Lab and Washington State Seed Lab  
Finals over 80%**

TEST NUMBER	DAYS PC'D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
1	7	22.50	64.50	76.75	80.00
2	7	20.25	70.25	81.00	87.25
3	4	59.75	89.75	91.00	93.25
4	-	35.75	64.00	86.25	88.50
5	-	31.75	59.50	82.00	83.00
6	-	26.00	48.00	85.50	90.00
7	-	69.50	87.25	91.50	92.50
8	-	44.25	70.00	79.25	81.25
9	-	63.50	80.50	87.75	88.25
10	-	65.75	85.75	91.00	92.25
11	-	76.50	87.00	91.25	91.25
12	-	33.75	55.75	80.75	82.00
13	-	26.00	68.75	81.75	82.00
14	7	89.00	89.75	90.50	90.50
15	7	91.25	92.25	92.50	92.50
16	7	85.50	87.75	88.75	88.75
17	7	26.25	71.50	88.00	89.75
18	7	26.00	74.00	90.75	92.75
19	7	51.50	89.50	92.75	93.00
20	7	56.00	80.50	89.50	90.50
21	7	53.50	81.75	89.75	91.25
22	7	26.25	90.75	92.25	92.75
23	7	81.25	91.75	92.75	93.25
24	7	82.00	90.25	92.50	93.00
25	7	18.75	88.50	92.50	93.00
26	7	87.25	92.50	92.50	92.50
27	7	42.00	74.25	82.50	89.50
28	7	53.00	77.75	86.75	93.00
29	7	34.25	89.75	92.00	92.00
30	7	58.50	87.50	89.50	91.75
31	7	59.50	78.25	85.75	89.00
32	7	16.50	89.25	93.75	94.25
33	7	9.00	69.25	76.75	80.00
34	7	63.75	87.25	90.75	92.00
35	7	46.75	68.75	83.00	86.25
36	7	80.00	88.00	88.75	88.75
37	7	77.00	83.75	84.25	84.75
38	7	79.50	86.00	86.00	86.25
39	7	78.75	86.25	86.50	86.75
40	7	80.50	86.75	87.25	87.50
41	7	80.25	85.25	85.75	86.00
42	7	43.25	62.00	75.50	85.50
43	7	3.00	46.50	66.50	82.50
44	7	22.25	77.00	87.00	90.75
45	7	29.00	73.00	80.50	82.25
46	7	83.50	89.25	90.00	91.00

TEST NUMBER	DAYS PC''D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
47	7	74.50	82.75	89.75	90.25
48	7	78.00	88.25	89.25	89.50
49	7	12.00	72.75	85.00	91.75
50	7	4.25	71.25	77.50	81.75
51	7	8.25	87.00	94.75	95.00
52	7	41.00	77.25	86.00	90.50
53	7	8.25	74.75	86.25	88.00
54	7	36.75	78.25	89.50	92.25
55	7	44.25	78.00	85.75	88.25
56	7	70.25	83.00	87.75	93.75
57	7	55.25	78.25	91.00	94.50
58	7	73.25	84.25	84.75	85.00
59	7	72.25	85.50	92.50	93.75
60	7	72.50	85.00	89.50	90.75
61	7	56.25	75.25	83.00	89.50
62	7	12.50	84.50	90.00	90.25
63	7	6.25	86.25	90.75	91.00
64	7	16.75	85.75	91.50	91.75
65	7	53.75	71.50	75.75	80.00
66	7	65.75	83.00	84.25	86.50
67	7	70.00	83.50	91.00	94.25
68	7	14.50	77.25	85.25	86.00
69	7	16.75	77.25	85.00	85.75
70	7	33.25	89.75	92.75	93.00
71	7	76.25	85.50	88.25	89.50
72	7	48.50	64.50	80.25	85.75
73	7	47.00	67.25	82.25	89.50
74	7	78.25	85.75	87.75	88.00
75	7	46.75	70.50	86.25	90.50
76	7	51.75	76.50	84.25	86.75
77	7	20.25	73.50	81.50	83.00
78	7	31.25	76.25	82.50	83.50
79	7	64.00	76.25	84.25	85.75
80	7	66.25	77.25	82.50	83.50
81	7	65.50	75.25	81.00	82.50
82	7	38.50	65.00	81.25	85.50
83	7	59.00	66.75	69.75	91.00
84	7	62.75	75.00	90.75	93.00
85	7	69.25	75.00	83.75	85.75
86	7	78.50	86.75	90.00	92.00
87	7	17.25	91.00	93.75	94.25
88	7	22.75	84.00	90.50	93.25
89	7	11.00	83.25	89.00	90.00
90	7	52.25	65.75	83.00	88.00
91	7	25.00	82.75	89.75	91.00
92	7	54.00	66.50	78.50	86.00
93	7	62.00	70.00	74.75	83.75
94	7	55.50	68.75	80.25	82.75
95	7	43.00	70.75	87.00	91.50
96	7	26.50	87.25	92.50	92.75
97	7	84.00	89.50	91.00	91.50
98	7	76.25	80.00	81.00	82.00
99	7	74.50	82.00	83.75	86.25

TEST NUMBER	DAYS PC"D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
100	7	74.00	81.00	83.50	87.50
101	7	62.75	71.75	80.50	85.75
102	7	21.00	88.50	94.00	94.50
103	7	53.50	83.00	90.25	92.50
104	7	60.75	76.75	81.75	82.50
105	7	46.75	65.50	83.25	88.25
106	7	27.50	89.25	91.50	92.25
107	7	39.50	66.00	78.50	87.75
108	7	71.50	85.50	92.75	94.75
109	7	78.00	82.75	83.50	83.50
110	7	87.50	92.00	92.75	93.25
111	7	53.25	66.75	77.25	81.25
112	7	37.00	86.00	90.75	90.75
113	7	83.25	87.75	90.25	90.50
114	7	66.75	83.25	84.00	86.25
115	7	66.75	81.75	83.50	83.75
116	7	85.75	93.00	93.25	93.00
117	7	59.50	79.75	80.75	80.75
118	7	64.50	80.00	81.50	81.50
119	7	74.75	91.50	92.50	93.50
120	7	63.00	81.75	84.25	85.25
121	7	72.75	87.75	88.25	89.25
122	7	53.75	82.00	82.25	83.50
123	7	52.00	79.00	80.75	84.50
124	7	61.25	88.25	90.25	90.25
125	7	72.50	85.00	85.00	86.00
126	7	71.50	84.75	86.00	87.25
127	7	85.25	91.50	92.25	92.50
128	7	70.75	82.75	82.75	82.75
129	7	75.75	93.25	94.25	94.50
130	7	62.50	89.25	89.50	89.75
131	7	78.50	85.50	86.50	86.50
132	7	74.75	81.50	83.50	83.75
133	7	60.25	90.00	90.75	91.00
134	7	82.00	85.75	86.25	86.75
135	7	66.75	87.00	89.75	90.75
136	7	72.25	80.00	81.00	90.50
137	7	81.75	87.50	88.75	89.25
138	7	77.50	84.00	85.75	86.50
139	7	67.75	78.50	80.50	81.25
140	7	56.00	84.00	87.00	87.50
141	7	74.75	91.75	92.50	92.50
142	7	74.00	91.50	92.00	92.25
143	7	67.75	83.25	84.50	85.00
144	7	67.50	88.00	88.00	88.25
145	7	55.75	79.50	81.25	81.50
146	7	67.25	93.75	94.50	94.50
147	7	87.00	92.75	93.00	93.00
148	7	91.00	95.50	95.50	95.75
149	7	31.50	81.25	82.75	83.00
150	7	57.75	81.00	81.75	82.75
151	7	51.50	78.75	80.75	81.00
152	7	72.25	85.25	86.75	87.75

TEST NUMBER	DAYS PC'D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
153	7	74.00	86.25	87.75	89.75
154	7	47.00	83.00	84.75	85.25
155	7	71.25	86.50	87.00	87.75
156	7	39.00	79.75	85.50	88.50
157	7	74.50	90.00	91.75	92.25
158	7	60.25	84.25	85.50	86.25
159	7	51.75	80.50	83.00	83.00
160	7	62.00	86.25	87.00	88.50
161	7	46.50	77.00	79.50	80.50
162	7	81.75	94.50	94.50	94.50
163	7	57.00	80.75	83.00	83.50
164	7	48.75	80.25	82.75	84.50
165	7	66.25	86.75	87.50	88.00
166	7	62.00	87.75	88.50	88.75
167	7	79.75	82.00	83.50	83.75
168	7	78.50	83.00	83.25	83.50
169	7	68.25	79.25	80.75	81.50
170	7	79.25	86.00	86.75	86.75
171	7	72.00	80.25	80.25	80.25
172	7	74.00	89.00	91.00	91.00
173	7	73.50	90.50	92.50	93.00
174	7	75.00	88.00	90.50	91.50
175	7	66.50	86.00	87.50	88.00
176	7	68.00	83.00	85.50	85.50
177	7	62.75	85.25	88.75	89.25
178	7	73.00	85.50	87.50	88.00
179	7	69.50	84.75	89.00	89.00
180	7	73.00	88.50	92.50	93.50
181	7	71.50	84.00	85.50	86.00
182	7	76.00	89.75	90.25	90.50
183	7	54.75	89.00	90.50	90.75
184	7	53.50	91.25	93.25	93.25
185	7	63.75	82.25	88.75	89.50
186	7	68.50	78.00	81.00	82.00
187	7	65.50	78.75	80.75	81.25
188	7	75.25	81.75	82.00	82.25
189	7	84.50	88.00	88.25	88.25
190	7	83.00	87.50	87.75	87.75
191	7	71.50	86.50	88.50	88.50
192	7	75.00	83.50	83.50	85.00
193	7	68.75	81.75	84.50	85.75
194	7	69.50	83.00	85.50	85.50
195	7	65.75	81.75	84.25	85.00
196	7	74.50	89.00	91.00	92.00
197	7	76.50	85.25	86.75	87.00
198	7	73.25	88.25	88.50	88.75
199	7	78.00	88.75	89.25	89.25
200	7	82.75	89.50	90.25	90.50
201	7	60.50	85.50	87.50	88.00
202	7	72.50	80.00	80.50	81.00
203	7	66.00	88.25	89.00	89.50
204	7	88.25	95.00	95.25	95.25
205	7	66.50	86.75	88.50	89.00

TEST NUMBER	DAYS PC'D	7 DAYS	14 DAYS	21 DAYS	28 DAYS
206	7	71.75	88.25	88.75	88.75
207	7	47.00	76.50	81.25	82.50
208	7	73.50	89.25	92.25	92.50
209	7	61.25	79.00	81.25	85.50
210	7	44.75	82.00	83.75	84.25
211	7	79.25	89.25	89.50	89.75
212	7	51.00	86.75	89.00	89.00
213	7	79.75	92.75	93.00	93.00
214	7	56.50	82.00	83.25	83.75
215	7	61.00	78.75	80.25	80.50
216	7	66.00	89.00	90.00	90.00
217	7	77.25	88.75	90.75	91.25
218	7	64.75	87.25	90.75	91.25
219	7	71.75	86.25	88.25	88.75
220	7	69.25	83.00	84.00	84.50
221	7	85.25	92.50	93.25	93.50
222	7	83.50	91.25	92.00	92.00
223	7	76.75	92.00	93.50	93.50
224	7	80.00	89.50	89.75	89.75
225	7	52.50	84.25	90.25	91.25
226	7	63.25	79.50	85.00	85.75
227	7	71.25	83.50	84.00	84.25
228	7	59.75	80.50	81.25	82.50
229	7	58.75	83.25	84.00	84.25
230	7	72.50	82.00	83.00	83.00
231	7	68.00	85.25	87.75	88.25
232	7	75.75	86.25	87.00	87.25
233	7	84.00	92.50	93.00	93.00
234	7	61.25	80.50	84.00	85.00
235	7	70.00	91.00	92.00	93.75
236	7	83.50	88.25	90.00	90.50
237	7	76.00	90.50	92.25	92.75
238	7	63.00	80.75	87.25	88.25
239	7	55.00	89.25	91.50	92.50
240	7	75.50	89.50	92.00	92.50
241	7	70.50	87.00	88.25	88.25
242	7	84.25	90.00	90.25	90.25
243	7	81.25	91.00	92.00	92.00
244	7	88.25	93.75	93.75	93.75
245	7	72.50	85.25	86.00	86.25
246	7	74.25	80.25	81.00	81.00
247	7	85.50	90.75	90.75	91.25
248	7	78.50	90.50	91.00	91.00
249	7	78.00	88.25	90.00	91.00
250	7	57.75	85.75	87.00	87.00
251	7	76.00	84.00	84.50	85.50
252	7	65.75	82.50	85.75	86.50
253	7	67.50	86.00	88.50	88.50
254	7	71.50	92.50	93.50	94.00
255	7	62.75	78.50	83.25	85.00
256	7	59.00	81.75	89.75	91.50
257	7	68.00	82.25	84.50	85.00
258	7	65.25	82.00	83.75	85.25

<b>TEST NUMBER</b>	<b>DAYS PC"D</b>	<b>7 DAYS</b>	<b>14 DAYS</b>	<b>21 DAYS</b>	<b>28 DAYS</b>
259	7	74.00	88.50	90.00	90.50
260	7	78.50	92.75	92.75	92.75
261	7	70.50	83.50	84.00	84.00
262	7	48.25	80.25	87.00	88.25
263	7	71.75	87.00	87.25	87.50
264	7	72.50	84.00	86.00	86.50
265	7	77.50	88.50	88.50	88.50
266	7	83.75	90.50	90.75	90.75
267	7	77.75	88.50	89.50	89.50
268	7	84.50	90.50	90.75	91.00
269	7	44.50	86.50	89.50	91.00
270	7	79.50	90.25	90.25	90.25
271	7	78.00	86.00	86.25	86.25
272	7	85.75	91.25	91.75	91.75
273	7	77.75	87.75	88.75	89.00
274	7	80.75	91.25	91.75	92.00
275	7	79.25	84.25	84.50	84.50
276	7	80.75	87.25	87.50	87.50
277	7	79.50	87.00	87.50	87.75
278	7	42.00	85.50	86.50	87.00
279	7	77.50	84.50	85.50	87.00
280	7	78.00	90.00	91.50	91.50
281	7	83.50	89.50	89.50	90.00
282	7	78.00	81.75	82.50	82.50
283	7	67.75	85.25	85.75	85.75
284	7	74.75	83.50	84.50	84.50
285	7	77.50	87.00	87.00	87.00
<b>Total of 285 Samples</b>		<b>17703.00</b>	<b>23692.00</b>	<b>24780.75</b>	<b>25159.75</b>
<b>Average of 285 Samples</b>		<b>62.12</b>	<b>83.13</b>	<b>86.95</b>	<b>88.28</b>