

PROPOSAL 1: STRUCTURAL CHANGE TO TABLE 3 ADDITIONAL DIRECTIONS, FROM A 2-COLUMN FORMAT TO A ONE COLUMN FORMAT.

PRESENT RULE:

Section 4.10, Table 3. Methods of testing for laboratory germination, AGRICULTURAL SEEDS

Kind of seed	<u>Additional Directions</u> (....= sub, temp, first)
Specific requirements	Fresh and dormant and final counts) (see Sec. 4.9-b-e-f) seed (See sec. 4.2-e and 4.9-e-f)

PROPOSED RULE:

Section 4.10, Table 3. Methods of testing for laboratory germination, AGRICULTURAL SEEDS, VEGETABLE AND HERB SEEDS

Kind of seed	(column width would be narrowed to fit the table) Additional Directions (see sec. 4.9-b-e-f. Fresh and dormant: see Sec. 4.2-e, 4.9-e-f) (....= substrate, temp, first and final counts)
Agropyron cristatum	Light optional. <u>Fresh and dormant</u> : KNO3 and prechill at 5° or 10°C for 7 days
Agropyron desertorum	Light optional. <u>Fresh and dormant</u> : KNO3 and prechill at 5° or 10°C for 7 days
Agrostis canina	Light; KNO3
Agrostis capillaris	Light; KNO3. <u>Fresh and dormant</u> : Prechill at 5° or 10° C for 7 days
Agrostis gigantea	Light. <u>Fresh and dormant</u> : KNO3
Agrostis stolonifera var. palustris ..	Light; KNO3. <u>Fresh and dormant</u> : Prechill at 5° or 10° C for 7 days
Alopecurus arundinaceus	Light; KNO3.
Alopecurus pratensis	Light
Alysicarpus vaginalis	See section 4.8-a for swollen seeds
Andropogon gerardii var. gerardii	Light; KNO3. <u>Fresh and dormant</u> : Prechill at 5° C for 2 weeks
Andropogon hallii	Light; KNO3. <u>Fresh and dormant</u> : Prechill at 5° C for 2 weeks
Anthoxanthum odoratum	Light
Arachis hypogaea	Remove shells. <u>Fresh and dormant</u> : Ethephon, ethylene (refer to sec. 4.9 g-h)
Arrhenatherum elatius	Light
Artemisia ludoviciana	Light
Astragalus cicer	
Avena sativa	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days and conclude test on 7th day or predry (refer to sec. 4.2-g) and test for 10 days.
Axonopus fissifolius	Light. <u>Fresh and dormant</u> : KNO3
Beta vulgaris subsp. vulgaris field beet	See sec. 4.8-c
Beta vulgaris subsp. vulgaris sugar beet	See sec. 4.8-c
Bothriochloa ischaemum	Light; KNO3. <u>Fresh and dormant</u> : Prechill at 5° C for 2 weeks.
Bouteloua curtipendula	Light; KNO3
Bouteloua gracilis	Light. <u>Fresh and dormant</u> : KNO3
Brachiaria ramosa	Light and KNO3 optional. <u>Fresh and dormant</u> : Predry for 7 days (refer to sec. 4.2-g)
alternate method	Light; KNO3

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- Brassica napus
Brassica nigra
Brassica rapa
 annual turnip rape (bird rape)

Brassica rapa
 biennial turnip rape
Bromus arvensis

Bromus catharticus

Bromus hordeaceus

Bromus inermis

Bromus marginatus
Buchloe dactyloides
 burs
 caryopses
Calamagrostis canadensis

Cannabis sativa
Carthamus tinctorius
Cenchrus ciliaris

Chloris gayana
Cicer arietinum
Coronilla varia
Crambe abyssinica
Crotalaria brevidens var. intermedia...
Crotalaria juncea
Crotalaria lanceolata
Crotalaria pallida
Crotalaria spectabilis
Cyamopsis tetragonoloba
Cynodon dactylon var. aridus

Cynodon dactylon var. dactylon
Cynosurus cristatus
Dactylis glomerata

Desmodium tortuosum
Dichondra repens
Echinochloa frumentacea
Ehrharta calycina
Elymus canadensis
Elymus elymoides
Elymus trachycaulus

Elytrigia elongata
 alternate method
Elytrigia intermedia subsp. barbulata..
 alternate method
Elytrigia intermedia subsp. intermedia
 alternate method
Elytrigia spicata

Eragrostis curvula
Eragrostis trichodes
Erodium cicutarium
Fagopyrum esculentum
- Light. Fresh and dormant: KNO3 and prechill at 10° C for 3 days
Light. Fresh and dormant: KNO3

Light. Fresh and dormant: Prechill at 10° C for 5 days

Light; see section 4.8-g for alternate method. Fresh and dormant: In soil at 15° C
Light. Fresh and dormant: Prechill at 5° or 10° C for 7 days
Light optional. Fresh and dormant: Prechill at 5° or 10° C for 5 days, then test at 30° C for 9 additional days
Light

Light; KNO3. Fresh and dormant: Prechill at 5° C for 2 weeks
Light; KNO3.
Light and KNO3 optional. Fresh and dormant: Prechill at 5° C for 5 days

Light at 15° C
Light; press fascicles into well packed soil and prechill at 5° C for 7 days; see sec. 4.8-d
Light; KNO3

Fresh and dormant: KNO3

Light; KNO3; see sec. 4.9-a. Fresh and dormant: Prechill at 10° C for 7 days and then test at 20-35° C. Continue tests of hulled seed for 14 days and of unhulled seed for 21 days.
Light; KNO3; see sec. 4.9-a.
Light. Fresh and dormant: Prechill for 3 days at 5° or 10° C.
Light; germination more rapid in soil. Fresh and dormant: Prechill at 5° or 10° C for 7 days and test at 15-25° C.

Light
Light. Fresh and dormant: Prechill at 5° C for 2 weeks.

Light. Fresh and dormant: Prechill at 5° or 10° C for 5 days.
If still dormant on 10th day of germination period, rechill 2 days; then place at 20-30° C for 4 days.
Light optional. Fresh and dormant: KNO3 and prechill at 5° C for 5 days.
Light. Fresh and dormant: KNO3 and prechill at 5° C for 5 days.
Light optional.
Light.
Light.
Light optional.
Light and KNO3 optional. Fresh and dormant: KNO3 and prechill at 5° or 10° C for 7 days.
Light. Fresh and dormant: KNO3.
Light; KNO3. Fresh and dormant: Prechill at 5° or 10° C for 6 weeks.
Clip seeds.

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Festuca arundinacea	Light and KNO ₃ optional. <u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days and extend test to 21 days.
Festuca brevipila	Light and KNO ₃ optional.
Festuca ovina alternate method....	Light.
Festuca pratensis	Light and KNO ₃ optional.
Festuca rubra subsp. commutata	Light and KNO ₃ optional. <u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days.
Festuca rubra subsp. rubra	Light and KNO ₃ optional. <u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days.
Festuca tenuifolia	KNO ₃ .
Glycine max	
Gossypium spp.	<u>Fresh and dormant</u> : Test by method described in sec. 4.8-e.
alternate method	
Hedysarum boreale	
Helianthus annuus	
Hibiscus cannabinus	
Hilaria jamesii	
Holcus lanatus	Light.
Hordeum vulgare	<u>Fresh and dormant</u> : Prechill 5 days at 5° or 10° C or predry (refer to sec. 4.2-g)
Indigofera hirsuta	
Kochia prostrata	
Kummerowia stipulacea	
Kummerowia striata	
Lathyrus hirsutus	
Lathyrus sylvestris L.	
Lens culinaris	
Lespedeza cuneata	
Lespedeza juncea	
Leymus cinereus	
Linum usitatissimum	
Lolium x hybridum	Light. <u>Fresh and dormant</u> : KNO ₃ and prechill at 5° or 10° C for 5 days and test at 15-25° C; if necessary re-chill for 3 days and continue test at 15-25° C an additional 4 days.
Lolium multiflorum	Light; see sec. 3.5 and 4.8-i for fluorescence test. <u>Fresh and dormant</u> : KNO ₃ and prechill at 5° or 10° C for 5 days and test at 15-25° C; if necessary, re-chill for 3 days and continue test at 15-25° C an additional 4 days.
Lolium perenne	Light; see sec. 3.5 and 4.8-i for fluorescence test. <u>Fresh and dormant</u> : KNO ₃ and prechill at 5° or 10° C for 5 days and test at 15-25° C; if necessary, re-chill for 3 days and continue test at 15-25° C an additional 4 days.
Lotus corniculatus	
Lotus uliginosus	
Lupinus albus	
Lupinus angustifolius	
Lupinus luteus	
Medicago arabica	Remove seeds from bur; see sec 4.9-c.
Medicago lupulina	See sec. 4.9-c.
Medicago orbicularis	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C
Medicago polymorpha	Remove seeds from bur; see sec 4.9-c.
Medicago sativa	See sec. 4.9-c.
Melilotus albus	
Melilotus indicus	
Melilotus officinalis	
Melinis minutiflora	Light.
Mucuna pruriens var. utilis	
Nicotiana tabacum	Light.
Onobrychis vicifolia	

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<i>Oryza sativa</i>	See sec. 4.8-h for alternate method.
<i>Oryzopsis hymenoides</i>	<u>Fresh and dormant</u> : Prechill at 5° C for 4 weeks and test for 21 additional days.
alternate method	<u>Fresh and dormant</u> : Dark prechill in soil at 5° C for 4 weeks.
<i>Panicum antidotale</i>	Light.
<i>Panicum maximum</i> var. <i>maximum</i>	Light and KNO ₃ optional.
<i>Panicum maximum</i> var. <i>trichoglume</i>	Light and KNO ₃ optional.
<i>Panicum milliaceum</i>	
<i>Panicum virgatum</i>	Light; KNO ₃ . <u>Fresh and dormant</u> : Prechill at 5° C for 2 weeks.
<i>Pascopyrum smithii</i>	Dark. <u>Fresh and dormant</u> : KNO ₃ or soil.
<i>Paspalum dilatatum</i>	Light; KNO ₃ .
<i>Paspalum notatum</i>	
bahiagrass 'Pensacola'	Light; see sec. 4.8-b.
all other cvs.	Light; remove enclosing structures; see sec. 4.8-b.
<i>Paspalum urvillei</i>	<u>Fresh and dormant</u> : scratch caryopses; KNO ₃ .
<i>Pennisetum glaucum</i>	Light. <u>Fresh and dormant</u> : KNO ₃ .
<i>Pennisetum purpureum</i>	
<i>Phalaris arundinacea</i>	Light; KNO ₃ .
<i>Phalaris canariensis</i>	
<i>Phalaris stenoptera</i>	Light; KNO ₃ .
alternate method	Light; presoak at 15° C for 24 hours.
<i>Phaseolus vulgaris</i>	
<i>Phleum pratense</i>	Light; see sec. 4.9-a. <u>Fresh and dormant</u> : KNO ₃ and prechill at 5° or 10° C for 5 days.
<i>Piptatherum miliaceum</i>	Light. <u>Fresh and dormant</u> : Prechill at 5° C for 2 weeks.
<i>Pisum sativum</i>	
<i>Poa annua</i>	Light.
<i>Poa arachnifera</i>	Light; KNO ₃ . <u>Fresh and dormant</u> : Prechill at 5° C for 2 weeks.
<i>Poa bulbosa</i>	KNO ₃ or soil. <u>Fresh and dormant</u> : Prechill all samples at 5° C for 7 days.
<i>Poa compressa</i>	Light; KNO ₃ . <u>Fresh and dormant</u> : 10-30° C.
<i>Poa glauca</i>	Light; KNO ₃ .
glauantha bluegrass	
<i>Poa nemoralis</i>	Light.
<i>Poa pratensis</i>	Light; KNO ₃ . <u>Fresh and dormant</u> : Prechill at 10° C for 5 days.
<i>Poa secunda</i>	Light; KNO ₃ .
<i>Poa trivialis</i>	Light.
<i>Psathrostachys juncea</i>	Light. <u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days.
<i>Pueraria montana</i> var. <i>lobata</i>	
<i>Ricinus communis</i>	Remove caruncle if mold interferes with test.
<i>Sanguisorba minor</i>	
<i>Schizachyrium scoparium</i>	Light; KNO ₃ . <u>Fresh and dormant</u> : Prechill at 5° C for 2 weeks.
<i>Secale cereale</i>	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days or predry (refer to sec. 4.2-g).
<i>Secale montanum</i>	
<i>Sesamum indicum</i>	
<i>Sesbania exaltata</i>	
<i>Setaria italica</i>	
<i>Sinapis alba</i>	Light.
<i>Sorghastrum nutans</i>	Light; KNO ₃ . <u>Fresh and dormant</u> : Prechill at 5° C for 2 weeks.
<i>Sorghum x alatum</i>	<u>Fresh and dormant</u> : Prechill at 5° C for 5 days.
<i>Sorghum bicolor</i>	
broomcorn	
<i>Sorghum bicolor</i>	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days.
grain cvs.	
sweet or forage cvs.	<u>Fresh and dormant</u> : Test at 30-45° C maintaining 45° C for 2-4 hours per day.
<i>Sorghum x drummondii</i>	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days.
<i>sorghum-sudangrass</i>	

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Sorghum x drummondii	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days.
sorghum-sudangrass	
Sorghum x drummondii	<u>Fresh and dormant</u> : Prechill at 10° C for 5 days.
sudangrass	
Sorghum halepense	Light. <u>Fresh and dormant</u> : KNO3
Sorghum 'Sorghum'	<u>Fresh and dormant</u> : Prechill at 5° C for 5 days.
Sporobolus cryptandrus	Light; KNO3. <u>Fresh and dormant</u> : Prechill at 5° C for 4 weeks.
Stipa viridula method 1	H2SO4, GA3 and Thiram; dark (see sec. 4.8-k). <u>Fresh</u>
	<u>and dormant</u> : TZf on 400 seeds.
method 2	KNO3; dark (see sec. 4.8-k).
Trifolium alexandrinum	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium campestre	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium dubium	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium frageriferum	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium glomeratum	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium hirtum	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium hybridum	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium incarnatum	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium lappaceum	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium pratense	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium repens	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium resupinatum	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium semipilosum	
Trifolium subterraneum	See sec. 4.9-c. <u>Fresh and dormant</u> : 15° C.
Trifolium vesiculosum	See sec. 4.9-c.
x Triticosecale	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days, or predry (refer to sec. 4.2-g).
Triticum aestivum	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days, or predry (refer to sec. 4.2-g).
Triticum durum	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 5 days, or predry (refer to sec. 4.2-g).
Vicia articulata	
Vicia benghalensis	
Vicia pannonica	
Vicia sativa subsp. nigra	
Vicia sativa subsp. sativa	
Vicia villosa subsp. varia	<u>Fresh and dormant</u> : Prechill at 10° C for 5 days and test at 10° C.
Vicia villosa subsp. villosa	
Vigna angularis	
Vigna radiata var. radiata	
Vigna unguiculata subsp. unguiculata	
cowpea	
Zea mays subsp. mays	
field corn and popcorn	
Zoysia japonica	Light; KNO3.
Zoysia matrella	Light; KNO3.

Section 4.10, Table 3. Methods of testing for laboratory germination, VEGETABLE and HERB SEEDS

(column width would be narrowed to fit the table)

Kind of seed

Additional Directions

(see sec. 4.9-b-e-f. Fresh and dormant: see Sec. 4.2-e, 4.9-e-f)

(....= substrate, temp,
first and final counts)

Abelmoschus esculentus
Allium cepa
alternate method
Allium porrum

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Allium schoenoprasum	
Anethum graveolens	
Anthriscus cerefolium (L.) Hoffmann	Light.
Apium graveolens	Light; see sec. 4.9-a.
Arctium lappa	
Asparagus officinalis	
Atropa bella-donna L.	Light; KNO3.
Barbarea verna	Light; KNO3.
Beta vulgaris subsp. cicla	See sec. 4.8-c.
Beta vulgaris subsp. vulgaris	See sec. 4.8-c.
Borago officinalis L.	Light.
Brassica alboglabra	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 3 days; KNO3 and light.
Brassica chinensis	
Brassica juncea	Light. <u>Fresh and dormant</u> : Prechill at 10° C for 7 days and test for 5 additional days; KNO3.
Brassica napus var. napobrassica	
Brassica napus var. pabularia	
Brassica oleracea var. acephala	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 3 days; KNO3 and light.
Brassica oleracea var. botrytis	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 3 days; KNO3 and light.
Brassica oleracea var. capitata	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 3 days; KNO3 and light.
Brassica oleracea var. costata	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 3 days; KNO3 and light.
Brassica oleracea var. gemmifera	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 3 days; KNO3 and light.
Brassica oleracea var. gongylodes	<u>Fresh and dormant</u> : Prechill at 5° or 10° C for 3 days; KNO3 and light.
Brassica pekinensis	
Brassica perviridis	
Brassica rapa	
Capsicum spp.	<u>Fresh and dormant</u> : Light and KNO3.
Carthamus tinctorius	Light at 15° C.
Carum carvi L.	Light.
Cichorium endivia	Light; KNO3 or soil. <u>Fresh and dormant</u> : See sec. 4.8-f.
Cichorium intybus	Light; KNO3 or soil; see sec. 4.9-a.
Citrullus lanatus var. citroides	Soak seeds 6 hrs. <u>Fresh and dormant</u> : test at 30° C.
Citrullus lanatus var. lanatus	Keep substratum on dry side (sec. 4.9-b). <u>Fresh and dormant</u> : Test at 30° C.
Coriandrum sativum L.	
Cucumis melo	Keep substratum on dry side (sec. 4.9-b).
Cucumis sativus	Keep substratum on dry side (sec. 4.9-b).
Cucurbita pepo, C. maxima and	Keep substratum on dry side (sec. 4.9-b).
C. moschata	
Cuminum cyminum L.	
Cynara carunculus	
Cynara scolymus	
Daucus carota subsp. sativus	
Eruca sativa Miller	
Foeniculum vulgare Miller	
Glycine max	
Lactuca sativa	Light. <u>Fresh and dormant</u> : Prechill at 10° C for 3 days or test at 15° C.
Lepidium sativum	<u>Fresh and dormant</u> : Light.
Lycopersicon esculentum	<u>Fresh and dormant</u> : Light; KNO3.
Melissa officinalis L.	Light.
Nepeta cataria L.	
Ocimum basilicum L.	KNO3.
Origanum majorana L.	
Pastinaca sativa	
Petroselinum crispum	
Phaseolus coccineus	
Phaseolus lunatus	
Phaseolus vulgaris	See sec. 4.8-j.
garden bean	
Physalis pubescens	Light; KNO3.
Pimpinella anisum L.	

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Pisum sativum	
Raphanus sativus	
Rheum rhabarbarum	Light.
Rorippa nasturtium-aquaticum	Light.
Rosmarinus officinalis L.	Light.
Rumex acetosa	Light. <u>Fresh and dormant</u> : Test at 15° C.
Salvia officinalis	
Satureja hortensis	
Solanum melongena	<u>Fresh and dormant</u> : Light; KNO3.
Spinacia oleracea	Keep substratum on dry side (sec. 4.9-b).
Taraxacum officinale	Light (see sec. 4.9-a).
Tetragonia tetragonioides	Soak fruits overnight (16 hrs.), air dry 7 hrs; plant in very wet towels. Do not rewater unless later counts exhibit drying out. <u>Fresh and dormant</u> : On 21st day scrape fruits and test for 7 additional days.
Thymus vulgaris L.	
Tragopogon porrifolius	<u>Fresh and dormant</u> : Prechill at 10° C for 3 days.
Valerianella locusta	<u>Fresh and dormant</u> : Test at 10° C.
Vicia faba	See sec. 4.9-c. <u>Fresh and dormant</u> : Prechill at 10° C for 3 days.
Vigna unguiculata subsp. sesquipedalis	
Vigna unguiculata subsp. unguiculata	
southern pea	
Zea mays subsp. mays	
sweet corn	

SUPPORTING EVIDENCE (discussion):

This proposal is the first of a series of nine proposals designed to make all the tables easier to use. The changes are structural and not intended to change the meaning of any entries. It is helpful to read through all the subsequent proposals to understand the overall result of the changes.

Rearranging "additional directions" in table 3 to look like tables 4 and 5 was deemed easier than the reverse. This arrangement has the following advantages/purposes:

1. The single column eliminates having to double check the heading.
2. No wording has been changed and all common names will remain.
3. This proposal prepares the table for subsequent footnote standardization and/or elimination.
4. This proposal also prepares the table for subsequent alphabetical integration with tables 4 and 5.
5. Will make future editorial additions simpler.

Rules committee comment:

The proposal did not include synonyms. Are you proposing to eliminate synonyms from the tables?

Response:

We are not proposing omission of the synonyms. Note that they ARE

included in the lists for proposals 5 and 7. Omission here in proposal 1 was done to save space. Synonyms have no entries under the additional directions column so we did not think it necessary to include them in this proposal.

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PROPOSAL 2: HEADING STANDARDIZATION FOR GERMINATION TABLES 3, 4 AND 5.

PRESENT RULE:

4.10, Table 3. Methods of testing for laboratory germination, AGRICULTURAL SEEDS, VEGETABLE AND HERB SEEDS (as amended by proposal 1 in this series)

Kind of seed	Substrata	Temperature	First	Final	Additional Directions
	(See sec. 4.9-a-b)	° C. (See sec. 4.9-c)	count days	count days	(see sec. 4.9-b-e-f. Fresh and dormant: see Sec. 4.2-e, 4.9-e-f.)
			(See sec.4.9-d)		

4.11, Table 4. Methods of testing for laboratory germination, FLOWER SEEDS

Kind of seed	Substrata	Temperature	First	Final	Additional
		° C.	count ^a days	count ^b days	Directions

4.12, Table 5. Methods of testing for laboratory germination, TREE AND SHRUB SEEDS

Kind of seed	Substrata	Temperature	Test duration	Additional Directions
		° C.	days	(see sec. and 4.9e and 4.9l)

PROPOSED RULE:

4.10, Table 3. Methods of testing for laboratory germination, AGRICULTURAL SEEDS, VEGETABLE AND HERB SEEDS

Kind of seed	Substrata	Temperature	First	Final	Additional Directions
		° C.	count days	count days	(See sec. 4.2 and 4.9)

4.11, Table 4. Methods of testing for laboratory germination, FLOWER SEEDS

Kind of seed	Substrata	Temperature	First	Final	Additional Directions
		° C.	count ^a days	count ^b days	(See sec. 4.2 and 4.9)

4.12, Table 5. Methods of testing for laboratory germination, TREE AND SHRUB SEEDS

Kind of seed	Substrata	Temperature	<u>First</u>	<u>Final</u>	Additional Directions
		° C.	<u>count</u>	<u>count</u>	(See sec. 4.2 and 4.9)
			<u>days</u>	<u>days</u>	

(column will be empty)

SUPPORTING EVIDENCE (discussion):

This proposal is the second of a series of nine proposals designed to make all the tables easier to use. This structural change to the headings is not intended to change interpretation. It is helpful to read through all the subsequent proposals to understand the overall result of the changes.

(Proposal 2, page 2)

We believe the more general heading (4.2 and 4.9 versus 4.9-b-e-f etc.) is more appropriate for the column headings. The old headings are inconsistent. The fact that rule section references were left off headings for tables 4 and 5 is evidence that we could simplify and standardize all the table headings without much disruption. All the old section references are included in the proposed reference statement. Nothing has been omitted. This proposal prepares the tables for subsequent footnote standardization and alphabetization of tables 3, 4 and 5.

Footnotes a and b in the flower table heading will be moved in proposal 3.

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**PROPOSAL 3: FOOTNOTE STANDARDIZATION AND/OR ELIMINATION
FOR TABLES 3, 4, AND 5.**

PRESENT RULE: (Pending ratification of proposals 1 and 2)

Section 4.10, Table 3. Methods of testing for laboratory germination, AGRICULTURAL SEEDS, VEGETABLE AND HERB SEEDS

Section 4.11, Table 4. Methods of testing for laboratory germination, FLOWER SEEDS

Section 4.12, Table 5. Methods of testing for laboratory germination, TREE AND SHRUB SEEDS

(as amended by proposals 1 and 2 of this series.)

CURRENT FOOTNOTES:

Table 3.

- a. Hard seeds often present: see sections 4.2d and 4.9k (6)
- b. Rhizomatous derivatives of a johnsongrass x sorghum cross or a johnsongrass x sudangrass cross.
- c. Make first count when necessary or desirable
- d. Determine viability of ungerminated seeds; see sections 4.2e and 4.9k.
- e. Hard seeds often present: see section 4.9k(6).
- f. T.Z. Tetrazolium: see section 4.9k(2).

Table 4.

- a. Make preliminary counts only when necessary or advisable for efficiency. Many flower seedlings can be judged more accurately and critically if seedlings are left for final count especially in test durations of 7-14 days.
- b. Final count may vary with certain types, cultivars, or strains within any flower seed kind. Remaining seeds at the end of the test should be critically examined for any viable seeds and recorded as dormant seeds (see section 4.9k).
- c. Hard seeds often present: see sections 4.2d and 4.9k(6).
- d. Embryo excision method: see section 4.9k(1).
- e. T.Z. tetrazolium: see section 4.2k(2).

Table 5.

- a. Embryo excision method: see section 4.9k(1).
- b. T.Z. tetrazolium: see section 4.2k(2).
- c. Hard seeds often present: see sections 4.2k(3) and (6).
- d. For incubation use prechill procedures in 4.9l(2) but substitute warmer temperature in place of 2-5deg. C.

(Proposal 3, page 2 - footnote standardization and elimination)

PROPOSED RULE:

(only entries with proposed changes are listed)

Section 4.10, Table 3. Methods of testing for laboratory germination, AGRICULTURAL SEEDS, VEGETABLE AND HERB SEEDS

Kind of seed	Substrata	Temperature ° C.	First count days	Final count days	Additional Directions (See sec. 4.2 and 4.9)
AGRICULTURAL SEEDS					
Alysicarpus vaginalis alyceclover	B, T	35	4	21	<u>Hard seeds: see sec. 4.2d and 4.9k(6). Swollen seeds: see sec. 4.8a.</u>
Andropogon gerardii var. garardii big bluestem	P, TS	20-30	7	14	Light; KNO ₃ . Fresh and dormant: Prechill at 5° C for 2 weeks. <u>Ungerminated seeds: sec. 4.2e and 4.9k.</u>
Andropogon hallii sand bluestem	P, TS	20-30	7	14	Light; KNO ₃ . Fresh and dormant: Prechill at 5° C for 2 weeks. <u>Ungerminated seeds: sec. 4.2e and 4.9k.</u>
Astragalus cicer cicer milkvetch	B, TB, T	15-25	10	21	<u>Hard seeds: see sec. 4.9k(6)</u>
Bothriochloa ischaemum yellow bluestem	P, TS	20-30	7	14	Light; KNO ₃ . Fresh and dormant: Prechill at 5° C for 2 weeks. <u>Ungerminated seeds: sec. 4.2e and 4.9k.</u>
Bouteloua curtipendula side-oats grama	P	15-30	7	14	Light; KNO ₃ . <u>Ungerminated seeds: see sec. 4.2e and 4.9k.</u>
Bouteloua gracilis blue grama	P, TB	20-30	7	14	Light. Fresh and dormant: KNO ₃ . <u>Ungerminated seeds: see sec. 4.2 e and 4.9k.</u>
Buchloe dactyloides buffalograss (burs)	P, TB, TS	20-35	7	14	Light; KNO ₃ . Fresh and dormant: Prechill at 5° C for 2 weeks. <u>Ungerminated seeds: sec. 4.2 e and 4.9k.</u>
(caryopses)	P	20-35	5	14	Light; KNO ₃ .
Cenchrus ciliaris buffelgrass	S	30	7	28	Light; press fascicles into well packed soil and prechill at 5° C for 7 days; see sec. 4.8-d. <u>Ungerminated seeds: sec. 4.2e and 4.9k.</u>
Coronilla varia crownvetch	B, T, TB, S	20	7	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Crotalaria brevidens var. intermedia slenderleaf crotalaria	T, B, S,	20-30	4	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>

(Proposal 3, page 3)

Crotalaria juncea sunn crotalaria	T, B, S,	20-30	4	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Crotalaria lanceolata lanceleaf crotalaria	T, B, S,	20-30	4	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Crotalaria pallida smooth crotalaria	T, B, S,	20-30	4	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Crotalaria spectabilis showy crotalaria	T, B, S,	20-30	4	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Cyamopsis tetragonoloba guar	B, T, S,	30; 20-30	5	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Desmodium tortuosum Florida beggarweed	B, T	30	5	28	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Dichondra repens dichondra	B, T	20-30	7	28	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Ehrharta calycina perennial veldtgrass	P	10-30	7	28	<u>Light. Ungerminated seeds: see sec. 4.2e and 4.9k</u>
Elymus elymoides bottlebrush squirreltail	P, B	15; 20	10	14	<u>Ungerminated seeds: see sec. 4.2e and 4.9k</u>
Eragrostis curvula weeping lovegrass	P	20-35	5	14	<u>Light. Fresh and dormant: KNO3. Ungerminated seeds: see sec. 4.2e and 4.9k</u>
Eragrostis trichodes sand lovegrass	P	20-30	5	14	<u>Light; KNO3. Fresh and dormant: Prechill at 5° or 10° C for 6 weeks. Ungerminated: see sec. 4.2e and 4.9k</u>
Glycine max soybean	B, T, S, TC	20-30; 25	5	8	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Gossypium spp.	B, T, S	20-30	4	12	<u>Fresh and dormant: Test by method described in sec. 4.8-e. Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Alternate method	B, T, S	30	4	8	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Hedysarum boreale northern sweetvetch	B, TB, T	15-25; 20	14	28	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Hilaria jamesii galletta grass	P, B	20; 25; 20-30	4	10	<u>Ungerminated seeds: see sec. 4.2e and 4.9k</u>
Indigofera hirsuta hairy indigo	B, T	20-30	5	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Kochia prostrata forage kochia	P	20	4	14	<u>Ungerminated seeds: see Sec. 4.2e and 4.9k</u>
Kummerowia stipulacea korean lespedeza	T, B, S	20-35	5	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Kummerowia striata common lespedeza (striate lespedeza)	T, B, S	20-35	7	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>

(Proposal 3, page 4)

Lathyrus hirsutus rough pea	T, B	20	7	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Lathyrus sylvestris L. flatpea	T	15-25; 20	14	28	<u>Hard seeds: see sec. 4.9k(6)</u>
Lens culinaris lentil	B, T	20	5	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Lespedeza cuneata sericea lespedeza (Chinese lespedeza)	T, B, S	20-35	7	21	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Lespedeza juncea Siberian lespedeza	T, B, S	20-35	7	21	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Leymus cinereus basin wildrye	P	15-25	10	21	<u>Ungerminated seeds: see sec. 4.2 e and 4.9k</u>
Lotus corniculatus birdsfoot trefoil	B, T, P	20	5	12	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Lotus uliginosus common lespedeza (striate lespedeza)	B, T	20	5	12	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Lupinus albus white lupine	B, T	20	3	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Lupinus angustifolius blue lupine	B, T, S	20	4	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Lupinus luteus yellow lupine	B, T	20	7	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Medicago arabica spotted burclover	B, T	20	4	14	Remove seeds from bur; see sec. 4.9c. <u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Medicago lupulina black medick	T, B, S	20	4	7	See sec. 4.9c. <u>Hard seeds: see Sec. 4.2d and 4.9k(6)</u>
Medicago orbicularis buttonclover	B, T	20	4	10	See sec. 4.9c. <u>Hard seeds: see sec. 4.2d and 4.9k(6)</u> . Fresh and dormant: 15°C.
Medicago polymorpha California burclover	B, T	20	4	14	Remove seeds from bur; see sec. 4.9c. <u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Medicago sativa alfalfa	B, T, S	20	4	7	See sec. 4.9c. <u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Melilotus albus white sweetclover	B, T, S	20	4	7	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Melilotus indicus sourclover	B, T	20	3	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Melilotus officinalis yellow sweetclover	B, T, S	20	4	7	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Mucuna pruriens var. utilis velvetbean	B,T,S,C	20-30	3	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Onobrychis vicifolia sainfoin	B, T	20-30	4	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>

(Proposal 3, page 5)

Oryzopsis hymenoides Indian ricegrass	P	15	7	42	Fresh and dormant: Prechill at 5° C for 4 weeks and test for 21 additional days. <u>Ungerminated seeds: see sec. 4.2e and 4.9k.</u>
Alternate method	S	5-15; 15; 15-25	7	28	Fresh and dormant: dark prechill in soil at 5° C for 4 weeks. <u>Ungerminated seeds: see sec. 4.2 e and 4.9k.</u>
Panicum virgatum switchgrass	P, TS	15-30	7	14	Light; KNO ₃ . Fresh and dormant: Prechill at 5° C for 2 weeks. <u>Ungerminated seeds: see sec. 4.2e and 4.9k</u>
Pascopyrum smithii western wheatgrass	B, P, T	15-30	7	28	Dark. Fresh and dormant: KNO ₃ or soil. <u>Ungerminated seeds: see 4.2e and 4.9k</u>
Phaseolus vulgaris field bean	B,T,S,TC	20-30; 25	5	8	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Piptatherum miliaceum yellow bluestem	P	20-30	7	42	Light. Fresh and dormant: Prechill at 5° C for 2 weeks; <u>Ungerminated seeds: see sec. 4.2e and 4.9k.</u>
Pisum sativum field pea	B,T,S	20	3	8	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Pueraria montana var. lobata kudzu	T, B	20-30	5	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Schizachyrium scoparium little bluestem	P, TS	20-30	7	14	Light; KNO ₃ . Fresh and dormant: Prechill at 5° C for 2 weeks; <u>Ungerminated seeds: see sec. 4.2e and 4.9k.</u>
Secale montanum mountain rye	B, T	15; 20	4	7	<u>Ungerminated seeds: see sec. 4.2e and 4.9k</u>
Sesbania exaltata sesbania	T, B	20-30	5	7	<u>Hard seeds: see sec. 4.2d and 4.9k(6)</u>
Sorghastrum nutans indiangrass	P, TS	20-30	7	14	Light; KNO ₃ . Fresh and dormant: Prechill at 5° C for 2 weeks; <u>Ungerminated seeds: see sec. 4.2e and 4.9k.</u>
Sorghum 'Sorghgrass' ¹ sorghgrass	B, T, S	20-35; 15-35	5	21	Fresh and dormant: Prechill at 5° C for 5 days.
Sporobolus cryptandrus sand dropseed	P	5-35; 15-35	7	14	Light; KNO ₃ . Fresh and dormant: Prechill at 5° C for 4 weeks. <u>Ungerminated seeds: see Sec. 4.2e and 4.9k.</u>
Stipa viridula (method 1) green needlegrass	P	15-30	7	14	H ₂ SO ₄ , GA ₃ and Thiram; dark (See sec. 4.8-k). Fresh dormant: and TZ on 400 seeds: <u>sec. 4.9k(2)</u>
(method 2)	P	15-30	7	14	KNO ₃ ; dark (see sec. 4.8-k).

(Proposal 3, page 6)

Trifolium alexandrinum berseem clover	B, T, S	20	3	7	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium campestre large hop clover	B, T	20	4	14	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium dubium small hop clover (suckling clover)	B, T	20	4	14	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium fragiferum strawberry clover	B, T	20	3	7	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium glomeratum cluster clover	B, T	20	4	10	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium hirtum rose clover	B, T	20	4	10	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium hybridum alsike clover	B, T, S	20	3	7	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium incarnatum crimson clover	B, T, S	20	4	7	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium lappaceum lappa clover	B, T	20	3	7	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium pratense red clover	T, B, S	20	4	7	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium repens white and ladino clover	B, T, S	20	3	7	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium resupinatum Persian clover	B, T	20	3	7	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium semipilosum Kenya clover	B, T, S	20	3	7	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium subterraneum sub clover, subterraneum clover	B, T	20	4	14	See sec. 4.9c. Fresh and dormant: 15° C. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Trifolium vesiculosum arrowleaf clover	B, T	20; 15	4	10	See sec. 4.9c. <u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Vicia articulata monantha vetch	T, B	20	5	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Vicia benghalensis purple vetch	T, B	20	5	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Vicia pannonica Hungarian vetch	T, B	20	5	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>

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Vicia sativa subsp. nigra blackpod vetch	T, B	20	5	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Vicia sativa subsp. sativa common vetch	T, B	20	5	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Vicia villosa subsp. varia winter vetch	T, B	20	5	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Vicia villosa subsp. villosa hairy vetch	T, B	20	5	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Vigna angularis adzuki bean	B, T, S	20-30	3	10	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Vigna radiata var. radiata mung bean	B, T, S	20-30	3	7	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Vigna unguiculata subsp. unguiculata adzuki bean	B, T, S	20-30	5	8	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>

VEGETABLE AND HERB SEEDS

Abelmoschus esculentus okra	T, B	20-30	4	14	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Barbarea verna upland cress	P	20-30		7	<u>Make first count when necessary or desirable.</u>
Borago officinalis L. borage	P	20		10	<u>Light. Make first count when necessary or desirable.</u>
Eruca sativa Miller roquette	B, T	20		7	<u>Make first count when necessary or desirable.</u>
Glycine max soybean	B, T, S, TC	20-30; 25	5	8	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Nepeta cataria L. catnip	TB	20-30	7	21	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Ocimum basilicum L. sweet basil	B, T	20-30		14	<u>KN03. Make first count when necessary or desirable.</u>
Origanum majorana L. sweet marjoram	B, T	15		21	<u>Make first count when necessary or desirable.</u>
Phaseolus coccineus scarlet runner bean	B,T,S	20-30	5	9	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Phaseolus lunatus lima bean	B,T,C,S	20-30	5	9	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Phaseolus vulgaris garden bean	B,T,S TC	20-30; 25	none	8	<u>See sec. 4.8j. Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Pisum sativum garden pea	B,T,S	20	5	8	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Thymus vulgaris L. thyme	B, T	15		21	<u>Make first count when necessary or desirable.</u>

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Vigna unguiculata subsp. sesquipedalis, yard-long bean	B, T, S	20-30	5	8	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>
Vigna unguiculata subsp. Unguiculata, southern pea	B, T, S	20-30	5	8	<u>Hard seeds: see sec. 4.2d and 4.9k(6).</u>

⊆ Rhizomatous derivatives of a johnsongrass x sorghum cross or a johnsongrass x sudangrass cross.

Proposal editorial note:

All other footnotes from Table 3 are replaced with wording in the additional directions section. Footnote c (formerly b) has been inadvertently left off the table for over 18 years. This proposal restores the footnote on the Sorghum 'Sorghum' entry.

Section 4.11, Table 4. Methods of testing for laboratory germination, FLOWER SEEDS

Kind of seed	Substrata	Temperature ° C.	First count days	Final count days	Additional Directions (See sec. 4.2 and 4.9)
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Proposal editorial note:

The "a" and "b" footnotes from first and final count headings will be carried down and added to every entry in this table. The entries below have additional changes (Footnotes c, d, and e have been replaced with wording added to the "additional directions" column.):

Alcea rosea L. hollyhock	B, T	20	5 ^a	18 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Centaurea americana Nuttall basketflower	B, T	20-30	5 ^a	14 ^b	Clip radicle end of seed for rapid response. <u>Hard seed: See sec. 4.2d and 4.9k(6).</u>
Hibiscus spp. hibiscus	B, T	20-30	7 ^a	21 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Ipomoea alba L. moonflower	B, T	20-30	10 ^a	21 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Ipomoea quamoclit L. cypress vine	B, T	20-30	7 ^a	14 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u> Sometimes slow to germinate.
Ipomoea spp. cardinal climber, hearts and honeyvine (all types)	B, T	20; 20-30	4 ^a	14 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Lablab purpureus (L.) Sweet hyacinth-bean	B, T	20-30	6 ^a	12 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Lathyrus latifolius L. everlasting pea	T	20	12 ^a	30 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u> Slow to germinate.
Lathyrus odoratus L. sweet-pea, annual	T, S	20	none ^a	14 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>

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Lavatera trimestris L. herb treemallow	B	20	7 ^a	21 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Lupinus polyphyllus Lindley lupine, Russell hybrids	B, T	20-30	14 ^a	30 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u> Slow to germinate.
Lupinus subcarinosus Hooker Texas bluebonnet	B, T	20-30	10 ^a	21 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Lupinus spp. lupine, all annual types and cultivars	B, T	20-30	5 ^a	18 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Mimosa pudica L. sensitive plant	B	20-30	8 ^a	21 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Pelargonium spp. geranium	B, T, TB	20	7 ^a	28 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Alternate method (for clipped and scarified seeds)	B, T, TB	20	7 ^a	14 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Phaseolus coccineus scarlet runner bean	B, T, S	20-30	5 ^a	9 ^b	<u>Hard seed: see sec. 4.2d and 4.9k(6).</u>
Proboscidea louisianica (Miller) Thellung martynia, devil's claw, unicorn plant	P	20	none ^a	10 ^b	Light; excise embryos and place in closed dish: <u>See 4.9k(1).</u>
Trifolium dubium Irish shamrock	B, T, TB	20	4 ^a	14 ^b	See sec. 4.9c. New crop may require 15° C. <u>Hard seeds: See sec. 4.2d and 4.9k(6).</u>

- a. Make preliminary counts only when necessary or advisable for efficiency. Many flower seedlings can be judged more accurately and critically if seedlings are left for final count, especially in test durations of 7-14 days.
- b. Final count may vary with certain types, cultivars, or strains within any flower seed kind. Remaining seeds at the end of test should be critically examined for any viable seeds and recorded as dormant seeds (see sec. 4.9k).

Proposal editorial note:

All other footnotes from table 4 replaced with wording in additional directions.

Section 4.12, Table 5. Methods of testing for laboratory germination, TREE AND SHRUB SEEDS

Kind of seed	Substrata	Temperature ° C.	First count days	Final count days	Additional Directions (See sec. 4.2 and 4.9)
Acer spp. (all other maples, Boxelder - see Purity Table 1)	TB	20-30		28	Prechill 45-130 days. Use embryo excision: <u>see sec. 4.9k(1).</u>
	P	18-22		14	
Amalanchier alnifolia Saskatoon serviceberry	P	20		14	Use embryo excision: <u>see sec. 4.9k(1).</u> TZ may also be used: <u>see sec. 4.9k(2).</u>
Atriplex canescens fourwing saltbush	B	15		21	TZ: <u>see sec. 4.9k(2).</u>

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Berberis thunbergii Japanese barberry	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1).</u>
Berberis vulgaris European barberry	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1).</u>
Celastrus spp. (See Purity Table 1) bittersweet	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1).</u>
Ceratoides lanata winterfat	P, T	15	14	For fresh lots, prechill 14 days TZ may also be used: <u>see sec. 4.9k(2).</u>
Cercocarpus montanus true mountain mahogany	B, P	15; 10-30	28	Prechill 60 days at 1-2° C; or use TZ: <u>see sec. 4.9k(2).</u>
Chamaecyparis nootkatensis Alaska cedar	TB, P	20	28	Incubate 28 days at room temperature (for incubation, see 4.9l(2) but <u>substitute warmer temperature in place of 2-5° C.</u>) then prechill for 120 days.
Cornus florida flowering dogwood	C, TB, P	20-30 18-22	28 10	Prechill 90-120 days. Use embryo excision: <u>see sec. 4.9k(1).</u>
Cornus sericea red-osier dogwood	TB, TC	20-30	28	Prechill 120-160 days. TZ may also be used: <u>see sec. 4.9k(2).</u>
Cowania mexicana cliffrose	B, P	15; 10-30	28	Prechill 30 days at 1-2° C; or use TZ: <u>see sec. 4.9k(2).</u>
Crataegus mollis downy hawthorn	C, TB	20-30	14	Soak in conc. H2SO4, for two hours, followed by 90 days incubation at room temperature (for incubation, <u>see 4.9l(2) but substitute warmer temperature in place of 2-5° C.</u>) Then prechill 120 days. TZ may also be used: <u>see sec. 4.9k(2).</u>
Fraxinus americana white ash	P TB, TC	18-22 15-25	10-14 28	Use embryo excision: <u>see Sec. 4.9k(1).</u> TZ may also be used: <u>see sec. 4.9k(2).</u> Northern sources more dormant than southern. Prechill 60- 140 days.
Fraxinus excelsior European ash	P TB	18-22 20-30	10-14 28	Use embryo excision: <u>see sec. 4.9k(1).</u> TZ may also be used: <u>See sec. 4.9k(2).</u> Incubate 60-90 days at room temperature (for incubation, <u>see 4.9l(2) but substitute warmer temperature in place of 2-5° C.</u>) Then prechill 90 days.
Fraxinus latifolia Oregon ash	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1).</u> TZ may also be used: <u>See sec. 4.9k(2).</u>

	TB	20-30	28	Incubate 60-90 days at room temperature (for incubation, <u>see 4.9l(2) but substitute warmer temperature in place of 2-5° C.</u>). Then prechill 90 days.
Fraxinus nigra black ash	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1)</u> . TZ may also be used: <u>see sec. 4.9k(2)</u> .
	TB	20-30	28	Incubate 60-90 days at room temperature (for incubation, <u>see 4.9l(2) but substitute warmer temperature in place of 2-5° C.</u>). Then prechill 90 days.
Fraxinus pennsylvanica incl. var. lanceolata. green ash	TB, TC	20-30	28	Prechill southern sources 60-90 days. Prechill northern sources up to 140 days (30-60 days incubation at room temperature prior to prechill may be helpful. For incubation, <u>see 4.9l(2) but substitute warmer temperature in place of 2-5° C.</u>).
Gleditsia triacanthos honey locust	B	20	21	Hard seeds: <u>see 4.9k(3) and (6)</u> . Soak in conc. H2SO4 for one hour.
Magnolia grandiflora southern magnolia	C, TB	20-30	42	Prechill 45 days or use TZ: <u>see sec. 4.9k(2)</u> .
Malus spp. apple, crabapple	P	18-22	7-10	Use embryo excision: <u>see sec. 4.9k(1)</u> . TZ may also be used: <u>see sec. 4.9k(2)</u> .
Pinus albicaulus whitebark pine	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1)</u> .
	TB, P	20-30	28	Prechill 28 days.
Pinus cembra Swiss stone pine	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1)</u> , or TZ: <u>see sec. 4.9k(2)</u> .
	S, P	20-30	28	Prechill 180-270 days.
Pinus cembroides Mexican pinyon pine	B, P	20	28	Paired tests. Prechill 21 days or use embryo excision: <u>see sec. 4.9k(1)</u> .
Pinus coulteri coulter pine, bigcone pine	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1)</u> .
	S, P	15-25	28	Prechill 60-90 days.
Pinus jeffreyi Jeffrey pine	TB, P S	20-30	21	Paired tests. Prechill 28 days or use embryo excision: <u>see sec. 4.9k(1)</u> .
Pinus lambertiana sugar pine	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1)</u> .
	S, P	20-30	28	Prechill 60-90 days.
Pinus monticola western white pine	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1)</u> .

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	S, P	20-30	28	Prechill 60-90 days or incubate 28 days at room temperature, then prechill 60 days. <u>(For incubation see 4.9l(2) but substitute warmer temperature in place of 2-5° C.)</u> .
Pinus parviflora Japanese white pine	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1)</u> .
Prunus spp. (see Purity Table 1) apricot, cherry, peach, plum	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1)</u> . TZ may also be used: <u>see sec. 4.9k(2)</u> .
Purshia tridentata antelope bitterbrush	B	15	7	Presoak for 24 hrs at 20-22° C followed by 28 days prechill, or use TZ: <u>see sec. 4.9k(2)</u> .
Pyrus communis pear	P	18-22	10-14	Use embryo excision: <u>see sec. 4.9k(1)</u> . TZ may also be used: <u>see sec. 4.9k(2)</u> .
Robinia pseudoacacia black locust	B	20	21	<u>Hard seeds: see sec. 4.9k(3) and (6)</u> . Soak in conc. H2SO4 for one hour.
Rosa multiflora multiflora rose	TB, P	10-30	28	Prechill 28 days. TZ may also be used: <u>see sec. 4.9k(2)</u> .
Vitis vulpina multiflora rose	C, TB	20-30	28	Prechill 90 days. TZ may also be used: <u>see sec. 4.9k(2)</u> .

Proposal editorial note:

All footnotes for table 5 are replaced by wording in the additional directions section.

SUPPORTING EVIDENCE (discussion):

This proposal is the third of a series of nine proposals designed to make all the tables easier to use. It is helpful to read through all the subsequent proposals to understand the overall result of the changes.

This is a structural change needed to prepare the table for subsequent alphabetization. It replaces most footnotes with direct section references under additional directions. No wording has been changed. Movement of the a and b down into the entries for the flower table prepares the table for subsequent merging with tables 3 and 5.

The structure of the statement "see sec. 4.8a for swollen seeds" was rearranged to "swollen seeds: see sec. 4.8a" to match the structure of other notations such as "hard seeds: see sec. 4.2d and 4.9k(6)". Dashes in the section referrals were omitted because they were inconsistently applied (e.g. 4.9-c was changed to 4.9c).

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PROPOSAL 4: CHANGE IN SECTION 4.9A AND SUBSTITUTION OF PT FOR P IN TABLE 5.

PRESENT RULE:

4.9 Explanation of Tables 3, 4, and 5

Tables 3, 4, and 5 contain specific germination requirements for the kinds of seeds listed in column 1. Some explanations of these tables and additional germination requirements and conditions are as follows:

a. Substrata. - Symbols for substrata in column 2, Tables 3 and 4 are: B = between blotters; TB = top of blotters; T = paper toweling, used either as folded towel tests or as rolled towel tests in horizontal or vertical position; S = sand; TS = top of sand; P = covered petri dishes with (a) two layers of blotters, or (b) three thicknesses of filter paper, or (c) top of sand; C = creped cellulose paper wadding (0.3-inch thick Kimpak or equivalent) covered with a single thickness of blotter through which holes are punched for the seed which are pressed for about one-half their thickness into the paper wadding; RB = blotters with raised covers, prepared by folding up the edges of the blotter to form a good support for the upper fold which serves as a cover, preventing the top from making direct contact with the seeds; TC = on top of creped cellulose paper without a blotter.

Since it is generally difficult to obtain consistent supplies of soil, it is not to be used as primary testing substrate. However, it may be necessary to use it when seedlings show phytotoxic symptoms or if evaluation of seedlings is in doubt. Soil is commonly used for comparative or investigative purposes. Refer to section 4.5b (1).

Symbols for substrata in column 2, Table 5, are the same as for Tables 3 and 4 except that "P" includes (in addition to the above indicated materials) sponge rock, vermiculite, terralite, or a mixture of 50% sand and vermiculite, sand and perlite, etc. If there is question as to whether a paper substratum is toxic to developing seedlings, check tests should be made on Whatman's No. 2 filter paper or its equivalent. Seeds of celery, celeriac, chicory, dandelion, timothy, and bermudagrass are particularly sensitive to toxic substrata. If root injury is evident on substratum moistened with potassium nitrate, retests should be made on substratum moistened with water.

(Table 5 as amended by proposals 2 and 3)

(Proposal 4, page 2)

PROPOSED RULE:

4.9 Explanation of Tables 3, 4, and 5

Tables 3, 4, and 5 contain specific germination requirements for the kinds of seeds listed in column 1. Some explanations of these tables and additional germination requirements and conditions are as follows:

a. Substrata. - Symbols for substrata in column 2, Tables 3 and 4 are: B = between blotters; TB = top of blotters; T = paper toweling, used either as folded towel tests or as rolled towel tests in horizontal or vertical position; S = sand; TS = top of sand; P = covered petri dishes with (a) two layers of blotters, or (b) three thicknesses of filter paper, or (c) top of sand; C = creped cellulose paper wadding (0.3-inch thick Kimpak or equivalent) covered with a single thickness of blotter through which holes are punched for the seed which are pressed for about one-half their thickness into the paper wadding; RB = blotters with raised covers, prepared by folding up the edges of the blotter to form a good support for the upper fold which serves as a cover, preventing the top from making direct contact with the seeds; TC = on top of creped cellulose paper without a blotter.

Since it is generally difficult to obtain consistent supplies of soil, it is not to be used as primary testing substrate. However, it may be necessary to use it when seedlings show phytotoxic symptoms or if evaluation of seedlings is in doubt. Soil is commonly used for comparative or investigative purposes. Refer to section 4.5b (1).

If there is question as to whether a paper substratum is toxic to developing seedlings, check tests should be made on Whatman's No. 2 filter paper or its equivalent. Seeds of celery, celeriac, chicory, dandelion, timothy, and bermudagrass are particularly sensitive to toxic substrata. If root injury is evident on substratum moistened with potassium nitrate, retests should be made on substratum moistened with water.

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Section 4.12, Table 5. Methods of testing for laboratory germination, TREE AND SHRUB SEEDS

(Only entries with P are listed. P is replaced with PT.)

Kind of seed	Substrata	Temperature ° C.	First count days	Final count days	Additional Directions (See sec. 4.2 and 4.9)
<i>Abies amabilis</i> Pacific silver fir	PI	15-25		28	Prechill 21 days.
<i>Abies balsamea</i> balsam fir	TB, PI	20-30		21	Prechill 28 days.
<i>Abies concolor</i> white fir	TB, PI	20-30		28	Paired tests. Pacific Coast sources may need 21 days prechill.
<i>Abies fraseri</i> fraser fir	TB, PI	20-30		21	Prechill 28 days.
<i>Abies grandis</i> grand fir	TB, PI	20-30		28	Prechill 14 days.
<i>Abies homolepis</i> nikko fir	TB, PI	20-30		21	Prechill 21 days.
<i>Abies lasiocarpa</i> subalpine fir	TB, PI	20-30		28	Prechill 21 days.
<i>Abies magnifica</i> , <i>Abies x shastensis</i> California red fir and Shasta red fir	TB, PI	20-30		21	Prechill 28 days.
<i>Abies procera</i> noble fir	TB, PI	20-30		28	Prechill 14 days.
<i>Abies veitchii</i> abies, veitch fir	TB, PI	20-30		28	
<i>Acer</i> spp.(all other maples, boxelder see Purity Table 1)	TB PI	20-30 18-22		28 14	Prechill 45-130 days. Use embryo excision: see sec. 4.9k(1).
<i>Amelanchier alnifolia</i> Saskatoon serviceberry	PI	20		14	Use embryo excision: see sec. 4.9k(1). TZ may also be used: see sec. 4.9k(2).
<i>Artemisia nova</i> black sagebrush	PI	15; 20		21	Dormant lots may need 14 days prechill.
<i>Artemisia tridentata</i> big sagebrush	PI	15; 20		21	Dormant lots may need 14 days prechill.
<i>Berberis thunbergii</i> Japanese barberry	PI	18-22		10-14	Use embryo excision: see sec. 4.9k(1).
<i>Berberis vulgaris</i> European barberry	PI	18-22		10-14	Use embryo excision: see sec. 4.9k(1).

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Betula alleghaniensis yellow birch	<u>PI</u>	20-30	21	Paired tests. Prechill 21 days.
Betula papyrifera paper birch	<u>PI</u>	20-30	21	Use 16 hrs. light.
Betula spp. (all other birches-- see Purity Table 1)	<u>PI</u>	20-30	21	More than 8 hrs light may be beneficial.
Celastrus spp. (See Purity Table 1) bittersweet	<u>PI</u>	18-22	10-14	Use embryo excision: see sec. 4.9k(1).
Ceratoides lanata winterfat	<u>PI</u> , T	15	14	For fresh lots, prechill 14 days. TZ may also be used: see sec. 4.9k(2).
Cercocarpus ledifolius curlleaf mountain-mahogany	B, <u>PI</u>	15;10-30	28	Prechill 70 days at 1-2° C.
Cercocarpus montanus true mountain-mahogany	B, <u>PI</u>	15;10-30	28	Prechill 60 days at 1-2° C; or use TZ: see sec. 4.9k(2).
Chamaecyparis lawsoniana Port Orford cedar	TB, <u>PI</u>	20	28	Paired tests. Use KNO ₃ .
Chamaecyparis nootkatensis Alaska cedar	TB, <u>PI</u>	20	28	Incubate 28 days at room temperature (for incubation see 4.9l(2) but substitute warmer temperature in place of 2-5° C.) then prechill for 120 days.
Chrysothamnus nauseosus rubber rabbitbrush	<u>PI</u>	25;20-30	28	
Cornus florida flowering dogwood	C, TB, <u>PI</u>	20-30 18-22	28 10	Prechill 90-120 days. Use embryo excision: see sec. 4.9k(1).
Cowania mexicana cliffrose	B, <u>PI</u>	15;10-30	28	Prechill 30 days at 102° C; or use TZ: see sec. 4.9k(2).
Fraxinus americana white ash	<u>PI</u>	18-22	10-14	Use embryo excision: see sec. 4.9k(1). TZ may also be used: see sec. 4.9k(2).
	TB, TC	15-25	28	Northern sources more dormant than southern. Prechill 60- 140 days.
Fraxinus excelsior European ash	<u>PI</u>	18-22	10-14	Use embryo excision: see sec. 4.9k(1). TZ may also be used: see sec. 4.9k(2).
	TB	20-30	28	Incubate 60-90 days at room temperature (for incubation, see 4.9l(2) but substitute warmer temperature in place of 2-5° C.). Then prechill 90 days.
Fraxinus latifolia Oregon ash	<u>PI</u>	18-22	10-14	Use embryo excision: see sec. 4.9k(1). TZ may also be used: see sec. 4.9k(2).

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	TB	20-30	28	Incubate 60-90 days at room temperature (for incubation, see 4.9l(2) but substitute warmer temperature in place of 2-5° C.). Then prechill 90 days.
Fraxinus nigra black ash	PI	18-22	10-14	Use embryo excision: see sec. 4.9k(1). TZ may also be used: see sec. 4.9k(2).
	TB	20-30	28	Incubate 60-90 days at room temperature (for incubation, see 4.9l(2) but substitute warmer temperature in place of 2-5° C.). Then prechill 90 days.
Larix decidua European larch	TB, PI	20-30	21	
Larix kaempferi Japanese larch	TB, PI	20-30	16	Prechill 21 days.
Larix x marschlinsii Dunkeld larch	TB, PI	20-30	21	
Larix occidentalis western larch	TB, PI	20-30	21	Paired tests. Prechill 21 days or use KNO ₃ .
Larix sibirica Siberian larch	TB, PI	20-30	21	
Malus spp. apple, crabapple	PI	18-22	7-10	Use embryo excision: see sec. 4.9k(1). TZ may also be used: see sec. 4.9k(2).
Picea engelmannii Engelmann spruce	TB, PI	20-30	16	Paired tests. Prechill 21 days or use KNO ₃ .
Picea glehnii	TB, PI	20-30	14	Prechill 21 days.
Picea jezoensis	TB, PI	20-30	14	Prechill 21 days.
Picea pungens vars. blue spruce and Colorado blue spruce	TB, PI	20-30	16	20° C and 25° C temperatures are also satisfactory.
Picea sitchensis Sitka spruce	TB, PI	20-30	21	Paired tests. Prechill 21 days or use KNO ₃ .
Pinus albicaulus whitebark pine	PI	18-22	10-14	Use embryo excision: see sec. 4.9k(1).
	TB, PI	20-30	28	Prechill 28 days.
Pinus aristata bristlecone pine	TB, PI	20-30	14	
Pinus banksiana jack pine	TB, PI	20-30	14	
Pinus canariensis Canary pine	PI	20	21	Soak 1 day in water at room temperature prior to test.

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Pinus cembra Swiss stone pine	PI	18-22	10-14	Use embryo excision: see sec. 4.9k(1), or T2: see sec. 4.9k(2).
	S, PI	20-30	28	Prechill 180-270 days.
Pinus cembroides Mexican pinyon pine	B, PI	20	28	Paired tests. Prechill 21 days or use embryo excision: see sec. 4.9k(1).
Pinus contorta var. contorta lodgepole pine, shore pine	TB, PI	20-30	28	More than 8 hrs light may be beneficial to some lots. Prechill 28 days.
Pinus contorta var. latifolia lodgepole pine	TB, PI	20-30	21	Paired tests. Prechill 21 days.
Pinus coulteri coulter pine, bigcone pine	PI	18-22	10-14	Use embryo excision: see sec. 4.9k(1).
	S, PI	15-25	28	Prechill 60-90 days.
Pinus densiflora Japanese red pine	TB, PI	20-30	21	
Pinus echinata shortleaf pine	TB, PI	20-30	28	Paired tests. Prechill 14 days.
	PI	22	28	Paired tests. Prechill 28 days.
Pinus elliotii slash pine	TB, PI	20-30	28	
	PI	22	28	
Pinus flexilis	B, PI	20-30	21	Prechill 21 days.
Pinus glabra spruce pine	TB, PI	20-30	16	Prechill 21 days.
Pinus halepensis Aleppo pine	TB, PI	20	28	
Pinus jeffreyi Jeffrey pine	TB, PI	20-30	21	Paired tests. Prechill 28 days or use embryo excision: see sec. 4.9k(1).
	S			
Pinus lambertiana sugar pine	PI	18-22	10-14	Use embryo excision: see sec. 4.9k(1).
	S, PI	20-30	28	Prechill 60-90 days.
Pinus leucodermis	TB, PI	20-30	28	Prechill 40 days.
Pinus monticola western white pine	PI	18-22	10-14	Use embryo excision: see sec. 4.9k(1).
	S, PI	20-30	28	Prechill 60-90 days or incubate 28 days at room temperature, then prechill 60 days. (For incubation see 4.9l(2) but substitute warmer temperature in place of 2-5° C.).
Pinus mugo (incl. var. mugus) Swiss mountain pine, Mugo Swiss mountain pine	TB, PI	20-30	14	
Pinus nigra var. larico Corsican pine	TB, PI	20-30	14	

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Pinus nigra var. nigra Austrian pine	TB, <u>PI</u>	20-30	14	
Pinus palustris longleaf pine	<u>PI</u>	20	21	
Pinus parviflora Japanese white pine	<u>PI</u>	18-22	10-14	Use embryo excision: see sec. 4.9k(1).
Pinus patula Jelescote pine	TB, <u>PI</u>	20	18	
Pinus pinaster cluster pine	TB, <u>PI</u>	20	28	Paired tests. Prechill 28 days.
Pinus pinea Italian stone pine	<u>PI</u>	20	21	Soak 1 day in water at room temperature prior to test.
Pinus ponderosa ponderosa pine, western yellow pine	TB, <u>PI</u>	20-30	21	Paired tests. Prechill 28-35 days.
Pinus radiata Monterey pine	<u>PI</u>	20	25	Prechill 21 days. More than 0 hrs. light may be beneficial.
Pinus resinosa red pine, Norway pine	TB, <u>PI</u>	20-30; 25	14	Light not essential for maximum germination.
Pinus rigida pitch pine	TB, <u>PI</u>	20-30	14	
Pinus strobus eastern white pine	TB, <u>PI</u>	20-30	21	Paired tests. Prechill 28-42 days. More than 8 hrs light may be beneficial.
Pinus sylvestris Scotch pine	TB, <u>PI</u>	20-30	14	Paired tests. Mediterranean sources may need 21 days prechill.
Pinus taeda loblolly pine	TB, <u>PI</u>	20-30	28	Paired tests. Prechill 28 days.
	<u>PI</u>	22	28	Paired tests. Prechill 28 days. Use 16 hrs light.
Pinus thunbergii Japanese black pine	TB, <u>PI</u>	20-30	21	More than 8 hrs light may be beneficial to some lots.
Pinus virginiana Virginia pine, scrub pine	TB, <u>PI</u> TB	22 20-30	21 21	
Pinus wallichiana Himalayan pine	TB, <u>PI</u>	20-30	28	More than 8 hrs light may be beneficial to some lots.
Platycladus orientalis Oriental arborvitae (Chinese arbovitae)	TB, <u>PI</u>	20	21	
Prunus spp. (see Purity Table 1) apricot, cherry, peach, plum	<u>PI</u>	18-22	10-14	Use embryo excision: see sec. 4.9k(1). TZ may also be used: see sec. 4.9k(2).
Pseudotsuga menziesii var caesia grey Douglas-fir	TB, <u>PI</u>	20-30	21	Prechill 21 days.
Pseudotsuga menziesii var glauca blue Douglas-fir	TB, <u>PI</u>	20-30	21	Paired tests: Prechill 21 days.

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Pseudotsuga menziesii var menziesii green Douglas-fir	TB, <u>PI</u>	20-30	21	Paired tests: Prehill 21 days.
Pyrus communis pear	<u>PI</u>	18-22	10-14	Use embryo excision: see sec. 4.9k(1). TZ may also be used: see sec. 4.9k(2).
Rosa multiflora multiflora rose	TB, <u>PI</u>	10-30	28	Prehill 28 days. TZ may also be used: see sec. 4.9k(2).
Sequoia sempervirens redwood	TB, <u>PI</u>	20-30	21	
Sequoiadendron giganteum giant sequoia	TB, <u>PI</u>	20-30	28	Paired tests. Prehill 30 days.
Thuja occidentalis northern white cedar, eastern arborvitae	TB, <u>PI</u>	20-30	21	
Thuja plicata western red cedar, giant arborvitae	TB, <u>PI</u>	20-30	21	
Tsuga canadensis eastern hemlock, Canada hemlock	TB, <u>PI</u>	15	28	Prehill 28 days.
Tsuga heterophylla western hemlock, Pacific hemlock	TB, <u>PI</u>	20	28	Paired tests. Prehill 21 days.

SUPPORTING EVIDENCE (discussion):

This proposal is the fourth of a series of nine proposals designed to make all the tables easier to use. It is helpful to read through all the subsequent proposals (particularly 5 and 6) to understand the overall result of the changes. This is an editorial change needed to prepare the table for subsequent alphabetization and combining of tables 3, 4, and 5 into a new table 3.

We believe that the additional materials for P in this table warranted the creation of the new substrate designation PT for these entries. This proposal substitutes PT for P in table 5.

This proposal (number 4) was rewritten December 28, 1996 in response to concerns expressed by the Rules committee.

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Date of Proposal: 10/15/96
Amended: 12/28/96

PROPOSAL 5: GERMINATION TABLE ALPHABETIZATION (PART A) WITH CONSOLIDATION OF EXACT DUPLICATES (PART B)

Part A: alphabetization

PRESENT RULE:

Section 4.10, Table 3. Methods of testing for laboratory germination, AGRICULTURAL SEEDS, VEGETABLE AND HERB SEEDS

Section 4.11, Table 4. Methods of testing for laboratory germination, FLOWER SEEDS

Section 4.12, Table 5. Methods of testing for laboratory germination, TREE AND SHRUB SEEDS

(as amended by proposals 1 through 4 of this series)

PROPOSED RULE:

Tables 3, 4, and 5 are merged into the following table with the order of entries listed below. The remaining footnotes are at the end of the new table 3.

4.10 Table 3. Methods of testing for laboratory germination.

(alphabetical order; entries with identical procedures are starred)

Abelmoschus esculentus	Agrostis tenuis	Arabis alpina
Abies amabilis	Ailanthus altissima	Arachis hypogaea
Abies balsamea	Alcea rosea	Arctium lappa
Abies concolor	Allium cepa	Arctotis fastuosa
Abies fraseri	Allium porrum	Arctotis stoechadifolia
Abies grandis	Allium schoenoprasum	Armeria spp.
Abies homolepis	Alopecurus arundinaceus	Arrhenatherum elatius
Abies lasiocarpa	Alopecurus pratensis	Artemisia ludoviciana
Abies magnifica ...	Alysicarpus vaginalis	Artemisia nova
Abies procera	Alyssum saxatile	Artemisia tridentata
Abies veitchii	Amaranthus spp.	Asclepias tuberosa
Acer rubrum	Amberboa moschata	Asparagus densiflorus
Acer saccharinum	Amelanchier alnifolia	Asparagus officinalis
Acer spp. ...	Anagallis arvensis ...	Asparagus setaceus
Achillea millefolium	Anaphalis margaritacea	Aster novae-angeliae
Achillea ptarmica	Anchusa azurea	Astragalus cicer
Aesculus pavia	Anchusa capensis	Atriplex anescens
Ageratum houstonianum	Andropogon gerardii var. gerardii	Aubrieta deltoidea
Agropyron cristatum	Andropogon gerardii var. paucipilus	Avena byzantina
Agropyron desertorum	Andropogon hallii	Avena sativa
Agropyron elongatum	Anemone pulsatilla	Axonopus affinis
Agropyron intermedium var. intermedium	Anethum graveolens	Axonopus fissifolius
Agropyron intermedium var. trichophorum	Anthemis sancti-johannis	Baileya multiradiata
Agropyron smithii	Anthemis tinctoria	Barbarea verna
Agropyron spicatum f. inerme	Anthoxanthum odoratum	Begonia spp.
Agropyron trachycaulum	Anthriscus cerefolium	Bellis perennis
Agrostis canina	Antirrhinum spp.	Berberis thunbergii
Agrostis capillaris	Apium graveolens	Berberis vulgaris
Agrostis gigantea	Aquilegia alpina	Beta vulgaris subsp. cicla
Agrostis stolonifera var. palustris	Aquilegia chrysantha	*Beta vulgaris subsp. vulgaris field beet
	Aquilegia spp.	Beta vulgaris subsp. vulgaris sugar beet

(Proposal 5, page 2)

*Beta vulgaris subsp. vulgaris
table beet
Betula alleghaniensis
Betula papyrifera
Betula spp. ...
Borago officinalis
Bothriochloa ischaemum
Bouteloua curtipendula
Bouteloua gracilis
Brachiaria ramosa
Brachycome iberidifolia
Brassica alboglabra
Brassica chinensis
Brassica juncea
Brassica napus
Brassica napus var. napobrassica
Brassica napus var. pabularia
Brassica nigra
*Brassica oleracea var. acephala
ornamental kale...
*Brassica oleracea var. acephala
collards and kale
Brassica oleracea var. alboglabra
Brassica oleracea var. botrytis
Brassica oleracea var. capitata
Brassica oleracea var. costata
Brassica oleracea var. gemmifera
Brassica oleracea var. gongylodes
Brassica oleracea var. tronchuda
Brassica pekinensis
Brassica perviridis
Brassica rapa
Brassica rapa annual turnip rape
(bird rape)
Brassica rapa biennial turnip
rape
Bromus arvensis
Bromus catharticus
Bromus hordeaceus
Bromus inermis
Bromus marginatus
Bromus mollis
Bromus unioloides
Browallia spp.
Brugmansia arborea
Brunnera macrophylla
Buchloe dactyloides
Buphthalmum salicifolium
Cactaceae
Calamagrostis canadensis
Calceolaria spp.
Calendula officinalis
Callistephus chinensis
Calocedrus decurrens
Camissonia cheiranthifolia
Campanula carpatica Jacquin
Campanula medium 'Calycanthema'
Campanula medium Canterbury
Campanula persicifolia
Campanula rotundifolia
Cannabis sativa
*Capsicum spp. vegetable
*Capsicum spp. ornamental pepper
Cardiospermum halicacabum
Carnegiea gigantea

*Carthamus tinctorius
*Carthamus tinctorius
Carum carvi
Carya illinoensis
Carya ovata
Casuarina spp.
Catalpaspeciosa
Catalpabignonioides
Catharanthus roseus
Cedrus spp. ...
Celastrus spp. ..
Celosia argentea ...
Cenchrus ciliaris
Centaurea americana
Centaurea cineraria
Centaurea cyanus
Centaurea gymnocarpa
Centaurea imperialis
Centranthus ruber
Cerastium tomentosum
Ceratoides lanata
Cercocarpus ledifolius
Cercocarpus montanus
Chamaecyparis lawsoniana
Chamaecyparis nootkatensis
Cheiranthus cheiri
Chloris gayana
Chrysanthemum carinatum
Chrysanthemum ptarmiciflorum
Chrysothamnus nauseosus
Cicer arietinum
Cichorium endivia
Cichorium intybus
Citrullus lanatus var. caffer
Citrullus lanatus var. citroides
Citrullus lanatus var. lanatus
Clarkia amoena
Clarkia unguiculata
Cleome hassleriana
Cobaea scandens
Coix lacryma-jobi
Coleus blumei
Coleus scutellarioides
Collinsia heterophylla
Consolida ajacis
Consolida ambigua
Cordyline australis f.
Coreopsis lanceolata
Coreopsis tinctoria
Coriandrum sativum
Cornus florida
Cornus sericea
Cornus stolonifera
Coronilla varia
Cosmos bipinnatus
Cosmos sulphureus
Cowaniamexicana
Crambe abyssinica
Crataegus mollis
Crossandra infundibuliformis
Crotalaria brevidens var.
intermedia
Crotalaria juncea
Crotalaria lanceolata
Crotalaria pallida
Crotalaria spectabilis
Cucumis melo
Cucumis sativus

Cucurbita pepo
Cucurbita spp. etc. ornamental
gourds...
Cuminum cyminum
Cupressus arizonica
Cyamopsis tetragonoloba
Cyclamen africanum
Cynara cardunculus
Cynara scolymus
Cynodon dactylon var. aridus
Cynodon dactylon var. dactylon
Cynoglossum amabile
Cynosurus cristatus
Dactylis glomerata
Dahlia spp.
Daucus carota subsp. sativus
Daucus carota subsp. carota
Delphinium cardinale
Delphinium elatum
Desmodium tortuosum
Dianthus barbatus
Dianthus caryophyllus
Dianthus chinensis ...
Dianthus deltoides
Dianthus plumarius
Dianthus x allwoodii
Dichondra repens
Dictamnus albus
Didiscus caeruleus ...
Digitalis spp.
Dimorphotheca sinuata
Doronicum orientale
Dorotheanthus bellidiformis
Echinacea purpurea
Echinochloa crusgalli var.
frumentacea
Echinochloa frumentacea
Echinops ritro
Ehrharta calycina
Elymus canadensis
Elymus cinereus
Elymus elymoides
Elymus junceus
Elymus smithii
Elymus trachycaulus
Elytrigia elongata
Elytrigia intermedia subsp.
barbulata
Elytrigia intermedia subsp.
intermedia
Elytrigia spicata
Ephedra viridis
Episcia spp.
Eragrostis curvula
Eragrostis trichodes
Erigeron speciosus
Erodium cicutarium
Eruca sativa
Eruca vesicaria subsp. sativa
Erysimum hieraciifolium
Erysimum x allionii
Eschscholzia californica
Eucalyptus deglupta
Eucalyptus grandis
Euphorbia heterophylla
Euphorbia marginata
Eustoma grandiflorum
Exacum affine

(Proposal 5, page 4)

*Phaseolus coccineus ornamental
*Phaseolus coccineus vegetable
Phaseolus lunatus
Phaseolus vulgaris field bean
Phaseolus vulgaris garden bean
Phleum pratense
Phlox drummondii
Physalis pubescens
Physalis spp.
Picea abies
Picea engelmannii
Picea glauca var. albertiana
Picea glauca var. glauca
Picea glauca var. glauca'Densata'
Picea glehnii
Picea jezoensis
Picea koyamai
Picea mariana
Picea omorika
Picea orientalis
Picea polita
Picea pungens
Picea rubens
Picea sitchensis
Pimpinella anisum
Pinus albicaulis
Pinus aristata
Pinus banksiana
Pinus canariensis
Pinus caribaea
Pinus cembra
Pinus cembroides
Pinus clausa
Pinus contorta var. contorta
Pinus contorta var. latifolia
Pinus coulteri
Pinus densiflora
Pinus echinata
Pinus elliottii
Pinus flexilis
Pinus glabra
Pinus halepensis
Pinus heldreichii var. leucoderm.
Pinus jeffreyi
Pinus kesiya
Pinus lambertiana
Pinus leucodermis
Pinus luchuensis
Pinus merkusii
Pinus monticola
Pinus mugo
Pinus muricata
Pinus nigra var. laricio
Pinus nigra var. nigra
Pinus nigra var. poiretiana
Pinus palustris
Pinus parviflora
Pinus patula
Pinus pinaster
Pinus pinea
Pinus ponderosa
Pinus radiata
Pinus resinosa
Pinus rigida
Pinus serotina
Pinus strobus

Pinus sylvestris
Pinus taeda
Pinus thunbergii
Pinus virginiana
Pinus wallichiana
Piptatherum miliaceum
Pisum sativum field pea
Pisum sativum garden pea
Platanus occidentalis
Platyclusus orientalis
Platycodon grandiflorus
Plumbago auriculata
Poa annua
Poa arachnifera
Poa bulbosa
Poa compressa
Poa glauca
Poa glaucantha
Poa nemoralis
Poa nevadensis
Poa pratensis
Poa secunda
Poa trivialis
Polygonum capitatum
Populus spp.
Portulaca grandiflora
Primula spp.
Proboscidea louisianica
Prunus spp. ...
Psathrostachys juncea
Pseudotsuga menziesii var.
menziesii
Pseudotsuga menziesii var. glauca
Pseudotsuga menziesii var. caesia
Psylliostachys suworowii
Pueraria lobata
Pueraria montana var. lobata
Pulsatilla vulgaris
Purshia tridentata
Pyrethrum spp.
Pyrus communis
Quercus muehlenbergii
Quercus virginiana
Quercus alba
Quercus spp.
Ranunculus spp.
Raphanus sativus
Ratibida columnifera
Reseda odorata
Rheum rhabarbarum
Rhododendron spp.
*Ricinus communis
*Ricinus communis ornamental
Robinia pseudoacacia
Rorippa nasturtium-aquaticum
Rosa multiflora
Rosmarinus officinalis
Rudbeckia hirta
Rumex acetosa
Sagina subulata
Saintpaulia spp.
Salpiglossis sinuata
Salvia farinacea
Salvia officinalis
Salvia splendens
Sanguisorba minor
Sanvitalia procumbens
Saponaria ocymoides

Satureja hortensis
Scabiosa atropurpurea
Scabiosa caucasica
Schizachyrium scoparium
Schizanthus spp.
Secale cereale
Secale montanum
Sedum acre
Sempervivum spp.
Senecio cruentus
Sequoia sempervirens
Sequoiadendron giganteum
Sesamum indicum
Sesbania exaltata
Sesbania macrocarpa
Setaria italica
Silene armeria
Sinapis alba
Sinningia speciosa
Solanum melongena
Solanum spp.
Solenostemon scutellaroides
Sorghastrum nutans
Sorghum 'Sorghum'
Sorghum bicolor broomcorn
Sorghum bicolor grain cvs.,
sweet or forage cvs.
Sorghum halepense
Sorghum sudanense
Sorghum x alnum
Sorghum x drummondii sudangrass
Sorghum x drummondii sorghum-
sudangrass
Spinacia oleracea
Sporobolus cryptandrus
Stachys byzantina
Stipa viridula
Syringa vulgaris
Tagetes spp.
Tanacetum ptarmiciflorum
Tanacetum spp.
Tanacetum vulgare
Taraxacum officinale
Tetragonia tetragonioides
Thuja occidentalis
Thuja orientalis
Thuja plicata
Thunbergia alata Sims
Thymus serpyllum
Thymus vulgaris
Tithonia rotundifolia
Torenia fournieri
Trachymene coerulea
Tragopogon porrifolius
Trifolium alexandrinum
Trifolium campestre
Trifolium dubium Irish shamrock
Trifolium dubium small hop clover
Trifolium fragiferum
Trifolium glomeratum
Trifolium hirtum
Trifolium hybridum
Trifolium incarnatum
Trifolium lappaceum
Trifolium pratense
Trifolium repens
Trifolium resupinatum
Trifolium semipilosum

(Proposal 5, page 5)

Trifolium subterraneum
Trifolium vesiculosum
x Triticosecale
Triticum aestivum
Triticum durum
Tropaeolum spp.
Tsuga canadensis
Tsuga heterophylla
Ulmus americana
Ulmus parvifolia
Ulmus pumila
Vaccaria hispanica
Vaccaria pyramidata
Valerianella locusta
Venidium fastuosum
Verbena x hybrida
Veronica austriaca
Veronica spicata
Vicia articulata
Vicia benghalensis
Vicia faba
Vicia pannonica
Vicia sativa subsp. nigra
Vicia sativa subsp. sativa
Vicia villosa subsp. varia
Vicia villosa subsp. villosa
Vigna angularis
Vigna radiata var. radiata
Vigna unguiculata subsp.
sesquipedalis
*Vigna unguiculata subsp.
unguiculata cowpea
*Vigna unguiculata subsp.
unguiculata southern pea
Viola cornuta
Viola tricolor
Vitis vulpina
Yucca filamentosa
*Zea mays subsp. mays field corn
and popcorn
*Zea mays subsp. mays sweet corn
*Zea mays subsp. mays ornamental
corn
Zinnia angustifolia ...
Zoysia japonica
Zoysia matrella

- a. Make preliminary counts only when necessary or advisable for efficiency. Many flower seedlings can be judged more accurately and critically if seedlings are left for final count, especially in test durations of 7-14 days.
- b. Final count may vary with certain types, cultivars, or strains within any flower seed kind. Remaining seeds at the end of test should be critically examined for any viable seeds and recorded as dormant seeds (see sec. 4.9k).

(Proposal 5, page 6)

- c. Rhizomatous derivatives of a johnsongrass x sorghum cross or a johnsongrass x sudangrass cross.

Part B: Combination of exact duplicates

PRESENT RULE

The following entries are exact duplicates (re: substrate, temp., counts, and additional directions):

- Beta vulgaris subsp. vulgaris beet (Vegetable section)
Beta vulgaris subsp. vulgaris field beet (Ag. section)
Brassica oleracea var. acephala ornamental kale (Flower section)
Brassica oleracea var. acephala collards and kale (Veg. section)
Capsicum spp. pepper (Vegetable section)
Capsicum spp. ornamental pepper (Flower section)
Carthamus tinctorius safflower (Ag. section)
Carthamus tinctorius safflower (Vegetable section)
Glycine max soybean (Ag. section)
Glycine max soybean (Vegetable section)
Phaseolus coccineus scarlet runner bean (Vegetable section)
Phaseolus coccineus scarlet runner bean (Flower section)
Ricinus communis castorbean (Ag. section)
Ricinus communis castorbean (Flower section)
Vigna unguiculata subsp. ungu. cowpea (Ag. section)
Vigna unguiculata subsp. ungu. southern pea (Vegetable section)
Zea mays subsp. mays field corn and popcorn (Ag. section)
Zea mays subsp. mays sweet corn (Vegetable section)
Zea mays subsp. mays ornamental corn (Flower section)

PROPOSED RULE:

Beta vulgaris subsp. vulgaris
field beet and table beet

Brassica oleracea var. acephala
collards, vegetable and ornamental kale

Capsicum spp.
vegetable and ornamental pepper

(Proposal 5, page 7)

Carthamus tinctorius
safflower

Glycine max
soybean

Phaseolus coccineus
scarlet runner bean

Ricinus communis
castor bean

Vigna unguiculata subsp. unguiculata
cowpea and southern pea

Zea mays subsp. mays
field corn, popcorn, sweet corn,
ornamental corn

SUPPORTING EVIDENCE (discussion):

This proposal is the fifth of a series of nine proposals designed to make all the tables easier to use. This structural change to the tables is not intended to change interpretation. Alphabetical ordering of the entries addresses several difficulties of the current table format. Duplicate entries can be eliminated. Users no longer have to be frustrated by inadvertently searching in the wrong table. Footnotes and headings are standardized. New entries that have multiple uses are easily accommodated. This structure simplifies the rules without losing any important information.

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PROPOSAL 6: EDITORIAL CHANGES FOR SECTIONS THAT ME TABLES 3, 4, AND 5.

PRESENT RULE:

- 1.4a(5) Vegetable seed samples shall consist of at least 400 seeds per sample.
- 1.4a(6) Tree and shrub seed samples shall consist of at least 600 seeds per sample for germination purposes (1000 seeds for paired tests).
- 4.2d Seeds known and recognized to contain hard seed are indicated by footnotes in Tables 3, 4, and 5. ...
- 4.2e Viability of ungerminated seeds of all species listed in Tables 3, 4, and 5 may be determined by any appropriate method or combination of methods. ...
- 4.9 Explanation of Tables 3, 4, and 5
- 4.9a Tables 3, 4, and 5 contain specific germination requirements for the kinds of seeds listed in column 1. (as amended by proposal 4)
Substrata. - Symbols for substrata in column 2, Tables 3 and 4 are:...
- 4.9d Duration of test. - The duration of test for each of the various kinds of seeds is given in Tables 3, 4 and 5....
- 4.9d(1) The prechilling period is not included in the germination periods given in Tables 3, 4, and 5 unless otherwise specified.
- 4.9e. Light. - Where light is prescribed in Tables 3 and 4, it should be provided by a cool white fluorescent source. The illuminance for dormant seed should be 75-125 ft-c (750-1250 lux). The seeds should be illuminated for at least 8 hours in every 24. Where the seeds are germinated at alternating temperatures they should be illuminated during the high temperature period. ... For tree and shrub seeds, light shall be provided as described above for all species in Table 5 with the following provisions: (a) illuminance for non-dormant seed and during seedling development shall remain at 75-125 ft-c; (b) Up to 16 hours of light may be beneficial in some test conditions and for some lots, as noted in Table 5, but continuous light should not be used unless it is known that this does not inhibit germination of the species.
- 4.9k(3) Scarification. - For tree and shrub species listed in Table 5, impermeable seed coats of ungerminated seeds may be modified by either mechanical or chemical scarification. ...
- 4.9k(5) Cutting test for tree and shrub seeds (Table 5) - ...

(Proposal 6, page 2)

4.9k(6) For all other species listed in Tables 3, 4, and 5 continue the test for 5 additional days. ... For hard seeds in tree and shrub seed (Table 5) see section 4.9k(3).

4.9l Prechill and Paired tests. -

(1) Procedures for agricultural, vegetable, herb and flower seed prechill: Place seed on or in moist substratum at the indicated low temperature for the specified period of time. Refer to Tables 3, and 4.

(2) Procedures for tree and shrub seed prechill:
...(d) Place imbibed seed from a, b, or c at 2-5° C for length of time specified in Table 5 and maintain sufficient aeration and moisture to prevent the seed from drying out.

(3)... For some tree and shrub species in Table 5, 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 5 by the term "Paired tests." ...

Page 22: 4.10, Table 3. ... (Refer to pages 53-66)

4.11, Table 4. ... (Refer to pages 67-78)

4.12, Table 5. ... (Refer to pages 79-85)

PROPOSED RULE:

1.4a(5) Vegetable seed samples (as categorized by AOSA Handbook No. 25: Uniform classification of Weed and Crop Seeds) shall consist of at least 400 seeds per sample.

1.4a(6) Tree and shrub seed samples (as categorized by AOSA Handbook No. 25: Uniform classification of Weed and Crop Seeds) shall consist of at least 600 seeds per sample for germination purposes (1000 seeds for paired tests).

4.2d Seeds known and recognized to contain hard seed are indicated in the "Additional directions" column of Table 3...

4.2e Viability of ungerminated seeds of all species listed in Table 3 may be determined by any appropriate method or combination of methods. ...

4.9 Explanation of Table 3

Table 3 contains specific germination requirements for the kinds of seeds listed in column 1.

(Proposal 6, page 3)

- 4.9a (as amended by proposal 4)
Substrata. - Symbols for substrata in column 2, Table 3 are:...
- 4.9d Duration of test. - The duration of test for each of the various kinds of seeds is given in Table 3....
- 4.9d(1) The prechilling period is not included in the germination periods given in Table 3 unless otherwise specified.
- 4.9e. Light. - Where light is prescribed in Table 3, it should be provided by a cool white fluorescent source. The illuminance for dormant seed should be 75-125 ft-c (750-1250 lux). The seeds should be illuminated for at least 8 hours in every 24. Where the seeds are germinated at alternating temperatures they should be illuminated during the high temperature period. ... For tree and shrub seeds (as categorized by AOSA Handbook No. 25: Uniform classification of Weed and Crop Seeds), light shall be provided as described above with the following provisions: (a) illuminance for non-dormant seed and during seedling development shall remain at 75-125 ft-c; (b) Up to 16 hours of light may be beneficial in some test conditions and for some lots, as noted in Table 3, but continuous light should not be used unless it is known that this does not inhibit germination of the species.
- 4.9k(3) Scarification. - For tree and shrub species (as categorized by AOSA Handbook No. 25: Uniform classification of Weed and Crop Seeds), impermeable seed coats of ungerminated seeds may be modified by either mechanical or chemical scarification. ...
- 4.9k(5) Cutting test for tree and shrub seeds (as categorized by AOSA Handbook No. 25: Uniform classification of Weed and Crop Seeds) - ...
- 4.9k(6) For all other species listed in Table 3 continue the test for 5 additional days. ... For hard seeds in tree and shrub seed (as categorized by AOSA Handbook No. 25: Uniform classification of Weed and Crop Seeds) see section 4.9k(3).
- 4.9l Prechill and Paired tests. -
(1) Prechill procedures for all seed not categorized as tree or shrub by AOSA Handbook No. 25: Uniform classification of Weed and Crop Seeds: Place seed on or in moist substratum at the indicated low temperature for the specified period of time. Refer to Table 3.
(2) Prechill procedures for tree and shrub seed as categorized by AOSA Handbook No. 25: Uniform classification of Weed and Crop Seeds:

(Proposal 6, page 4)

...(d) Place imbibed seed from a, b, or c at 2-5° C for length of time specified in Table 3 and maintain sufficient aeration and moisture to prevent the seed from drying out.

(3) ... 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." ...

Page 22: 4.10, Table 3. Methods of testing for laboratory germination. Refer to the green section. (see proposal 8) (eliminate references to Tables 4 and 5) add: The contents of Tables 4 and 5 have been added to Table 3. Tables 4 and 5 no longer exist.

Page 53: 4.10, Table 3. Methods of testing for laboratory germination.

add the sentence: The contents of Tables 4 and 5 have been added to Table 3. Tables 4 and 5 no longer exist.
- in small type below the Table title.

Index changes: see proposal 9.

SUPPORTING EVIDENCE (discussion):

This is the sixth of nine proposals designed to make the tables easier to use. It is recommended that all the proposals be read to understand the overall result of the changes. These changes are needed as a result of consolidating Tables 3, 4, and 5. There is no intention to change the meaning of the rules. Those who still need to know classification of the seeds will still have the categorized index and Handbook 25. Numbering for tables 6-12 has been left intact and suggested notations about the absence of 4 and 5 are in this proposal. Table numbers 6-12 may be changed later to account for the absence of tables 4 and 5.

Rules committee comment:

The statement "as categorized by AOSA Handbook No. 25: Uniform Classification of Weed and Crop Seeds" is used too often in this proposal. A statement referring the user to Handbook No.25 for the proper crop classification should be made at the beginning of this proposal.

(Proposal 6, page 5)

Response:

Since the tables will no longer be categorized, we feel it is important to provide this backup reference for the categories wherever the categories are used. If a statement was at the beginning of the rules or a section, it might be overlooked. Having the reference right where it is needed is efficient for the user. These additions help clarify species category identity after the tables are merged.

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Date of proposal: 10/15/96

Response added: 12/28/96

PROPOSAL 7: PURITY TABLE ALPHABETIZATION (PART A) WITH CONSOLIDATION OF EXACT DUPLICATES (PART B)

Part A: alphabetization

PRESENT RULE:

2.4, Table 1.

Weights for working sample of agricultural; vegetable and herb; flower; and tree and shrub seeds

PROPOSED RULE:

2.4, Table 1.

Weights for working samples

The 3-part grouping is replaced with alphabetized entries. For tree and shrub entries, column 2 (noxious weed exam) will be empty. Entries will be alphabetized as follows (entries with identical numbers are starred):

Abelmoschus esculentus	Agrostis stolonifera var.	subsp. cicla, beet, swiss chard
Abies amabilis	palustris	Beta vulgaris subsp. vulgaris
Abies balsamea	Agrostis tenuis colonial	sugar beet and field beet
Abies concolor	Agrostis tenuis col. 'Astoria'	Betula alleghaniensis
Abies fraseri	Agrostis tenuis col. 'Highland'	Betula lenta
Abies grandis	Ailanthus altissima	Betula nigra
Abies homolepis	Allium cepa	Betula papyrifera
Abies lasiocarpa	Allium porrum	Betula pendula
Abies magnifica	Allium schoenoprasum	Betula populifolia
Abies magnifica var. shastensis	Alopecurus arundinaceus	Bothriochloa ischaemum
Abies procera	Alopecurus pratensis	Bouteloua curtipendula
Abies veitchii	Alysicarpus vaginalis	Bouteloua gracilis
Abies x shastensis	Amelanchier alnifolia	Brachiaria ramosa
Acer ginnala	Anagallis arvensis	Brachycome iberidifolia
Acer macrophyllum	Andropogon gerardii var. gerardii	Brassica alboglabra
Acer negundo	Andropogon gerardii var. paucipil.	Brassica chinensis
Acer pensylvanicum	Andropogon hallii	Brassica juncea
Acer platanoides	Anethum graveolens	Brassica napus var. annua
Acer pseudoplatanus	Anthoxanthum odoratum	Brassica napus var. biennis
Acer rubrum	Apium graveolens	Brassica napus var. napobrassica
Acer saccharinum	Aquilegia spp.	Brassica napus var. pabularia
Acer saccharum	Arachis hypogaea	Brassica nigra
Acer spicatum	Arctium lappa	Brassica oleracea var. acephala
Achillea millefolium	Arrhenatherum elatius	Brassica oleracea var. alboglabra
Aesculus pavia	Artemisia ludoviciana	Brassica oleracea var. botrytis
Agropyron cristatum	Artemisia nova	Brassica oleracea var. capitata
Agropyron desertorum	Artemisia tridentata	Brassica oleracea var. costata
Agropyron elongatum	Asparagus officinalis	Brassica oleracea var. gemmifera
Agropyron intermedium var.	Aster novae-angliae	Brassica oleracea var. gongylodes
intermedium	Astragalus cicer	Brassica oleracea var. tronchuda
Agropyron intermedium var.	Atriplex canescens	Brassica pekinensis
trichophorum	Avena byzantina	Brassica perviridis
Agropyron smithii	Avena sativa	Brassica rapa annual turnip rape
Agropyron spicatum f. inerme	Axonopus affinis	(bird rape)
Agropyron trachycaulum	Axonopus fissifolius	*Brassica rapa biennial turnip
Agrostis canina	Baileya multiradiata	rape
Agrostis capillaris colonial	Barbarea verna	*Brassica rapa turnip
Agrostis capillaris col. 'Astoria'	Berberis thunbergii	Bromus arvensis
Agrostis capillaris col. 'Highland'	Berberis vulgaris	Bromus catharticus
Agrostis gigantea	Beta vulgaris subsp. vulgaris and	Bromus hordeaceus

(Proposal 7, page 2)

Bromus inermis
Bromus marginatus
Bromus mollis
Bromus unioloides
Buchloe dactyloides
Calamagrostis canadensis
Calocedrus decurrens
Camissonia cheiranthifolia
Cannabis sativa
Capsicum spp.
*Carthamus tinctorius
*Carthamus tinctorius
Carya illinoensis
Carya ovata
Casuarina spp.
Catalpa speciosa
Catalpa bignonioides
Cedrus atlantica
Cedrus deodara
Cedrus libani
Celastrus orbiculatus
Celastrus scandens
Cenchrus ciliaris
Centaurea cyanus
Ceratoideus lanata
Cercocarpus ledifolius
Cercocarpus montanus
Chamaecyparis lawsoniana
Chamaecyparis nootkatensis
Chloris gayana
Chrysothamnus nauseosus
Cicer arietinum
Cichorium endivia
Cichorium intybus
Citrullus lanatus var. caffer
Citrullus lanatus var. citroides
Citrullus lanatus var. lanatus
Clarkia amoena
Coleus blumei
Coreopsis lanceolata
Coreopsis tinctoria
Cornus florida
Cornus sericea
Cornus stolonifera
Coronilla varia
Cosmos sulphureus
Cowania mexicana
Crambe abyssinica
Crataegus mollis
Crotalaria brevidens var.
intermedia
Crotalaria juncea
Crotalaria lanceolata
Crotalaria pallida
Crotalaria spectabilis
Cucumis melo
Cucumis sativus
Cucurbita pepo, C. moschata, C.
pepo squash
Cucurbita pepo, C. moschata, C.
pepo pumpkin
Cupressus arizonica
Cyamopsis tetragonoloba
Cynara cardunculus
Cynara scolymus
Cynodon dactylon var. aridus
Cynodon dactylon var. dactylon
Cynosurus cristatus
Dactylis glomerata
Daucus carota subsp. sativus
Desmodium tortuosum
Dianthus barbatus
Dichondra repens
Digitalis purpurea
Dimorphotheca sinuata
Echinacea purpurea
Echinochloa crusgalli var.
frumentacea
Echinochloa frumentacea
Ehrharta calycina
Elymus canadensis
Elymus cinereus
Elymus elymoides
Elymus junceus
Elymus smithii
Elymus trachycaulus
Elytrigia elongata
Elytrigia intermedia subsp.
barbulata
Elytrigia intermedia subsp.
intermedia
Elytrigia spicata
Ephedra viridis
Eragrostis curvula
Eragrostis trichodes
Erodium cicutarium
Erysimum hieraciifolium
Erysimum x allionii
Eschscholzia californica
Eucalyptus deglupta
Eucalyptus grandis
Eustoma grandiflorum
Fagopyrum esculentum
Festuca arundinacea
Festuca brevipila
Festuca ovina
Festuca pratensis
Festuca rubra subsp. commutata
Festuca rubra subsp. rubra
Festuca tenuifolia
Festuca trachyphylla
Fraxinus americana
Fraxinus excelsior
Fraxinus latifolia
Fraxinus nigra
Fraxinus pennsylvanica var.
lanceolata
Fraxinus pennsylvanica var.
pennsylvanica
Fraxinus pennsylvanica var.
subintegerrima
Gaillardia aristata
Gaillardia pulchella
Gilia tricolor
Gleditsia triacanthos
*Glycine max
*Glycine max
Gossypium spp.
Grevillea robusta
Gypsophila spp.
Hedysarum boreale
Helianthus annuus
Hibiscus cannabinus
Hilaria jamesii
Holcus lanatus
Hordeum vulgare
Indigofera hirsuta
Kochia prostrata
Kummerowia stipulacea
Kummerowia striata
Lactuca sativa
Larix decidua
Larix kaempferi
Larix occidentalis
Larix sibirica
Larix x eurolepis
Larix x marschlinisii
Lathyrus hirsutus
Lavatera trimestris
Layia platyglossa
Lens culinaris
Lepidium sativum
Lespedeza cuneata
Lespedeza hedysaroides
Lespedeza juncea
Lespedeza stipulacea
Lespedeza striata
Leymus cinereus
Liatris spp.
Libocedrus decurrens
Linaria maroccana
Linum grandiflorum
Linum perenne
Linum usitatissimum
Liquidambar styraciflua
Lobularia maritima
Lolium multiflorum
Lolium perenne
Lolium x hybridum
Lotus corniculatus
Lotus uliginosus
Lupinus albus
Lupinus angustifolius
Lupinus luteus
Lupinus subcarneus
Lycopersicon esculentum
Lycopersicon lycopersicum
Machaeranthera tanacetifolia
Magnolia grandiflora
Malus spp. apple
Malus spp. crabapple
Medicago arabica
Medicago lupulina
Medicago orbicularis
Medicago polymorpha
Medicago sativa
Melilotus albus
Melilotus indicus
Melilotus officinalis
Melinis minutiflora
Monarda citriodora
Mucuna deeringiana
Mucuna pruriens var. utilis
Nasturtium officinale
Nemophila maculata
Nemophila menziesii
Nicotiana tabacum
Nyssa aquatica
Nyssa sylvatica
Oenothera agrillicola
Oenothera macrocarpa

(Proposal 7, page 3)

Onobrychis viciifolia
Oryopsis miliacea
Oryza sativa
Oryzopsis hymenoides
Panicum antidotale
Panicum maximum var. *maximum*
Panicum maximum var. *trichoglume*
Panicum milliaceum
Panicum virgatum
Papaver nudicaule
Papaver rhoeas
Pascopyrum smithii
Paspalum dilatatum
Paspalum notatum
Paspalum urvillei
Pastinaca sativa
Pennisetum americanum
Pennisetum glaucum
Pennisetum purpureum
Penstemon penlandii
Penstemon strictus
Petroselinum crispum
Phacelia campanularia
Phacelia tanacetifolia
Phalaris arundinacea
Phalaris canariensis
Phalaris stenoptera
Phaseolus coccineus
Phaseolus lunatus
**Phaseolus vulgaris* field bean
**Phaseolus vulgaris* garden bean
Phleum pratense
Phlox drummondii
Physalis pubescens
Picea abies
Picea engelmannii
Picea glauca var. *glauca* 'Densata'
Picea glauca var. *albertiana*
Picea glauca var. *glauca*
Picea glehnii
Picea jezoensis
Picea koyamai
Picea mariana
Picea omorika
Picea orientalis
Picea polita
Picea pungens
Picea rubens
Picea sitchensis
Pinus albicaulis
Pinus aristata
Pinus banksiana
Pinus canariensis
Pinus caribaea
Pinus cembra
Pinus cembroides
Pinus clausa
Pinus contorta
Pinus coulteri
Pinus densiflora
Pinus echinata
Pinus elliotii
Pinus flexilis
Pinus glabra
Pinus halepensis
Pinus heldreichii var.

Leucodermis
Pinus jeffreyi
Pinus kesiya
Pinus lambertiana
Pinus leucodermis
Pinus luchuensis
Pinus merkusii
Pinus monticola
Pinus mugo var. *mughus*
Pinus mugo var. *mugo*
Pinus muricata
Pinus nigra subsp. *laricio*
Pinus nigra var. *nigra*
Pinus nigra var. *poiretiana*
Pinus palustris
Pinus parviflora
Pinus patula
Pinus pinaster
Pinus pinea
Pinus ponderosa
Pinus radiata
Pinus resinosa
Pinus rigida
Pinus serotina
Pinus strobus
Pinus sylvestris
Pinus taeda
Pinus thunbergii
Pinus virginiana
Pinus wallichiana
Piptatherum miliaceum
Pisum sativum field pea
Pisum sativum garden pea
Platanus occidentalis
Platyclusus orientalis
Poa annua
Poa arachnifera
Poa bulbosa
Poa compressa
Poa glauca
Poa glaucantha
Poa nemoralis
Poa nevadensis
Poa pratensis
Poa secunda
Poa trivialis
Populus spp.
Prunus armeniaca
Prunus avium
Prunus domestica
Prunus persica
Psathrostachys juncea
Pseudotsuga menziesii var. *caesia*
 & var. *glauca*
Pseudotsuga menziesii var.
 menziesii
Pueraria lobata
Pueraria montana var. *lobata*
Purshia tridentata
Pyrus communis
Quercus alba
Quercus muehlenbergii
Quercus virginiana
Quercus spp.
Raphanus sativus
Ratibida columnifera
Rheum rhabarbarum
Rhododendron spp.

Ricinus communis
Robinia pseudoacacia
Rorippa nasturtium-aquaticum
Rosa multiflora
Rudbeckia hirta
Rumex acetosa
Salvia farinacea
Salvia officinalis
Sanguisorba minor
Satureja hortensis
Schizachyrium scoparium
Secale cereale
Secale montanum
Sequoia sempervirens
Sequoiadendron giganteum
Sesamum indicum
Sesbania exaltata
Sesbania macrocarpa
Setaria italica
Silene armeria
Sinapis alba
Solanum melongena
Solenostemon scutellarioides
Sorghastrum nutans
Sorghum 'Sorghum'
Sorghum bicolor broomcorn
Sorghum bicolor grain cvs.,
 et or forage cvs.
Sorghum halepense
Sorghum sudanense
Sorghum x almxm
Sorghum x drummondii sorghum-
 sudangrass
Sorghum x drummondii sudangrass
Spinacia oleracea
Sporobolus cryptandrus
Stipa viridula
Syringa vulgaris
Taraxacum officinale
Tetragonia tetragonioides
Thuja occidentalis
Thuja orientalis
Thuja plicata
Tragopogon porrifolius
Trifolium alexandrinum
Trifolium campestre
Trifolium dubium
Trifolium fragiferum
Trifolium glomeratum
Trifolium hirtum
Trifolium hybridum
Trifolium incarnatum
Trifolium lappaceum
Trifolium pratense
Trifolium repens
Trifolium resupinatum
Trifolium semipilosum
Trifolium subterraneum
Trifolium vesiculosum
x Triticosecale spp.
Triticum aestivum (also durum...)
Tsuga canadensis
Tsuga heterophylla
Ulmus americana
Ulmus parvifolia
Ulmus pumila
Valerianella locusta
Vicia articulata

(Proposal 7, page 4)

Vicia benghalensis
Vicia faba
Vicia pannonica
Vicia sativa subsp. nigra
Vicia sativa subsp. sativa
Vicia villosa subsp. varia
Vicia villosa subsp. villosa
Vigna angularis
Vigna radiata var. radiata
Vigna unguiculata subsp.
 sesquipedalis
*Vigna unguiculata subsp.
 unguiculata cowpea
*Vigna unguiculata subsp.
 unguiculata southern pea
Viola cornuta L.
Viola tricolor L.
Vitis vulpina
Zea mays subsp. mays field corn
 and popcorn
Zea mays subsp. mays sweet corn
Zoysia japonica
Zoysia matrella

Part B: Combination of exact duplicates

PRESENT RULE:

The following entries are exact duplicates (re: weights and counts):

**Brassica rapa* biennial turnip rape (From Ag. section)

**Brassica rapa* turnip (From Veg. section)

**Carthamus tinctorius* safflower (From Ag. section)

**Carthamus tinctorius* safflower (From Veg. section)

**Glycine max* soybean (From Ag. section)

**Glycine max* soybean (From Veg. section)

**Vigna unguiculata* subsp. unguiculata cowpea (From Ag. section)

**Vigna unguiculata* subsp. unguiculata southern pea (Veg. section)

PROPOSED RULE:

Brassica rapa L.
biennial turnip rape, turnip

Carthamus tinctorius
safflower

Glycine max
soybean

(Proposal 7, page 5)

Vigna unguiculata subsp. unguiculata
cowpea, southern pea

SUPPORTING EVIDENCE (discussion):

This is the seventh of a series of proposals designed to make the rules easier to use. The proposal is a structural change not intended to change the interpretation of entries in Table 1. Alphabetization eliminates the need for tabs and eliminates the duplicate entries listed above. Those who wish to look up classification of a crop can still do so by using AOSA Handbook 25 Uniform Classification of Crops and Weeds.

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Date of proposal: 10/15/96

PROPOSAL 8: COLOR CODING

PRESENT RULE:

All pages white

PROPOSED RULE:

Table 1 (purity): printed on yellow paper

Table 3 (germination): printed on green paper

SUPPORTING EVIDENCE (discussion):

This is proposal 8 in a series of nine proposals designed to make the tables easier to use. Color coding would provide easier access into the correct table.

Rules committee comment:

One member suggested that colored samples be provided at the meeting.

Response:

Colored samples will be available at the meetings. Colors are pale green and pale yellow.

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Date of proposal: 10/15/96

Response added: 12/28/96

PROPOSAL 9: INDEX CHANGES

PRESENT RULE:

APPENDIX 2. COMMON NAME LIST WITH EQUIVALENT SCIENTIFIC NAMES
Alphabetized common name list and location of seed kinds described
or mentioned in Tables 1,3,4, and 5.

Common Name	Scientific Name	Pages
AGRICULTURAL SEEDS ...		
VEGETABLE AND HERB SEEDS ...		
FLOWER SEEDS...		
TREE AND SHRUB SEEDS...		

PROPOSED RULE:

APPENDIX 2. COMMON NAME LIST WITH EQUIVALENT SCIENTIFIC NAMES
Alphabetized common name list of seed kinds described or mentioned
in Tables 1 and 3.

Common Name	Scientific Name	<u>(pages omitted)</u>
AGRICULTURAL SEEDS ...		
VEGETABLE AND HERB SEEDS ...		
FLOWER SEEDS ...		
TREE AND SHRUB SEEDS ...		

SUPPORTING EVIDENCE (discussion):

Proposals 1-8 alphabetizes, simplifies, and color codes the tables. The index would now primarily be used to look up scientific names. Once the scientific name is known, the user would turn to the green or yellow table and look up the alphabetized entry. This is the reasoning for elimination of the page numbers. Page number elimination will make subsequent updating much easier. For now, the categories are retained. Elimination of the categories could be done with another proposal at a later date.

Rules committee comment:

Proposals 5 and 7 seek to merge all crop groups in single tables. To be consistent, the headings "AGRICULTURAL SEEDS," "VEGETABLE AND HERB SEEDS," "FLOWER SEEDS," AND "TREE AND SHRUB SEEDS" should be eliminated and the kinds merged as in Proposals 5 and 7.

(Proposal 9, page 2)

Response:

This proposal only eliminates the page numbers. Merging was not done for lack of time. As stated, the merging could be done with another proposal at another time.

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Date of proposal: 10/15/96
Response added: 12/28/96

SUMMARY OF AOSA RULE CHANGE PROPOSALS 1-9

The following nine proposals have been submitted with the goal of making the purity and germination tables easier to use. Only structural changes have been made and they are not intended to change the meaning of any of the rules in any way. We recommend that AOSA and SCST members read all of the proposals to understand the overall effect of the changes. We intend that all the proposals be voted on in sequential order. Proposals 1-6 and 9 are linked. Proposals 7 and 8 could stand alone and could be voted on separately even if any of the others are defeated.

If all proposals pass the result will be a set of rules with Table 1 (purity) alphabetized into one list and printed on pale yellow paper. Tables 3,4, and 5 would be merged, alphabetized and have only three footnotes. The new table 3 would be printed on pale green paper.

To accomplish this transformation, we present this step by step series of proposals as summarized below:

1. Structural change to Table 3 Additional directions, from a 2-part column to a one column format.
2. Heading standardization for Germination Tables 3, 4, and 5.
3. Footnote standardization/elimination for Germination Tables 3,4, and 5.
4. Change in section 4.9a and substitution of PT for P in Table 5.
5. Germination Table alphabetization (Part A) with consolidation of exact duplicates (Part B)
6. Editorial changes for sections that mention Tables 3, 4, and 5.
7. Purity Table alphabetization (Part A) with consolidation of exact duplicates (Part B)
8. Color coding of tables
9. Index changes

Rules committee comment:

Proposals are not all in the exact format that the rule will appear

Response:

As submitted, the proposals are 46 pages. We feel that the full length format would have been unnecessarily unwieldy and costly. Also, we were given informal verbal permission from Rodney Young to submit the proposals in this form. (Comment and response added 12/28/96. Additional comments and responses are provided in the supporting evidence section of some proposals.)

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PROPOSAL 10:

PRESENT RULE:

New Rule, except for proposed change to Handbook 25. The present Handbook 25 Rule reads as follows:

Scientific/Common name	Family	Class	Classification								NOX
			Spp.	contaminating							
			A	E	H	R	S	I	V		
<i>Eremochloa ophiuroides</i> - centipedegrass	(Poaceae)	T,W	W	W	W	W	W	W	W	W	NO

PROPOSED RULE:

2.4, Table 1. Weights for working sample of agricultural, vegetable and herb, flower, and tree and shrub seeds

Kind of seed	Minimum weight For Purity Analysis	Minimum weight for noxious- weed seed Or bulk examination	Approximate Number of Seeds per gram	Approximate Number of Seeds per Ounce
Agricultural Seeds	Grams	Grams	Number	Number
<i>Eremochloa ophiuroides</i> (Munro) Hackel. - centipede grass	2	20	1253	35,530

4.8 Special procedures and alternate methods for germination.

- m. *Centipedegrass (Eremochloa ophiuroides)*. - Firm seed remaining at 21 days shall be clipped distal from the embryo and transferred to substratum moistened with 400 ppm gibberellic acid (GA₃) for 7 additional days. Refer to 4.9k(4) for GA procedure. Normal seedlings developing from this special procedure are to be reported as percent dormant seed.

(Proposal 10, page 2)

4.10, Table 3. Methods of testing for laboratory germination,
AGRICULTURAL SEEDS

Kind of seed	Substrata (See Sec. 4.9-a-b)	Temperature °C (See Sec. 4.9-c)	First count days (See Sec. 4.9-d)	Final count days (See Sec. 4.9-d)	Additional Directions	
					Specific requirements (See Sec. 4.9-b-e-f)	Fresh and dormant seed (See Sec. 4.2-e and 4.9-e-f)
<i>Eremochloa ophiuroides</i> (Munro) Hackel. - centipedegrass	P	20-35	7	21	Light	See sec. 4.8-m

AOSA HANDBOOK 25: UNIFORM CLASSIFICATION OF WEED AND CROP SEEDS

Scientific/Common name	Family	Spp.	Classification							
			Class	contaminating						
			A	E	H	R	S	I	V	
<i>Eremochloa ophiuroides</i> - centipede	(Poaceae)	R,T,W	C	W	W	C	W	C	W	NO

SUPPORTING EVIDENCE:

AOSA Rules are proposed for *Eremochloa ophiuroides* (Munro) Hackel., centipedegrass, which is a popular warm season perennial turf grass along the southeastern coastal plain of the United States. Currently, centipedegrass is only listed in AOSA Handbook 25.

AOSA Rules 2.4, Table 1:

Proposed factors for Table 1 were determined by weighing 2500 seeds for 30 seed lots. The average weight of 2500 seeds was 1.997 g, with a range of 1.825 g to 2.341 g.

AOSA Rules 4.10, Table 3:

Proposed germination methods for Table 3 are based on work done by

(Proposal 10, page 3)

Delouche (1961), Walker (1976) and an AOSA Region V referee project on centipedegrass germination (Guerke, 1984). Preliminary to the regional referee, a comparison of various standard germination test regimes on 30 samples was conducted to determine optimum conditions, a survey was made of southern seed laboratories to identify methods in use, and comparison was made of germination requirements of similar warm season turf grass species.

Proposed dormancy breaking procedures are based on techniques evaluated in the 1994 and 1995 AOSA Region V referee projects (Guerke, 1994; 1995). Further, these methods were applied to 99 seed samples over a 2 year period in the Georgia State Seed Laboratory in Tifton. Thirty three percent of seed lots tested showed from 1% - 31% dormant seed after 21 days, with a mean of 12% dormant seed. The percent germination plus dormant seed total agreed with tetrazolium test seed viability determinations with no more than 3% variance.

AOSA Handbook 25:

Proposed changes include adding "R" under Species Class since centipedegrass is also utilized in revegetation applications. Also, a "C" other crop classification is proposed for agricultural, revegetation and turf seed lots. In the southeast, commercially grown centipedegrass may contaminate other agricultural, revegetation or turf seed lots. It would be considered as other crop and not particularly objectionable in seed trade.

Literature Cited

Delouche, J.C. 1961. Effect of gibberellin and light on germination of centipedegrass seed (*Eremochloa ophiuroides*). Proc. Assoc. Off. Seed Analysts. 51: 147-150.

Guerke, W.R. 1984. Region V - Southern Referee: Treated wheat germination and centipedegrass (*Eremochloa ophiuroides*) germination. News Letter Assoc. Off. Seed Analysts. 58(3): 51 (abstr.).

Guerke, W.R. 1994. Region V - Southern Referee: Germination of centipedegrass using GA₃. News Letter Assoc. Off. Seed Analysts. 68(3): 36-37 (abstr.).

Guerke, W.R. 1995. Region V - Southern Referee: Centipedegrass germination. News Letter Assoc. Off. Seed Analysts. 69(3):57 (abstr.).

Walker, J.T. 1976. Centipedegrass seed treatments and light-temperature effects on germination. Plant Disease Reporter. 60(5):393-397.

(Proposal 10, page 4)

Copies of cited literature are being submitted with the Proposal for committee review.

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DATE OF PROPOSAL:

September 27, 1996

PROPOSAL 11:

PRESENT RULE:

Handbook 25, Page 33

<u>Scientific/Common Name</u>	<u>Family</u>	Spp.	<u>Classifications</u>									
			<u>contaminating</u>									
			Class	A	F	H	R	S	T	V	NOX	
Chrysanthemum coronarium --chrysanthemum, garland --crown daisy	(Asteraceae)		F,W			W	C	W	W	W	W	NO

Proposed Addition to Present Rule:

<u>Scientific/Common Name</u>	<u>Family</u>	Spp.	<u>Classifications</u>									
			<u>contaminating</u>									
			Class	A	F	H	R	S	T	V	NOX	
Chrysanthemum coronarium --chrysanthemum, edible --chrysanthemum, garland --crown daisy	(Asteraceae)		F,V,W			W	C	W	W	W	C	NO

SUPPORTING EVIDENCE:

Chrysanthemum coronarium is grown in the Pacific Northwest as a vegetable, as salad greens, mostly exported to Asian markets. Handbook 25 currently classes C. coronarium as a flower (F), or a weed (W). This proposal would add the class vegetable (V) and also the common name edible chrysanthemum as used in commercial catalogs. Copies of company catalog pages were submitted to the rules committee with proposal.

References:

Staff of the L.H. Bailey Hortorium, Cornell University. 1976. Hortus Third: A Concise Dictionary of the Plants Cultivated in the United States and Canada. Macmillan Publishing Company.

Bremness L. 1994. Herbs. Dorling Kindersley.

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DATE OF PROPOSAL:

October 13, 1996
Revised January 6, 1997

PROPOSAL 12:

PRESENT RULE:

New Rule

PROPOSED ADDITION TO PRESENT RULE:

Table 3.

Kind of Seed		Additional Directions				
Substrata	Temp. Degrees C	First Count Days	Final Count Days	Additional Specific Requirements	Fresh and Dormant Seed	
Chrysanthemum coronarum garland, crown daisy, edible chrysanthemum	TB,P 15; 15-25	7	14	Prechill 5 to 7 days at 5C. Low germ may be due to unfilled seed.		

SUPPORTING EVIDENCE:

See attached germination trial data. Reps of 200 seed planted in 4 x 4 boxes on top of brown towels were placed in the 15, 20, 15-25, and 20-30 degree germinators. A duplicate set was first prechilled at 5 degrees, for 7 days and then placed in each temperature. No trial was made to determine if light vs. dark affected germination. Prechill did have a positive affect, especially in the months after harvest.

C. coronarium has a problem with unfilled seed. All 14 lots had a significant unfilled count.

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PROPOSAL 13:

PRESENT RULE:

New Rule

PROPOSED ADDITION TO PRESENT RULE:

2,4. Table 1. Weights for working sample of agricultural, vegetable and herb, flower, and tree and shrub seeds.

Kind of Seed	Min. weight for purity analysis	Min. weight for nox. weed seed or bulk exam	Approx. number of seeds per gram	Approx. number of seeds per ounce
Vegetable and Herb Seeds	Grams	Grams	Number	Number
Chrysanthemum coronarium garland, crown daisy, edible chrysanthemum	6.5	65	385	10,895

Flower Seeds

Repeat of above information

SUPPORTING EVIDENCE:

See attached seed counts.

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PROPOSAL 14:

The inclusion of "pleated filter paper" as a substrate that can be used as an alternative to blotters or towels.

PRESENT RULE:

- 4.8.1(1) Germination tests on coated seed units and on de-coated seed shall be conducted in accordance with methods in section 4.10. Kinds for which soaking or washing is specified in section 4.8 shall not be soaked or washed in the case of coated seed.
- 4.9.a Substrata.-Symbols for substrata in column 2, tables 3 and 4 are: B=between blotters; TB=top of blotters; T=paper toweling, used either as folded towel tests or as roll towel tests in horizontal or vertical position; S=sand or soil; TS=top of sand or soil; P=covered petri dish with (a) two layers of blotters, or (b) three thicknesses of filter paper, or © top of sand or soil; C=creped cellulose paper wadding (0.3-inch thick Kimpak or equivalent) covered with a single thickness of blotter through which holes are punched for the seed which are pressed for about one-half their thickness into the paper wadding; RB=blotters with raised covers, prepared by folding up the edges of the blotter to form a good support for the upper fold which serves as a cover, preventing the top from making direct contact with the seeds; TC=on top of creped cellulose paper without a blotter.

PROPOSED RULE:

- 4.8.1(1) Germination tests on coated seed units and on de-coated seed shall be conducted in accordance with methods in section 4.10. Kinds for which soaking or washing is specified in section 4.8 shall not be soaked or washed in the case of coated seed. For pelleted seed, the use of pleated filter paper is recommended.
- 4.9.a Substrata.-Symbols for substrata in column 2, tables 3 and 4 are: B=between blotters; TB=top of blotters; T=paper toweling, used either as folded towel tests or as roll towel tests in horizontal or vertical position; S=sand or soil; TS=top of sand or soil; P=covered petri dish with a) two layers of blotters, or b) three thicknesses of filter paper, or c) top of sand or soil; C=creped cellulose paper wadding (0.3-inch thick Kimpak or equivalent) covered with a single thickness of blotter through which holes are punched for the seed which are

(Proposal 14, page 2)

pressed for about one-half their thickness into the paper wadding; RB=blotters with raised covers, prepared by folding up the edges of the blotter to form a good support for the upper fold which serves as a cover, preventing the top from making direct contact with the seeds; TC=on top of creped cellulose paper without a blotter. Pleated filter paper (PP) may be substituted for B, TB, or T. The pleated paper should have a weight of 100-120 g per square meter (2.9 to 3.5 oz. per square yard) and a water absorption of 220-240%.

SUPPORTING EVIDENCE:

Pleated filter paper is an important tool that should be available to analysts when performing certain types of germination tests:

1. The pleats keep pelleted seeds from rolling and keeps the seedlings separated.
2. Multigerm seed units can be evaluated much easier when the test is planted on pleated paper because the seed units are kept separate.
3. Pelleted seeds do not dry out and the coating material does not adhere to the cotyledons of the seedlings (this is especially important in the case of small seedlings, such as some of the flowers). See Table 1.
4. Comparisons between blotter tests and pleated paper tests for nonpelleted and pelleted sugarbeets showed not significant difference in results. See Table 2.

Pleated filter paper is commonly used in ISTA laboratories. ISTA Rules state:

"Table 5A. Germination methods; ...BP as well as TP may be substituted by PP (pleated paper)."1 In the section for testing coated seed, the following statement is made "For pelleted seed the use of pleated paper.....is recommended."2 Adoption of this proposal would be consistent with the effort to harmonize AOSA and ISTA rules.

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(Proposal 14, page 3)

DATE OF PROPOSAL:

October 15, 1996

TABLE 1.

PETUNIA

Comparison of results between raw seed and pelleted seed tested on 2 different media

Sample #	Raw Germ Blotters	Pelleted Germ Blotters	Pelleted Germ Pleats
1	90	75	88
2	81	73	75
3	91	76	92
4	85	40	92
5	81	38	85
6	89	46	86
7	92	69	89
8	88	51	76
9	94	87	85
10	89	73	85
11	86	49	91
12	92	40	88
13	89	82	92
14	93	54	74
15	96	68	83
16	89	75	88
17	96	84	90
18	97	92	93
AVG	90	65	86

IMPATIENS

Comparison of results between raw seed and pelleted seed tested on 2 different media

Sample #	Raw Germ Blotters	Pelleted Germ Blotters	Pelleted Germ Pleats
1	92	35	54
2	88	37	49
3	88	69	73
4	87	35	57
5	98	88	92
6	72	53	70
7	84	80	82
AVG	87	57	68

(Proposal 14, page 4)

TABLE 2.

SUGAR BEETS

Comparison of results of pelleted sugarbeet seed tested on 2 different media

Sample #	Pelleted Germ Blotters	Pelleted Germ Pleats
1	98	98
2	92	92
3	96	96
4	92	93
5	93	93
6	93	93
7	98	98
8	92	92
9	86	88
10	95	96
11	68	80
12	90	98
13	87	98
14	80	90
15	79	94
16	77	86
17	82	91
18	84	90
19	90	98
20	83	90
21	83	58
22	96	76
23	94	84
24	91	62
25	84	66
26	83	64
27	76	53
AVG	87	86

SUGARBEETS

Comparison of results of nonpelleted sugarbeet seed Tested on 2 different media

Sample #	Raw Germ Blotters	Raw Germ Pleats
28	81	84
29	86	85
30	94	94
31	92	91
32	98	97
33	97	97
34	91	89
35	81	82
36	86	89
37	94	89
38	82	91
39	94	93
40	86	89
41	86	90
42	97	98
43	95	99
44	93	95
45	100	99
46	98	99
47	90	90
48	94	91
49	86	86
50	94	95
51	97	98
52	93	94
AVG	91	92

Sugarbeet germination test data provided by Michael Dideriksen, HILLESOG MONO-HY, Longmont, CO.

PROPOSAL 15:

To address the multiple seed units of tree and shrub seed

PRESENT RULE:

4.5 Evaluation of seedlings

- c. Multiple seed units. - New Zealand spinach, *Beta* spp., schizocarps (double fruits) of Apiaceae, multiple seeds of little burnet, and seed units of grasses consisting of multiple florets shall be regarded as having germinated if they produce one or more normal seedlings.

PROPOSED RULE (changes underlined):

4.5 Evaluation of seedlings

- c. Multiple seed units. - New Zealand spinach, *Beta* spp., schizocarps (double fruits) of Apiaceae, multiple seeds of little burnet, seed units of grasses consisting of multiple florets, and tree and shrub seed with multiple seed units shall be regarded as having germinated if they produce one or more normal seedlings. A duplicate germination test may be conducted on tree and shrub seed with multiple seed units to determine the number of seedlings per 100 seed units. For the duplicate test, the seed units shall remain on the substrate until the end of the germination test, and all seedlings shall be counted. The result from the first test shall be reported as percentage germination, and the result of the duplicate test shall be reported as the number of seedlings per 100 seed units.

SUPPORTING EVIDENCE:

1. The Rules do not address multiple seed units in tree and shrub seed, such as *Cornus*. Different analysts or laboratories must decide how to count seedlings germinated from multiple seed units without guidance from the Rules. This results in a lack of uniformity.
2. Tree and shrub nursery managers plant based on the germination tests and do not thin the seedlings to one per unit. When only one seedling is reported per seed unit in the germination test, the nursery beds are often too dense, causing many plants to be too small. For example, a *Cornus* with 50% single germination and 30% double germination would have a germination of 80% and 110 seedlings per 100 seed units. To get 15 seedlings per square foot in the nursery bed, 19 seed units per square foot would need to be planted if the 80% germination figure were used. Since 110 seedlings per 100 seed are produced, however, the 19 seed units planted would produce 21 seedlings per square foot.

(Proposal 15, page 2)

This nursery bed seedling density is too high and results in a crop too small, i.e., a crop failure. Also, more seed than necessary is used.

3. Reporting only the total seedlings per 100 seed units would make checking for tolerance between the four replicates difficult. Table 2 only goes to 100%.
4. Reporting both the percentage germination and the total seedlings per 100 seed units from one germination test would be difficult because the seed unit must remain on the substrate until the end of the test for the total seedlings count. Keeping track of the percentage germination if multiple day counts are made would be almost impossible. Therefore, a duplicate test is needed.

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DATE OF PROPOSAL:

10-15-96; modified 01-03-97