

TECHNICAL NOTES

U.S. Department of Agriculture

Natural Resources Conservation Service

TN-PLANT MATERIALS – CA- 5 (Revision 2)

June 1999

BASIC SEED DATA SUPPORTING NRCS VEGETATIVE GUIDES

The data presented in this Technical Note was used to prepare the new Vegetative Guide seeding rates in pounds of pure live seed (PLS) per acre. Seeding rates for conservation practices used in California that utilize vegetative plantings are listed in the Vegetative Guides for each of the 16 Major Land Resource Areas. Vegetative Guides needed by an NRCS Field Office can be found in Section II of the Field Office Technical Guide. All of the planting alternatives presented to clients should be based on rates obtained from the Vegetative Guides in the Field Office Technical Guide. In some cases, the rates may differ slightly due to the nature of the job but these should be discussed first with the appropriate discipline specialist or plant materials specialist.

Table 1 provides the best available information on the number of seeds per pound for California native grasses, native forbs and shrubs, other grasses and cereals, legumes, and other forbs and shrubs. The first scientific name is based on the 1993 edition of The Jepson Manual – Higher Plants of California. The indented scientific name represents the previous common or historical usage. Data was primarily obtained from the Journal of Seed Technology, Volume 6 Number 2 titled "Rules for Testing Seeds" published by the Association of Official Seed Analysts in 1986; Part 201 of the Federal Seed Act Regulation – "Seed Testing Regulations" published by the USDA Agricultural Marketing Service; USDA Agricultural Handbook 339 - Grasses and Legumes for Soil Conservation in the Pacific Northwest and Great Basin States; the 1948 USDA Yearbook of Agriculture-Grass; and from the California Department of Food and Agriculture's Seed Laboratory. Other data was obtained from University of California DANR Publication 3338 and USDA-NRCS California Plant Materials Technical Note 40.

Table 2 demonstrates the variability in seed weights from year to year and between seed grown in different parts of the state. The standard number of seeds per pound represents an average for that species or cultivar.

Table 3 demonstrates the variability in purity and germination between seed lots for the same species. The percent germination and the percent of hard seed in legumes in a seed lot varies from year to year due to climatic factors and storage conditions. The percent hard seed is discounted when we calculate the amount of pure live seed (PLS). This is why it is necessary to calculate the PLS based on the seed tag data for each bag of seed and seed lot.

Revised by Gene Bishop, Retired, Former Assistant Manager, Lockeford Plant Materials Center, Natural Resources Conservation Service, Lockeford, California and by Walt Bunter, State Agronomist, Natural Resources Conservation Service, Davis, California.

The number of seeds per square foot that would result from applying one pound of seed per acre can be calculated by dividing the number of seeds per pound by 43,560 square feet per acre. The number of seeds per square foot is used to calculate the seeding rates that provide the desired species composition and plant population.

Seeding rates in the new Vegetative Guides were calculated based on goals that varied from planting 20 up to 60 pure live seed (PLS) per square foot depending on the practice and seeding method.

Remember to adjust the seeding rates at the field site to plant the needed pounds of PLS.

Using the percent germination and percent purity data on the seed tag, PLS can be determined by the formula:

$$\text{Percent PLS} = (\text{percent germination} * \text{percent purity}) / 100$$

Adjusted Seeding Rate = (100 / percent PLS in the seed bag/lot) * specified lbs. of PLS/acre

EXAMPLE: If the specified seeding rate is 10 lbs. PLS/acre and the seed tag shows:

Purity: 95 percent

Germination: 79 percent (do not include the percent hard seed)

Therefore: PLS content of seed bag = $7505/100 = 75$ percent

Adjusted Seeding Rate is: (Round to nearest lb./acre)

$$(100/75) * 10 \text{ lbs./acre} = 1.333 * 10 = 13.33 \text{ lbs./acre} \text{ USE } \mathbf{13 \text{ lbs./acre}}$$

Seeds per Foot of Drill Row

When a seed drill will be used, testing and calibration are needed to insure that the specified seeding rate is being applied. The required number of seeds per foot of drill row can be calculated using the following formula:

$$\text{Seeds/ft. of Row} = (\mathbf{\text{Adjusted Seeding Rate}} \text{ in lbs./acre} * \text{Number of Seeds/lb.}) / \text{RF}$$

RF = Row Factor - which represents the total feet of rows/acre

RF = 87,120 for 6 inch row spacing

= 74,488 for 7 inch row spacing

= 65,340 for 8 inch row spacing

= 57,935 for 9 inch row spacing

= 52,272 for 10 inch row spacing

TABLE 1. CALIFORNIA SEED DATA FOR SINGLE SPECIES

CALIFORNIA NATIVE GRASSES				
COMMON NAME	SCIENTIFIC NAME	SEEDS/LB ^{1/}	SEEDS/SF ^{1/}	
Barley				
California Barley	Hordeum brachyantherum ssp. californicum	127,000 ^{2/}	2.9	
	H. californicum			
Meadow Barley	Hordeum brachyantherum ssp. brachyantherum	100,800 ^{2/}	2.3	
		78,670-153,680 **		
Bentgrass				
Spike Bentgrass	Agrostis exarata	5,896,800 ^{2/}	135.4	
Bluegrass				
One-sided Bluegrass	Poa secunda ssp. secunda	1,046,960 ^{2/}	24.0	
Pine Bluegrass	Poa scabrella			
Bromegrass				
California Brome	Bromus carinatus	103,680 ^{2/}	2.4	
	'Cucamonga'		32,720-220,190 **	
Mountain Brome	Bromus carinatus var. carinatus	63,500 *	1.5	
	Bromus marginatus			
Canarygrass				
Reed Canarygrass	Phalaris arundinacea	537,520 *	12.3	
Deergrass				
Deergrass	Muhlenbergia rigens	6,000,000	137.7	
Dropseed				
Alkali Sacaton	Sporobolus airoides	1,758,000 ^{2/}	40.4	
Fescue				
California Fescue	Festuca californica	200,000 ^{2/}	4.6	
Creeping Red Fescue	Festuca rubra	365,120 * ^{2/}	8.4	
		365,150-449,060 **		
Idaho Fescue	Festuca idahoensis	450,000 ^{2/}	10.3	
Mokelumne Fescue	Festuca rubra	450,000 ^{2/}	10.3	
Molate Fescue	Festuca rubra	450,000 ^{2/}	10.3	
Small Fescue	Vulpia microstachys var. microstachys	300,000	6.7	
	Festuca microstachys			
Hairgrass				
Slender Hairgrass	Deschampsia elongata	1,626,160 ^{2/}	37.3	
Tufted Hairgrass	Deschampsia caespitosa	1,864,350 ^{2/}	42.8	
		1,334,020-2,170,630 **		

^{1/} Rounded to nearest 10 seeds per pound. Represents number of clean seeds after other crop seeds, weed seeds, and inert matter have been subtracted. Percent germination and purity data would still be needed to calculate PLS. Number of seeds per square foot (SF) for one pound of seed applied per acre was calculated by dividing the number of seeds per pound by 43,560 square feet per acre.

^{2/} Data from Table 2, Plant Materials Technical Note No. 40, or University of California DANR Publication 3338.

* Data from Journal of Seed Analysts.

** A range is given when there is a constant variance in the seeds per pound. In these cases an average seeds per pound is also provided. Ranges will be in accordance with "Rules For Testing Seeds" published by the Association of Official Seed Analysts in the Journal of Seed Technology, Volume 6 Number 2, 1986.

TABLE 1. CALIFORNIA SEED DATA FOR SINGLE SPECIES - Cont'd

CALIFORNIA NATIVE GRASSES				
COMMON NAME	SCIENTIFIC NAME	SEEDS/LB ^{1/}	SEEDS/SF ^{1/}	
Melic				
California Melic	Melica californica	326,340 ^{2/}	7.5	
			305,820-362,300 **	
Coastrange Melic	Melica imperfecta	492,080 ^{2/}	11.3	
			420,620-566,720 **	
Needlegrass				
Desert Stipa	Achnatherum speciosum	150,000 ^{2/}	3.4	
Desert Needlegrass	Stipa speciosa			
Foothill Stipa	Nassella lepida	320,160 ^{2/}	7.3	
Foothill Needlegrass	Stipa lepida		316,318-324,000 **	
Nodding Stipa	Nassella cernua	223,680 ^{2/}	(deawned) 5.1	
Nodding Needlegrass	Stipa cernua		109,040-286,000 **	
Purple Stipa	Nassella pulchra	109,750 ^{2/}	(deawned) 2.5	
Purple Needlegrass	Stipa pulchra		97,590-117,740 **	
Ricegrass				
Indian Ricegrass	Oryzopsis hymenoides	161,920 * ^{2/}	3.7	
	Achnatherum hymenoides			
Sloughgrass				
Sloughgrass	Beckmannia syzigachne	718,000	16.5	
Squirreltail				
Big Squirreltail	Sitanion jubatum	126,330 ^{2/}	2.9	
	Elymus multisetus		55,792-278,490 **	
Squirreltail	Sitanion hystrix	136,080 * ^{2/}	3.1	
	Elymus elymoides		86,180-235,870 **	
Wheatgrass				
Slender	Agropyron trachycaulum	133,810 *	3.1	
'Primar' 'Yolo'	Elymus trachycaulus ssp. trachycaulus			
Streambank	Agropyron riparium	167,830 *	3.9	
'Sodar'	Elymus lanceolatus spp. lanceolatus			
Western	Agropyron smithii	113,400 *	2.6	
	Pascopyrum smithii			
Wildrye				
Basin wildrye	Elymus cinereus	143,790 *	3.3	
	Lyemus cinereus			
Beardless	Elymus triticoides	169,250 ^{2/}	3.9	
Blue wildrye	Elymus glaucus	134,900 ^{2/}	3.1	
'Anderson' 'Berkeley'			109,940-152,730 **	
Creeping wildrye	Elymus triticoides	114,000 ^{2/}	2.6	
'Rio'	Lyemus triticoides			

^{1/} Rounded to nearest 10 seeds per pound. Represents number of clean seeds after other crop seeds, weed seeds, and inert matter have been subtracted. Percent germination and purity data would still be needed to calculate PLS. Number of seeds per square foot (SF) for one pound of seed applied per acre was calculated by dividing the number of seeds per pound by 43,560 square feet per acre.

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TABLE 1. CALIFORNIA SEED DATA FOR SINGLE SPECIES - Cont'd

CALIFORNIA NATIVE FORBS AND SHRUBS			
COMMON NAME	SCIENTIFIC NAME	SEEDS/LB^{1/}	SEEDS/SF^{1/}
Bladderpod			
Bladderpod	Isomeris arborea	4,500	0.1
Buckwheat			
California	Erigonum fasciculatum (Benth)	334,000	7.7
'Duro'			
Sulfur Flower	Erogonum umbellatum (Torrey)	140,500	3.2
'Sierra'			
Lupine			
Arroyo lupine	Lupinus succulentus	15,000	0.3
Saltbush			
Desert	Atriplex polycarpa	450,000	10.3
Four-wing	Atriplex canescens	66,230 *	1.5
'Marana'			
Quailbush	Atriplex lentiformis	500,000	11.5
'Casa'			
Shadscale	Atriplex confertifolia	64,920	1.5
Spear Oracle	Atriplex patula	154,000	3.5
Spiny, spinescale	Atriplex spinifera	96,000	2.2

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TABLE 1. CALIFORNIA SEED DATA FOR SINGLE SPECIES - Cont'd

OTHER GRASSES AND CEREAL GRAINS				
COMMON NAME	SCIENTIFIC NAME	SEEDS/LB^{1/}	SEEDS/SF^{1/}	
Barley				
Barley	Hordeum vulgare	13,610 *	0.3	
	'UC 476' 'UC603'			
	'Arivat' 'Seco'	10,700	0.25	
Bentgrass				
Redtop	Agrostis gigantea	4,851,250 *	111.4	
Bluegrass				
Annual	Poa annua	1,195,240 *	27.4	
Bulbous	Poa bulbosa	266,240 *	6.1	
Kentucky	Poa pratensis	1,390,280 *	31.9	
			1,020,600-1,757,700 **	
Sherman Big	Poa ampla	1,046,960 *	24.0	
	Poa secunda			
Bristlegrass				
Green	Setaria viridis	542,000	12.4	
Plains	Setaria macrostachya	305,000	7.0	
Yellow	Setaria lutescens	172,000	4.0	
	Setaria glauca			
Bromegrass				
Red Brome	Bromus rubens	268,000	6.2	
	'Panoche'			
Rescuegrass	Bromus catharticus	51,260 *	1.2	
Smooth Brome	Bromus inermis	142,880 *	3.3	
			136,080-149,690 **	
Softchess	Bromus mollis	251,750 *	5.8	
	'Blando' brome			
	Bromus hordeaceus ssp. multiformis			
Buckwheat				
	Fagopyrum esculentum	20,400 ^{2/}	0.47	
	'Mancan' 'Manor'			
	Fagopyrum sagittatum			
Corn				
Field Corn	Zea mays	1,360 *	0.03	
Dallisgrass				
Dallisgrass	Paspalum dilatatum	281,230 *	6.5	

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OTHER GRASSES AND CEREAL GRAINS			
COMMON NAME	SCIENTIFIC NAME	SEEDS/LB ^{1/}	SEEDS/SF ^{1/}
Eleusine			
Indian Goosegrass	<i>Eleusine indica</i>	533,000	12.2
Ragimillet	<i>Eleusine coracana</i>	257,000	5.9
Threespike	<i>Eleusine triistachya</i>	527,000	12.1
Fescue			
Chewings fescue	<i>Festuca rubra</i> var. <i>commutata</i>	450,000 ^{2/}	10.3
Hard fescue	<i>Festuca trachyphlla</i>	591,950 *	13.6
'Scaldis'	<i>Festuca ovina</i> var. <i>duriusculo</i>		
'Durar' 'Eureka'			
Foxtail fescue	<i>Festuca megalura</i>	857,000	19.7
'Zorro'	<i>Vulpia myuros</i> var. <i>hirsuta</i>		
Sheep fescue	<i>Festuca ovina</i>	528,440 *	12.1
'Covar'			
Tall fescue	<i>Festuca arundinacea</i>	206,390 *	4.7
'Fawn' also Dwarf types		176,900-233,600 **	
Foxtail			
Creeping Meadow	<i>Alopecurus arundinaceus</i>	613,000	14.1
Meadow	<i>Alopecurus pratensis</i>	405,970 *	9.3
Indian Ricegrass			
'Paloma'	<i>Oryzopsis hymenoides</i>	141,000	3.2
	<i>Achnatherum hymenoides</i>		
Millet			
Foxtail millet	<i>Setaria italica</i>	217,730 *	5.0
		183,710-249,480 **	
Japanese millet	<i>Echinochloa crus-galli</i> ssp. <i>Frumentacea</i>	142,880 *	3.3
	<i>Echinochloa frumentacea</i>		
Proso Millet	<i>Panicum miliaceum</i>	83,920 *	1.9
Milo			
Milo	<i>Sorghum vulgare</i> ssp. <i>subglabrescens</i>	24,950 *	0.57
Grain Sorghum	<i>Sorghum bicolor</i> ssp. <i>bicolor</i>	13,610-36,290 **	
Oats			
Common oats	<i>Avena sativa</i>	19,280 *	0.44
'Cayuse' 'Montezuma'		15,880-22,680 **	
Red Oats	<i>Avena byzantina</i>	19,280 *	0.44
'California Red'	<i>Avena sativa</i>	15,880-22,680 **	
Wildoats	<i>Avena fatua</i>	30,000	0.7

^{1/} Rounded to nearest 10 seeds per pound. Represents number of clean seeds after other crop seeds, weed seeds, and inert matter have been subtracted. Percent germination and purity data would still be needed to calculate PLS. Number of seeds per square foot (SF) for one pound of seed applied per acre was calculated by dividing the number of seeds per pound by 43,560 square feet per acre.

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OTHER GRASSES AND CEREAL GRAINS			
COMMON NAME	SCIENTIFIC NAME	SEEDS/LB ^{1/}	SEEDS/SF ^{1/}
Orchardgrass			
Orchardgrass	Dactylis glomerata	428,650 *	9.8
'Berber', 'Akaroa', 'Latat', 'Palestine'		381,020-476,280 **	
Panicum			
Blue Panicum	Panicum antidotale	621,430 *	14.3
Phalaris			
Hardinggrass	Phalaris tuberosa ssp. stenoptera Phalaris aquatica	340,200 *	7.8
Koleagrass	Phalaris tuberosa ssp. hirtiglumis Phalaris aquatica	340,200 *	7.8
'Perla'			
Ricegrass			
Smilo	Oryzopsis miliacea Piptatherum miliaceum	911,740 *	20.9
Rye			
Cereal	Secale cereale	18,140 *	0.42
'Merced'			
'Tetra petkus	Secale cereale var. tetra petkus	19,000	0.44
Ryegrass			
Annual	Lolium multiflorum	190,510 *	4.4
'Common' 'Gulf'	Lolium perenee ssp. multiflorum	179,170-201,850 **	
Perennial	Lolium perenee	240,410 *	5.5
Wimmera 62	Lolium rigidum	185,000	4.25
210,920-269,890 **			
Sorghum-Sudangrass	Sorghum vulgare x Sorghum sudanense	17,000 ^{2/}	0.4
'Sudax'			
Sudangrass			
Sudangrass	Sorghum sudanense	45,360 *	1.0
'Piper'	Sorghum vulgare var. sudanense Sorghum bicolor spp. drummondii	38,560-49,900 **	
Timothy			
Swamp Timothy	Heleocholea schoenoides Crypsis schoenoides	1,750,000	40.2
Timothy	Phleum pratense	1,163,480 *	26.7
1,090,910-1,236,060 **			
Triticale			
Triticale	x Triticosecale	12,000 ^{2/}	0.28
'Juan'			

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OTHER GRASSES AND CEREAL GRAINS			
COMMON NAME	SCIENTIFIC NAME	SEEDS/LB^{1/}	SEEDS/SF^{1/}
Veldtgrass			
Mission Veldtgrass	<i>Ehrharta calycina</i>	297,760 *	6.8
Watergrass			
Watergrass	<i>Echinochloa crus-galli</i>	300,000 *	6.9
Barnyardgrass	<i>Echinochloa crus-galli</i>	300,000 *	6.9
Wheat			
Common	<i>Triticum vulgare</i>	11,340 *	0.26
'Anza'	<i>Triticum aestivum</i>		
Wheat x Wheatgrass Hybrid	<i>Agropyron x Triticum</i>	12,000 *	0.28
'Regreen'			
Wheatgrass			
Beardless	<i>Agropyron spicatum</i>	124,740 *	2.9
'Whitmat'	<i>Agropyron spicatum</i> var. <i>inerme</i> <i>Pseudoroegneria spicata</i> ssp. <i>inermis</i>		
Bluebunch	<i>Agropyron spicatum</i> . <i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>	124,740 *	2.9
Crested	<i>Agropyron cristatum</i>	310,720 *	7.1
Desert	<i>Agropyron desertorum</i>	195,050 *	4.5
'Nordan'		181,440-201,850 **	
Intermediate	<i>Agropyron intermedium</i>	79,380*	1.8
'Greenar' 'Tegmar'	<i>Elytrigia intermedia</i>	72,580-86,180 **	
Pubescent	<i>Agropyron intermedium</i>	81,650 *	1.9
'Luna' 'Topar'	<i>Elytrigia intermedia</i>	72,580-86,180 **	
Siberian	<i>Agropyron sibiricum</i> <i>Agropyron fragile</i> ssp. <i>sibiricum</i>	170,000 *	3.9
Tall	<i>Agropyron elongatum</i>	74,840 *	1.7
'Alkar' 'Largo' 'Jose'	<i>Elytrigia elongata</i>		
Wildrye			
Russian	<i>Elymus junceus</i> <i>Psathyrostachys juncea</i>	163,300 *	3.7
		156,490-167,830 **	
Zoysia			
Zoysiagrass	<i>Zoysia matrella</i>	681,000	15.6

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LEGUMES				
COMMON NAME	SCIENTIFIC NAME	SEEDS/LB^{1/}	SEEDS/SF^{1/}	
Alfalfa				
Alfalfa	Medicago sativa	226,800 *	5.2	
Beans				
CA Blackeye, Blackeyed Peas	Vigna sinensis Vigna unguiculate	3,630 *	0.08	
Bell Bean, Horsebean, Fava Bean	Vicia faba	3,000 ^{2/}	0.07	
Hyacinth or Lab Lab	Lablab purpureus	3,000	0.07	
Clover				
Alsike	Trifolium hybridum	680,400 *	15.6	
Berseem 'Multicut'	Trifolium alexandrinum	206,900 ^{2/}	4.8	
Crimson	Trifolium incarnatum	149,690 *	3.4	
Hairy Canary	Dorycnium hirsutum	130,000	3.0	
Ladino or White Dutch or New Zealand White	Trifolium repens	793,800 *	18.2	
Red	Trifolium partense	272,160 *	6.2	
Rose 'Hykon'	Trifolium hirtum	163,300 *	3.8	
Strawberry 'Salina'	Trifolium fragiferum	288,040 *	6.6	
Subterranean 'Clare' 'Mt. Barker'	Trifolium subterraneum	110,000 ^{2/}	2.5	
Guar				
Guar	Cyamopsis tetragonolobe	15,880 *	0.4	
Medic				
Barrel Medic	Medicago tribuloides Medicago truncatula	300,000	6.7	
Black Medic	Medicago lupulina	265,360 *	6.1	
Bur Medic 'Santiago' 'Serena'	Medicago polymorpha	170,400 ^{2/}	3.9	
California Burclover	Medicago hispida Medicago polymorpha	170,100 *	3.9	
Peas				
Field Pea 'Austrian Winter' 'Magnus'	Pisum sativum	2,400	0.06	
			1,800-3,000 ^{2/} **	
Cowpea 'CB5' 'Chinese Red'	Vigna unguiculata ssp. unguiculata	3,000	0.07	
			2,000-4,000 ^{2/} **	

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TABLE 1. CALIFORNIA SEED DATA FOR SINGLE SPECIES - Cont'd

LEGUMES				
COMMON NAME	SCIENTIFIC NAME	SEEDS/LB^{1/}	SEEDS/SF^{1/}	
Sainfoin				
Sainfoin	Onobrychis viciaefolia (unhulled)	22,680 *	0.5	
'Onar' 'Remont'	Onobrychis viciifolia			
Scurfpea				
Scurfpea, Leather root	Psoralea macrostachy Hoita marostachya	25,000	0.6	
Sesbania				
Sesbania	Sesbania exaltata	47,630 *	1.1	
Sweet Clover				
White	Melilotus alba	258,550 *	5.9	
'Hubam'				
Yellow	Melilotus officinalis	258,550 *	5.9	
'Madrid'				
Trefoil				
Birdsfoot	Lotus corniculatus	369,680 *	8.5	
'Cascade' 'Empire' 'Viking'				
Narrowleaf	Lotus tenuis	485,000	11.1	
Vetch				
Cahaba White	Vicia sativa x Vicia cordata	8,000	0.2	
Common	Vicia sativa	8,000 ^{2/}	0.2	
Hairy	Vicia villosa	16,300 ^{2/}	0.4	
Milkvetch	Astragalus civer	122,470 *	2.8	
'Lutana'				
Perennial or Cow vetch	Vicia cracca spp. tenuifolia	36,000	0.8	
Purple	Vicia benghalensis	9,980 *	0.23	
Woolypod or Winter	Vicia dasycarpa	11,340 *	0.26	
'Lana'	Vicia villosa spp. dasycarpa			

^{1/} Rounded to nearest 10 seeds per pound. Represents number of clean seeds after other crop seeds, weed seeds, and inert matter have been subtracted. Percent germination and purity data would still be needed to calculate PLS. Number of seeds per square foot (SF) for one pound of seed applied per acre was calculated by dividing the number of seeds per pound by 43,560 square feet per acre.

^{2/} Data from Table 2, Plant Materials Technical Note No. 40, or University of California DANR Publication 3338.

* Data from Journal of Seed Analysts.

** A range is given when there is a constant variance in the seeds per pound. In these cases an average seeds per pound is also provided. Ranges will be in accordance with "Rules For Testing Seeds" published by the Association of Official Seed Analysts in the Journal of Seed Technology, Volume 6 Number 2, 1986.

TABLE 1. CALIFORNIA SEED DATA FOR SINGLE SPECIES - Cont'd

FORBS AND SHRUBS			
COMMON NAME	SCIENTIFIC NAME	SEEDS/LB^{1/}	SEEDS/SF^{1/}
Bulrush			
Alkali	<i>Scripus robustus</i>	178,000	4.1
American	<i>Scirpus americanus</i>	163,000	3.7
Knotted clubrush	<i>Scirpus tuberosus</i>	178,000	4.1
River	<i>Scirpus flaviatilis</i>	117,000	2.7
Burhead			
Burhead	<i>Echinodorus cordifolius</i>	97,000	2.2
Bureed			
Bureed	<i>Sparganium eurycarpum</i>	17,000	0.4
Burnet			
Burnet	<i>Sanguisorba minor</i>	53,000	1.2
Crotalaria			
Crotalaria or Sunn Hemp	<i>Crotalaria juncea</i>	15,000	0.3
Filaree			
Filaree	<i>Erodium cicutarium</i>	199,580 *	4.6
Phacelia			
Tansy phacelia 'Phaci'	<i>Phacelia tanacetifolia</i>	824,000 ^{2/}	18.9
Poppy			
California Poppy	<i>Eschscholzia californica</i>	293,000	6.7
Safflower			
Safflower	<i>Carthamus tinctorius</i>	13,610 *	0.3
Sago pondweed			
Sago pondweed	<i>Potamogeton pectinatus</i>	97,000	2.2
Saltbush			
Australian	<i>Atriplex semibaccata</i>	75,000	1.7
Fat hen	<i>Atriplex patula</i> ssp. <i>hastata</i> <i>Atriplex prostrata</i>	908,000	20.8
Redscale	<i>Atriplex rosea</i>	151,330	3.5
Smartweed			
Bigseed ladysthumb	<i>Polygonum pennsylvanicum</i>	106,000	2.4
Dotted	<i>Polygonum punctatum</i>	261,000	6.0
Ladysthumb	<i>Polygonum persicaria</i>	365,000	8.4
Pale ladysthumb	<i>Polygonum lapathifolium</i>	155,000	3.6
Swamp	<i>Polygonum hydropiperoides</i>	196,000	4.5
Spikerush			
Spikerush	<i>Heleocharis palustris</i>	901,000	20.7
Sunflower			
Sunflower	<i>Helianthus annuus</i>	7,000	0.16

^{1/} Rounded to nearest 10 seeds per pound. Represents number of clean seeds after other crop seeds, weed seeds, and inert matter have been subtracted. Percent germination and purity data would still be needed to calculate PLS. Number of seeds per square foot (SF) for one pound of seed applied per acre was calculated by dividing the number of seeds per pound by 43,560 square feet per acre.

^{2/} Data from Table 2, Plant Materials Technical Note No. 40, or University of California DANR Publication 3338.

* Data from Journal of Seed Analysts.

** A range is given when there is a constant variance in the seeds per pound. In these cases an average seeds per pound is also provided. Ranges will be in accordance with "Rules For Testing Seeds" published by the Association of Official Seed Analysts in the Journal of Seed Technology, Volume 6 Number 2, 1986.

TABLE 2. VARIABILITY IN SEEDS PER POUND FOR SELECTED NATIVE GRASSES ^{1/}

Species	No. of Samples	Number of Seeds per Pound		
		Low Value	High Value	Average Value
<i>Bromus carinatus</i>	9	32,718	220,194	103,683
<i>Deschampsia caespitosa</i>	3	1,334,018	2,170,633	1,864,350
<i>Elymus glaucus</i>	4	109,937	152,727	124,724
<i>Hordeum brachyantherum</i> ssp. <i>brachyantherum</i>	10	78,668	153,679	100,798
<i>Melica californica</i>	3	305,825	362,300	326,341
<i>Melica imperfecta</i>	4	420,623	566,717	492,076
<i>Nassella cernua</i>	9	109,039	286,003	223,675
<i>Nassella lepida</i>	2	316,318	324,000	320,159
<i>Nassella pulchra</i> (deawned)	10	97,590	177,743	109,749
<i>Sitanion hystrix</i>	*	86,184	235,872	136,080 *
<i>Sitanion jubatum</i>	11	55,792	278,487	126,327

* Data is a standard established by the Association of Official Seed Analysts.

^{1/} This data was developed from seed analysis data provided by the California Department of Food and Agriculture's Seed Laboratory. November 21, 1995.

TABLE 3. VARIABILITY IN PERCENT PURITY AND GERMINATION FOR SELECTED NATIVE GRASSES AND OTHER GRASSES

Grass Species	Sample 1		Sample 2		Sample 3		Sample 4	
	% Purity	% Germination						
<i>Achnatherum coronatum</i>	70.00	40	--	64				
<i>Agropyron desertorum</i>	96.87	91	98.10	93	96.86	90	78.00	82
<i>Agropyron smithii</i>	87.04	86	94.46	93	75.00	56		
<i>Agropyron trachycaulum</i>	99.33	95	99.12	98	97.00	83		
<i>Bouteloua gracilis</i>	60.00	60	39.00	56	95.00	88		
<i>Bromus carinatus</i>	99.09	--	97.63	--	97.73	85	94.88	96
<i>Bromus carinatus</i> var. <i>carinatus</i>	98.00	91	98.00	85	90.00	85	--	61
<i>Bromus catharticus</i>	97.00	91	95.00	85	97.00	92	94.00	71
<i>Bromus rubens</i>	92.16	--	92.01	14	89.42	19	93.00	10
<i>Elymus glaucus</i>	96.94	85	80.00	60	--	85	99.70	89
<i>Elymus triticoides</i>	85.00	85	90.00	80	88.00	90	--	10
<i>Eragrostis curvula</i>	97.00	85	98.00	65	95.00	87	97.00	82
<i>Festuca idahoensis</i>	90.00	75	90.00	80				
<i>Festuca rubra</i>	84.00	90	95.00	85	97.00	80	95.00	85
<i>Hesperoatipa comata</i>	97.69	--	95.27	89	29.00	13		
<i>Hordeum brachyantherum</i> ssp. <i>brachyantherum</i>	59.11	82	90.14	95	95.00	80		
<i>Melica californica</i>	58.58	66	75.18	69	90.00	60		
<i>Melica imperfecta</i>	66.57	11	69.51	58	50.90	54	90.00	60
<i>Nassella cernua</i>	67.71	--	75.53	11	87.10	59	91.47	71
<i>Nassella pulchra</i>	83.57	--	90.12	70	90.03	73	88.56	81
<i>Oryzopsis hymenoides</i>	98.00	80	94.00	11	95.00	11	99.00	--
<i>Poa secunda</i> ssp. <i>secunda</i>	80.00	40	96.12	95				
<i>Sitanion hystrix</i>	42.67	25	9.00	80	92.90	59	90.01	96
<i>Sitanion jubatum</i>	48.35	15	49.00	37	23.24	89	34.37	84

TABLE 3. VARIABILITY IN PERCENT PURITY AND GERMINATION FOR SELECTED NATIVE GRASSES AND OTHER GRASSES - Cont'd

Grass Species	Sample 5		Sample 6		Sample 7		Sample 8	
	% Purity	% Germination						
Bromus carinatus	99.76	97	95.00	80	--	85	98.00	74
Bromus carinatus var. carinatus	--	80	--	73	98.46	88		
Bromus catharticus	97.00	89						
Bromus rubens	98.84	47	95.00	80				
Elymus glaucus	99.92	86	80.00	85	97.80	40		
Elymus triticoides	88.00	90						
Festuca rubra	87.00	69	98.00	80				
Nassella cernua	80.00	50	94.00	82				
Nassella pulchra	80.04	53	93.36	41	72.00	45	70.00	60
Sitanion hystrix	72.56	76	96.02	92				
Sitanion jubatum	59.33	65	53.07	--	8.48	--	--	90

Grass Species	Sample 9		Sample 10		Sample 11	
	% Purity	% Germination	% Purity	% Germination	% Purity	% Germination
Bromus carinatus	93.00	69				
Elymus glaucus	98.22	87	97.00	88	99.00	75
Nassella pulchra	--	50	90.00	38		

Sources of Data Used to Develop Table 3

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