

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
LOCKEFORD, CALIFORNIA

NOTICE OF RELEASE OF COASTAL 500 GERMPLASM CALIFORNIA BROME
SELECTED PLANT MATERIAL

The Natural Resources Conservation Service (NRCS) and the U.S. Department of Agriculture (USDA) announce the release of a selected ecotype of California brome (*Bromus californica* Hook. & Arn.) for the coastal California ecoregion. Coastal 500 Germplasm California brome was tested under the accession number 9083080.

This plant will be referred to as Coastal 500 Germplasm California brome and is released as a selected plant material class of certified seed (natural track).

This alternative release procedure is justified because there are no existing commercial sources of California brome to supply the ecoregional demand. The potential for immediate use is high due to the strong interest in regionally adaptive native grass species.

Collection Site Information: Accession 9083080 was collected in 2006 from native plants located near Cal Poly Canyon in San Luis Obispo County at 35° 18.768 N. latitude and 120° 39.021 W. longitude (MLRA 14). It was growing in sandy clay loam soils on a 10% slope with north exposure. Collection site elevation was 152 meters (500 feet) with an average annual precipitation of 58 centimeters (23 inches).

Description: Coastal 500 Germplasm California brome is a native, cool-season, short-lived perennial bunchgrass. The base of this robust plant is open with hairy sheaths having erect stems (culms) growing up to 110 centimeters in height. Leaf blades are 0.5 to 1 cm wide, lax, and spread out along stems. The inflorescence (seed head, open panicle) is 10-30 cm long, large, open, and erect to somewhat drooping. The spikelets are 5 to 7 flowered, 2 to 4 cm long, 5 to 7 mm wide and flattened. Lemmas are 1 to 1.5 cm long, flattened, keeled, and usually pubescent. The awns are 2 to 5 mm long. Seeds mature in May and June. The root system is fibrous, deep and widespread.

Method of Breeding and/or Selection: Coastal 500 Germplasm California brome was evaluated at four different growing sites (Penn Valley, NRCS-Lockeford PMC, Morgan Hill, and Los Alamos) in California from Fall 2006 through Spring 2008. A total of 28 accessions of California brome were collected in May and June 2006 throughout the state of California and

included in the evaluation. Accessions were planted in a randomized complete block design with four replications at each test site. All accession collections were planted at the four locations to determine the range of adaptability. Field work; including seed bed preparation, seed planting and weed control, was carried out by Pacific Coast Seed, Inc. No supplemental irrigation was used for the evaluation. Performance data was collected by Pacific Coast Seed, Inc. for initial seedling vigor, % stand, foliage width and height, plant vigor, uniformity, seed amount, seed fill, seed maturity, and forage. From these initial evaluations, Coastal 500 Germplasm was determined to be the superior accession within the coastal California region. Coastal 500 Germplasm had superior performance for vigor, robust plants (height and width), and seed production at Penn Valley, Los Alamos, and Morgan Hill test sites. Performance at the Lockeford PMC was good in 2007, but only average in 2008. (See Tables)

In addition and in support of the above presentation, a complete set of data and Statistix8 analysis is available on CD.

Ecological Considerations and Evaluations: Coastal 500 Germplasm California brome is a selection of naturally occurring germplasm. An Environmental Evaluation was completed on June 18, 2008 using guidelines established by NRCS and the best available information for this species. Results of these evaluations determined that Coastal 500 Germplasm California brome was suitable for release. This outcome is determined by the fact California brome is a naturally occurring species throughout California and the distribution of this seed or plant material would not constitute an introduction of an exotic species into local ecosystems. The release of this selection will be made available as a native alternative to planting exotic species within our California restoration, revegetation, erosion control and rangeland projects. This species also provides a seed source for bird and rodent populations and may provide unknown benefits by maintaining habitat that shelters beneficial insects and butterflies. Any negative impacts on other native plant species would likely be minimal.

Conservation Use: Coastal 500 Germplasm California brome will provide an important regional component as a selection for habitat restoration, revegetation, erosion control, and rangeland projects within the coastal California zone. In addition to its preferred adaptation to the cool coastal California region, the first year vigor and superior second year performance make this selection a complimentary species to numerous conservation uses.

Area of Adaptation: Coastal 500 Germplasm will provide vigor and robust growth in cool coastal California climates. This local selection is potentially adapted for use in MLRA 4c, 14c, 14d, 15c, and 15d.

Availability of Plant Materials: Generation 0 seed, which is equivalent to breeder seed will be maintained by the USDA-NRCS Plant Material Center in Lockeford, California and will be

available in limited quantities to interested parties for increase purposes. Long-term preservation of seed will be stored at the National Plant Germplasm System (NPGS).

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References:

1. Hickman, J. C. (ed.). 1993. The Jepson Manual: Higher Plants of California. The Regents of the University of California, Berkeley, CA.
2. Hitchcock, A.S. 1935. Manual of the Grasses of the United States. USDA Misc. Publ. No. 200, Washington DC.
3. Crampton, Beecher. 1974. Grasses in California. University of California Press, Berkeley, CA.
4. University and Jepson Herbaria. 2006. (http://ucjeps.berkeley.edu/cgi-bin/get_chc.pl) University of California Press, Berkeley, CA.
5. U.S. Department of Agriculture, National Resources Conservation Service. 1993. Plant Material Center Project No: 06I9301L. Lockeford, CA.
6. U.S. Department of Agriculture, National Resources Conservation Service. 1996. A Vegetative Guide to Selected Native Grasses of California. Davis CA.
7. Stromberg, M.R., P. Kephart and V. Yadon. 2002. Composition, invisibility, and diversity in coastal California grasslands. Madroño 48: 236-252.

8. Howard, Janet L. 1997. *Bromus carinatus*. In: Fire Effects Information System, [<http://www.fs.fed.us/database/feis/>] [2006, March 15]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer).

Signatures for release of:

Coastal 500 Germplasm California brome (*Bromus carinatus* Hook. & Arn.)



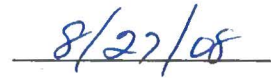
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DATE



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DATE

Table 1. March 2007 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Penn Valley, California.

Accession	Vigor ¹	Std ² /	Ht ³ /	Width ⁴ /
3074	5.8	61.3	16.0	17.5
3075	5.5	62.5	18.0	15.5
3076	4.5	65.0	12.3	13.5
3077	5.0	57.5	18.0	17.8
3078	4.0	75.0	9.8	15.8
3079	6.0	63.8	19.8	15.8
3080	3.8	47.5	16.8	15.5
3081	7.0	65.0	23.0	21.8
3082	6.0	47.5	19.3	15.5
3083	5.0	46.3	16.5	16.5
3084	4.8	36.3	18.0	17.0
3085	4.0	51.3	10.5	15.5
3086	4.3	41.3	12.5	17.5
3087	4.3	38.8	16.8	15.8
3088	3.5	52.5	8.5	16.0
3089	5.5	75.0	14.3	15.8
3090	5.3	67.5	15.5	19.5
3091	4.8	65.0	15.0	18.8
3092	4.0	60.0	10.0	14.5
3093	3.0	57.5	11.8	14.8
3094	3.0	36.3	10.0	12.3
3095	4.5	48.3	14.5	18.3
3096	3.0	37.5	11.0	14.0

3097	4.3	52.5	11.0	18.0
3098	3.3	42.5	10.8	14.8
3099	7.8	63.8	24.0	21.0
30100	3.8	40.0	16.5	16.8
30101	3.5	43.8	13.5	13.8
Mean	4.6	53.6	14.8	16.4
LSD _(0.05)	1.3	20.1	3.4	3.9

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 2. May 2007 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Penn Valley, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	7.0	87.5	118.8	35.0
3075	5.8	82.5	102.0	30.0
3076	6.8	87.5	108.8	30.0
3077	6.8	91.3	102.5	35.0
3078	6.8	70.8	118.8	32.5
3079	4.8	72.5	85.8	31.3
3080	7.0	80.0	110.0	36.3
3081	6.0	82.5	102.5	33.8
3082	4.3	68.0	108.9	33.5
3083	4.8	83.8	87.8	31.3
3084	5.8	78.8	98.8	35.0

3085	3.3	61.3	66.3	35.0
3086	4.3	75.0	82.0	33.8
3087	8.3	86.4	102.8	31.2
3088	5.0	77.5	85.0	32.5
3089	6.5	87.5	102.5	35.0
3090	7.5	89.5	103.0	35.0
3091	8.2	93.0	123.7	35.6
3092	7.3	83.8	106.5	33.8
3093	5.1	61.2	95.4	34.4
3094	4.0	67.5	88.8	28.8
3095	7.5	77.5	118.8	35.0
3096	7.0	61.3	114.9	35.2
3097	7.3	77.5	103.8	37.5
3098	5.4	81.5	91.6	29.7
3099	6.3	90.0	101.3	33.8
30100	5.8	85.0	90.8	32.5
30101	4.5	75.0	76.8	32.5
Mean	6.0	79.1	99.9	33.4
LSD _(0.05)	1.4	8.7	16.8	6.7

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 3. March 2008 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Penn Valley, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	5.0	72.2	42.3	28.2

3075	4.3	38.8	38.8	27.5
3076	5.5	53.8	41.3	31.3
3077	5.0	60.0	40.8	28.8
3078	4.0	73.8	32.3	30.0
3079	5.5	63.8	53.0	32.5
3080	6.3	67.5	53.8	32.5
3081	6.5	66.3	53.8	27.5
3082	6.3	51.3	55.0	30.0
3083	5.8	47.5	52.5	28.8
3084	5.3	27.5	46.3	25.0
3085	6.0	36.3	47.0	27.5
3086	5.8	37.5	41.3	31.3
3087	6.0	71.3	41.3	32.5
3088	5.0	77.5	32.5	30.0
3089	6.3	71.3	51.3	31.3
3090	4.8	58.8	36.3	26.3
3091	3.8	48.8	31.3	28.8
3092	3.8	42.5	33.8	26.3
3093	6.1	47.0	51.2	36.0
3094	4.5	50.0	35.0	27.5
3095	4.5	46.3	38.8	27.5
3096	4.2	54.8	49.0	29.4
3097	4.6	51.4	39.0	31.1
3098	4.4	51.8	33.8	31.9
3099	5.5	60.0	45.8	30.0
30100	5.5	58.8	46.3	35.0

30101	4.5	37.5	35.0	32.5
Mean	5.2	54.4	42.8	29.9
LSD _(0.05)	1.9	23.6	15.6	7.5

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 4. May 2008 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Penn Valley, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	6.3	63.8	82.0	28.8
3075	5.5	62.1	65.3	32.1
3076	5.8	52.5	70.5	30.0
3077	6.0	83.8	74.3	32.5
3078	4.0	55.0	71.3	26.3
3079	6.3	83.8	75.0	33.8
3080	5.5	82.5	64.3	27.5
3081	4.5	62.5	65.5	25.0
3082	5.0	73.7	66.6	27.8
3083	6.0	67.5	80.3	32.5
3084	4.5	72.5	61.3	28.8
3085	4.3	60.0	57.5	30.0
3086	4.5	80.0	52.5	30.0
3087	6.0	77.1	78.3	29.5
3088	4.5	66.3	70.0	27.5
3089	7.3	76.3	83.5	32.3

3090	5.0	62.5	71.3	28.8
3091	3.8	52.1	61.3	25.1
3092	5.0	71.3	75.5	30.0
3093	4.2	53.7	61.7	30.6
3094	5.5	66.3	80.5	30.0
3095	6.0	61.3	67.5	28.8
3096	4.7	72.1	66.6	24.5
3097	4.4	58.8	72.6	29.5
3098	5.3	70.0	60.8	30.0
3099	5.3	87.5	65.3	28.8
30100	5.0	65.0	65.3	28.8
30101	6.0	72.5	82.5	31.3
Mean	5.2	68.3	69.6	29.4
LSD _(0.05)	1.9	20.3	17.4	5.7

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 5. March 2007 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Lockeford, California.

Accession	Vigor ¹	Std ² /	Ht ³ /	Width ⁴ /
3074	5.0	29.8	11.5	13.0
3075	6.5	55.0	15.8	16.5
3076	4.5	30.5	10.3	11.0
3077	7.3	51.3	17.5	17.8
3078	4.5	45.0	9.3	12.8
3079	6.8	61.3	14.0	18.5
3080	6.0	33.8	14.5	14.5
3081	6.8	46.7	17.1	17.0
3082	5.5	27.5	17.3	14.5
3083	5.8	40.0	13.3	14.8
3084	5.8	22.5	12.8	14.0
3085	5.0	33.8	11.0	13.0
3086	4.3	26.3	12.3	16.8
3087	6.3	62.5	14.0	18.0
3088	4.5	33.8	9.0	10.8
3089	4.3	25.3	12.0	12.0
3090	5.1	60.9	10.9	13.2
3091	4.2	23.6	10.4	10.7
3092	4.0	40.0	7.5	8.3
3093	3.8	23.8	8.3	11.5
3094	3.5	27.5	9.0	9.0

3095	3.5	32.5	9.3	11.8
3096	3.5	29.3	9.8	14.4
3097	3.5	15.0	6.8	10.5
3098	3.5	37.5	8.5	10.8
3099	7.3	40.0	21.3	19.3
30100	4.2	10.7	10.9	12.1
30101	5.0	26.3	11.3	13.3
Mean	5.0	35.4	12.0	12.0
LSD _(0.05)	1.4	22.9	5.5	5.8

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 6. May 2007 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Lockeford, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	6.0	55.0	60.8	32.5
3075	4.5	54.6	54.6	29.1
3076	5.5	54.6	88.9	30.7
3077	5.3	63.6	61.0	27.8
3078	6.1	74.5	56.1	31.0
3079	6.5	71.3	79.5	27.5
3080	5.5	43.9	62.7	30.0
3081	5.5	71.4	70.2	27.5
3082	6.3	66.4	65.1	27.4
3083	6.0	78.1	72.7	27.4

3084	5.1	39.5	72.4	26.0
3085	6.6	71.7	61.1	23.4
3086	6.3	71.8	71.3	32.5
3087	4.7	36.4	57.5	32.2
3088	6.4	74.5	79.4	29.3
3089	5.6	53.1	61.4	29.1
3090	5.1	44.5	74.0	30.9
3091	4.3	32.5	58.5	22.5
3092	4.3	47.7	58.4	29.1
3093	6.0	66.3	78.5	32.5
3094	6.8	67.9	85.3	37.6
3095	6.8	77.5	79.5	32.5
3096	3.0	31.2	58.6	24.3
3097	4.8	41.2	44.1	29.3
3098	5.3	51.7	57.7	27.4
3099	6.1	62.9	64.1	31.0
30100	6.7	68.9	77.5	24.7
30101	6.0	50.0	70.5	33.8
Mean	5.6	58.1	67.2	29.2
LSD _(0.05)	2.3	29.1	31.6	8.2

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 7. March 2008 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Lockeford, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	5.0	53.8	25.3	21.3
3075	6.7	65.8	38.3	25.5
3076	4.7	37.5	26.6	25.5
3077	7.7	82.0	45.1	31.7
3078	5.6	67.5	26.7	32.3
3079	8.0	90.0	52.0	44.0
3080	5.8	41.3	35.8	33.5
3081	7.3	80.9	46.1	32.3
3082	5.8	51.2	37.1	25.7
3083	7.0	60.0	41.3	32.3
3084	4.5	46.3	23.0	25.3
3085	6.3	47.5	31.8	35.0
3086	5.8	56.3	29.8	30.0
3087	7.3	58.0	39.4	45.3
3088	6.0	50.9	20.7	32.3
3089	4.8	57.5	26.3	22.8
3090	4.9	20.5	19.3	26.8
3091	5.3	55.9	32.7	22.3
3092	5.0	36.3	24.8	23.0
3093	5.5	73.8	27.8	29.0
3094	4.5	50.0	21.8	19.8
3095	4.5	51.3	21.3	19.8
3096	4.5	40.5	21.7	25.5
3097	4.3	44.2	22.1	26.0

3098	3.0	32.5	13.3	16.3
3099	4.2	63.8	24.7	12.2
30100	5.0	39.1	26.6	25.8
30101	6.5	60.0	39.5	32.3
Mean	5.5	54.1	30.0	27.6
LSD _(0.05)	1.7	30.8	12.0	10.3

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 8. May 2008 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Lockeford, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	5.3	66.3	82.8	30.0
3075	6.3	63.8	95.0	35.0
3076	5.5	45.0	90.0	33.8
3077	7.5	62.8	101.5	42.2
3078	7.0	82.4	105.2	39.4
3079	7.8	92.5	106.3	47.8
3080	5.5	65.0	80.0	35.0
3081	8.0	85.8	106.8	41.0
3082	5.8	53.8	86.3	35.0
3083	5.0	83.8	102.5	40.0
3084	4.3	65.0	70.0	30.0
3085	5.0	60.0	71.3	37.5
3086	5.0	67.5	81.3	35.0
3087	6.4	79.6	87.0	47.7

3088	5.5	60.0	90.0	37.5
3089	4.3	63.8	75.0	28.8
3090	5.8	32.8	92.5	33.8
3091	4.9	80.8	88.5	32.7
3092	5.5	53.8	78.8	33.8
3093	7.0	86.3	97.5	38.8
3094	4.5	61.3	67.5	32.5
3095	4.8	60.0	72.5	31.3
3096	6.2	64.5	95.9	37.2
3097	4.0	52.5	80.0	31.3
3098	4.0	46.3	73.0	38.8
3099	4.8	56.3	72.5	30.0
30100	6.0	57.2	96.0	36.5
30101	6.7	83.8	85.5	37.5
Mean	5.7	65.4	86.8	35.7
LSD _(0.05)	1.1	17.5	25.8	25.8

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 9. March 2007 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Morgan Hill, California.

Accession	Vigor ¹	Std ² /	Ht ³ /	Width ⁴ /
3074	4.8	No data	35.5	24.3
3075	5.5		42.8	23.3
3076	4.0		31.8	19.5
3077	6.8		52.8	30.0
3078	3.3		17.5	21.8
3079	7.3		56.5	35.0
3080	6.0		47.8	30.0
3081	6.5		49.8	21.8
3082	6.0		46.0	35.0
3083	5.5		44.3	30.0
3084	5.3		48.0	29.5
3085	4.3		26.3	26.3
3086	3.8		28.3	26.3
3087	6.0		39.8	27.5
3088	3.0		19.8	21.3
3089	6.5		53.5	30.0
3090	3.8		23.8	20.5
3091	5.0		34.0	22.8
3092	3.0		11.5	16.0
3093	3.3		17.5	20.3
3094	2.3		9.0	16.8
3095	3.5		15.5	19.8
3096	3.0		19.0	20.5

3097	2.5	17.0	21.8
3098	4.8	18.5	23.3
3099	8.5	69.8	36.3
30100	4.5	37.5	23.0
30101	6.0	39.8	24.3
Mean	4.8	34.0	24.3
LSD _(0.05)	1.1	11.1	7.1

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 10. May 2007 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Morgan Hill, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	5.3	No data	60.5	17.3
3075	5.8		59.3	17.5
3076	4.5		50.0	18.3
3077	7.3		52.8	20.8
3078	4.5		45.0	17.8
3079	6.5		56.3	25.3
3080	7.0		59.5	21.5
3081	6.8		64.0	23.8
3082	5.3		62.8	22.0
3083	4.5		53.3	17.3
3084	5.0		50.8	19.0
3085	3.3		36.3	15.5
3086	3.8		44.8	16.5

3087	6.5	56.5	20.5
3088	4.3	37.8	18.0
3089	5.0	63.0	17.8
3090	4.8	55.3	18.3
3091	5.5	60.5	17.0
3092	4.3	51.8	16.0
3093	4.5	48.3	16.8
3094	3.0	23.8	17.3
3095	4.5	50.5	18.3
3096	4.8	53.8	19.8
3097	3.8	56.8	16.5
3098	5.3	61.5	24.3
3099	8.0	71.0	23.3
30100	4.0	44.8	17.8
30101	5.5	50.8	20.0
Mean	5.1	52.9	19.1
LSD (0.05)	1.7	11.88	5.5

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).
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Table 11. March 2008 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Morgan Hill, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
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3074	8.0	No data	33.3	28.5
3075	6.5		33.8	25.5
3076	5.3		25.0	24.3
3077	6.5		31.3	25.3
3078	4.0		16.5	22.5
3079	8.0		43.0	30.3
3080	7.0		32.3	24.5
3081	6.5		39.3	27.0
3082	6.0		34.5	27.8
3083	5.8		30.8	20.5
3084	5.5		26.0	26.5
3085	4.8		15.8	29.0
3086	4.8		21.3	28.8
3087	6.4		28.4	30.6
3088	4.0		13.5	22.3
3089	6.0		31.5	26.0
3090	4.5		22.8	26.3
3091	6.3		26.8	26.5
3092	4.3		17.3	22.5
3093	5.5		21.8	23.0
3094	2.5		12.5	19.8
3095	4.8		16.3	23.5
3096	3.8		17.8	21.3
3097	1.3		13.8	22.5
3098	6.0		26.0	29.8
3099	3.8		24.3	11.5

30100	5.3	23.8	25.5
30101	7.0	29.8	27.5
Mean	5.4	25.3	25.0
LSD _(0.05)	1.5	7.2	6.5

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 12. May 2008 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Morgan Hill, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	8.3	No data	71.8	24.8
3075	6.0		63.0	21.3
3076	6.0		72.3	25.0
3077	7.0		60.8	29.3
3078	5.3		66.8	23.9
3079	8.5		76.8	26.8
3080	7.3		60.5	26.3
3081	7.0		70.0	30.5
3082	5.8		61.8	22.8
3083	5.5		56.3	23.8
3084	4.8		52.0	27.5
3085	4.5		32.5	29.5
3086	4.3		41.5	28.5
3087	6.7		59.4	35.2
3088	2.5		26.3	21.8
3089	5.5		66.5	21.5

3090	5.3	70.0	27.8
3091	6.0	74.3	24.5
3092	3.8	60.3	19.0
3093	5.5	70.3	20.0
3094	3.0	13.7	19.6
3095	4.0	55.8	22.5
3096	4.0	47.3	22.5
3097	3.3	61.3	23.7
3098	6.8	72.5	28.5
3099	4.0	24.5	13.3
30100	5.3	51.3	24.8
30101	7.8	71.3	29.0
Mean	3.2	55.0	19.1
LSD (0.05)	5.4	57.5	24.6

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 13. March 2007 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Los Alamos, California.

Accession	Vigor ¹	Std ² /	Ht ³ /	Width ⁴ /
3074	6.0	82.5	39.5	33.3
3075	7.3	73.8	54.3	32.5
3076	6.0	71.3	45.8	32.3
3077	7.0	77.5	43.5	33.3
3078	4.5	68.8	22.3	30.8
3079	6.8	71.3	46.5	32.5
3080	6.5	72.5	39.8	29.8
3081	7.3	67.5	48.3	35.0
3082	7.3	63.8	63.5	43.8
3083	7.3	70.0	55.3	36.3
3084	6.3	37.5	53.0	39.5
3085	5.8	72.5	35.8	41.5
3086	5.0	55.0	30.0	31.8
3087	6.3	78.8	36.5	35.8
3088	4.0	76.3	17.8	26.3
3089	7.5	76.3	54.3	42.5
3090	4.3	76.3	16.8	28.8
3091	4.5	81.3	29.0	30.0
3092	4.0	68.8	17.0	25.3
3093	4.3	58.8	20.0	26.8
3094	3.3	47.5	10.3	26.0
3095	4.8	65.0	22.5	29.3
3096	4.3	51.3	18.3	34.0

3097	3.3	51.3	12.8	27.0
3098	3.8	82.5	17.3	31.3
3099	8.8	87.5	60.8	34.3
30100	6.0	60.0	47.8	32.3
30101	6.3	73.8	39.0	32.0
Mean	5.6	68.1	35.6	32.6
LSD (0.05)	.9	14.9	10.9	7.3

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 14. May 2007 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Los Alamos, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	6.5	83.8	66.3	31.5
3075	7.8	83.8	70.0	48.0
3076	6.0	82.5	50.3	35.5
3077	7.3	85.0	50.5	42.5
3078	5.5	82.5	51.5	29.0
3079	6.0	86.3	56.8	33.3
3080	6.3	76.3	52.5	28.3
3081	7.0	71.3	58.0	50.0
3082	7.0	73.8	64.3	44.5
3083	6.8	77.5	56.8	39.0
3084	6.0	47.5	45.5	38.0
3085	6.3	78.8	41.5	42.5
3086	5.3	73.8	41.3	33.3

3087	7.0	85.0	54.3	46.8
3088	3.8	78.8	38.8	22.0
3089	7.3	92.5	67.5	36.0
3090	6.0	85.0	54.5	25.5
3091	5.3	76.3	52.5	22.5
3092	3.5	90.0	32.3	23.8
3093	3.3	75.0	51.0	20.5
3094	3.0	68.8	16.8	26.5
3095	4.5	82.5	46.5	26.0
3096	4.3	72.5	48.3	26.5
3097	2.5	62.5	50.3	24.5
3098	4.3	90.0	46.0	25.3
3099	8.3	73.8	62.5	23.5
30100	6.8	75.0	51.3	40.5
30101	6.0	80.0	49.3	34.3
Mean	5.7	78.2	51.0	32.8
LSD (0.05)	1.5	12.9	12.9	12.1

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 15. March 2008 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Los Alamos, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	5.5	70.0	13.3	13.5
3075	5.8	86.3	18.8	17.3

3076	3.5	66.3	12.0	10.5
3077	7.3	73.8	26.3	21.3
3078	5.0	65.0	13.5	13.0
3079	5.8	72.5	18.8	17.0
3080	6.8	77.5	20.8	16.3
3081	5.8	66.3	19.3	15.0
3082	5.8	56.3	17.8	15.8
3083	6.3	61.3	20.0	19.5
3084	5.5	53.8	15.0	12.0
3085	5.8	66.3	17.8	20.3
3086	4.0	48.8	11.8	12.0
3087	8.0	70.0	25.8	24.0
3088	4.3	43.8	15.5	17.3
3089	6.0	88.8	17.8	15.0
3090	3.2	58.8	11.9	10.4
3091	4.0	48.8	9.8	9.5
3092	3.3	57.5	9.0	8.8
3093	4.0	57.5	11.0	10.0
3094	4.3	48.8	11.3	9.3
3095	4.0	55.0	13.3	10.8
3096	4.0	53.8	12.0	9.8
3097	3.8	40.0	11.3	12.0
3098	3.8	48.8	11.5	14.3
3099	6.8	72.5	25.3	15.5
30100	6.3	61.3	21.5	19.8
30101	6.5	58.8	18.5	17.8

Mean	5.2	61.7	16.1	14.5
LSD _(0.05)	1.5	26.8	6.1	6.3

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).

Table 16. May 2008 Vigor, Height, Stand, Width, Seed culms, and Seed Amount data for Coastal 500 California Brome (*Bromus carinatus*) at Los Alamos, California.

Accession	Vigor ¹	Std ^{2/}	Ht ^{3/}	Width ^{4/}
3074	5.5	86.3	49.3	18.3
3075	6.5	87.5	54.8	27.5
3076	3.3	67.5	33.3	14.8
3077	6.8	87.5	55.0	29.3
3078	5.5	76.3	54.5	20.0
3079	5.5	81.3	54.8	20.0
3080	6.5	83.8	53.5	24.5
3081	6.3	76.3	58.8	25.8
3082	5.5	80.0	45.8	24.3
3083	5.5	77.5	44.8	21.0
3084	5.8	73.8	37.3	20.5
3085	5.5	83.8	33.5	23.5
3086	4.5	60.7	38.9	20.9
3087	7.8	87.5	60.3	49.8
3088	5.0	67.5	48.3	27.8
3089	6.5	88.9	57.8	25.4
3090	3.8	58.8	36.0	15.8
3091	3.8	58.8	47.5	14.3

3092	3.3	57.5	34.0	15.0
3093	4.3	71.3	49.5	17.0
3094	5.0	70.0	50.8	18.3
3095	4.3	67.5	43.8	16.5
3096	4.0	70.0	39.5	12.8
3097	3.5	55.0	42.0	16.5
3098	4.0	68.8	41.5	20.3
3099	5.5	83.8	46.0	19.0
30100	7.0	83.8	54.5	22.8
30101	5.8	66.3	45.8	24.8
Mean	5.2	74.2	46.8	21.4
LSD (0.05)	2.2	13.5	8.8	12.5

1-Vigor plant (vigor) (9 =best - 1 =worst); 2-Std (stand) - Estimate of percent stand; 3-Ht (height) - average plant height (in); 4-width – average plant width (in.).