



United States Department of Agriculture  
Natural Resources Conservation Service  
Plant Materials Program

# Northern Cal 40 germplasm California brome

*Bromus carinatus* Hook. & Arn.

A Conservation Plant Release by USDA NRCS Lockeford Plant Materials Center, Lockeford, California



Northern Cal 40 germplasm California brome (*Bromus carinatus* L.), a selected ecotype released by the Lockeford Plant Materials Center in 2008. ©Lockeford Plant Materials Center.

## Description

California brome is a native, cool-season, perennial bunchgrass. The plants tend to establish quickly and are competitive but short-lived, 5-7 years in most areas. The base of the plant is open with erect stems (culms) growing up to 1.1 m (3ft 6 in) in height. Seeds mature in May and June. The roots are fibrous, deep and widespread.

## Source

Northern Cal 40 germplasm (*Bromus carinatus* Hook. & Arn.) was originally collected in 2006 in Contra Costa County, California. The population was growing in silty clay loam soils on a 2% slope with western exposure. The collection site elevation was 12 m (40 ft) with average annual rainfall of 48 cm (19 in).

Northern Cal 40 was one of 28 accessions from throughout California evaluated at four different growing sites (Penn Valley, NRCS-Lockeford PMC, Morgan Hill, and Los Alamos) in California from fall 2006 through spring 2008. Performance data was collected for initial seedling vigor, % stand, foliage width and height, plant

vigor, uniformity, seed amount, seed fill, seed maturity, and forage production. Northern Cal 40 was noted for robust plants, vigorous growth and overall superiority at test sites while under natural growing conditions..

## Conservation Uses

California brome is widely used to protect soils after wildfires, soil disturbance from mining, restoration of disturbed upland plant communities and to improve rangeland productivity. This species is considered to be a moderately to highly productive, nutritious, and palatable forage that is relished by all classes of livestock prior to maturity. In some ranges it is important summer forage for elk, but considered less palatable to deer. Bear, geese, and various rodents also consume the foliage. The deep fibrous root system makes the plant fairly resistant to grazing and drought. While a good range grass, used alone it may not be suitable for permanent pasture because of its short longevity. One of the better uses of California brome may be as a native competitor to aid in the reduction of exotic weeds a year or two in advance of planting other native grasses. California brome provides good cover for wildlife and the seed is consumed by small mammals and game birds. It is sometimes recommended as a cover crop for vineyards and orchards in California.

## Area of Adaptation and Use

Northern Cal 40 California brome is anticipated to be well adapted to Major Land Resource Areas (MLRA) 14c-d, 15c-e, 16e, 17d-e, and 18d. Seed increase fields at the Lockeford Plant Materials Center in San Joaquin County (MLRA 17) established and produced limited quantities of seed.

California Brome as a species grows well over a wide variety of soil types including sands, silts, and clays though it is most productive and persistent in moderately moist, well-developed, deep, medium-textured soils. It tolerates soils in the pH range of 5.5 to 8.0. It requires nearly full to full sunlight. California brome is considered a pioneer species as well as a late seral species under open canopy and full sun situations.

## Establishment and Management for Conservation Plantings

Recommended seeding rate for California brome is 8-10 lbs of pure live seed (PLS) per acre for single species plantings. There are 60, 000-82,000 seeds/lb with the upper range associated with de-awned seed. Each pound of seed planted per acre will result in about 1.5-2.0 seeds/sq. ft. Lower rates (1-3 lbs/ac) should be used in seed mixes with less competitive grasses.

Seed into a relatively clean and weed-free seedbed to a depth of ¼ to ½ inch. Planting sites should have good weed control for the 2 years prior to planting. It is advisable to leave a moderate amount of plant residue on the surface to reduce soil erosion from wind and rain. Planting should be scheduled for early fall generally after the first rains have begun to fill the soil profile. When planting through thick residues, California brome is best seeded using a rangeland drill. Grain drills may be used on level fields with little plant residue. Broadcast seeding may be used in areas not easily planted with a drill, but additional practices to encourage good seed to soil contact, such as cultipacking and harrowing, may be necessary after planting. Emergence generally occurs within 10-14 days.

The deep fibrous root system makes the plant fairly resistant to grazing and drought though it can be reduced under heavy grazing. While a good range grass, used alone it may not be suitable for permanent pasture because of its relatively short longevity.

California brome is top-killed by fire, but recovers rapidly depending upon the intensity of the fire, typically sprouting from surviving root crowns during the next growing season. Fire is an effective tool for post-harvest residue management in seed production fields. As a cover crop, the species has intermediate tolerance to mowing.

#### **Ecological Considerations**

Native to western North America, California brome spreads easily by seed and can quickly become a moderate to serious weed pest in certain agricultural crops. Its use should generally be avoided in certain areas of intensive agriculture such as fields of introduced grasses grown for seed. High seeding rates in mixes with other less competitive native grasses should be avoided.

#### **Seed and Plant Production**

Recommendations for seed production of California brome include fall planting with a row spacing of 75 – 90 cm (30 – 36 in) with a seeding rate pure live seed) of 82 – 100 seeds per meter of row (25 – 30 seeds/pls per linear ft). Fertilization is not recommended during establishment as it encourages weed growth. Fertilize established fields for seed production at a suggested fertilization rate of 50

lbs of nitrogen per acre, applied annually. Control weeds in established fields with cultivation, pre-emergent and broadleaf –selective herbicides. Irrigation may be required at stand establishment to prevent soil crusting. Bring soil moisture to field capacity in the fall. In California, irrigate every 14 – 21 days for a total of 6 acre inches of irrigation if rainfall is insufficient during spring and early summer. Harvest is in early summer. Seed production of 280 kg/h (250 lb/acre) may be anticipated.

#### **Availability**

*For seed or plant increase:* 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).

*For conservation use:* Sources derived from local, natural origins should be favored for sensitive sites.

*For more information, contact:*  
USDA-NRCS

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#### **Citation**

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For additional information about this and other plants, please contact your local USDA Service Center, NRCS field office, or Conservation District <<http://www.nrcs.usda.gov/>>, and visit the PLANTS Web site <<http://plants.usda.gov>> or the Plant Materials Program Web site <<http://www.plant-materials.nrcs.usda.gov>>

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