USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

MOUNTAIN BROME

Bromus marginatus Nees ex Steudel

Plant Symbol = BRMA4

Contributed by: USDA NRCS Idaho State Office

Jeanne R. Janish. 1977.

Alternate Names
Bromus carinatus, California brome

Uses
Soil stabilization/erosion control: Mountain brome germinates and establishes quickly when seeded making it a good choice for quick cover of disturbed

sites such as highway right-of-ways, coal mine spoils, heavy metal mine tailings, spent oil shale and wildfire revegetation. It is a short-lived pioneer perennial species and when planted with slower developing native plants, provides excellent cover crop attributes for the slower establishing species. It has good root production, especially when combined with a legume. Mountain brome roots decompose slowly providing long lasting erosion control even after the plants have died.

Wildlife: Mountain brome is an excellent plant for the revegetation of livestock and big game ranges in foothill and mountain locations. It is highly palatable in the spring providing good forage for wildlife and livestock. The leaves provide excellent grazing for elk, cattle and horses and are also eaten by sheep and deer. The seeds are readily eaten by small mammals and birds.

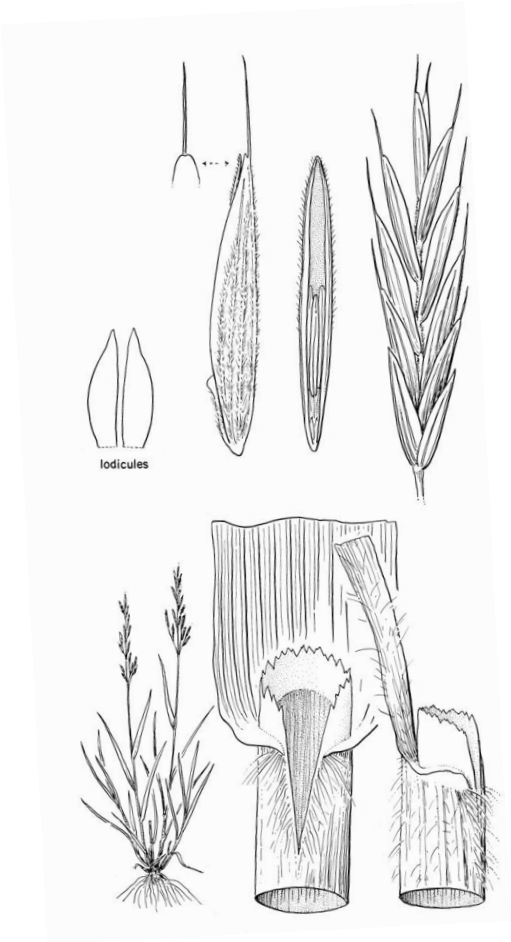
Grazing/livestock/pasture: Because mountain brome is a short lived perennial it should not be used for permanent pasture. Hay production levels drop after the third to fourth year as plants lose vigor and begin to die out. It can be used successfully, however, as a mixture component with slower developing long-lived perennial pasture species.

Legal Status
Consult the PLANTS Web site and your State Department of Natural Resources for status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Taxonomy
There is debate concerning the proper placement of mountain brome in plant taxonomy. The California brome (*Bromus carinatus)* complex, to which mountain brome belongs along with foothills brome (*B. polyanthus*), is highly variable and taxonomists have named many taxa that can be viewed at a specific or subspecific level. Following the rules of botanical nomenclature, if *B. marginatus* is synonymous with *B. carinatus*, then *B. carinatus* has priority because that name was published by William Jackson Hooker and George Walker Arnott in 1840 (Hook. & Arn. Bot. Beechey's Voyage 403. 1840), while *B. marginatus* wasn't published until 1854 by Christian Gottfried Daniel Nees von Essenbeck, some fourteen years later (Nees ex Steudel, Syn. Pl. Glum. 1: 322. 1854). However, if they are to be seen as separate entities, then the group should be broken into the following three taxa as suggested by Cronquist et al (1977):

1 plants annual or biennial, 3-10 dm tall: awns usually > 7mm long *B. carinatus*

1 plants perennial, 8-12 dm tall; awns usually < 7 mm long
  2 plants mostly pubescent throughout *B. marginatus*
  2 plants glabrous, at least in the spikelets *B. polyanthus*



Jeanne R. Janish. 1977.

Description
General: Grass Family (Poaceae). Mountain brome is a short-lived, perennial, cool season C-3 type bunch grass native to the mountain and intermountain regions of Western North America.

Plants develop from a shallow, non-rhizomatous root system. Culms are tall, usually 0.5 to 1.0 meters (20 to 40 inches), but sometimes reaching 1.5 meters (60 inches). Leaves are flat and broad, 4 to 10 mm wide (0.15 to 0.4 inches), mostly soft hairy, especially around the sheath, but can be glabrous or scabrous. Auricles are absent or much reduced, and the ligule is membranous, from 1 to 4 mm (0.05 to 0.15 inches) long.

The inflorescence is a loosely contracted, nodding panicle reaching 10 to 30 cm (4 to 12 inches) long. Spikelets are 5 to 10 flowered, 20 to 40 mm (0.8 to 1.6 inches) long; the glumes lanceolate, strongly keeled. The first glume is 7 to 11 mm (0.3 to 0.45 inches) long with 3 to 5 nerves. The second glume is larger, 9 to 13 mm (0.35 to 0.5 inches) long and 5 to 7 nerved. Lemmas are long, 11 to 15 mm (0.45 to 0.6 inches), keeled with the apex slightly bifid to entire with awns 4 to 6 mm (0.15 to 0.25 inches) long.

Distribution
Mountain brome is common in the mountains and foothills of the Intermountain West. It is often found in relatively moist habitats in mountain big sagebrush, mountain shrub, aspen, and spruce-fir communities and up to sub-alpine mountain meadows.

For more information on distribution, please consult the plant profile page for this species on the PLANTS website.

Adaptation
Mountain brome is well adapted to the foothills and mountains of the Intermountain West in areas with sixteen inches or more annual precipitation. It can be found naturally at elevations ranging from 1,500 to 3,200 meters (5,000 to 10,500 feet) and has been tested at elevations as high as 3,000 meters (9,850 feet). It prefers deep, fertile, mesic soils of medium to fine textures, but also survives on thin, dry or coarse soils, resulting in lower levels of production.

Mountain brome does not tolerate flooding or high water tables but can tolerate very mild salinity. It is winter hardy and has good shade tolerance and fair tolerance to fire.

Establishment
Seed should be planted in a well-prepared, firm, weed-free seedbed in late fall or early spring. Spring plantings should not be later than May 15th in the mountain foothill zone or no later that June 1st in the mountain zone. Dormant fall plantings should be made no earlier than October 20th and preferably after November 1st.

Seed should be planted at ¼ to ½ inch depth. For pure stands the recommended drill seeding rate is 10 lb/ac.
For native mixtures limit mountain brome to 2 lb/acre to ensure slower developing species are allowed

adequate space for establishment. For erosion control plantings following wildfire, seeding rates should be 1.5 to 2.0 times the rates listed above (broadcast plantings should target 40 to 60 seeds per square foot).

This species is often seeded into rough terrain not easily transversed by equipment. In such cases mountain brome can be successfully broadcast seeded.

Management
Seedlings germinate in early spring (or fall under proper conditions) and plants mature by late June to early August. Moderate fall regrowth will occur with adequate soil moisture or when fall rains occur. Mountain brome has medium to rapid seedling vigor. However, mountain brome plants do not anchor their root systems rapidly, and plantings should be protected from grazing until a strong root system has established and plants are producing seed heads.

Weed control measures may be required during the establishment year.

Plants are fairly sensitive to grazing and should be managed carefully. Grazing utilization should be limited to 50% of the total annual growth.

Environmental Concerns
Although mountain brome is native to Western North America, it is sometimes considered "weedy" due to its ability to quickly establish in disturbed sites.

Please consult with your local NRCS Field Office, Cooperative Extension Service Office or state natural resource or agriculture department regarding this species' status and use. Weed information is also available from the PLANTS Web site.

Pests and Potential Problems
Mountain brome is known to be susceptible to head smut (*Ustilago bullata*); however 'Garnet' mountain brome has shown increased head smut resistance when compared to other mountain brome accessions. Fungicidal seed treatments have proven to be an effective means of further controlling head smut in mountain brome (see Hewitt, 1977) in seed production fields.

Mountain brome releases are resistant to stem rust, leaf rust, and leaf spot, but are susceptible to stripe rust and to aphid injury. Aphid injury typically occurs when mountain brome is grown in pure solid stands.
Seed Production

Drill seed in the fall as a dormant planting or in spring into a firm weed-free seed bed with soil moisture at field capacity.

Plant 5.0 pounds pure live seed (PLS) per acre at 36 inch row spacing or 25 to 30 PLS per foot of drill row. Soil surface should be kept moist throughout the two week germination period. Low rates of broadleaf herbicides should be applied when grasses are in the 3 to 5 leaf stage. Fertilization is not recommended during the first growing season unless indicated by a soil test.

Good soil moisture should be maintained throughout the growing season and post harvest. If sprinkler irrigated, plants should not be watered during flowering.

Seed is normally ready to harvest in late June to mid July of the second growing season. Harvest by direct combining or swather. Swathing with a temporary "diaper" (a heavy piece of plastic or canvas clipped under the belt draper) can minimize seed loss due to shatter.

Expected seed yields range from 300 lb/acre dryland to 600 to 1200 lb/acre irrigated for the first and second year of production. Third year yields are approximately 600 to 800 lb/acre. By the fourth year irrigated yields normally drop below 400 lb/acre.

Seed should be dried to 12 percent moisture or less before storing. Seed should be stored in a cool, dry environment. Under proper storage conditions seed will retain viability for 5 to 7 years.

Weed control measures may be required during the establishment year, and cultivation for maintenance of row culture is recommended for the life of the stand. Seed production fields should be regularly monitored for insects and disease. Soil tests should be conducted on seed production fields to determine the proper fertilization regimen, however only a moderate response to fertilization can be expected from mountain brome, and fertilization may stimulate weed growth and competition.

Releases
There are two registered varieties of mountain brome that have been released in the U.S., 'Bromar' and "Garnet". If, however, one takes a broader view of the taxonomy, one must also include two additional varieties of California brome, 'Cucamonga' and 'Deborah'.

Aberdeen PMC Display nursery plots of Bromar (left) and Garnet (right). Photo by Dan Ogle.

'Bromar' was chosen from among 154 accessions collected in the Pacific Northwest and was released in 1946 cooperatively by Washington, Idaho and Oregon Agricultural Experiment Stations at Pullman, Moscow and Corvallis. It was selected for being taller, leafier and having better seedling vigor than commercial strains. It shows outstanding performance when planted in mixtures with sweetclover or red clover for short pasture rotations. Tests have shown Bromar to be moderately resistant to head smut, but chemical seed treatment is recommended. Breeder seed is maintained by the NRCS Plant Materials Center in Pullman, Washington and Foundation seed is produced by the Washington Crop Improvement Association.

'Cucamonga' comes from the Mediterranean climate of California and was released in 1949 by California AES, Davis and the California NRCS Plant Materials Center. It has a short green period which limits its value as a forage plant, but it has been used successfully for erosion control and ground cover on droughty sites with low fertility. It is known to be susceptible to head smut, and therefore must be treated chemically.

'Deborah' was developed in Great Britain by combining two ecotypes, one from the UK and one from the South American Andes. It shows good drought tolerance, moderate resistance to smut and powdery mildew, but is susceptible to fruit fly.

Garnet Germplasm was released in 2001 by the Upper Colorado Environmental Plant Center in Meeker, Colorado and the Bridger Plant Materials Center in Bridger, Montana. The original collection came from a site near the town of Garnet in Granite County, Montana in 1976. Garnet shows improved seedling vigor, longer plant duration, extended seed production and better resistance to head smut when compared to Bromar. Tested class seed is available from the UCEPC in Meeker, CO.

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