

PLANT MATERIALS TECHNICAL NOTE

MEADOW BROME *Bromus biebersteinii*

An Introduced Grass for Conservation Use in Montana and Wyoming

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Cattle grazing meadow brome

General Description

Meadow brome collected in Turkey was first introduced into the United States in 1949. The initial evaluations of the species in the West were conducted at the Plant Materials Centers in Pullman, Washington, and Aberdeen, Idaho.

Meadow brome is a long-lived, perennial grass producing short, stout rhizomes 4 to 6 inches long, but does not become sod-bound. It creeps slowly, and therefore may have a bunch grass appearance, especially in thin stands. Individual plants become larger at the base when fully established, especially under good moisture and fertility conditions. The plant has numerous light green leaves that are predominantly basal and mildly pubescent. Seed stalks are from 24 to 48 inches tall and extend above the leaf mass in an open panicle. Pure, solid stands provide strong competition with annual and perennial weeds.

Meadow brome contains some of the desirable features of both smooth brome (*Bromus inermis*) and orchardgrass (*Dactylis glomerata*). It can extend the prime grazing season, increase total forage production, and most varieties are compatible with alfalfa (*Medicago sativa*). Meadow brome has much faster recovery after utilization, produces more basal leaves, has better fall

growth, and is more palatable as both green forage and cured hay than smooth brome. Meadow brome has good drought tolerance and excellent winter-hardiness.

Adaptation

Meadow brome is adapted to a broad range of soil conditions. It performs best on moderately-deep to deep, fertile, well-drained soils, but also performs fairly well on shallower soils. Preferred soil textures range from coarse gravelly to medium-textured. Meadow brome grows well under dryland conditions receiving greater than 14 inches of annual precipitation, but performs best with 16 inches or more of annual precipitation or under irrigation. It is rated “poor” to “moderate” for salinity tolerance (less than 5 mmhos per centimeter) and is sensitive to flooding, often dying if under water for more than 10 days. Meadow brome has performed well at elevations from 500 feet to over 6,000 feet. There is some indication its range may extend into a lower rainfall zone and to slightly lower elevations than smooth brome.

Conservation Uses

Use for Hay: Grown alone or in a mixture with a legume, meadow brome produces excellent hay due to its dense basal growth. It retains a better grass/legume ratio with alfalfa in grass-alfalfa mixtures than smooth brome.

Recent research near Buffalo, Wyoming, has shown meadow brome will not produce as much biomass given the same rate of nitrogen fertilization as smooth brome or intermediate and pubescent wheatgrass (both *Thinopyrum intermedium*). One strategy to boost late-spring and summer irrigated production is to fertilize in a split application after the first and second cutting/grazing periods. Apply fertilizer based on current soil tests and balance the rates for nitrogen and phosphorus to maintain the desired stands of both grasses and legumes, i.e., if more grass is needed in the stand, more nitrogen fertilizer is added. If the legume component is the most important, add more phosphorous fertilizer.



Meadow brome seed



Meadow brome seedheads

From 2002 to 2004, 'MacBeth' meadow brome produced 11.40 to 11.64 tons dry matter per acre at the Bozeman and Kalispell test sites, respectively, 118% of the statewide mean of 30 grass entries.

Use for Pasture: Meadow brome is palatable to sheep, cattle, horses, and many classes of wildlife. It responds well to rotation-deferred grazing systems, and starts spring growth earlier than most other grasses, although it can become stemmy if not harvested quickly. Meadow brome is ready for grazing when it reaches 8 to 12 inches in height, and livestock should be removed when 3 to 4 inches of stubble remains. A 3 to 4 week regrowth period is necessary for maximum

production and longevity of the stand. Meadow brome has a strong re-growth characteristic, which results in consistent growth over the growing season with continued forage value into the fall. With adequate soil moisture, the leaves stay green and continue to grow even after seed maturation.

About 6 inches of re-growth should be left in the fall to enhance carbohydrate root reserves to support early growth the next spring. A good practice is to use no more than 60% of the annual growth during the winter season or 50% during the growing season. To maintain long-lived stands, meadow brome should be allowed to periodically mature and produce seed before grazing.

Erosion control/reclamation: Due to its slow spread by rhizomes and seed, meadow brome is best adapted to stabilization of disturbed soils in areas with 14 inches or more of annual precipitation.

Ease of Establishment

Meadow brome has approximately 93,000 seeds per pound. For dryland and irrigated plantings, a seeding rate of 10 pounds Pure Live Seed (PLS) per acre is recommended (21.3 seeds per square foot). If broadcast or planted for critical area treatment, double the seeding rate to 20 pounds PLS per acre or 42.6 seeds PLS per square foot. Broadcasting on critical areas could require as much as 40 PLS pounds per acre (see NRCS, Plant Materials Technical Note, MT-46, Seeding Rates for Conservation Species for Montana and Field Office Technical Guide (eFOTG), Section IV, Practice Specification, Critical Area Planting, Code 342, for recommended planting rates).

When planting with legumes, an alternate-row planting is recommended to accommodate differences in seedling vigor. Use 6 to 8 PLS pounds per acre of meadow brome seed with this planting method.

Seedlings are vigorous and stands are easy to establish on firm, weed-free seedbeds. Meadow brome seeds, however, do not flow uniformly through a drill unless mixed with rice hulls or other carriers to prevent “bridging” across drill box openings. Dryland and erosion control plantings should be made in the late fall or very early spring when soil moisture is not limited. Irrigated plantings should be made in early to mid-spring. Seeding depth should be no deeper than ¼- to ½-inch.

Meadow brome is compatible with other legumes, including cicer milkvetch (*Astragalus cicer*), birdsfoot trefoil (*Lotus corniculatus*), sainfoin (*Onobrychis viciifolia*), and red and alsike clover (*Trifolium pratense* and *Trifolium hybridum*), respectively). At planting, be sure to inoculate these legumes with the proper *Rhizobium* for each species. When seeding meadow brome in mixtures, adjust the seeding rate to attain the percentage of meadow brome desired in the stand.

Under dryland conditions, new plantings should not be grazed until late-summer or fall of the second growing season. Seedlings may be severely damaged or killed by overgrazing, especially during the seedling year. Under irrigated conditions, the new planting should not be grazed until late-summer or fall of the first growing season. To prevent grazing damage during critical establishment periods, the best management practice is to harvest meadow brome for hay.

When planting for seed production, treat the seed in the drillbox with a fungicide labeled to reduce head smut, which are common in bromes. Major seed loss from head smut usually occurs in the first year's seed crop. Irrigated seed production plantings should have at least 24 inches between rows. The recommended PLS seeding rate for 24-inch row spacing is 5 pounds per acre and 4 pounds per acre at the 30-inch row spacing. Dryland seed yields are commonly 150 to 200 bulk pounds per acre; whereas, irrigated seed yields range from 450 to 600 bulk pounds per acre. Seed matures fairly evenly and is ready for harvest in mid- to late-July. Harvest seed by swathing

at the firm dough stage and then combine the windrow about 7 days later, once the seed has matured.

Direct combining is also acceptable, but the field must be closely monitored and harvested before seed shatter occurs. The seed should be at or below 12% moisture for storage in bins and at or below 15% for storage in sacks.

Meadow brome seed production fields remain productive for two to three seed crops. Between-row cultivation and ripping may help to extend the stands productive life. 'Fleet', 'Paddock', 'Montana', and 'MacBeth' were selected for a longer seed production life and higher seed production in the third production year when compared to 'Regar' (see NRCS, Plant Materials Technical Note, MT-69, Standard and Preferred Forage and Reclamation Plants for Use in Montana and Wyoming, for a list of recommended varieties).

Limitations

The variety, 'Regar', is the most susceptible of all meadow brome varieties to be covered with head smut (*Ustilago bullata*). 'Regar' also has an early heading characteristic, which limits its use with alfalfa.



Head smut in a brome seedhead on the left, normal seedhead on the right

There have been no reported insect or disease problems in forage-producing fields of meadow brome. Head smut does not appear detrimental in plantings used for forage production or erosion control. Banks grass mite (*Oligonychus pratensis*) has been observed in seed production fields, but only at moderate levels of infestation.

Meadow brome has been used in the northern United States and southern Canada for over 60 years and has not posed any environmental concerns. It is not considered weedy, but could spread into adjoining degraded plant communities via seed under ideal conditions.

Availability and Releases

Meadow brome is available on the commercial seed market (see NRCS, Plant Materials Technical Note, MT-57, Plant and Seed Vendors for Idaho-Montana-Nevada-Eastern Oregon-Utah-Eastern Washington-Wyoming) for a list of vendors. Foundation, Registered, and Certified seed classes are recognized.

'Cache' meadow brome was developed by the USDA-ARS, Forage and Range Research Laboratory at Utah State University, Logan, Utah, and was released in 2004 with Plant Variety Protection (PVP). Cache was derived from selections of 'Regar', 'Fleet', and 'Paddock' and was selected for improved seedling establishment and increased forage yields on irrigated and semi-irrigated pastures in the Intermountain and Northern Great Plains regions of the western United States.

'MacBeth' meadow brome was developed at Montana State University and released in 2001. 'MacBeth' has similar forage yields to 'Regar', 'Fleet', and 'Paddock', with a slight yield advantage in Montana dryland trials. At two test locations, 'MacBeth' produced more total forage of the 30 accessions evaluated in the trials.

'Montana' meadow brome was also released by Montana State University in 2001 and licensed exclusively to a private seed company. 'Montana' has similar forage yields to 'Regar', 'Fleet', and 'Paddock'. The major attribute for 'Montana' is its improved seed yield potential over 'Regar' and 'Paddock'. At three test locations, 'Montana' averaged 35% higher seed yields than 'Paddock' and 167% higher seed yields than 'Regar' in the third year of production.

'Paddock' meadow brome was selected by the Agriculture Canada Research Station, Saskatoon, Saskatchewan, Canada, and released in 1987. It was developed from an introduction from Krasnodar, USSR, in 1969. 'Paddock' has a similar habit of growth to 'Regar' and 'Fleet'. Leaves are slightly wider than 'Regar', and forage yields are similar to 'Fleet' and 'Regar'. 'Paddock' seed yields are greater than 'Regar' seed yields.

References

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For seeding rates see Plant Materials Technical Note MT-46 (Revision 3). Available at <http://www.mt.nrcs.usda.gov/technical/ecs/plants/technotes>.

For proper seed source selection, see Montana Technical Note MT-67: *Seed Source Selection, Use of Certified Seed, and Appropriate Seed Release Class Improve Conservation Planting Success*. Available at <http://www.mt.nrcs.usda.gov/technical/ecs/plants/technotes>.

For recommended variety selection, see *Standard and Preferred Forage and Reclamation Plants for Use in Montana & Wyoming* Plant Materials Technical Note MT-69: Available at <http://www.mt.nrcs.usda.gov/technical/ecs/plants/technotes>.

For proper cultural practices and grazing guidelines, see either MSU EB-19: *Dryland Pastures in Montana & Wyoming—Species and Cultivars, Seeding Techniques and Grazing Management* or MSU EB-99: *Irrigated Pastures in Montana & Wyoming*. Available at <http://www.plant-materials.nrcs.usda.gov/pubs/mtpmspu1138.pdf>.

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