

PLANT MATERIALS TECHNICAL NOTE

UPRIGHT PRAIRIE CONEFLOWER *Ratibida columnifera*

A Native Forb for Conservation Use in Montana and Wyoming

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Upright prairie coneflower

General Description

Prairie coneflower is a native, late-season, herbaceous perennial in the Aster Family. It is prominently taprooted and grows upright from a woody base to a height of 12 to 36 inches. The numerous leaves are deeply pinnately-lobed into linear or lance-shaped segments along alternately branched stems. Showy yellow ray flowers droop and surround the columnar-shaped, brown, central disk. Occasionally, the ray flowers are reddish-brown in color. The flowers bloom from late June through August, with seed ripening completed from early August into September. The mature seedhead has a pleasant odor when crushed that is similar to anise or licorice. The fruit is a one-seeded, gray-black achene.

Adaptation or Range

Prairie coneflower is a drought-tolerant wildflower of the Great Plains commonly found from south-central Canada to northern Mexico, and from Manitoba and Minnesota west to southeastern Idaho. It prefers to grow in the dry, open spaces of prairie grasslands and mountain foothills, and is found along roadsides, in waste and disturbed areas, and along railroad rights-of-way. Prairie coneflower does well on a variety of soil types, including loams and rocky to gravelly-sandy textures. It tolerates a pH range from slightly acidic to moderately alkaline and weakly saline conditions, in areas receiving 10 to 30 inches of annual precipitation. Prairie coneflower attains optimum growth in full sun and low to moderate levels of competition within a native plant community. It occurs at elevations ranging from 3,200 to 8,400 feet in Colorado, Montana, Utah, and Wyoming. This plant

is a common component of such ecological sites as shallow, silty, shallow to gravel, and silty steep. Associated species include western wheatgrass *Pascopyrum smithii*, bluebunch wheatgrass *Pseudoroegneria spicata*, prairie Junegrass *Koeleria macrantha*, Sandberg bluegrass *Poa secunda* ssp. *secunda*, blanketflower *Gaillardia aristata*, white and purple prairie clover *Dalea candida* and *D. purpurea* (respectively), big sagebrush *Artemisia tridentata*, and western yarrow *Achillea millefolium* var. *occidentalis*.

In Montana, prairie coneflower is found as a minor component on sites in Major Land Resource Areas (MLRAs) 32, 43B, 46, 52A, 53A, 58A, and 60B. It is known to inhabit at least 46 of 56 Montana counties. Prairie coneflower establishment and vigor was good in a demonstration planting in Sweet Grass County. Under irrigation in Madison County, prairie coneflower establishment and vigor was good.

In Wyoming, prairie coneflower is present east of the Continental Divide as a minor component on sites in MLRAs 49, 58B, 60A, 60B, 61, 64, 62, and 64. It is known to inhabit 13 counties in Wyoming. Prairie coneflower had excellent stand and vigor ratings in a field planting near Powell. At the full seeding rate, it produced a poor stand on a gas well-pad field planting near Pinedale.

Conservation Uses

Prairie coneflower is palatable and nutritious to all classes of domestic livestock when utilized in the early stages of plant growth and development. It is considered a desirable spring browse plant for big game animals, and the seed of prairie coneflower is preferred by several species of upland birds and small mammals. Prairie coneflower is a medium- to tall-statured forb that may fill a structural cover niche for multiple species of upland game birds in a variety of plant community types. Prairie coneflower is commonly recommended as a component in native seedings to provide diversity, deter invasive species encroachment through resources competition by its extensive root system, and as an ornamental wildflower in low maintenance or natural landscapes. It attracts many different insects when flowering and is a mid- and late-season flowering species for pollinator habitat improvement plantings.



Upright prairie coneflower in a pollinator habitat test plot at the Bridger Plant Materials Center

Ease of Establishment

Prairie coneflower readily establishes by direct seeding. Seedling vigor is moderately weak and stands can be slow to establish.

Planting Rates (all recommended amounts based on pure-live-seed PLS)

There are approximately 600,000 seeds per pound. As a guideline, at a seeding rate of 1 pound per acre, there are approximately 13.8 seeds per square foot. The full seeding rate, based on about 25 seeds per linear or square foot, is 2 PLS pounds per acre, but it would seldom be seeded in a pure stand. It is recommended in native seed mixtures at a rate of $\frac{1}{8}$ to $\frac{1}{4}$ PLS pound per acre. The broadcast seeding rate is double the recommended drill rate unless harrowed and packed to assure seed-to-soil contact.

Stand Establishment

For best results, seed should be planted into a firm, weed-free seedbed as early in the spring as possible. To ensure uniform seed placement, drill-seed prairie coneflower to a depth of $\frac{1}{4}$ - to $\frac{1}{2}$ -inch at 12-inch row spacing. Because of its small seed size, broadcast seeding is favorable if seed-to-soil contact is provided; however in dryland situations, adequate precipitation at the time of germination is critical for survival. Periodic mowing during the establishment year is one option for weed suppression.

Seed production fields should be established in rows at 25 PLS per linear foot. Between-row spacing is dependent on the type of planting and cultivation equipment used, and ranges from 24 to 36 inches. Adequate between-row space should be provided to perform mechanical weed control. At 24-inch row spacing, the recommended seeding rate is 0.9 PLS lb/acre and at 30- and 36-inch row spacing, the seeding rate is 0.7 and 0.6 PLS lb/acre respectively. There are presently no herbicides specifically labeled for controlling weeds in seed production fields of prairie coneflower. Seed harvest can be accomplished by swathing and combining from cured windrows, or direct combining. Direct combining should take place when the seed has just begun to shatter from the very top of the ripened seedhead. Seed production of 300 to 500 lb/acre can be attained under irrigated conditions. At the Bridger Plant Materials Center (BPMC), Stillwater upright prairie coneflower produced a good seed crop for three years on a well-drained soil under limited irrigation prior to seed harvest. Seed viability is very high and longevity can be expected for five to eight years when stored at moderate temperatures and low humidity.



Stillwater upright prairie coneflower seed production field at the Bridger Plant Materials Center

Limitations

Powdery mildew may be present at times of elevated humidity, but usually does not have a long-term negative impact on the plants. Prairie coneflower is not considered a weed, but may actively re-seed itself under desirable conditions.

Releases

Stillwater Germplasm upright prairie coneflower was released in 2004 as a Selected Class pre-varietal germplasm from the USDA-NRCS BPMC in cooperation with the Agricultural Experiment Stations in Montana and Wyoming. It is a composite of five Montana accessions intended to add species diversity in native seed mixes for rehabilitation of disturbed sites.

Additional Information

Manual of Montana Vascular Plants. 2012. P. Lesica. Brit Press, Fort Worth, Texas.

Seeding Rates and Recommended Cultivars. USDA-NRCS Plant Materials Technical Note Number, MT-46. Current version available at

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mt/plantsanimals/?cid=nrcs144p2_057725

Upright Prairie Coneflower Plant Fact Sheet and Plant Guide available at

<http://plants.usda.gov/java/factSheet>