

ROCKY MOUNTAIN BEEPLANT

Cleome serrulata Pursh

Plant Symbol = CLSE

Alternative Names

Alternate Common Names: Navajo spinach, Rocky Mountain beeweed

Alternate Scientific Names: *Peritoma serrulata* (Pursh) DC.

Description

General: Rocky Mountain beepplant is a tall, upright, native, annual forb with showy purple flowers. Plants typically reach 1 to 2 m (3 to 6 ft) with single or multiple stems. The leaves are trifoliate with three, lanceolate or elliptic leaflets, each 1.5 to 7 cm (0.6 to 2.8 in) long and 4 to 14 mm (0.16 to 0.55 in) wide. The flowers are pink to purple with four petals and four sepals. Flowers closely resemble those of the Brassicaceae, but have long, exerted stamens. The fruit is a long, narrow pod, 2.5 to 7 cm (1.0 to 2.76 in) long (Welsh et al., 2003). Flowering occurs in mid-summer, in August and September in northern states but can flower as early as May in southern latitudes (iNaturalist, 2024). Rocky Mountain beepplant and other *Cleome* are self-fertile, and outcrossing does not increase seed set or seedling vigor (Cane, 2008). There are approximately 145,370 seeds/kg (66,000 seeds/lb) (Ogle et al., 2019). *Cleome* is currently accepted as a member of the caper family (Capparaceae) (USDA NRCS, 2023), but it has also been associated with the sister family, Brassicaceae, or placed its own family, Cleomaceae (Cane, 2008).

Distribution: Rocky Mountain beepplant is native throughout much of North America. It is commonly found in western states with infrequent occurrences as far east as Maine and Massachusetts but is absent from the southeast. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: Rocky Mountain beepplant occupies disturbed, early seral sites including roadsides in valley and foothill shrubland and grasslands. In the Intermountain West it is associated with sagebrush scrub habitat (Munz and Keck, 1959; Welsh et al., 2003).

Adaptation

Rocky Mountain beepplant is found in semi-arid rangeland plant communities receiving approximately 200 to 500 mm (8 to 20 in) mean annual precipitation. In drier areas it is more commonly found occupying depressions and low areas that accumulate additional soil moisture.

Uses

Rocky Mountain beepplant serves as an early seral forb in restoration and reclamation (Herron et al., 2013; Tilley et al., 2022). It is recommended for use in hedgerows, wildflower meadow, rangeland, and ornamental plantings (Lee-Mäder et al., 2016). The addition of Rocky Mountain beepplant to seed mixes has been shown to provide greater overall cover, greater native plant diversity, and greater arthropod richness than adjacent reference communities in reclamation seedings (Herron et al., 2013;



Figure 1. Rocky Mountain beepplant flower cluster and honeybee (above). Seeds attached to pod lining (below). Photos by IDPMC.

Curran et al., 2019; Curran et al., 2022). Rocky Mountain beeplant has also been shown to reduce the above ground growth of the invasive *Halogeton glomeratus* (Prasser and Hild, 2016).

Rocky Mountain beeplant is recommended for pollinator plantings in the U.S. and Canadian Rocky Mountain Region (Mader et al., 2011) and Intermountain West (Ogle et al., 2019). This species is pollinated by bees, butterflies, wasps, and hummingbirds (Lee-Mäder et al., 2016; Prendusi, 2023). It provides pollen and nectar to agriculturally managed bees like European honeybee (*Apis mellifera*) and alfalfa leaf-cutter bee (*Megachile rotundata*). Honey yields of over 100 lb per colony have been reported from Rocky Mountain beeplant over a 10-day period (Lee-Mäder et al., 2016). This species is known to benefit diverse native insects, especially in post-fire restoration seedings by producing a pollen and nectar source in the first year of establishment (Cane, 2008.). There are documented visits to Rocky Mountain beeplant by monarch butterflies (*Danaus plexippus*) (Lee-Mäder et al., 2016), and the species is recommended for monarch butterfly habitat creation (Ogle et al., 2019).

Rocky Mountain beeplant also has value for larger wildlife. The seed is known to be eaten by doves (Kearny and Peebles, 1951).

Ethnobotany

Rocky Mountain beeplant is also known as Navajo spinach (Wytsalucy, 2019). Navajo, Hopi, Cochiti and Apache boiled and ate the plant's greens, and Hopi boiled flowers of Rocky Mountain beeplant for food (Adams et al., 2002). Rocky Mountain beeplant was used to create pottery paint and dyes (Adams et al., 2002).

Status

Wetland Indicator: Rocky Mountain beeplant is classified as facultative upland in all regions.

Please consult the PLANTS Web site (<http://plants.usda.gov/>) and your state's Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

Planting Guidelines

Rocky Mountain beeplant is recommended for use at sites receiving >300 mm (12 in) mean annual precipitation in the intermountain West (Ogle et al., 2019). This species can be broadcast, or drill seeded into a firm, weed-free seed bed to depth of 0 to 3 mm (0 to 1/8 in). The full stand seeding rate is 17 lb/ac. The actual applied rate should be adjusted to match the desired percentage of the species in the mix. Stratifying seed in cold, moist sand for 30 days is commonly recommended for spring seeding (Everwild, 2023); however, fall, dormant seedings are recommended for most rangeland applications (Ogle et al., 2019).

Seeds often have significant dormancy and various pre-treatments have been explored. Chilling duration, gibberellins, and seed after-ripening all influence seed germination and can be used to improve plant establishment. Seeds presoaked in gibberellic acid and hydrogen peroxide germinated faster and at higher rates at 4 °C (39 °F) compared to other treatments for multiple source locations tested (Wytsalucy et al., 2021). Untreated seed placed in oxygenated water at 22 °C (72 °F) with 24 hr light did not produce any seedlings after 20 days (unpublished results from the authors).

Management

Rocky Mountain beeplant is an early seral colonizer (Welsh et al., 2003). It is typically abundant on disturbed sites for the first few years following disturbance and then reduces in density making way for later seral, longer-lived species. Occasionally it forms persistent stands, especially under management where succession is interrupted.

Pests and Potential Problems

Leaf damage (shot holes) from flea beetles (*Phyllotreta* sp.), key pests of cole crops (Knodel, 2017), have been observed on Rocky Mountain beeplant at the Aberdeen, Idaho Plant Materials Center.



Figure 2. Seed collection using racquet and hopper (above). Ripe seed pods ready for harvest (below). Photos by IDPMC.

Environmental Concerns

Rocky Mountain beeplant is a native species and is commonly found in ruderal disturbed sites. While being associated with disturbance, it is not considered weedy or invasive.

Seeds and Plant Production

Rocky Mountain beeplant is not typically grown in containers for planting. It is easy to establish by direct seeding, and potted plants grow and mature quickly and often go to flower and fruit in the greenhouse before outplanting.

Wildland seed harvest with racquet and hopper is very easy and several pounds of seed can be quickly collected. Seed should be harvested when pods are dried and seed readily shatters. In southern Idaho, harvesting takes place in late September. Stands from previous years may not persist due to succession and new stands may need to be located periodically. Seed shatters easily when ripe but may need to be run through a brush machine to remove seed from the pod. Inert matter and other material can be cleaned using screens and light air.

Cultivars, Improved, and Selected Materials (and area of origin)

Rocky Mountain beeplant is broadly available on the commercial market, but no improved or released material is available. Seed should be selected based on the local climate, resistance to local pests, and intended use. Consult with your local land grant university, local extension or local USDA NRCS office for recommendations on adapted cultivars for use in your area.

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Citation

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