USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

MUNRO'S GLOBEMALLOW
Sphaeralcea munroana (Douglas) Spach
Plant Symbol = SPMU2

Contributed by: NRCS Plant Materials Center, Pullman, WA

Sphaeralcea munroana. **Pamela Pavek**

Alternate Names
Orange globemallow, desert mallow, whitestem globemallow (*S. munroana* ssp. *subrhomboidea*), *Malva munroana*, *Nuttallia munroana*, *Malvastrum munroana*, *Malveopsis munroana*

Uses
Pollinator habitat: Munro's globemallow attracts many species of bees, a few of which are specialists, requiring pollen and nectar only from *Sphaeralcea* and related genera. These include the ground-nesting bees *Diadasia diminuta*, *D. lutzi*, and *Colletes sphaeralcea*. The *Diadasia* are proficient and dedicated pollinators, and have been found colonizing trial plots on research farms (Cane 2011).

Forage: Plants in the *Sphaeralcea* genus are important forage sources for a number of rodents, rabbits and other lagomorphs, and ungulates such as deer and antelope (Beale and Smith 1970; Pendery and Rumbaugh 1986, Rumbaugh et al. 1993). Browsing deer will often consume all of the foliage and leave only the woody base.

Ornamental: Munro's globemallow is hardy to Zone 4 and is recommended for rock gardens, banks, desert shrub areas, and along driveways and walkways (Rugged Country Plants 2011). This plant is also suitable for container planting (Cane 2011). For an attractive appearance, High Country Gardens (2011) suggests cutting the plants to the ground level every year.

Range revegetation: This plant is one of the gems of the arid west. It can be used to add aesthetic beauty and diversity to range landscapes.

Ethnobotanical: People of the Gosiute tribe made paint with the flowers and applied it to the inside of their earthenware dishes (Native American Ethnobotany Database 2011).

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

Description
General: Mallow family (Malvaceae). *Sphaeralcea munroana* is a native perennial forb or subshrub. It has a taproot, an open branching form and grows to 20 to 80 cm (8 to 32 inches) tall. Leaves and stems are pale green and have a slightly rough texture due to a covering of fine white hairs. Leaves are alternate, petiolate, have round-toothed margins, three to five lobes, and are 2 to 6 cm (0.8 to 2.4 in) long. Flowers and buds are on showy clusters in leaf axils and bloom May through August. The flowers have a diameter of 2 cm (0.75 in), five pale orange to brick-red petals, and numerous stamens. Seeds are produced in dry fruits with multiple capsules that form a sphere, and there is one seed per capsule. Seeds are pubescent and average 1.5 mm (0.06 in) in length (Rydberg 1917; Lyons and Merilees 1995; Burke Museum of Natural History and Culture 2011).

The genus name *Sphaeralcea* is from the Greek word "spharia" which is a globe (referring to the spherical fruits) and the Latin word "alcea" which means a kind of mallow. The species name *munroana* refers to Dr. Donald Munro (1789 – 1853) who was the Curator of Gardens at the Horticultural Society of London, a Fellow of the Linnean Society, and gardener-in-chief for British botanist John Lindley (Charters 2011).

Cross section of *S. munroana* fruit showing individual seeds in each capsule. James Cane, ARS

Distribution: Munro's globemallow is found throughout British Columbia and the western states of Washington, Idaho, Montana, Wyoming, Colorado, Utah, Nevada, Oregon and California. The taxon is divided into two subspecies: ssp. *munroana* which is found throughout the species' entire range, and ssp. *subrhomboidea* which is found only in Oregon, Idaho, Wyoming and Utah. Subspecies *subrhomboidea* is also known by the common name whitestem globemallow. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: This plant is typically found in association with sagebrush on desert plains to low mountain slopes (Lyons and Merilees 1995; Hichcock and Cronquist 1973).

Adaptation

Munro's globemallow is adapted to dry areas with open exposure. It is often found growing in rocky, sandy soil but also grows well in heavy clay (High Country Gardens 2011). Annual precipitation requirements range from 15 to 38 cm (6 to 15 in).

Establishment

Munro's globemallow can be established by seed or seedlings. Seed should be planted with a drill into a weed-free seed bed at a rate of 4 kg PLS per ha (3.5 lbs PLS per acre) and at a depth of 0.6 cm (0.25 in) (Lambert 2005). When planted in a mix, the seeding rate should be adjusted according to the proportion of the mix. The seed has an impermeable seed coat and should be scarified using boiling water or other treatment prior to planting if a high initial germination rate is desired (see Seeds and Plant Production below).

Seedlings can be produced by sowing treated seed in containers in a greenhouse in January and hardened off for 2 to 4 weeks prior to transplanting to a prepared field site in the spring. Plants should be spaced 25 to 75 cm (10 to 30 in) apart (Rugged Country Plants 2011).

A globemallow bee (*Diadasia diminuta*) visiting a Munro's globemallow flower. James Cane, ARS

Management

For optimal production of *Sphaeralcea munroana* seed, the pollination services of bees are required. James Cane, ARS (2011) has found outcrossing of *S. munroana* increases seed production 4-fold. He also discovered in one study 37 out of 57 of the bees that visited *S. munroana* and related plant species were ground-nesting floral specialists, such as *Diadasia diminuta*, *D. lutzi*, and *Colletes sphaeralcea.* The other 20 species that visited were also ground-nesting but floral generalists. Honey bees will work the flowers, but their pollination efficacy is unknown. To enhance ground-nesting bee habitat, do not cultivate around or within the plot during bloom.

Turrets indicate the presence of globemallow bee (*Diadasia diminuta*) nests. Vince Tepedino, ARS

Dunne (2011) a private seed producer in Worland, WY, has found fields of *Sphaeralcea munroana* are easily established and weeds can be controlled with the proper application of herbicides. However, due to the seed's hard coat and levels of dormancy, volunteer plants are problematic during the years of production because they interfere with between-row cultivation operations and have high amounts of green growth at harvest. Furthermore, volunteer plants will emerge in succeeding crops for many years. The volunteers cannot be controlled with applications of pre-emergent herbicides or glyphosate (Dunne 2011).

Dunne (2011) and other commercial seed producers have also found the plant's indeterminance to be problematic. With summer precipitation or irrigation, Munro's globemallow will remain green and continue to flower throughout the growing season. Compounding this problem, seeds will shatter soon after ripening. Dunne (2011) states Munro's globemallow can easily be harvested with a combine, however small amounts of seed harvestable at one time causes production to be economically unviable. In areas where irrigation is the only source of summer moisture, it may be possible to manipulate the plant's determinance by shutting off irrigation early in the growing season.

Pests and Potential Problems
This species is susceptible to a fungal rust pathogen (*Puccinia sherardiana*) (Dunne 2011). Seed can be damaged by weevils of the genus *Macrorhoptus* (Cane 2011).

Environmental Concerns
None

Seeds and Plant Production
Harvested seed can be cleaned by processing with a brush machine (Barner 2009) or hammer mill and air screening equipment. There are approximately 804,760 seeds per kilogram (365,800 seeds per pound) (Barner 2009).

S. munroana and other members of the *Sphaeralcea* genus have an impermeable seed coat which causes challenges for plant production. Cold moist stratification with no other pretreatment is unlikely to result in satisfactory germination. At the Pullman Plant Materials Center, seed of three accessions was planted into containers in mid October 2009, stratified outside for 90 days and moved into a greenhouse. Seed germinated within 7 to 14 days and achieved germination rates of 6%, 14% and 25%.

Smith and Kratsch (2009) report significant germination improvements for *S. munroana* seed (84% average germination) following the combination of scarification (nicking the seed) and a 6 wk cold stratification. Kildisheva and Davis (2011) examined the effects of seed piercing with a steel blade, 6 wk cold stratification (4.6±0.02 C) and combined scarification plus stratification. Germination was significantly improved with both the scarification (35 %) and the combined scarification and stratification (44 %) treatments.

Kildisheva and Davis (2011) also compared the effects of scarification with a steel blade, submergence in a 100 ppm gibberellic acid (GA_3) solution, submergence in deionized water, and the combination of these treatments. Scarification alone and scarification followed by a 24 hour water or GA_3 soak achieved the highest germination (87%, 93 % and 88 %, respectively) at the end of the 21 day period. Seeds soaked in distilled water for 24 hrs achieved significantly higher germination than those soaked for 48 hrs. However, a similar relationship did not exist between scarified seeds soaked in GA_3.

Although mechanical scarification can be an effective dormancy treatment, many mechanized techniques can cause embryo damage, primarily a result of scarification severity. Page et al. (1966) and Roth et al. (1987) suggest seeds of *S. munroana* died following mechanical scarification in a sandpaper-lined rotating drum, irrelevant of treatment duration.

Chemical scarification treatments have been shown to be effective for some *Sphaeralcea* species (Page et al. 1966, Sabo et al. 1979, Roth et al. 1987, Smith and Kratsch 2009). For instance, submergence in 18 M sulfuric acid (H_2SO_4) for 10 min significantly increased germination of *S. coccinea* (77 %) and two accessions of *S. grossulariifolia* (69 % and 62 %, respectively) however failed to do so for *S. munroana* (8 %) (Roth et al. 1987). Improved germination of *S. munroana* (53%) was achieved with a 3-hr soak in the organic solvent diethyl dioxide ($C_4H_{10}O_2$) (Roth et al.1987).

An alternative technique, submergence in boiling water, can be effective for large-scale seed treatment. Jensen (2011) at the Forest Service Shrub Sciences Lab in Provo, Utah, has found an improvement in germination with application of boiling water prior to planting. He also found with this treatment, no stratification period is necessary. Kildisheva and Davis (2011) compared the effects of a10-sec submergence in boiling water, tumbling with aluminum oxide, burning, heat application at 80 C for 1 hr, and the combination of burning and heating. Seeds subject to the boiling water treatment reached the highest cumulative germination (49%); while seeds subject to the remaining treatments did not exceed 20% germination.

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

'ARS-2892' is select-class germplasm released by the ARS in 1993. Seed was collected from plants growing on the Hyrum Lake Dam in Cache County, UT and compared to 49 other accessions of *Sphaeralcea* species. It was selected for its large shoot size, succulence, leafy growth form and seed yield potential (Rumbaugh and Pendery 1993).

References

Barner, J. 2009. Propagation protocol for production of *Sphaeralcea munroana* (Douglas) Spach seeds; USDA Forest Service – F6 Bend Extractory, Bend, OR. In: Native Plant Network [Online] Available at: http://www.nativeplantnetwork.org (Accessed 8 Feb 2011).

Beale, D.M. and A.D. Smith. 1970. Forage use, water consumption, and productivity of pronghorn antelope in Western Utah. Journal of Wildlife Management 34:570-582.

Burke Museum of Natural History and Culture. [Online]. Available at: http://biology.burke.washington.edu/herbarium/imagecollection.php (Accessed 3 Feb 2011). University of Washington, Seattle, WA.

Cane, J.H. 2011. Unpublished data. USDA ARS Bee Biology and Systematics Lab, Logan, UT.

Charters, M.L. 2011. California Plant Names: Latin and Greek Meanings and Derivations. [Online] Available at: http://www.calflora.net/botanicalnames/ (Accessed 3 Feb 2011).

Dunne, R. 2011. Personal communication.

High Country Gardens. 2011. [Online] Available at: http://www.highcountrygardens.com/catalog/product/91940 (Accessed 3 Feb 2011).

Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle and London.

Jensen, S.L. 2011. Personal communication.

Kildisheva, O.A. and A.S. Davis. 2011. Unpublished Data. University of Idaho Center of Forest Nursery and Seedling Research, Moscow, ID.

Lyons, C.P. and B. Merilees. 1995. Trees, Shrubs and Flowers to Know in Washington and British Columbia. Lone Pine Publishing, Auburn, WA, Vancouver, BC and Edmonton, AB.

Native American Ethnobotany Database. 2011. [Online] Available at http://herb.umd.umich.edu/ (Accessed 1Feb 2011). University of Michigan, Dearborn, MI.

Page, R.J., D.L. Goodwin, and N. E. West. 1966. Germination requirements of scarlet globemallow. Journal of Range Management 19:145-146.

Pendery, B.M. and M.D. Rumbaugh. 1986. Globemallows: forbs for Utah rangelands. Utah Science 47:41-45.

Roth, T.E., J.L. Holechek, and M.Y. Hussain. 1987. Germination resposne of 3 globemallow species to chemical treatment. Journal of Range Management 40:173-175.

Rugged Country Plants. 2011. [Online] Available at: http://www.ruggedcountryplants.com/sphaeralcea.munroana.htm (Accessed 1 Feb 2011).

Rumbaugh, M.D. and B.M. Pendery. 1993. Registration of ARS-2892 Munroe globemallow. Crop Sci. 33:1108.

Rumbaugh, M.D., H.F. Mayland, B.M. Pendery, and G.E. Shewmaker. 1993. Utilization of Globemallow (*Sphaeralcea*) taxa by sheep. J. of Range Mgmt. 46:103-109.

Rydberg, P.A. 1917. Flora of the Rocky Mountains and adjacent plains, Colorado, Utah, Wyoming, Idaho, Montana, Saskatchewan, Alberta, and neighboring parts of Nebraska, South Dakota, and British Columbia. The author, New York.

Sabo, D.G., G.U. Johnson, W.C. Martin and E.F. Aldon. 1979. Germination requirements of 19 species of arid land plants. USDA Forest Severvice Research Paper RM-210. Rocky Mountain Forest and Range Esperiment Station, Fort Collins, Colorado.

Smith, A. and H. Kratsch. 2009. Seed Propagation of Sphaeralcea (Globemallow). Hortscience 44:1139-1140.

Tepedino, V. 2010. Globe mallow bee (*Diadasia diminuta*). [Online] Available at http://www.fs.fed.us/wildflowers/pollinators/pollinator-of-the-month/globe_mallow_bee.shtml (Accessed 2 Feb 2011). ARS Bee Research Lab, Logan, UT.

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