

## *Eremalche parryi*

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### **Taxonomy-**

*Eremalche parryi* is a herbaceous annual from the Malvaceae family. It is also known by the common name of Parry's Mallow. Recently, the taxonomic naming has come under some confusion with a close relative, Kern Mallow, a plant on the endangered species list. The naming convention of *Eremalche parryi ssp. parryi* is also used to indicate Parry's Mallow (Cypher, 2002). Kern Mallow is identified as *Eremalche parryi ssp. kernensis*.

### **Geographic Distribution-**

Parry's mallow is native to North America, specifically the United States. The plant is endemic to California where it can be found in the Sierra Nevada Foothills, the San Joaquin Valley, the San Francisco Bay Area, the Western Transverse Ranges and both the Inner and Outer South Coast Ranges (Andreason & Bates, 2012). This includes 13 counties in California (USDA Plants Database, 2013). *E. parryi* is found roughly between 35 and 45 North latitude but there is no published data on this information.

Many reports show *E. parryi* growing on south facing slopes and on tops of sand dunes. Most reports show it growing in soil such as decomposed granite, sand or gravel, indicating that this plant grows best in a drier, well-drained soil. This may indicate that the plant is quick to produce a fibrous root system to anchor itself into unstable soil that other plants may not be able to grow in and may demonstrate the root system is able to scavenge for resources in less than fertile soil conditions. Some reports show the plant growing between 4-5 feet tall, even in less than ideal soil conditions. *E. parryi* grows at a variety of altitudes ranging from 32 meters above sea level up to 1500 meters with a majority of reports between 30-400 meters above sea level (Calflora, 2013). There are no reports that indicate this plant is an invasive threat. It has remained endemic in California since its discovery.

## **Native Habitat-**

*E. parryi* grows best in well drained soil, as established by its growth patterns on gravelly or sandy hillsides. It prefers full sun as is indicated by its appearance primarily on south facing slopes of hills. *E. parryi* appears to be a short day plant as indicated by its March/April/May flowering period. The seeds germinate best when covered with a thin layer of vermiculite or soil and will germinate in January in their native environment. This is typically after the monsoon season in California. The plant is known to grow in areas that are also habitat for many herbaceous plants and woody shrubs including *Eriogonum elongatum*, *Eriogonum nudum*, *Camissonia strigulosa*, *Gilia minor*, *Hemizonia kelloggii* and *Hornungia procumbens*.

## **Taxonomic Morphology-**

The stem of *E. parryi* is typically erect and less than 50cm tall. Often ascending basal branches can be seen. Tips of stems are often densely hairy in a radial pattern. Leaves are generally 2-5cm wide and deeply lobed to dissected, with 3-5 lobes per leaf. The lobe tips are deeply toothed. The plant has a fibrous root system that measured 28.575cm long in a seven-week-old potted plant. This enables the plant to anchor itself loose soils. There are no identified underground storage organs.

*E. parryi* produces mostly perfect flowers but cases of pistillate flowers have been observed. Colors of the corolla can vary from mauve, purple or rose-pink and occasionally, but rarely, white or lavender petals have been observed. There are five petals and five sepals. Petals are 5-19 mm long with 5-10 mm abruptly acuminate sepals behind the petals (Andreason & Bates, 2012). Flowers are often held in loose terminal cymes (Munz, 1959) The ovary is superior and contains between 8-24 carpels, which together can produce a wheel like fruit when fertilized. The cross section of the segments of this fruit is wedge shaped with a ridged outer wall. The plant flowers in March, April and May and fruits are ready for collection when the wheels are absent of green coloring, typically when they are light yellow or brown. The flowers and fruits mature indeterminately so a longer flowering period is possible within the three month window and it is likely the fruits won't mature at the same time (Borders, 2006).

There is no known uses for this particular species of *Eremalche*, but its placement in the mallow family may indicate several important medicinal applications. The primary medicinal effects of most mallows is to soothe and heal mucous surfaces. Leaves and roots, and both green and ripe seeds have been used to treat malaria, fever, pain, variola, and also have antibacterial, anti-inflammatory, analgesic and hepatoprotective properties (Konate et. al, 2012). Pulp from plants in the mallow family have been known to alleviate a variety of skin issues including bruising, scrapes, cuts, boils and stings. Since cotton is the only plant in this family that has established toxicity, the use of *E. parryi* should be further researched to establish if it is safe for human contact.

#### **Name and Description of Cultivars on the Market-**

There are no known cultivars on the market.

#### **Propagation Methods-**

Seed is the ideal form of propagation. Each flower will produce between 8-24 wedge-shaped seeds. There does not appear to be dormancy requirements for the seeds but further research should be conducted to establish whether dormancy exists or not.

Greenhouse experimentation indicated accelerated germination with increased temperature and cover. Eighty seeds were planted in a 128 plug tray and half were covered lightly with vermiculite and half were left uncovered. The tray was placed in a mist house where it received water at regular intervals and was kept at a constant temperature. At 21°C, germination occurred within the week producing 15 sprouted seedlings from the covered group and 7 from the uncovered. In its native habitat, the plants typically germinate in mid-January (Borders, 2006), where the average temperature is around 13°C. This temperature should allow the seeds to germinate within three weeks. For greenhouse production, covering seed and maintaining a higher temperature can accelerate germination in a controlled environment more than can typically be seen in the wild.

#### **Product Specifications-**

For cut flowers, the ideal plant will have several long stems with few leaves and inflorescences

larger than one inch. For use in baskets or in the landscape, dwarf varieties should be grown to keep stems short but still have many large inflorescences. For medicinal purposes, the ideal plant would have large thick leaves and stems that can be used for pastes and ointments.

### **Market niche-**

*E. parryi* will ideally be sold in the very early spring. If seeded early, plants could potentially flower earlier making this plant usable for either Valentine's Day or Easter. Since the flowering can continue until May, it might also make a good Mother's Day plant, although flowering time will be brief that late in the spring and so close to the increasing day length. This plant could be forced year round through the use of shade cloths but the flowering would likely cease once it is out in a natural environment during a long day season.

The flower for this Parry's Mallow looks similar to a hellebore but the hellebore appears to produce significantly more flowers than the wild Parry's Mallow. Hellebore tends to flower around the same time as well. However, the hellebore is a perennial whereas *Eremalche parryi* is an annual. Until proper breeding programs have been put in place to increase the desirable characteristics in this plant, it serves well as a native plant to be installed in dry, temperate climates during the winter months for adequate flowering.

As there is limited history available for this plant, attracting the average consumer may prove difficult. However, rare plant enthusiasts may enjoy its disinclination to spread by any means other than the human hand. It is also closely related to an endangered species of mallow known as Kern Mallow or *Eremalche parryi ssp. kernensis*.

Initial limitations with this plant include the short growing season and its ability to grow solely in temperate climates. This limits the geographic distribution this plant is marketable in. It could be grown indoors but would not be ideal due to its size. Outdoor growth is limited by the locale. *E. parryi* has been known to be a favorite plant for jackrabbits and desert cottontails to feed on and has documented infection by certain scale insects (Borders, 2006). These issues could be problematic for

production in the cut flower industry.

Information in the ornamental market is limited, outside of botanists and horticulturalists studying native plants of California.

Seed harvesting seems to be a simple procedure and with proper techniques, enough seed could be supplied to start sales on the wild type within two years. However, breeding programs to improve certain characteristics, such as flower color and size, time of flowering or size of leaves, could take significantly longer. See section on Needs Assessment for Genetic improvement for further information.

### **Anticipated Cultural Requirements-**

*E. parryi* is currently winter hardy in zones 7a-9b and has a heat zone tolerance of between 8-9. The plant will germinate well with a temperature of around 21C, but grows naturally in warmer climates with highs around 33C and lows around 18C. Plants grow best in full sun(500  $\mu\text{mol m}^{-2} \text{s}^{-1}$ ), with day length shorter than 12 hours to allow for flowering. Foliage will continue to grow throughout the summer when day length is around 16 hours. Plants do well in a greenhouse setting with daily fertilization at a constant liquid feed of 125 ppm N constant liquid feed (CLF) 15-5-15 Cal Mag. In its native habitat, fertilization is not necessary and it appears to adequately scavenge for nutrients in the soil. *E. parryi* prefers well drained soil, such as a light sandy loam (Borders, 2006). During experimentation, the plants grew well in a 50/50 combination of bark and LC8 growing medium. Plant growth regulators were not experimented with, and there is no known documentation of using them, but they could prove useful to keep the plants dwarfed before breeding programs have been established. There is no known disease susceptibility in *E. parryi* but it is a known host to certain scale insects. Insecticides may be effective against these insects but they don't appear to be a problem in the natural environment, only in nursery settings.

### **Complete Production Schedule**

*E. parryi* takes approximately seven weeks from seeding to flower bud formation. It should be

planted in week 1, or possibly in December of the previous year before sale. Plants take 1-2 weeks in a mist house setting for germination, and can be transplanted around week 4. Roughly 1-2 weeks is needed from flower bud formation to flower development. If shipping in a plug tray, the plant has a substantial root system on it at three weeks and should withstand shipping. Roots grow quickly but shipping should be delayed after transplanting for one week to allow the plant to properly root. There are no necessary chemical treatments known for this plant.

Without breeding intervention, this product can ideally be sold in hanging basket arrangements due to its ability to withstand drought and preference of a well-drained soil. Since it is a short day plant, this product will only work in hanging baskets destined for climates that have moderate temperatures in the winter and spring seasons. Other plants that could be included in the basket may be Baby's Breath (*Gypsophila repens*), Euphorbia (*Euphorbia antiquorum*), bacopa (*Sutera cordata*) or verbena (*Verbena xhybrida*), all which will keep the hanging basket flowering longer through the summer months. The intricate foliage of *E. parryi* will continue to grow throughout the season and will make the hanging baskets visually interesting well after blooming.

#### **Needs Assessment for Genetic Improvement-**

Since *E. parryi* is a short day plant, hybrid creation is one alternative to increase the flowering time. Since there is no known plant in the *Eremalche* genus that has a longer flowering period, this may not be possible. It is also not an economically feasible option for a plant that doesn't already have a very showy flower. If medicinal properties are found in the plant, conventional breeding techniques may be used to increase the size of the foliage for use in topical creams and ointments. Conventional breeding techniques can also be used to improve flower size and stem length if it to be used for cut flowers.

## Literature cited

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