***Lepidospartum burgessii* B.L. Turner** gypsum scalebroom
ASTERACEAE

Synonyms: none

General Description.—The common name for *Lepidospartum burgessii* is gypsum scalebroom or Burgess's broomshrub. The botanical name comes from the Greek, "lepidotus" meaning scaly and "spartium" meaning broom (Gledhill 1992). There are two other species in the genus *Lepidospartum* but neither is sympatric with gypsum scalebroom (Baldwin and others 2002). The range of *Lepidospartum latisquamum* S. Wats. extends from southern California to Utah and that of *L. squamatum* (Gray) Gray ranges from central California to Baja California (Baldwin and others 2002). Gypsum scalebroom was relatively recently described (Turner 1977). Prior to that time, it is likely to have frequently been mistaken for rabbitbrush, *Chrysothamnus nauseosus* (Pallas *ex* Pursh) Britt. Gypsum scalebroom is a woody shrub with numerous stems growing up to 1.2 m tall. The stems have multiple branches and are covered with silvery, matted, felt-like hairs out of which protrude numerous small oil blisters. The leaves are needlelike, alternate, and 5 to 12 mm long. There are three or four terminal flower heads on stems with three, rarely four, bright yellow flowers per head. The achenes are covered by dense white hairs and topped by a pappus of many slender bristles. Although gypsum scalebroom has been mistaken for rabbitbrush, the three rounded bracts of the involucre on the flower heads clearly distinguish it from any species in that genus.

Range.—Gypsum scalebroom is both a geographic and substrate endemic being restricted to certain gypsum soils in an approximate 1,000 square km area in northern Culberson County, Texas, and southern Otero County, New Mexico.

Ecology.—Gypsum scalebroom is found only on the gypsum flats at the fringe of the northern Chihuahuan Desert. Dick-Peddie (1993) designated the region Chihuahuan desert scrub whereas some authorities have regarded the whole area as part of the desert plains grassland (Humphrey 1958). The latter designation may be more appropriate for the relatively small areas where gypsum scalebroom occurs because creosote bush, which is the dominant shrub of the Chihuahuan desert scrub vegetation type, does not occur with gypsum scalebroom. Shrubs and sub-shrubs associated with Gypsum scalebroom include *Atriplex canescens* (Pursh) Nutt., *Opuntia leptocaulis* DeCandolle, and *Yucca elata* (Engelm.) Engelm. as well as *Tiquilia hispidissima* (Torr. & Gray) A. Richards. *Poliomintha incana* (Torr.) Gray is a common associate, and *Allenrolfia occidentalis* (S. Wats.) Kuntze is also observed to a lesser extent in Texas. Associated grasses include *Bouteloua breviseta* Vasey, *Sporobolus nealleyi* Vasey, and *Sporobolus airoides* (Torr.) Torr. *Gallardia multiceps* Greene, *Senecio warnockii* Shinners and species of *Mentzelia* and *Isocoma* are common forbs associated with gypsum scalebroom, although their contribution to the ground cover is low. Plants colonize two habitats, semistabilized gypsum dunes and relatively compacted gypsum soils at the edge of dry alkaline lakes (Powell 1998). In New Mexico the plants generally grow on stabilized, microbiotic-covered, gypsum soils with approximately 5 percent basal vegetation/litter cover. In Texas and at one site in New Mexico, shrubs grow on more mobile gypsum dunes with an average of 20 percent basal vegetation/litter cover (Ladyman and Gegick 2001). The plants occur singly or in scattered colonies. The climate in this area is relatively extreme with summer temperature highs between 34 ^{o}C and 41 ^{o}C and winter temperature ranging from lows of –2 ^{o}C and

highs of 14 ^{o}C. Freezing is common during this time. Precipitation comes primarily during the summer (ranging from 13.1 to 46.8 cm). However, substantial spring rains have been reported, and there is a high degree of year-to-year variability characteristic of most arid and semiarid climates (Noy-Mier 1973).

Reproduction.—The peak of flowering is during late July through early September, but within a population, flowering can extend from late April to early October. The number of flowers per shrub is highly variable; from one flower to literally hundreds of flower heads on any given shrub. There does not appear to be a close relationship between the size of the plant and the number of flowers because the largest shrubs are often in a decadent condition, that is, with more than 50 percent dead wood. In 1991/1992 and 1997 plants were counted in seven colonies in New Mexico (Huenneke 1991, Ladyman and others 1999). Approximately 15 percent of the individuals counted within those colonies in 1991/1992 were dead in 1997. The number of juvenile plants had also declined. Recruitment is only by clonal propagation. No seeds have been observed despite abundant yellow flowers and apparently adequate pollinators (Ladyman and others 1999). The results of studies on pollen germination on stigmas indicate an incompatibility system is operating (Ladyman and others 1999). The prematurely stunted pollen tube growth observed by florescent microscopy is indicative of sporophytic incompatibility, which is typical of members of the Asteraceae and other species with trinucleate pollen (Ladyman and others 1999, de Nettancourt 1977).

Growth and Management.—Gypsum scalebroom responds to irrigation and fertilization and can grow to over 1.5 m with luxurious silvery foliage in cultivation (author's personal observation). Transplantation is possible, but the success rate is not known. In 1998, two potential disease problems were identified. *Corythuca marmorata*, a known pathogen of some Asteraceae species, caused leaf loss and stem necrosis. A potential pathogenic fungus, *Alternaria alternata*, was observed within some flowers (Rotem 1994, Ladyman and Gegick 2001). Genetic diversity appears to exist between the Texas and New Mexico populations. The involucre length of plants growing in Texas was significantly longer than from those in New Mexico (Ladyman and Gegick 2001). It is unknown if individuals between these two populations are reproductively compatible. Some protective measures, including erecting exclosures, have been made for some colonies growing in an Area of Critical Concern and managed by the Bureau of Land Management (BLM 1997). This species appears to be facing relatively imminent extinction. From a simple model that assumed the rate of death was linear, extinction is predicted within 35 years (Ladyman and others 1999).

Benefits.—Gypsum scalebroom is visited by a wide variety of arthropods and possibly provides cover and food for small wildlife species. It is unlikely to be palatable to livestock, but they do appear to brush against it even if they do not use it as food (anecdotal information from ranchers in area and author's personal observation). This is likely due to the absence of other large shrubs in the region. It is a beautiful silvery ornamental shrub. It has been suggested that one way to slow its eventual extinction is to introduce it into the horticultural and landscape trade.

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