***Fouquieria splendens* Engelm.** ocotillo
FOUQUIERIACEAE

Synonyms: none

Illustration credit: Tonia Masaood

General Description.—The common name for *Fouquieria splendens* is Ocotillo. This is a relative of the renowned boojum tree (*Fouquieria columnaris*) of Baja California. Ocotillo is an erect shrub with several spiny ascending stems that grow up to 3 m tall. A mature individual may have as many as 75 stems (Epple 1995). The leaves are oblanceolate to oblong-obovate and only 10 to 25 mm long. The bright scarlet flowers are showy, and an individual may flower several times during the year. The flowers are arranged in an 8 to 25-cm -long panicle. Each flower has a tubular corolla, five petals, and 10 to 15 exerted stamens. The seed capsule is ovoid and incompletely three-celled. The flat seeds are white with a fringe of hair-like filaments. Flowering is from March to June depending upon latitude (Martin and Hutchins 1980).

Range.—Ocotillo occurs in Arizona, southern California, New Mexico, Nevada, and Texas in the USA. In Mexico it occurs in Sonora, Coahuila, Chihuahua, Durango, Zacatecas, San Luis Potosí, Hildalgo, and Baja California (Mason and Mason 1987).

Ecology.—Ocotillo grows in shallow soils on mesas, outwash plains, and rocky slopes from sea level to as high as 2,050 m elevation in the Guadalupe and Del Norte mountains of the Trans-Pecos region of Texas. Soils are generally rocky, shallow, well-drained, and of limestone or granitic origin and are often underlain by caliche (Mathews 1994). Although not restricted to calcareous soils, ocotillo tends to be characteristic of a calcareous community (Schmutz and others 1992). It has a relatively shallow root system (Burgess 1995). It is often found on southern facing slopes. In Mexico it also occurs in both the Sonoran and Chihuahuan deserts. Communities in which it commonly occurs are mesquite-grasslands (Mason and Mason 1987), high desert bunch-grass (Schmutz and others 1992), desert scrub (Van Devender 1995) and mesquital (mesquite), motorral desértico microfilo (fine-leaf desert shrubland), and pastizal (grassland) defined by Flores-Mata and others (1971).

Reproduction.—Ocotillo may self-pollinate to a limited extent, but flowers are generally cross-pollinated by hummingbirds and bees. In southern Arizona flowering coincides with the northward migration of hummingbirds (Mathews 1994). Seed set per flower is greater for plants flowering during migration than for plants flowering after hummingbirds have migrated (Rathcke and Lacey 1985, Waser 1979). The winged seeds of ocotillo are probably wind dispersed.

Growth and Management.—Ocotillo is a long-lived stable element of desert vegetation but with apparently specialized requirements for seed germination that limit its capacity to exploit opportunities for population expansion (Zedler 1981). There seems to be no significant change in the distribution and abundance of this species within the recent past. Evidence suggests that ocotillo habitat has increased as grasslands have declined (Van Devender 1995). However, considering the amount of urban development within octotillo habitat, the actual area occupied by the species may not have changed significantly. It may be significant to overall species sustainability that seedlings are rarely found on disturbed soils (Yeaton and others 1977) but are found under the canopy of mature plants (McAuliffe 1988, Young and Young 1986). It is a slow-growing species, and estimates of its life span range from less than 60 to greater than 72 years (Mathews 1994). It is likely that life span is related to latitude and substrate. The leaves are winter- and drought-

deciduous (Schmutz and others 1992). The leaves appear after rains and are a reliable indicator of recent rainfall (Powell 1998). They tend to mature and fall within a few weeks indicating that available photosynthate is limited and that growth is dependent upon precipitation. Ocotillo is a "water storer" in that the stems store relatively large amounts of water that buffer against drought stress (Burgess 1995). Wildfires may be detrimental to ocotillo populations. It rarely sprouts from the root crown following damage from fire, and its sprouting ability is probably dependent on fire severity (Ahlstrand 1982, McPherson 1995, White 1969). Mortality rates of 40 percent to 50 percent were reported after light to moderate fire in Arizona (Thomas 1991). Seedlings are not known to establish in recently burned areas (Mathews 1994), and its seeds are unlikely to survive for long in the soil (Zedler 1981). In fact, burning has been suggested as a control method for woody species, such as *Fouquieria splendens*, in desert grasslands (Mathews 1994).

Benefits.—The endangered Lucifer humming-bird's habitat in New Mexico centers on slopes and adjacent canyons in arid montane areas dominated by ocotillo and agave species (New Mexico Department of Game and Fish 1991). Ocotillo has no recorded forage value, presumably because its leaves are so short-lived (Dayton 1931). Ocotillo plants are popularly used for landscaping. Plants sold in reputable nurseries are obtained from private land under permit. There are typically two "types" of product. Smaller plants are sold in 1 gallon pots or larger specimens are sold "balled and burlapped." Although the plants transplant well if there are sufficient roots attached, many that are dug are not treated well and two thirds or more of those dug up are likely not to survive. Propagation has been reported using cuttings although conversations with horticulturalists indicate that this may be less easy than the literature indicates. The plant can also be grown from seed but is a relatively slow grower. Seeds apparently collected from Mexico can be purchased in the United States (Tradewinds Import-Export Company 2002). This trade between regions where the plant is native does raise the potential for genetic modification, or "dilution," of locally adapted genotypes by cultivated genotypes originally adapted to another region. This may pose a threat although, because of the slow growth and low turnover of individuals, the effects would be a long time in becoming apparent. For example, the cultivated genotypes may have particularly high fecundity and may be physiologically robust but do not have the genetic composition to be resistant to environmental or biological (e.g. disease or insect infestation) events that are periodic (perhaps decades apart) in the local area. Hedges or fences of living stems are common, especially in Mexico. It does not appear to be grown for its medicinal value. Historically the Mahuna Native Americans used it as a "blood medicine" (Moerman 1998). The Apache Indians used powdered roots to treat wounds and painful swellings and they also bathed in an ocotillo root mixture to relieve fatigue (Krochmal and others 1954, Powell 1998, Vines 1960). A beverage made from ocotillo flowers was used for cough medicine (Vines 1960). The Cahuilla, Papago and Yavapai tribes used the flowers in beverages, the fruits for a "candy," and the stalks as building material (Moerman 1998). The thorns were used for ear piercing by the Papago. The resin and wax from ocotillo bark was used for conditioning leather (Krochmal and others 1954, Powell 1988, Vines 1960). It seems that all uses are localized, personal, or historic in the Southwestern United States. It is not known if ocotillo is more widely used today in Mexico.

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