

**ARIZONA GAME AND FISH DEPARTMENT  
HERITAGE DATA MANAGEMENT SYSTEM**

**Plant Abstract**

**Element Code:** PDEUP0Z010

**Data Sensitivity:** No

**CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE**

**NAME:** *Manihot davisiae* Croizat  
**COMMON NAME:** Arizona Manihot, Cassava  
**SYNONYMS:** None  
**FAMILY:** Euphorbiaceae

**AUTHOR, PLACE OF PUBLICATION:** Croizat. 1942. Jnl. Arn. Arb. 23:224.

**TYPE LOCALITY:** Arizona: Pima County: Santa Catalina Mountains.

**TYPE SPECIMEN:** US 62129. J. G. Lemmon s. n. 27 August 1883.

**TAXONOMIC UNIQUENESS:** The genus *Manihot* is distributed in tropical and subtropical areas of the New World and contains approximately 100 species (Steinman and Felger 1997). There are two species of *Manihot* in Arizona (Lehr 1978).

**DESCRIPTION:** Non-technical: Slender perennial shrub with semi-woody stems, to about 9 feet tall (usually much smaller in Arizona). The alternate, light green to dark green, glabrous leaves have long petioles and are palmately 5-7 lobed. The primary lobes of the leaves are typically broadest toward the apex. The flowers can be either male or female on the same plant, with proximal female flowers and distal male flowers. Flowers are yellow-green and lack petals, instead having a 5-lobed calyx. Fruit is in the form of a globular capsule, approximately 0.7 inches long on a pedicel that is also ca. 0.7 inches long (Phillips et al. 1982, Steinman and Felger 1997, Rodgers and Appan 1973).

Technical: Erect perennial shrubs 1.0 - 3.0 m tall, cespitose, woody at the base. Stems glabrous, grayish brown. Leaves alternate, stipules deciduous, glabrous; petioles usually ca. 10.0 cm long, terete, glabrous; lamina non-peltate, dorsal and ventral surfaces glabrous, abaxial surface wax pattern smooth; venation camptodromous; palmately 7 lobed, 3 major, 2 smaller and often 2 more minute lobes; median lobes usually ca. 10.0 cm long, rhomboid, entire lobed or rhomboid pandurate, 3.0 - 4.0 cm wide, rarely narrower, pandurate lobes usually with a prominently dilated apical lobule, apex acuminate. Inflorescence, a monoecious axillary raceme, usually short, ca. 8.0 cm in length, occasionally longer, all part glabrous; bracteoles nonfoliaceous less than 0.3 cm, margin smooth; bractlets setaceous. Pistillate flowers restricted to the base of the inflorescence, borne on short (ca. 1.5 cm long) pedicels, tepals not seen. Staminate flowers campanulate ca. 1.2 cm long, tepals yellowish-green without any purplish pigmentation, cleft 1/3 of the way down into 5 lobes, lobes

oblong-obtuse, not prominently reflexed at anthesis; disc fleshy, 10 lobed; stamens 10, in 2 whorls of 5 each, longer ones ca. 0.8 cm long, shorter ones ca. 0.6 cm long, filaments and anthers cream colored. Fruit pedicels ca. 1.5 cm long, slightly curved downwards; capsules depressed globular, ca. 1.5 cm long from base to apex, surface nearly smooth without wings, apex depressed; fruit dehiscence loculicidal, the commissural sutures not disjoining. Seeds almost rotund, ca. 1.24 cm long; basal end prominently bulged in contrast to the tapering carunculate end, caruncle not prominent (Rodgers and Appan 1973, Phillips et al. 1982).

**AIDS TO IDENTIFICATION:** The only other *Manihot* in Arizona is *M. angustiloba*, which occurs sympatrically with *M. davisiae*. According to Phillips et al. (1982), the only visible difference between *M. davisiae* and *M. angustiloba* is in the lobation of the leaves. *M. angustifolia* has leaves that are deeply, palmately lobed, with the lobes being narrowly linear (not largest near the tip). Croizat (1942) also used the orbicular shape of the seeds of *M. davisiae* to separate the two species. Shreve and Wiggins (1964) stated that separation of these two species by seed characters does not hold up, because nearly orbicular seeds can also occur in *M. angustifolia*.

**ILLUSTRATIONS:** Line drawing (USFWS).

**TOTAL RANGE:** Southern Arizona and Mexico (Chihuahua, Sonora, and Sinaloa).

**RANGE WITHIN ARIZONA:** Pima County: Baboquivari, Las Guijas, Santa Catalina, and Santa Rita Mountains. Santa Cruz County: Santa Rita Mountains.

### **SPECIES BIOLOGY AND POPULATION TRENDS**

**GROWTH FORM:** Perennial shrub

**PHENOLOGY:** Typically flowering in mid-July and August in Arizona, setting fruit in August and early September. Steinman and Felger (1997) list the flowering/fruitlet period in Sonora as August-October.

**BIOLOGY:** Phillips et al. studied 3 populations in 1980 and 1981. The percentages of reproducing plants in these three populations were 15%, 45%, and 60%. The presence of seedlings in all 3 populations was noted. A few plants had unspecified insect damage to the leaves and a large green Sphinx moth larva was observed eating the leaves of 1 plant (Phillips et al. 1982).

**HABITAT:** In Arizona, this species occurs in 2 different types of habitat. The most common habitat in Arizona is dry, rocky slopes in foothills and mountains. This species can also be found in Arizona in ecotonal areas between Sonoran desertscrub and canyon riparian vegetation types in mountain canyons (Phillips et al. 1982). This species is most often found on rocky basalt slopes in Mexico. The vegetation of the habitat of this species is variable in Mexico but includes thornscrub, tropical deciduous forest, upper margins of Sonoran desertscrub, and lower margins of oak woodland (Martin et al. 1998, Steinman and Felger

**ELEVATION:** Arizona: 3,100 - 4,500 feet (946-1373 m). Mexico: 330 - 4,850 feet (101-1479 m).

**EXPOSURE:** Various, but typically southwest to southeast. Rogers and Appan (1973) postulated that most *Manihot* species are heliophiles, growing where there is little to no shade.

**SUBSTRATE:** Shallow and rocky soil, often among basalt rocks or on limestone (Phillips et al. 1982). Broadly speaking, *Manihot* species are often found on limestone or limestone derived-soils (Rogers and Appan 1973).

**PLANT COMMUNITY:** This species has been collected in Arizona in semi-desert grassland communities and in canyon bottoms within the Arizona upland subdivision of Sonoran desertscrub communities, as defined by Brown (1994). Some associated species in Arizona include *Fouquieria splendens*, *Mimosa dysocarpa*, *Janusia gracilis*, *Carnegie gigantea*, *Cercidium sp.*, *Prosopis sp.*, *Eriogonum wrightii*, *Erythrina flabelliformis*, *Vauquelinia californica*, *Haplophyton crooksii*, *Quercus sp.*, etc (Phillips et al. 1982).

**POPULATION TRENDS:** Population trends are apparently unknown. The 3 populations mentioned in Phillips et al.'s (1982) status report on this species contained 25, 200, and 55 plants. All populations were reproducing at the time and seedlings were present in each population.

### **SPECIES PROTECTION AND CONSERVATION**

**ENDANGERED SPECIES ACT STATUS:** None (USDI, FWS 1996)  
[3C USDI, FWS 1985]  
[C1 USDI, FWS 1980]

**STATE STATUS:** None

**OTHER STATUS:** Forest Service Sensitive (USDA, FS Region 3 1990, 1999, 2013)

**MANAGEMENT FACTORS:** Although Phillips et al. (1982) noted no evidence of cattle grazing on this species, they did mention that cattle grazing is modifying the habitat of this species in the Santa Rita Mountains. Several populations are located in canyons that see a fair amount of human recreation.

**CONSERVATION MEASURES TAKEN:** This species has been listed as "Forest Service Sensitive" since 1990. One population occurs within the Pusch Ridge Wilderness in the Santa Catalina Mountains.

**SUGGESTED PROJECTS:** Known populations should be monitored to some extent. Areas of suitable habitat should be searched for more populations, especially areas adjacent to known

**LAND MANAGEMENT/OWNERSHIP:** USFS Coronado National Forest (Nogales and Santa Catalina Ranger Districts), Arizona State Land Department, BIA Tohono O'odham Nation, and possibly private.

## **SOURCES OF FURTHER INFORMATION**

### **LITERATURE CITATIONS:**

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### **MAJOR KNOWLEDGEABLE INDIVIDUALS:**

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**ADDITIONAL INFORMATION:**

Phillips et al. (1982) recommended dropping from further consideration for federal listing due to lack of threats and taxonomic questions. Since leaf polymorphism is commonly prevalent in *Manihot* species, Rodgers and Appan (1973) cautioned against using leaf outline as a taxonomic character. Some forms of *M. davisiae* at the southern end of their range (Gentry 14293 and 2450) occur that not only have entire lobed leaves, but also mottled seeds that are uncharacteristic of *M. davisiae* (Phillips et al. 1982). Steinman and Felger (1997) mention this in their recent evaluation of this genus, but they recognize *M. davisiae* as a distinct species. It appears that some more taxonomic work and field studies of this taxon are needed. This species is of interest because it is related to *M. glaziovii* (the tree that produces the Ceara rubber of commerce), *M. esculenta* (from which cassava, tapioca, and other foods are derived), and *M. carthagenensis* (which is cultivated in Brazil for the starch in its fleshy roots).

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