UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
TUCSON PLANT MATERIALS CENTER
TUCSON, ARIZONA

NOTICE OF RELEASE OF A SELECTION OF DESERT SALTBUSH

Blythe Germplasm Desert Saltbush

[*Atriplex polycarpa* (Torr.) S. Wats.] from Blythe, California

The U.S. Department of Agriculture, Natural Resources Conservation Service announces the release of a selected ecotype of DESERT SALTBUSH [*Atriplex polycarpa* (Torr.) S. Wats.].

As a "selected" release, this plant will be referred to as Blythe Germplasm desert saltbush to document its original collection location. It has been assigned the Plant Identification (P.I.) number 399195. Blythe Germplasm is released as a selected class of certified seed (natural track).

This alternative release procedure is justified because existing commercial sources of desert saltbush are limited. The commercial sources that do exist have not been tested for performance in ecosystem restoration. The potential for immediate use is high. No commercial cultivars of desert saltbush have been released at this time.

Species:	*Atriplex polycarpa*
Common Name:	desert saltbush
Plant Symbol:	ATPO
Accession Numbers:	A-18348, P.I. 399195

Origin: Stands are located 16 km north of Blythe, California along Highway 95, at an elevation of 268 m. The stand is located to the east side of Highway 95 and west of the Colorado River, outside the boundaries of the Colorado River Indian Reservation. Very little variability was observed within the collection area. This variability was determined to be inconsequential. Therefore, any collection of desert saltbush located within 1 km north and south of this location will be considered a constituent of this source identified release. Wendall Hassell originally collected this accession in November 1973 (see Map 1).

Description[1]**:** Desert saltbush (*Atriplex polycarpa*) is a perennial, low, rounded, erect intricately branched shrub 1-2 m tall, with gray or yellowish-brown branches, the bark shed in long strips. The leaves are alternate, crowded on young twigs, oblong to spatula-shaped, 3-20 mm long, coated with small scales on both sides of the leaf. One-veined from the base. Male and female flowers are borne on separate plants; the male in leaf axils or on terminal spike; the female crowded along the numerous divergent branches in diffuse flower clusters. Flowers are tan to greenish in color. The seed is pale brown, 1-1.5 mm long.

Desert saltbush is found on alkaline plains and occasionally rocky or gravelly slopes in desert or grassland and is limited to between 120 - 900 meters (400-3,000 feet) elevation in alkali sinks in communities with creosote bush scrub, shadscale scrub, and sagebrush scrub. It is found in scattered localities in the San Joaquin Valley and Mohave and Colorado Deserts in California, southern Nevada, southwestern Utah and Arizona, Baja California, and northwestern California

[1] This information is taken from Mohave Revegetation Notes, U.C. Davis, Agronomy and Range Science, Publication Number 18, November 1977 by K.L. Burgess, C.R. Brown, and W.L. Graves. This publication reports on work supported by the BLM - Contract # 53400-CT4-2(N), Document Obligation No. 6809.

(Munz 1974; Benson and Darrow 1954). It is less extensive than *Atriplex canescens* in geographic distribution (Hastings et al. 1972), and less cold tolerant and more drought hardy (Nord 1977). It is reported to flower from May to August, with fruit ripening from October to December and seed dispersal occurring from November to May (Folles, 1974).

Phosphorous content in the soil is significantly correlated with yield of aerial plant parts (Lailhacar-Kind 1976). Although extremely tolerant of salt in the environment, its germination has been found to be reduced with higher salt concentrations (Chatterton and McKell 1969). Large quantities of salt are accumulated in the shoots. Salinity tolerance may be due to an accumulation of salt in the trichomes on the leaf surface from adjacent mesophyll cells, reducing salinity stress of photosynthetically active tissue (Chatterton 1970). Adult plants have been tested and found to withstand shoot water potential deficits of -69 bars (Sankary and Barbour 1972).

It does not accumulate nitrate even in high-nitrate environments (Chatterton et al. 1971a). *Atriplex polycarpa* flourishes on soils unsuitable for most other species, and is usually absent from less saline soils due to competition from more aggressive species (Lailhacar-Kind 1976).

Desert saltbush has been proposed as the best species to establish in pure stands as quail habitat (Glading et al. 1945). MacMillan (1960) found that a planting rate of 45 kg/ha was adequate to establish a thick stand of saltbush. It establishes easily if adequate moisture is present in the soil, and further care involves only protection from sheep and cattle. A satisfactory management system would allow only limited use during the summer and fall months. The species has been virtually eradicated by overgrazing in many of its original localities (Sampson and Jesperson 1963). Graves et al. (1976) found transplants to be more successful than spot seeding under western Mohave Desert conditions. A saponin content of 1.2% of dry weight has been found in the foliage of *Atriplex polycarpa*. Extracts from increasing quantities of foliage have been found to be increasingly inhibitory to germination of its own seed and that of several other species but will enhance germination of seed of California ephedra (Askham and Cornelius 1971). It is unlikely that the bracteoles of the utriculate fruiting body contain saponin (Sankary and Barbour 1972). Even so, the leaching of seeds has been found to increase germination (Cornelius and Hylton 1969). Activated carbon was the best treatment for speeding initiation of germination. It also resulted in a significantly higher 7-day and 14-day germination. Stratification in moist sand at 2 °C for 30 days, heating at 60 °C for four hours, and exposure to 100 ppm ethylene for 24 hours increased 7-day germination but were not significantly different from the control at 14 days. In addition, scarification, soaking in 6% sodium hypochlorite solution for 24 hours, and soaking in 6% hydrogen peroxide solution for 10 minutes significantly decreased germination at 14 days. Nord et al. (1971) reported best emergence in late spring from a planting depth of 1.25 cm versus 2.5 cm. Williams et al. (1974) obtained no germination of *Atriplex polycarpa* in washed plaster sand at either 1 or 2 cm. Burgess et al. (1977) obtained 13% germination in the same type of medium from a 1 cm depth, using a different seed source. Covering the seed with as little soil as possible (2-3 mm) would probably improve emergence. Chatterton and McKell (1969b) reported higher seed quality and germination from a November collection than from one made in December in 1966. They suggested percentage of seed fill was highest and germination most rapid in seed which matured early. Seeds left to ripen on the plants often germinate while still on the plant. Utricle size has been found to be significantly related to germination. Size catagories greater than 1.7 mm (1/15 inch) gave significantly better 14-day germination than unsorted control utricles. Size catagories less than 1.7 mm gave lower germination than the control. Separating utricles on the basis of size before seeding may improve seeding success.

Method of Selection: This accession was evaluated in two Initial Evaluation Plantings (IEP): 1974 Desert Species IEP and the 1977 Tree, Shrub and Annual Forb IEP. In the 1974 IEP, P.I. 399195 was the most uniform and best-looking accession. It was also noted as the best seed producer in 1974. In the 1974 IEP, P.I. 399195 was evaluated against six native accessions over

a four-year period. In the 1977 IEP, P.I. 399195 was consistently rated higher for vigor and cover. In this IEP, P.I. 399195 was evaluated against eleven accessions over a five-year period.

Ecological Considerations and Evaluation: Blythe Germplasm desert saltbush is a selection of naturally occurring germplasm and has undergone minimal purposeful selection. Blythe Germplasm does not differ significantly in rate or spread, seed production, and vigor from naturally occurring desert saltbush. Blythe Germplasm was "OK to release" when evaluated through the "Worksheet for Conducting and Environmental Evaluation of NRCS Plant Releases".

Anticipated Area of Adaptation: Range of adaptation is primarily MLRA's 30,31 and 40. This includes the Sonoran and Mohave deserts with elevations between 300 and 3,000 feet (91-914 meters) and annual precipitation from 3 to 10 inches (75-250 mm). Potential soils include sandy loam, loam and clay loam, as well as moderately saline soils. It is known to grow well on rangelands with soil pH varying for 6-8 (Nord 1977).

Arizona Ecological Sites[2]

MLRA/Annual Precipitation	Breaks	Loamy Bottom	Loamy Upland	Sandy Bottom	Sandyloam Upland
40-2 / 7-10"				X	
40-2 / 10-13"		X	X	X	X
40-4 / 2-7"	X	X		X	X
40-4 / 7-10"				X	
41-2 / 7-12"	X				

MLRA/Annual Precipitation	Saline Upland	Saline Bottom	Basalt Hills	Limy Fans	Tuff Hills
40-2 / 7-10"	X				
40-2 / 10-13"			X		
40-4 / 2-7"				X	X
40-4 / 7-10"	X				
41-2 / 7-12"		X			
41-3 / 12-16"		X			

Anticipated Conservation Use: The potential use for Blythe Germplasm desert saltbush is primarily as an erosion control plant on mismanaged rangelands and critical areas such as abandoned cropland and road cuts.

Establishment: Properly prepare the planting site and seedbed prior to seeding. Seed can then be drilled, broadcast, or hydroseeded into firm soil at a depth of 0.25-0.5 inches. Heavier textured soils will require a more shallow planting depth. If broadcast seeding is performed, dragging or harrowing to obtain appropriate soil cover should be performed. It is recommended to plant desert saltbush as a 5-10% component of a seed mix. Seed should be planted at the following rates:

Purpose (Land Use)	Seeding Method and Row Spacing	Lbs/acre (PLS)
Soil Erosion Control (Disturbed Lands)	Drill, 6-12" row spacing	0.11-0.22*
Soil Erosion Control (Disturbed Lands)	Broadcast	0.22-0.44**

* Based on 25 seed/ft^2 and desert saltbush representing 5-10% of a seed mix.
**Based on 50 seed/ft^2 and desert saltbush representing 5-10% of a seed mix.

Wildlife Potential: Desert saltbush provides cover for Gambel's quail and dove as well as browse for mule deer and rabbits.

Livestock: *Atriplex polycarpa* has long been noted for its excellent forage qualities (Bidwell and Wooten 1925). It is rated "good for deer; good to fair for cattle, sheep and goats; and fair for horses" (Sampson and Jesperson 1963). It is often found in association with highly unpalatable species and may be the only shrub in areas that are too arid or saline for other species to grow

[2] Ecological Sites in Arizona where the species minimally represents 5% of the plant community.

(Chatterton et al. 1971b). Its greatest forage value is in the fall, when grassland species make a minimal nutritional contribution to the range. Its nutritional value in crude protein, total digestible nutrients, and fats is comparable to that of alfalfa, and late in the year it is a good source of calcium, phosphorous, and carotenoids (Chatterton 1970). Goodin and McKell (1970) have estimated maximum forage yields under cultivation to be 12,822 kg/ha and suggest that cultivation as a forage crop has considerable potential in marginal lands subject to prolonged drought in excessive salinity.

Poisonous Properties: No poisonous properties have been noted in literature reviewed.

Weediness: Desert saltbush is not considered to be a weed.

Availability of Plant Materials: The Tucson Plant Materials Center will maintain seed production blocks of this source identified ecotype. Limited amounts of seed will be available to seed producers interested in seed production block establishment and to researchers as requested and as available.

National Environmental Policy Act (NEPA) Consideration: This material is native germplasm. Weediness and poisonous potential has been determined to be non-significant (see Attachment A. – Environmental Evaluation of Plant Materials Releases). Desert saltbush is not considered a weed. It does not appear in lists of plants with poisonous properties.

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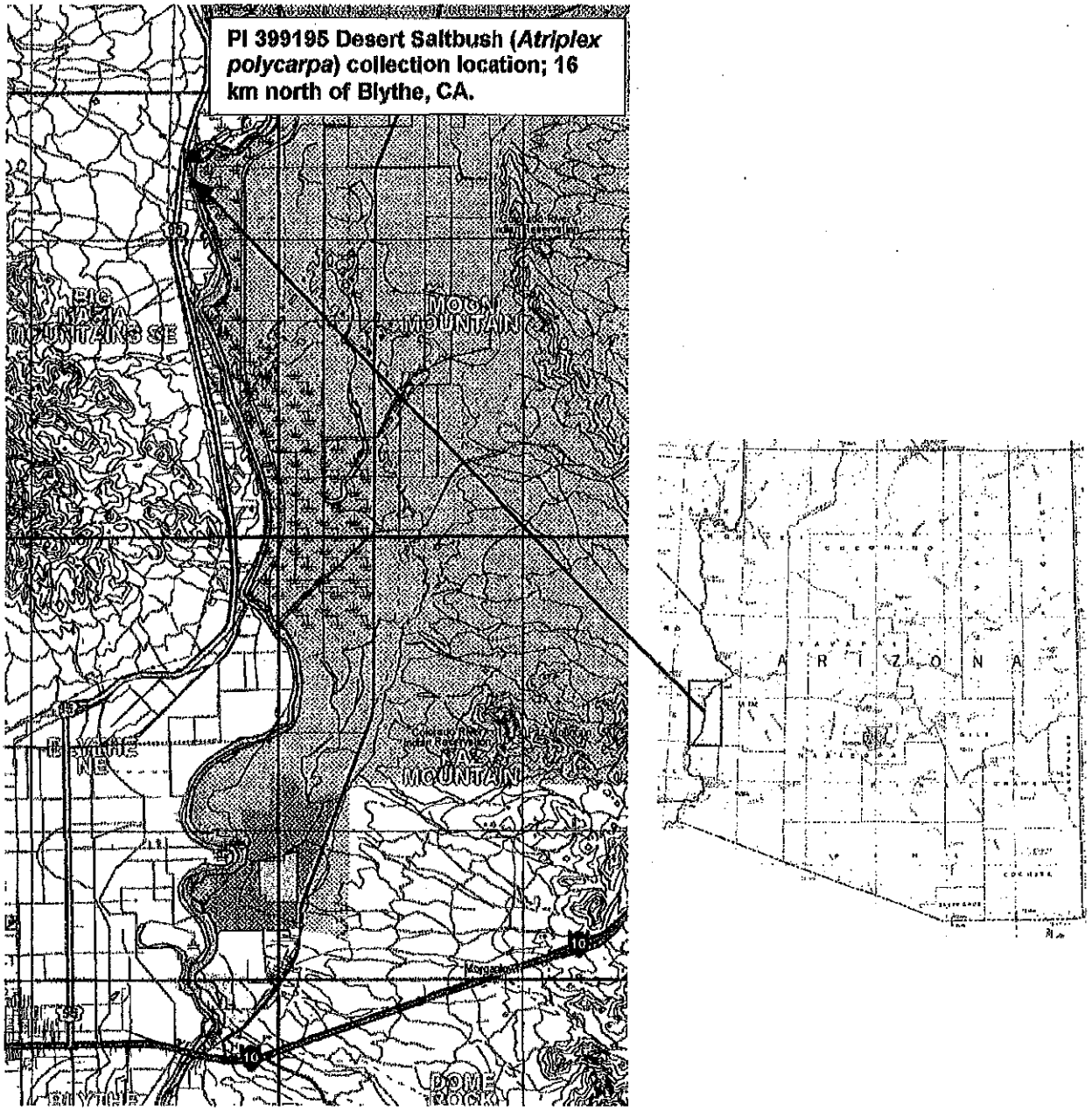
Map 1. Collection location for Blythe Germplasm desert saltbush.