

134.3 Sinaloan Thornscrub

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Sinaloan thornscrub includes the "Thornforest" of Gentry (1942) and Shreve (1937b, 1951), the "Tropical Thorn Woodland" of Hardy and McDiarmid (1969), and is analogous to the "Tamaulipan Thornscrub" of Muller (1947). We would also include most of Shreve's (1951) "Foothills of Sonora" and other communities of his subdivisions of the Sonoran Desert as *Sinaloan thornscrub* (Brown and Lowe, 1974b; Felger and Lowe, 1976). The reasons for this revision are based on both physiognomic and biotic criteria, and include: (1) the abundance of shrubbery and increased participation of short microphyllous trees which together make up a cover of from 20% to 90% with much of the intervening areas held by perennial forbs and grasses, (2) the fact that a large number of dominant and characteristic plant and animal species have their center of distribution and abundance here, e.g. Tree Ocotillo (*Fouquieria macdougalii*) and Elegant Quail (*Lophortyx douglasii*), (3) the absence or poor representation of numerous characteristic Sonoran desert species (e.g., *Larrea tridentata*, *Simmondsia chinensis*, *Cercidium microphyllum*, etc.), and (4) the appearance and often heavy representation of numerous southern tropical forms not found in the Sonoran desertscrub to the north (e.g., *Acacia cymbispina* and *Felis pardalis*).

Sinaloan thornscrub then covers much of southern and southeastern Sonora from near sea level south of parallel 28 to over 900 m in the mountains. Disjunct Sinaloan thornscrub communities occur on Sierra Kunkaak on Isla Tiburón, in the Sierra Santa Rosa, in the Sierra Espinazo Prieto, in the foothills of the Sierra de la Madera, and in other mountains within Shreve's (1951) Plains of Sonora and Central Gulf Coast subdivisions of the Sonoran Desert. Other disjunct thornscrub communities occur at the southwestern edge of semidesert grassland, and some semidesert grassland stands of *Fouquieria splendens* in the Tumacacori, Baboquivari, and Las Guías Mountains in southern Arizona contain *Eysenhardtia orthocarpa*, *Erythrina flabelliformis*, *Dodonaea viscosa* and other constituents of Sinaloan thornscrub, and appear to at least approach thornscrub status. Similar stands in the Rincon Mountains, also in southern Arizona, support such additional thornscrub species as *Tecoma stans*, *Lysiloma watsonii*, and *Acacia millefolia*. Other dense scrub communities occupy mountainous sites and arroyos within Shreve's (1951) "Magdalena" region of the Sonoran Desert and elsewhere in Baja California Sur in which *Lysiloma candida*, *Bursera odorata*, *Prosopis palmeri*, *Opuntia comonduensis*, *Fouquieria splendens*, *Stenocereus thurberi*, *Pachycereus pringlei*, and *Cercidium floridum* ssp. *peninsulare* participate (see e.g. Shreve and Wiggins, 1964:Plate 28).

The basic structure and composition is of drought deciduous, often thorny, pinnate-leaved, multi-trunked trees, and/or shrubs between 2 m and 7½ m in height. Sinaloan thornscrub typically contains as many as 1,600 to 2,000 perennial plants per ha (Gentry, 1942; Fig. 54). Its primary residency is on low hills, bajadas, mesas, and mountain slopes, although it now occupies lowland valleys where it has invaded former savanna grassland. There it still usually presents a more open aspect than on hillsides. Generally, shrubs tend to be more important in the north, trees being more prevalent southward and in the valleys and plains.

Precipitation means normally range from ca. 300-500 mm per year; as low as ca. 230 mm along the coast, to as high as ca. 635 mm (Table 12). Approximately 70% of this rain falls during the July through September growing season. The driest months are April and May, and plant growth is slowed

Table 12. Precipitation data from 11 stations in the Southwest in and adjacent to Sinaloan Thornscrub.

Station	Elevation (in m)	Mean monthly precipitation in mm												Total	Total July thru Sept.	Percent of total
		J	F	M	A	M	J	J	A	S	O	N	D			
Arizpe, Son. 30°20' 110°11'	770	21	8	17	1	2	29	165	113	43	13	12	48	472	321	68
Ojo de Agua, Son. 30°04' 109°47'	770	32	9	29	9	0.3	16	129	94	24	20	6	24	392	247	63
Opodepe, Son. 29°56' 110°38'	640	25	10	18	5	.8	13	125	127	60	29	11	20	444	312	70
Moctezuma, Son. 29°48' 109°42'	609	31	16	13	3	2	27	152	119	61	27	6	27	484	332	69
Baviacora, Son. 29°44' 110°10'	560	19	11	7	2	.3	12	93	76	32	10	21	24	307	201	65
Ures, Son. 29°26' 110°24'	390	18	14	11	9	3	17	133	120	59	30	12	36	462	312	68
Mazatan, Son. 29°00' 110°09'	550	29	18	9	2	1	37	150	134	64	26	7	26	503	348	69
Sahuaripa, Son. 29°03' 109°14'	510	30	16	8	2	2	31	102	94	44	15	9	24	377	240	64
Tonichi, Son. 28°36' 109°34'	183	40	18	7	5	2	67	153	157	67	28	10	33	587	377	64
Obregon, Son. 37°30' 109°56'	51	14	4	4	1	.3	7	79	85	59	22	6	21	302	223	74
Navojoa, Son. 27°25' 109°27'	38	19	5	4	2	1	15	87	103	78	30	8	33	385	268	70

or arrested from December to June. The landscape is then thorny and bare and in great contrast to the summer rainy season when it is luxuriant and green (Fig. 55). Nonetheless, many species including the numerous drought deciduous ones bloom in early spring. In fall, a second, shorter period of dryness occurs, and the leaves of some species turn color before being shed. The red foliage of the Brasil (*Haematoxylon brasiletto*) and Torote Papelito (*Bursera* spp.) are then especially conspicuous as are the yellow leaves of *Jatropha cordata* (Shreve, 1951). Freezing temperatures are unexpected and of short duration.

Quantitative data on plant composition in Sinaloan thornscrub are lacking except for studies by Gentry (1942) which were confined to a few areas in the southern extremity of our Southwest. The following shrubs and trees appear to be some of the most common, or at least conspicuous constituents of Sinaloan thornscrub and are from Gentry (1942), Shreve (1951), and field notes. Whether the species is typically encountered as a tree (T), shrub (S), or either, is indicated.

<i>Acacia angustissima</i> (S)	Whiteball Acacia
<i>A. constricta</i> (S)	Whitethorn, Mescat Acacia
<i>A. cymbispina</i> (T)	Espino
<i>A. farnesiana</i> (T)	Sweet Acacia
<i>A. pennatula</i> (T)	Feather Acacia
<i>Aloysia palmeri</i> (S)	Lippia
<i>Ambrosia cordifolia</i> (S)	—
<i>Bursera odorata</i> (T)	Torote, Chutama
<i>Caesalpinia pumila</i> (S)	—
<i>Ceiba acuminata</i> (T)	Pochote
<i>Celtis pallida</i> (S)	Desert Hackberry
<i>Cercidium sonora</i> (T)	Sonoran Palo Verde
<i>Dodonaea viscosa</i> (S)	Hopbush
<i>Encelia farinosa</i> (S)	Brittlebush
<i>Eysenhardtia orthocarpa</i> (S)	Kidneywood
<i>Fouquieria macdougalii</i> (T)	Tree Ocotillo
<i>Guaiacum coulteri</i> (T)	Guayacan
<i>Haematoxylon brasiletto</i> (S-T)	Brasil
<i>Ipomoea arborescens</i> (T)	Tree Morningglory

Jacquinia pungens (S-T)
Jatropha cardiophylla (S)
Karwinskia humboldtiana (S)
Lantana velutina (S)
Lysiloma divaricata (T)
Mimosa laxia (S)
Olneya tesota (T)
Piscidia mollis (T)
Randia obcordata (S)
Sapium biloculare (S)

San Juan, San Juanito
 Limber Bush, Sangre-de-Cristo
 Coyotillo
 Lantana
 Mauto
 —
 Ironwood, Palofierro
 Palo Blanco
 Papachillo
 Mexican Jumping Bean

Other more or less characteristic shrub and tree species are generally restricted to hillside habitats: e.g., *Randia laevigata* (T), *Acacia willardiana* (T), *Coursetia glandulosa* (S), *Jatropha cordata* (T), *Bursera laxiflora* (T), *Cassia biflora* (S), *Croton fragilis* (S), *Bursera confusa* (T), *Brongniartia alamosana* (T), and *Erythrina flabelliformis* (S-T); while others such as *Pithecellobium sonora* (T), *P. mexicanum* (T), *Acacia occidentalis* (T), *Prosopis juliflora* (T), *Forchammeria watsoni* (T), *Lycium berlandieri* (S), *Zizyphus obtusifolia* (S), *Condalia spathulata* (S), *Karwinskia parviflora* (T), *Jatropha cinerea* (S), *Atamisquea emarginata* (T), and *Guazuma ulmifolia* (S) favor drainages and moister level habitats.

Cacti are nowhere as prevalent as in some areas of the Sonoran Desert. Two species are particularly conspicuous, however: Organ Pipe Cactus (*Stenocereus thurberi*) and the Hecho (*Pachycereus pecten-aboriginum*). The former is a common participant in the more northern reaches of Sinaloan thornscrub, while the Hecho is increasingly common southward where it typically rises above the upper levels of the thornscrub proper—in contrast to subtropical deciduous forest which contains the Hecho within the tree canopy. Other species of cacti locally common are *Rathbunia alamosensis*, *Opuntia fulgida*, *Opuntia thurberi*, and *Lophocereus schottii*, all of which find their greatest abundance in the plains and valleys in contrast to the leaf-succulents which are largely confined to slopes and ridges. Several agaves (e.g.,



Figure 53. Tamaulipan thornscrub along lower Rio Grande between Eagle Pass and Laredo, Texas, ca. 260 m elevation. Summer aspect. A landscape of Texas Ranger or Cenizo (*Leucophyllum frutescens*), Mesquite (*Prosopis glandulosa*), acacia (*Acacia romeriana*, *A. spp.*), and other scrub species. These "brush" and "chaparral" areas have invaded former semidesert grasslands in southern Texas and are now probably best referred to as Tamaulipan thornscrub.



Figure 54. Sinaloan thornscrub between Cucurpe and Rayon, Sonora, ca. 500 m elevation. Drought deciduous aspect in March. A large number of shrubs are present and include: Tree Ocotillo (*Fouquieria macdougalii*), Hopbush (*Dodonaea viscosa*, *Caesalpinia pumila*), Mesquite (*Prosopis juliflora*), and Organ Pipe Cactus (*Stenocereus thurberi*). These and other communities designated by Shreve as the "Foothills of Sonora" subdivision of the Sonoran Desert are Sinaloan thornscrub.



Figure 55. Sinaloan thornscrub north of Obregon, Sonora in March of 1981. Because of the mild winter and copious rains most species are in leaf. The principal species are *Fouquieria maddougallii*, *Olneya tesota*, *Lantana horrida*, *Cercidium praecox* and *Opuntia* sp. Photo by Rich Glinski.

Agave schottii, *A. ocahui*) may be well represented locally and the Sotol (*Nolina matapensis*) is found at higher elevations. *Yuccas* are rare.

In the north, the arroyo and streamside habitats are principally populated by mesquite. Southward this dominance may be increasingly shared by a number of pinnate-leafed and broadleaf evergreen trees and shrubs (Fig. 56). These include the following additional species taken directly from Gentry (1942) and Shreve (1951).

<i>Acacia cymbispina</i>	<i>Albizzia sinaloensis</i>
<i>Bumelia occidentalis</i>	<i>Caesalpinia platyloba</i>
<i>Cassia emarginata</i>	<i>Celtis iguanaea</i>
<i>Cordia sonora</i>	<i>Erythea roezlii</i>
<i>Hymenoclea monogyra</i>	<i>Jacobinia ovata</i>
<i>Parthenium stramonium</i>	<i>Pisonia capitata</i>
<i>Pithecellobium dulce</i>	<i>Pithecellobium mexicanum</i>
<i>Plumeria acutifolia</i>	<i>Randia echinocarpa</i>
<i>Sapindus saponaria</i>	<i>Solanum amazonium</i>
<i>Stegnosperma</i> ssp.	<i>Vallesia glabra</i>
<i>Vitex mollis</i>	<i>Zizyphus sonorensis</i>

Here and elsewhere in the thornscrub there are numerous small woody and herbaceous perennials in the understory. These include *Ambrosia ambrosioides*, *Brickellia coulteri*, *Brongniartia palmeri*, *Commicarpus scandens*, *Antigonon leptopus*, and various species of *Janusia*, *Ruellia*, *Salvia*, *Passiflora*, *Phaseolus*, *Talinum*, *Boerhaavia*, *Elytraria*, *Carlowrightia*, *Ayenia*, *Desmodium*, *Turnera*, and *Abutilon*. Certain grasses such as *Bouteloua radicata* may be locally abundant on the higher and rougher slopes, while several other annual and root-perennial grasses may be seasonally abundant within the more open communities of the plains and valleys.

Sinaloan thornscrub hosts a number of endemic animals as

well as a number of more northerly (Sonoran Desert) and southerly (Sinaloan deciduous forest) distribution. The Desert Mule Deer (*Odocoileus hemionus eremicus*) is replaced by the Coues White-tailed Deer (*Odocoileus virginianus couesi*) and the Bobcat (*Felis rufus baileyi*) is sympatric with the Ocelot (*Felis pardalis*) and Jaguarundi (*Felis yagouaroundi*). Mammals not encountered to the north include the Painted Spiny Pocket Mouse (*Liomys pictus*), Coues' Rice Rat (*Oryzomys couesi*), and Sinaloan Pocket Mouse (*Perognathus pernix*). The representative hare is the Antelope or Allen Jack-rabbit (*Lepus alleni*). The Elegant Quail and Black-capped Gnatcatcher (*Poliophtila nigriceps*) are unique to Sinaloan thornscrub. Other characteristic avian species are also present in Tamaulipan thornscrub, other tropic-subtropical scrublands, or have closely related analogs there. Examples of these include the Ferruginous Owl (*Glaucidium brasilianum*), Sinaloa Wren (*Thryothorus sinaloa*), Wied's Crested Flycatcher (*Myiarchus tyrannulus*), and Beardless Flycatcher (*Camptostoma imberbe*). Still other more or less representative species as the Javelina (*Dicotyles tajacu*), Harris' Hawk (*Parabuteo unicinctus*), Elf Owl (*Micrathene whitneyi*), White-winged Dove (*Zenaida asiatica*), and Gila Woodpecker (*Melanerpes uropygialis*) are also able to inhabit denser habitats within the Arizona upland region of Sonoran desertscrub. Reptiles to be expected in Sinaloan thornscrub include *Urosaurus ornatus* and *Cnemidophorus costatus*. Neither reptiles nor amphibians in Sinaloan thornscrub have been adequately studied, but representative species would probably include *Leptodeira punctata*, *Masticophis striolatus*, *Masticophis valida*, and *Crotalus basiliscus*.



Figure 56. Sinaloan thornscrub near Tezopaco, Sonora, ca. 760 m elevation. A higher elevation community of short-statured trees and scrub adjacent to a drainage bottom where both evergreen (e.g., the palm *Erythaea roezlii*) and deciduous components participate. Note that the height of the scrub overstory is exceeded by the height of the columnar cactus as compared to the Sinaloan deciduous forest depicted in Figure 39.