

Figure 1. A. Intact tropical deciduous forest near Sabinito Sur. B. *Pennisetum ciliare* pasture in former tropical deciduous forest with Sierra de Álamos in the background. Photos by T. R. Van Devender in 1992.

# Notes on Non-Native Plants in Sonora

by Thomas R. Van Devender<sup>1</sup>, J. Jesús Sánchez-Escalante<sup>2</sup>, and Ana Lilia Reina-Guerrero<sup>1</sup>

## Introduction

Introduced exotic plants abound throughout the Sonoran Desert Region in Arizona in the United States and Sonora in Mexico. Their abundances and ecological roles can be viewed from several perspectives. With the notable exception of riparian habitats, introduced species usually account for relatively low percentages of local floras.

Ecologically, the diversity and abundance of introduced species are greatest in riparian (river bottoms, arroyos, washes, etc.) and pseudoriparian (edges of roads, etc.) habitats because they are naturally disturbed and unstable dispersal corridors that harvest water, nutrients, and seeds from large areas (Stromberg and Chew 1997). Successful invaders are often short-lived, grow rapidly, and have high reproductive effort. Longer-lived non-natives are usually survivors not easily killed by environmental stresses (floods, fire, drought, freezes, heavy grazing, etc.).

Unfortunately, a few exotics have the potential to cause ecological and economic havoc in the Sonoran Desert Region and threaten to change landscapes irrevocably. Competition with native species is typically intense, illustrated by the examples below. When a new species is introduced into an ecosystem, vegetation structure and species composition can be dramatically altered. The introduction of fire as an ecological process in desertscrub, thornscrub, and tropical deciduous forest (TDF) can be devastating. The worst invasive species in Sonora is *Cenchrus ciliaris* (buffelgrass, *zacate buffel*). Vast areas have

been cleared in Sonoran desertscrub, thornscrub, and tropical deciduous forest to plant this grass (Figure 1).

This paper updates our knowledge of the non-native plants of Sonora, and discussions of some recent movements of Sonoran non-native plants. Improved coverage in the SEINet network, especially the Madrean Discovery Expeditions database ([madreandiscovery.org](http://madreandiscovery.org)), has greatly increased our knowledge of the distributions of plants in Sonora.

## Sonoran Non-Native Plants

Van Devender et al. (2009) presented a summary of the non-native plants of Sonora. It is also available online on the SEINet Red de Herbarios del Noroeste de México portal: <https://herbanwmex.net/portal/checklists/checklist.php?clid=5726&pid=>. Here we update the status and nomenclature of the non-native plants of the state. A current list of non-native species is presented in Table 1. Since 2006, 20 additional non-native plant taxa have been discovered in Sonora, an increase from 6.4% to 6.9% of the state flora. The number of non-natives in the Asteraceae and Poaceae increased by six and five species. The number of non-native herbs increased from 76.5 to 82.0%.

Currently, the flora of Sonora has 3,842 vouchered taxa (Van Devender and Sánchez-E. unpubl. data), including 266 non-native species (6.9%), including those known to be established as well as those only known from a few collections. Only 35 species of non-natives are invasive (13.2%). Four families account for 48.9% of the non-native: Poaceae (73 species), Asteraceae and Brassicaceae (20 species each), and Fabaceae (17 species). Other families with significant numbers of non-natives are Amaranthaceae (9), Solanaceae (8), Lamiaceae and Polygonaceae (7), and Apiaceae and Malvaceae (5).

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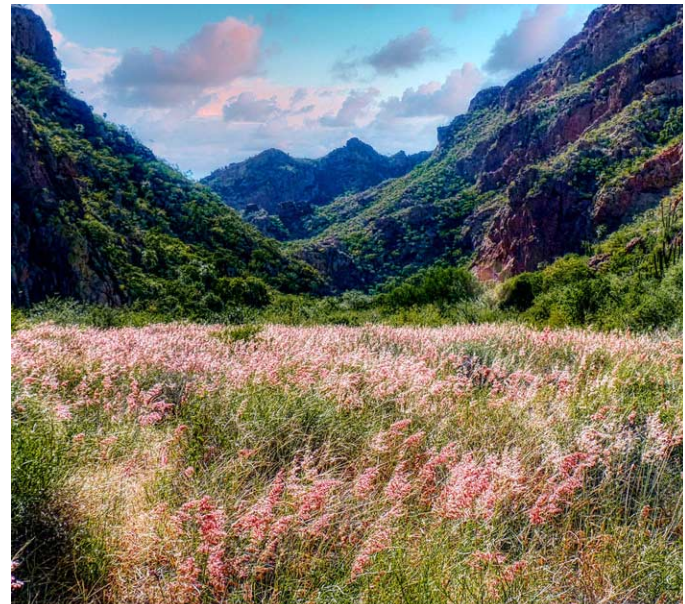


Figure 2. *Melinis repens*. A. Inflorescence with reddish spikelets. Rancho El Aribabi, Sierra Azul. September 2009. B. Invasion in Arroyo Los Anegados, Sierra El Aguaje. November 2015. Photos by J. J. Sánchez-E.

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The majority of the non-native species are herbs (82.0%), including annual (149 species) and perennial herbs (69 species). Woody non-natives are less common, but include trees (26 species), shrubs (15 species), succulents (5 species), and woody vines (4 species). Most (70.7%) of the Sonoran non-natives are from the Old World, especially Asia, Africa, and Europe. Sixty-seven species (25.2%) are native to the New World, including South America (38 species), Central America (22 species), Mexico (29 species), the Caribbean (2 species), the United States (7 species), and Canada (2 species), plus pantropical (3 species) and worldwide weeds (2 species).

Non-native plants can be grouped by the general occurrence in Sonora. Exotic species associated with human activities include ornamentals (garden herbs, hedges, shade trees, etc., 53 species), cultivated species (food, fiber, medicine, cultural, wood, etc., 41 species), agricultural (14 species), forage (13 species), and urban (13 species) species. More generally, non-natives are found in disturbed (90 species), riparian (25 species, including three aquatic plants), and roadside (15 species) habitats. Four species (*Hackelochloa granularis*, *Pteris cretica*, *Tagetes minuta*, and *Urochloa reptans*) are only known in Sonora from undisturbed natural habitats.

### Species on the Move

*Melinis repens* (Natalgrass, *zacate rosado*)

*Melinis repens* is an attractive perennial grass native to southern Africa that is widely introduced in Australia, North America, and

elsewhere (Figure 2A). In Mexico, it is a serious fire-prone, invasive species in the central highlands, including Querétaro (Serrano-C. et al. 2009) and Durango (González-E. et al. 2009). In Durango, it threatens native plants in grasslands and openings in pine-oak forests in the Sierra Madre Occidental (SMO). It is a serious invasive with *Dichanthium annulatum* (Kleberg bluestem, *zacate carretero*) and *Pennisetum ciliare* in the Rio Grande delta in southern Texas (Best 2009).

Van Devender and Reina-G. (2016) studied the flora of the Municipio de Yécora in the SMO in easternmost Sonora for 15 years beginning in 1995. During this period, *M. repens* increased dramatically. In September 2003, Mountain Pima Indian Luis Coyote said that *zacate rosado* was a new arrival in El Kípor. He thought that the government had dropped seeds from airplanes. El Kípor is located at 1640 m elevation in an area with pine-oak forest on the ridges and oak woodland and montane grasslands on lower slopes and in valleys. In September 1998 near Guadalupe Tayopa, *M. repens* dominated a rocky volcanic slope at 900 m elevation. The vegetation is a relictual low-elevation oak woodland on acidic volcanic slopes in a tropical deciduous forest zone (Goldberg 1982). Sánchez-E. et al. (2008) reported *M. repens* to be abundant at Rancho Santa Bárbara, ca. 43 km northeast of Álamos in southern Sonora. Santa Bárbara is in the westernmost SMO with pine-oak forest and oak woodland at 1250 m elevation and tropical deciduous forest in deep canyons below. The first patch of *M. repens* was seen in this area in the

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Figure 3. *Melinis repens* in the Sierra Pinitos. April 2009. A. Extensive burn area. B. Surviving/damaged *Fouquieria splendens* (ocotillo), *Lysiloma watsonii* (feather bush, *tepeguaje*), and *Stenocereus thurberi* (organpipe cactus, *pitahaya*) are visible. Photos by T.R. Van Devender

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1990s (Raúl Álvarez-Valdez, pers. comm. in 2008). *Melinis repens* was already present in TDF in southern Sonora along the Río Cuchujaqui in 1993 (Van Devender), the Sierra de Álamos in 1993 (Van Devender), and the Río Mayo in 1996 (Richard S. Felger).

In February 1995, Felger collected *M. repens* in the remote Cañón Las Barajitas in the Sierra Aguaje north of San Carlos, Sonora. This is an isolated mountain range on the coast of the Gulf of California in the southernmost Sonoran Desert with tropical thornscrub species on its slopes. Laura Moreno-M. and Sánchez-E. found it occasionally in Cañón La Balandrona in October 1999 and Cañón Los Anegados in May 2000 (Figure 2B). By December 2001, Felger and Sánchez-E found it common and widespread in Cañón La Balandrona. Today these areas are completely dominated by *M. repens*, likely in response to heavy rains from Hurricanes Henrieta (2007), Norberto (2008), and Jimena (2009). In 1984, J.E. Hoffman collected *M. repens* along MEX2 in the Sierra Pinito (Figure 3). In April 2009, it had covered and burned the entire southern slopes of the range.

There are currently 338 records of *M. repens* from Sonora in the SEINet databases. It is widely distributed in the state except for the lower, drier, hotter Sonoran Desert in the west. It is rare or absent between Nogales and the Chihuahuan border, likely due to colder winter temperatures in grassland valleys.

In August 2004, Van Devender and Reina-G. saw a slope in the Mule Mountains along AZ80 northwest of Bisbee covered with *M. repens*. Based on their observations in Mexico, they raised the alarm about its invasive potential to Arizona conservationists. Today, its range in Arizona extends to a large cluster centered on Tucson and the Santa Catalina Mountains, with outlier collections to the north in Aravaipa Canyon, Dragoon Mountains (Doug Ripley and Jim Verrier), Galiuro Mountains

(David Bertelsen), and the Picacho Mountains (John F. Wiens). We expect the range of *M. repens* to expand northward with continued global warming.

*Eruca vesicaria* subsp. *sativa*. Arugula, salad rocket.

*Eruca vesicaria* var. *sativa* is a spicy green used in salads, especially in Italy (Figure 4). This European annual has been reported as invasive in numerous countries. In North America, it is widespread from Canada to southern Mexico (Felger 2000). In Arizona and Sonora, it is a winter-spring annual (February to May). In Arizona, it was reported as occasional escapees from vegetable gardens from 1906 through 1962. Although it was known from near Gila Bend since 1960, it has recently exploded in this area as far west as Sentinel and Yuma. In the wet spring of 2005, it was the most abundant annual from Gila Bend west along I-8 for 70 kilometers in an area of at least several hundred square kilometers. The plants reached about a meter tall and extended in an almost unbroken carpet beyond the highway in both directions across undisturbed valleys and rocky slopes.

In Sonora, *E. vesicaria* was collected in 1912 in southern Sonora at Ontagota in the Yaqui Valley, likely grown in a community garden. In 1915, this American mining settlement was overrun by Yaqui Indians in the strife of the Mexican Revolution. More recent records of *E. vesicaria* in northwestern Sonora in the Lower Colorado River Valley subdivision of the Sonoran Desert were from San Luis Río Colorado and Sonoyta (Felger 2000). The Sonoyta population, likely from the Gila Bend population via AZ85, has been persistent since 2013 or earlier along MEX8 on the southwest side of town, and both west and southeast along MEX2 in Sonoran desertscrub at 324 to 442 m elevation.

In 2007, *E. vesicaria* was found along MEX2 west and east of Agua Prieta (adjacent to Douglas, Arizona) in Chihuahuan

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Figure 4. *Eruca vesicaria* var. *sativa* from west-northwest of Sonoyta. February 2013. A. flower. B. Leaf. Photos by T.R. Van Devender

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desertscrub at 1215 to 1321 m elevation. It has been collected east of Agua Prieta in desert grassland along MEX2 in Sonora at 1495 to 1499 m elevation (2009–2010), and in Chihuahua at 1533 m elevation.

*Eruca vesicaria* has also been collected in a few other localities in Sonora. In 2020, it was found along with *Brassica tournefortii* (Sahara mustard, *mostaza del Sahara*) in a cemetery along MEX 15 at Estación Llano in the Plains of Sonora subdivision of the Sonoran Desert in central Sonora. In 2012 it was collected along SON 104 near Moctezuma in foothills thornscrub at 637 m elevation in central Sonora. In 2005, it was found at Agua Amarilla along MEX16 west of Yécora in east-central Sonora. This is an unusual relictual pine-oak forest on hydrothermally altered soils in a tropical deciduous forest at 900 m elevation.

The conservation community in Arizona is concerned about *E. vesicaria* as an invasive species in the Sonoran Desert in Arizona below 610 m elevation. However, collections in Sonora demonstrate that it is adaptable and can live in more tropical areas as well as at higher elevations in colder habitats. It is clear that highways are the main dispersal vectors and that it only rarely enters natural habitats away from them.

### Invaders from the North

Several non-natives have entered Sonora from Arizona in the north.

#### *Eragrostis lehmanniana* (Lehmann's lovegrass)

This is a notorious invasive species in desert grassland in Arizona. Surprisingly, in Sonora it is mostly found within 50 kilometers of the Arizona border in the northeastern part of the

state. Most records are in desert grassland or Chihuahuan desertscrub at 1140 to 1775 m elevation from Cananea to Agua Prieta and east to the Chihuahua border in the Sierra San Luis. Outliers have been found in the Sierra La Madera west-northwest of Magdalena de Kino (Sonoran desertscrub, 740 m elevation), Sierra Buenos Aires (desert grassland, 670 m elevation, and oak woodland, 1707 m elevation), and Rancho San Fernando, Sierra La Madera near Moctezuma (oak woodland, 1490 m elevation). *Eragrostis lehmanniana* has not reached desert grassland in many areas to the south. In Sonora, it is a serious invasive only in the foothills of the Sierra San José near Naco and in the Sierra San Luis (Figure 5).

#### *Eragrostis echinochloidea* (African lovegrass)

This is a South African perennial grass that is most common in Arizona in the Santa Catalina Mountains and Tucson, where it has recently expanded into lower elevations. *Eragrostis echinochloidea* has been found as far north as Phoenix, east to Willcox, south to Rio Rico and the southwestern side of the Santa Rita Mountains. It extends from Tombstone to the Mule Mountains and south to Bisbee. It occurs close to the border in the Buenos Aires National Wildlife Refuge in the Altar Valley and near Naco. It has only been found in two places in Sonora: the MEX 15 bypass in Magdalena de Kino and Rancho Las Playitas near Bacoachi. The Las Playitas locality is on a working cattle ranch not close to a highway. *E. lehmanniana* has not reached this desert grassland yet.

#### *Eragrostis superba* (Wilman lovegrass)

This is another African grass that is known from the Superstition Mountains near Phoenix and the Verde Valley as far south the

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Sonoran border (Figure 6A). It is especially common in the northern Santa Rita Mountains and from Nogales northwest to Ruby and Arivaca. It is known to be close to the border in Nogales, the Patagonia and Huachuca Mountains, Naco, and the San Bernardino National Wildlife Refuge east of Douglas. The only record from Sonora is from Rancho Los Fresnos near the border just southwest of the Huachuca Mountains. We expect the range of *Eragrostis superba* to expand farther into Sonora. *E. echinocloidea* and *E. superba* are not yet invasive in Sonora.

*Bromus rubens* (red brome) and *B. tectorum* (cheatgrass)

These winter annual grasses are native to Eurasia and Africa and are serious invasive species in the western United States that are fire prone, causing extensive damage to natural communities. *Bromus rubens* has only been collected in a few places in Sonora (Figure 6B). It was collected on Pinacate Peak in the El Pinacate and Gran Desierto de Altar Biosphere Reserve from 1985 to 1987, and in Sonoyta in 1992. The only Sonoran record of *B. tectorum* was at El Papalote in the northernmost Pinacates northwest of Sonoyta in 1986. Van Devender and Reina-G. led Arizona Native Plant Society groups to the Pinacates in 2012 and 2019. They also did plant inventories throughout the Sonoyta area in 2012–2013. Neither *B. rubens* nor *B. tectorum* were found in these intensive spring surveys, suggesting a brief southern range extension during wet winters in the late 1980s. In 2005, *B. rubens* was found in the Sierra El Humo, which is ca. 39 kilometers southwest of the Baboquivari Mountains in Arizona. *B. rubens* has also been found in Arroyo Guadalupe 40



Figure 5. Desert grassland invaded by *Eragrostis lehmanniana* on the lower slopes of the Sierra San José near Naco. September 2017. Photo by Dale S. Turner

kilometers east of Agua Prieta in northeastern Sonora. The plants were close to the border and likely spread from the disturbance along the border patrol road on the Arizona side of the border. Winter rainfall annuals like these will likely decline with increased winter drought in the future.

*Oncosiphon piluliferum* (stinknet, *manzanilla apestosa*)

This winter-spring annual is native to South Africa and is invasive in the United States in California and Arizona (Figure 7). In Arizona, it flowers from February to May. First seen in Los Angeles and San Diego in the early 1980s, it heavily infested the counties between those cities. It was first collected in Phoenix in 1997 and began to expand rapidly about 2005. It is presently a serious invasive throughout Maricopa County. In March 2005, Sue Rutman found it along US85 in Organ Pipe Cactus National Monument in Pima County. Reina-G found it in March 2020 along the border road near the wall construction in the Monument. It was first seen in Tucson in March 2015 (Reina-G. and Van Devender). All of these localities are areas where heavy equipment from Phoenix was parked. John F. Scheuring mounted an intensive control program in Tucson soon after its discovery. In April 2019, Rutman found an infestation at Three Points west of Tucson. In April 2020, Reina-G. and Van Devender found a population in the cemetery in Arivaca. In April 2020, Alejandro Ramos found it in a neighborhood in Hermosillo, Sonora. It was likely transported on the tires of a personal vehicle returning from a family visit to relatives in the Phoenix area. It is not yet invasive in Sonora but has high potential. The only other



Figure 6. A. *Eragrostis superba* fruit. October 2007. Photo by T.R. Van Devender  
B. *Bromus rubens*. Diablo Canyon, Ajo Mountains. March 2020. Photo by Diane Drobka

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Figure 7. *Oncosiphon piluliferum*. A. and C. Dense infestation, flowers. Arizona Department of Transportation heavy vehicle parking area on upper right. Prince Road at I-10, Tucson. April 2015. Photos by T.R. Van Devender. B. Plant. Colonia Apolo, Hermosillo. April 2020. Photo by Alejandro Ramos.

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observations from Mexico are in Baja California in Tijuana (2.9 km south of the California border).

### North Out of the Tropics

Non-native plants have been moving northward along MEX 15 in Sonora.

#### *Dichanthium annulatum* (Kleberg bluestem, *zacate carretero*)

This African forage grass was a common roadside weed in southern Sonora in the early 1990s (Martin et al. 1998), as well as in south Texas (Best 2009). This grass occurs from tropical areas near Álamos and Navojia in southern Sonora north to near Querobabi in the Plains of Sonora subdivision of the Sonoran Desert about 140 km south of the Arizona border. An outlier population was collected from the Sierra Anibáachi 10 km south of the border at Agua Prieta. In Arizona, it has persisted at a truck stop along the Mariposa Road northwest of Nogales since 2005. In 2003, *D. annulatum* escaped from Biosphere 2 in Oracle (Felger et al. 2005). It was later collected near Tucson (Van Devender and Reina-G., 2004), Tempe (Dixie Z. Damrel, 2005), New River north of Phoenix (Darin Jenke, 2011), and the Santa Cruz River in Tucson (Reina-G., 2014). We can expect to find this grass in more areas in northern Sonora and southern Arizona.

#### *Leucaena leucocephala* (white leadtree, *guaje*)

This tree is native to southern Mexico and northern Central America but is introduced throughout the tropics (Figure 8). This “miracle” tree has been used for forage, pulpwood for paper, and the young pods and seeds are eaten by people. But it is highly invasive in many parts of the world. Howard S. Gentry’s book “Río Mayo Plants” was the first extensive floristic study of tropical deciduous forest in northwestern Mexico (Gentry 1942). He did not find *L. leucocephala* in his 1933–1939 fieldwork. Since then, this tree has expanded into most of Sonora except for the Sonoran Desert in the northwest. It follows roads and riparian drainages and is common in urban areas. In Arizona, it is most common around Phoenix, but recent reports suggest that it is expanding in the Tucson area. We expect the range of *L. leucocephala* to expand northward with continued global warming.

#### *Ricinus communis* (castor bean, *higuerilla*)

*Ricinus communis* is a large perennial herb native to the southeastern Mediterranean region, eastern Africa, and India, but is introduced throughout tropical regions and widely grown elsewhere as an ornamental plant (Figure 9). Gentry (1942) did not record it in the Río Mayo flora in southern Sonora. Since then, it has expanded into most of the state except for the

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Sonoran Desert in the northwest. It extended into the Sonoran Desert near Hermosillo along the Río Sonora. It was also collected in 1973 in Arroyo San Ignacio northwest of the Seri Indian village Desemboque along the coast of the Gulf of California (Richard S. Felger, 1973). The northernmost record is near Terrenate on the Río Magdalena (69 km south of the Arizona border). We expect the range of *R. communis* to expand northward with continued global warming.

### Climate Fluctuations

Plants often thrive and expand their ranges during periods of good climatic conditions and contract during droughts or after catastrophic freezes. By the summer of 2006, it was estimated that ca. 1 million hectares of *Cenchrus ciliaris* had been planted in Sonora (Ibarra-F. et al. 2009). It is now ubiquitous but not noticeably expanding its range. The survival and condition of planted pastures often reflect climatic fluctuations. The abundances of common, relatively non-invasive species like *Descurainia sophia* (common tansy mustard) and *Sisymbrium irio* (London rocket, *pamitón*) fluctuate dramatically tracking winter rainfall. Above, we reported the expansion of *Eruca vesicaria* in the Gila Bend area in the wet spring of 2005. *Bassia scoparia* (summer cypress, burningbush) is a large summer annual native to Eurasia that is widespread and common in the western United States. In Sonora, it has only been seen a few times along the Arizona border from Naco east to Agua Prieta and the Animas Valley. In July to August 2010, there was a large



Figure 8. *Leucaena leucocephala* in Hermosillo, Sonora. February 2018. Photo by J. J. Sánchez-E.

population in Esqueda along MEX17 and the railroad. It was not present in subsequent years.

Changes in abundance and distribution are normal in environments with fluctuating climates. Species usually have an environmental zone where they are invasive, while at higher or lower elevations, they may only be present. What is not obvious is that exceptionally favorable conditions may be triggers that release non-natives into new areas or habitats. The expansion of *Pennisetum cilare* and *Brassica tournefortii* (Dimmitt and Van Devender 2009) likely occurred in this manner. With global climate warming and redistribution of seasonal rains, we can expect summer rainfall non-natives to expand more rapidly than expected, and some winter-rainfall non-natives to contract their ranges.

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Figure 9A. *Ricinus communis*. A, C. Plant; flowers and fruit. Rancho San Antonio near Playa San Bartolo, Costa de Hermosillo. January 2020. Photo by J.J. Sánchez-E. B. Flowers. Colonia La Manga, Hermosillo. December 2010. Photo by A.L. Reina-G.

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Table 1. Non-native species of Sonora, Mexico. \* = invasive species.

### Acanthaceae

*Justicia spicigera*. Firecracker bush, *niple*. Shrub. Mexico to South America.

*Odontonema cuspidatum*. Firespike. Shrub. Mexico to Central America.

*Ruellia malacosperma*. Softseed wild petunia. Perennial herb. Mexico.

### Aizoaceae

*Mesembryanthemum nodiflorum*. Slenderleaf ice plant, *hielitos*. Annual. Africa.

\**Mesembryanthemum crystallinum*. Ice plant, *hielitos*. Annual. Africa, Eurasia.

### Amaranthaceae

*Amaranthus albus*. Prostrate pigweed, *quelite*. Annual. Mexico to Central America.

*Amaranthus cruentus*. Red amaranth. Annual. Central America.

*Atriplex semibaccata*. Australian saltbush, *chamizo*. Perennial herb. Australia.

*Bassia hyssopifolia*. Fivehorn smotherweed, *salado negro*. Annual. Eurasia.

*Chenopodiastrium murale*. Nettleleaf goosefoot, *chual*. Annual. Europe.

*Chenopodium album*. Lamb's quarters. Annual. Europe.

*Salsola paulsenii*. Barbwire Russian thistle. Annual. Eurasia.

\**Bassia scoparia*. Summer cypress, burningbush, *coquia*. Annual. Asia.

\**Salsola tragus*. Russian thistle, *chamizo volador*. Annual. Eurasia.

**Anacardiaceae**

*Schinus molle*. Brazilian peppertree, *pimiento*, *pirul*. Tree. South America.

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Table 1. Non-native species of Sonora, Mexico. \* = invasive species.

*Spondias purpurea*. Hog plum, yoyomo, ciruelo. Tree. Mexico to South America.

#### Apiaceae

*Ammi majus*. Bishop's weed, encaje. Annual. Africa, Europe.

*Anethum graveolens*. Dill, eneldo. Annual. Europe.

*Ciclospermum leptophyllum*. Marsh parsley. Annual. South America.

*Coriandrum sativum*. Coriander, cilantro. Annual. Europe.

*Foeniculum vulgare*. Sweet fennel, hinojo. Perennial herb. Africa, Eurasia.

#### Apocynaceae

*Cascabela thevetioides*. Luckynut. Shrub. Mexico to South America.

*Nerium oleander*. Oleander, laurel. Shrub. Africa, Eurasia.

\**Cryptostegia grandiflora*. Indian rubbervine, clavel de España. Woody vine. Madagascar

#### Araceae

*Colocasia esculenta*. Wild taro. Perennial herb. Asia.

#### Arecaceae

*Phoenix dactylifera*. Date palm, palma datilera. Tree. Africa.

*Washingtonia filifera*. California fan palm, palma. Tree. Western United States and Canada.

#### Asparagaceae

*Agave fourcroides*. Henequen. Rosette succulent. Mexico.

*Asparagus officinalis*. Asparagus, aspárrago. Perennial herb. North Africa, Eurasia.

#### Asphodelaceae

*Asphodelus fistulosus*. Onionweed. Perennial herb. Eurasia.

#### Asteraceae

*Acroptilon (Centaurea) repens*. Russian knapweed. Perennial herb. Eurasia.

*Calendula officinalis*. Scotch marigold. Perennial herb. Europe.

*Carthamus tinctorius*. Safflower, cártamo. Annual. Asia.

*Centaurea melitensis*. Malta starthistle, tocolote. Annual. Africa, Europe.

*Chrysanthemum coronarium*. Crown daisy. Annual. Eurasia.

*Cichorium intybus*. Chicory Perennial herb. Africa, Eurasia.

*Cotula australis*. Annual. Australia-New Zealand

*Lactuca saligna*. Willowleaf lettuce. Annual. Africa, Europe.

*Lactuca serriola*. Prickly lettuce. Annual. Europe.

*Oncosiphon piluliferum*. Stinknet, manzanilla apestosa. Annual. South Africa.

*Pseudognaphalium luteoalbum*. Jersey cudweed. Annual. Africa, Eurasia.

*Senecio vulgaris*. Common groundsel. Annual. Europe.

*Silybum marianum*. Milk thistle. Annual. Africa, Eurasia.

*Sonchus arvensis* subsp. *uliginosus*. Spiny sowthistle, chinita. Annual. Europe.

*Sonchus asper* subsp. *asper*. Spiny sowthistle, chinita. Annual. Europe.

*Sonchus oleraceus*. Common sowthistle, chinita. Annual. Europe.

*Sonchus tenerrimus*. Common sowthistle, chinita. Annual. Europe.

*Tagetes minuta*. Annual. South America.

*Taraxacum officinale*. Common dandelion, diente de león. Perennial herb. Eurasia.

*Zinnia peruviana* cultivar. Zinnia, india. Annual. Southwest United States to Mexico.

#### Balsaminaceae

*Impatiens balsamina*. Garden balsam. Annual. Asia.

#### Bignoniaceae

*Crescentia alata*. Gourd tree, ayal, tecomate. Tree. Mexico to Central America.

*Tecoma stans* var. *stans*. Trumpetbush, gloria, lluvia de oro. Tree. Mexico to South America.

#### Brassicaceae

*Brassica juncea*. Chinese mustard, brown mustard, mostaza. Annual. Africa, Eurasia.

*Capsella bursa-pastoris*. Shepherd's purse, bolsa del pastor. Annual. Europe.

*Cardamine* cf. *oligosperma*. Bittercress, berro amargo. Annual. Western United States and Canada.

*Chorispora tenella*. Purple mustard, crossflower. Annual. Eurasia.

*Erysimum repandum*. Spreading wallflower. Annual. Europe.

*Hirschfeldia incana*. Greek mustard, mostacilla. Annual. Europe.

*Nasturtium officinale*. Watercress, berro. Perennial herb. Europe.

*Raphanus raphanistrum*. Wild radish, rábano silvestre. Annual. Eurasia.

*Raphanus sativus*. Cultivated raddish, rábano. Annual. Europe.

*Rapistrum rugosum*. Annual bastard cabbage, mostaza. Annual. Africa, Eurasia.

*Sinapis arvensis*. Charlock mustard, mostaza. Annual. Europe.

*Sisymbrium irio*. London rocket, pamitón. Annual. Europe.

*Sisymbrium orientale*. Indian hedge mustard, pámita. Annual. Europe.

*Thlaspi arvense*. Field pennycress Annual. Africa, Eurasia.

\**Brassica nigra*. Black mustard, mostaza. Annual. Europe.

\**Brassica rapa*. Field mustard, nabo. Annual. Asia.

\**Brassica tournefortii*. Sahara mustard, mostaza del Sahara. Annual. North Africa, Europe.

\**Descurainia sophia*. Common tansy mustard. Annual. Africa, Europe.

\**Eruca vesicaria* subsp. *sativa*. Arugula, salad rocket. Annual. Europe.

\**Lepidium didymum*. Procumbent pepperwort. Annual. South America.

#### Cactaceae

*Opuntia engelmannii* var. *linguiformis*. Cow's tongue prickly pear cactus, nopal. Stem succulent. Texas, Coahuila, Mexico.

*Peniocereus serpentinus*. Snake cactus, reina de la noche. Stem succulent. Mexico.

#### Campanulaceae

*Hippobroma longiflora*. Star of Bethlehem, revienta caballo. Annual. Caribbean.

#### Cannabaceae

*Cannabis sativa*. Marijuana, marihuana, mota. Annual. Asia.

#### Capparaceae

*Cleome aculeata*. Prickly spiderflower. Annual. South America.

\**Cleome viscosa*. Asian spiderflower, Sticky beeplant. Annual. Africa, Australia.

#### Caryophyllaceae

*Corrigiola andina*. Corrigiola. Annual. South America

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Table 1. Non-native species of Sonora, Mexico. \* = invasive species.

*Herniaria hirsuta* subsp. *cinerea*. Hairly rupturewort. Annual. Africa, Eurasia.  
*Saponaria officinalis*. Soapwort, *jabón de palo*. Perennial herb. Europe.

#### Convolvulaceae

*Cuscuta tinctoria*. Dodder, *barba de león*. Annual. Mexico to Guatemala.  
*Ipomoea carnea* subsp. *fistulosa*. Bush morning glory, *gloria de la mañana*. Shrub. Mexico to South America.  
*Ipomoea heptaphylla*. Palmleaf morning glory, *trompillo*. Annual vine. Southeastern United States to South America, Old World.  
*Ipomoea X leucantha*. Morning glory, *trompillo*. Perennial herb. Central and southeastern United States to Mexico.  
*Merremia dissecta*. Noyau vine, *trompillo blanco casero*. Woody vine. Mexico to South America.  
 \**Convolvulus arvensis*. Common bindweed, *correhuela*. Perennial herb. Europe.

#### Cucurbitaceae

*Citrullus lanatus*. Watermelon, *sandía*. Annual vine. Africa.  
*Cucumis anguria*. Burr cucumber, *pepinito espinoso*. Annual vine. Africa.  
*Cucumis dipsaceus*. Hedgehog gourd, *huevos de gato*. Annual vine. Africa.  
*Cucumis melo* var. *cantalupo*. Cantaloupe, *melón*. Annual vine. Europe.  
*Cucumis melo* var. *dudaim*. Dudaim melon, *melón granada*. Annual. Africa.  
*Cucumis sativus*. Garden cucumber, *pepino*. Annual. Asia.  
*Lagenaria siceraria*. Bottle gourd, *bule*. Annual vine. Africa.  
*Luffa aegyptiaca*. Sponge gourd, *estropajo*. Annual vine. Africa, Asia.  
*Momordica charantia*. Bitter melon, *melón amargo*. Annual vine. Old World tropics.

#### Cyperaceae

*Cyperus difformis*. Variable flatsedge. Annual. Old World tropics.  
*Cyperus involucratus*. Umbrella papyrus, *papiro*. Perennial herb. Madagascar  
*Cyperus iria*. Ricefield flatsedge. Annual. Africa, Australasia.  
*Cyperus rotundus*. Nutsedge, *coquillo*. Perennial herb. Africa, Eurasia.

#### Euphorbiaceae

*Euphorbia hypericifolia*. Spurge, *golondrina*. Annual. Panropical.  
*Euphorbia peplus*. Spurge, *golondrina*. Annual. Eurasia.  
*Euphorbia velleriflora*. Spurge, *golondrina*. Perennial herb. Mexico to Central America  
*Jatropha gossypifolia*. Shrub. Mexico, South America, and the Caribbean islands  
 \**Ricinus communis*. Castor bean, *higuerilla*. Perennial herb. Africa, Eurasia.

#### Fabaceae

*Arachis hypogaea*. Peanut, *cacahuete*. Annual. South America.  
*Caesalpinia gilliesii*. Yellow bird-of paradise, *tabachín amarillo*. Shrub. South America.  
*Gleditsia triacanthos*. Honeylocust. Tree. Central United States.  
*Gliricidia sepium*. Quickstick, *mata ratón*, *madre de cacao*. Tree. Mexico to Central America.  
*Medicago lupulina*. Black medick, *trébol de flor amarilla*. Annual. Africa, Eurasia.  
*Medicago polymorpha*. Burclover, *trébol*. Annual. Eurasia.  
*Medicago sativa*. Alfalfa. Annual. Eurasia.  
*Melilotus albus*. White sweetclover, *trébol*. Annual. Europe.  
*Melilotus indica*. Sourclover, *trébol amargo*. Annual. North Africa, Eurasia.  
*Melilotus officinalis*. Yellow sweetclover, *trébol*. Annual. Eurasia.  
*Pedimelum rhombifolium*. Gulf Indian breadroot. Perennial herb. Southwestern United States to Mexico.  
*Phaseolus vulgaris*. Common bean, *frijol*. Annual. Mexico to Central America.  
*Prosopis* aff. *chilensis*. Chilean mesquite, *mezquite chileno*. Tree. South America.  
*Prosopis glandulosa* var. *glandulosa*. Texas mesquite, *mezquite*. Tree. United States (Kansas to Texas) to northeastern Mexico  
*Spartium junceum*. Spanish broom. Shrub. Europe.  
 \**Leucaena leucocephala*. White leadtree, *guaje*. Tree. Southern Mexico. Northern Central America.  
 \**Parkinsonia aculeata*. Mexican paloverde, *guacaporo*. Tree. Caribbean, South America.

#### Fumaricaceae

*Fumaria officinalis*. Common fumitory. Annual. Eurasia.  
*Fumaria parviflora*. Fineleaf fumitory. Annual. Europe.

#### Gelsemiaceae

*Gelsemium sempervirens*. Evening trumpetflower. Woody vine. Southeastern United States to Central America.

#### Geraniaceae

*Erodium cicutarium*. Filaree, *alfilerillo*. Annual. Europe.

#### Halagoraceae

*Myriophyllum spicatum*. Eurasian watermilfoil, *pluma de perico*. Perennial herb. North Africa, Eurasia.

#### Hemerocallidaceae

*Hemerocallis fulva*. Orange daylily. Perennial herb. Europe.

#### Lamiaceae

*Lamium amplexicaule*. Henbit deadnettle. Annual. North Africa, Eurasia.  
*Leonotis nepetaefolia*. Lion's ear, *cordoncillo de San Francisco*. Annual. Panropical.  
*Marrubium vulgare*. Horehound, *marrubio*. Perennial herb. North Africa, Eurasia.  
*Mentha spicata*. Spearmint, *hierbabuena*. Perennial herb. Eurasia.  
*Ocimum basilicum*. Common basil, *albahacar*. Perennial herb. Africa.  
*Physostegia virginiana*. Obedient plant. Perennial herb. United States.  
*Vitex rotundifolia*. Chastetree, *carnavalito*. Shrub. Australasia.

#### Malvaceae

*Abutilon theophrasti*. Velvetleaf. Annual. Asia.  
*Corchorus olitorius*. Nalta jute. Shrub. Asia.  
*Gossypium hirsutum*. Upland cotton, *algodón*. Annual. Central America.  
*Hibiscus syriacus*. Rose of Sharon. Shrub. China  
*Malva parviflora*. Cheeseweed mallow, *malva*. Annual. Eurasia.

#### Meliaceae

*Melia azederach*. Chinaberry tree, *piocha*. Tree. Asia.

#### Molluginaceae

*Mollugo cerviana*. Carpetweed. Annual. Europe.

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Table 1. Non-native species of Sonora, Mexico. \* = invasive species.

### Moraceae

*Ficus carica*. Fig, *higuera*. Tree. Asia.  
*Morus alba*. Common mulberry, *mora*. Tree. Asia.

### Myrtaceae

*Eucalyptus camaldulensis*. River redgum, *eucalipto*. Tree. Australia.  
*Psidium guajava*. Guava, *guayaba*. Tree. Southern Mexico to Central America.

### Nyctaginaceae

*Mirabilis jalapa*. Four o'clock, *maravilla*. Perennial herb. South America.

### Onagraceae

*Oenothera speciosa*. Pink primrose. Perennial herb. Southeastern United States to Mexico.

### Papaveraceae

*Papaver somniferum*. Opium poppy, *amapola*. Annual. Europe.  
 \**Glaucium corniculatum*. Blackspot hornpoppy. Annual. Eurasia.

### Pedaliaceae

*Sesamum orientale*. Sesame, *ajonjolí*. Annual. Asia.

### Pinaceae

*Pinus sylvestris*. Scots pine, *pino rojo*. Tree. Eurasia.

### Plantaginaceae

*Plantago major*. Common plantain, *plantén*. Perennial herb. Eurasia.  
*Veronica anagallis-aquatica*. Water speedwell. Perennial herb. Africa, Europe.  
*Veronica persica*. Birdeye speedwell. Annual. Asia.

### Poaceae

*Avena sativa*. Oats, *avena*. Annual. Europe.  
*Bothriochloa ischaemum*. King Ranch bluestem, Texas yellow beardgrass. Perennial herb. Eurasia.  
*Bothriochloa pertusa*. Pitted beardgrass. Perennial herb. Africa, Asia.  
*Bromus berterianus*. Chilean grass Annual. South America.  
*Bromus catharticus*. Rescue grass. Annual. South America.  
*Bromus rubens*. Red brome. Annual. Africa, Eurasia.  
*Bromus tectorum*. Cheatgrass. Annual. Africa, Eurasia.

*Cenchrus brownii*. Slimbristle sandbur, *guachapori*. Annual. Mexico to South America.  
*Chloris barbata*. Swollen fingergrass, *zacate borregero*. Annual. Australia.  
*Chloris verticillata*. Tumble windmill grass. Perennial herb. Central United States.  
*Dactyloctenium aegyptium*. Crowfootgrass. Annual. Old World tropics.  
*Dichanthium aristatum*. Angleton bluestem. Perennial herb. Asia.  
*Digitaria bicornis*. Asian crabgrass. Perennial herb. Australasia.  
*Digitaria ischaemum*. Smooth crabgrass. Annual. Eurasia.  
*Digitaria sanguinalis*. Hairy crabgrass. Annual. Eurasia.  
*Digitaria ternata*. Blackseed crabgrass. Annual. Africa, Asia.  
*Echinochloa colonum*. Jungle ricegrass. Annual. Old World tropics.  
*Echinochloa crusgalli* var. *crusgalli*. Barnyard grass. Annual. Asia.  
*Echinochloa crusgalli* var. *zelayensis*. Cockspur, Japanese millet. Annual. Asia  
*Echinochloa crus-pavonis*. Gulf cockspur grass. Annual. Africa, Eurasia.  
*Eleusine indica*. Indian goosegrass. Annual. Old World tropics.  
*Eragrostis barrelieri*. Mediterranean lovegrass. Annual. Eurasia.  
*Eragrostis cilianensis*. Stinkgrass, *zacate apestoso*. Annual. Africa, Eurasia.  
*Eragrostis ciliaris* var. *ciliaris*. Gophertail grass. Annual. Africa, Asia.  
*Eragrostis curvula*. Weeping lovegrass. Perennial herb. Africa.  
*Eragrostis echinochloidea*. African lovegrass. Perennial herb. Africa.  
*Eragrostis pilosa* var. *pilosa*. Indian lovegrass. Annual. Africa, Eurasia.  
*Eragrostis superba*. Wilman lovegrass. Perennial herb. Africa.  
*Eragrostis unioides*. Bug's eye grass. Annual. Africa, Asia.  
*Festuca arundinacea*. Tall fescue. Annual. Africa, Eurasia  
*Festuca perennis*. Perennial ryegrass. Perennial herb. Africa, Eurasia.  
*Festuca temulenta* subsp. *temulenta*. Darnel ryegrass. Annual. Europe.

*Hackelochloa granularis*. Pitscale grass. Annual. Africa, Australasia.  
*Hordeum aegiceras*. Beardless common barley, *cebada*. Annual. Asia.  
*Hordeum marinum* subsp. *gussoneanum*. Mediterranean barley, *cebada*. Annual. Africa, Eurasia.  
*Hordeum murinum* subsp. *glaucum*. Foxtail barley, *cebada*. Annual. Africa, Eurasia.  
*Hordeum murinum* subsp. *leporinum*. Mouse barley, *cebada*. Annual. Africa, Europe.  
*Hordeum vulgare*. Common barley, *cebada*. Annual. Africa, Asia.  
*Megathyrsus (Panicum) maximus*. Guineagrass. Perennial herb. Africa, Asia.  
 \**Melinis repens*. Natalgrass, *zacate rosado*. Perennial herb. Southern Africa.  
*Panicum antidotale*. Blue panicgrass, *zacate panizo azul*. Perennial herb. Asia.  
*Panicum coloratum*. Kleingrass, *zacate klein*. Perennial herb. Africa.  
*Panicum miliaceum*. Broomcorn millet. Annual. Asia.  
*Paspalum dilatatum*. Dallisgrass. Perennial herb. South America.  
*Pennisetum ciliare*. Buffelgrass. Perennial herb. Southern Africa.  
*Pennisetum setaceum*. Fountaingrass, *plumitas*. Perennial herb. Africa, Asia.  
*Phalaris canariensis*. Canarygrass. Annual. Africa.  
*Phalaris minor*. Littleseed canarygrass. Annual. Africa, Eurasia.  
*Phalaris paradoxa*. Hood canarygrass. Annual. Africa, Eurasia.  
*Poa annua*. Annual bluegrass. Annual. Europe.  
*Polypogon viridis*. Beardless rabbitfoot grass. Perennial herb. Africa, Eurasia.  
*Schedonus arundinaceus*. Tall fescue. Perennial herb. Africa, Eurasia.  
*Setaria adhaerans*. Bur bristlegrass. Annual. Pantropical.  
*Setaria pumila*. Yellow bristlegrass. Annual. Old World tropics.  
*Setaria setosa*. West Indian bristlegrass. Perennial herb. South America.  
*Sorghum bicolor*. Sweet sorghum, *sorgo*. Annual. Africa.

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Table 1. Non-native species of Sonora, Mexico. \* = invasive species.

*Sorghum X almum*. Columbus grass, *zacate maravilla*. Perennial herb. South America.

*Stenotaphrum secundatum*. Saint Augustine grass. Perennial herb. Africa, South America.

*Tragus berteronianus*. Spiked burgrass. Annual. Africa, Asia.

*Triticum aestivum*. Common wheat, *trigo*. Annual. Old World.

*Urochloa panicoides*. Liverseed grass. Annual. South Africa.

*Urochloa reptans*. Running grass. Annual. Asia.

*Zea mays* var. *mays*. Corn, *maiz*. Annual. Mexico.

*Zea mays* var. *mexicana*. *Teosinte*. Annual. Mexico.

\**Arundo donax*. Giant reed, *carrizo*. Shrub. Asia.

\**Avena fatua*. Wild oat, *avena silvestre*. Annual. Eurasia.

\**Cenchrus ciliaris*. Buffelgrass, *zacate buffel*. Perennial herb. Africa, Eurasia.

\**Cynodon dactylon*. Bermudagrass, *zacate inglés*. Perennial herb. Asia.

\**Dichanthium annulatum*. Kleberg bluestem, *zacate carretero*. Perennial herb. Africa, Asia.

\**Eragrostis lehmanniana*. Lehmann lovegrass, *zacate africano*. Perennial herb. Africa.

\**Polypogon monspeliensis*. Rabbitfoot grass, *zacate cola de zorra*. Annual. Africa, Eurasia.

\**Schismus arabicus*. Arabian grass. Annual. Africa, Eurasia.

\**Schismus barbatus*. Mediterranean grass. Annual. Africa, Eurasia.

\**Sorghum halepense*. Johnsongrass, *zacate Johnson*. Perennial herb. Africa, Asia.

#### Polygonaceae

*Pericaria persicaria*. Spotted ladythumb. Perennial herb. Eurasia.

*Polygonum argyrocoleon*. Silversheath knotweed. Annual. Eurasia.

*Polygonum aviculare*. Prostrate knotweed. Perennial herb. Worldwide.

*Polygonum convolvulus*. Black bindweed, *azahar de novio*. Annual. Eurasia.

*Rumex aceosella*. Sheep's sorrel. Perennial herb. Eurasia, British Isles.

*Rumex crispus*. Curly dock. Perennial herb. Africa, Eurasia.

*Rumex obtusifolius*. Bitter dock. Perennial herb. Africa, Eurasia.

*Rumex stenophyllus*. Narrowleaf dock. Perennial herb. Eurasia.

#### Pontederiaceae

\**Eichhornia azurea*. Anchored water hyacinth. Perennial herb. Mexico to South America.

\**Eichhornia crassipes*. Common water hyacinth, *patito*. Perennial herb. South America.

#### Primulaceae

*Anagallis arvensis*. Scarlet pimpernel. Annual. Eurasia.

*Anagallis minima*. Chaffweed. Annual. Europe.

#### Pteridaceae

*Pteris cretica*. Cretan brake. Perennial herb. Africa, Eurasia.

#### Ranunculaceae

*Consolida ajacis*. Doubtful knight's spur. Annual. Eurasia.

#### Rhamnaceae

*Ziziphus jujuba*. Chinese jujube, *dátil chino*. Tree. Asia.

#### Rosaceae

*Prunus persica*. Peach, *durazno*. Tree. Asia.

*Pyrus communis*. Common pear, *pera*. Tree. Eurasia.

#### Rutaceae

*Casimiroa edulis*. White sapote, *zapote blanco*. Tree. Mexico to South America.

*Ruta graveolens*. Subshrub. Eurasia.

#### Salvinaceae

\**Salvinia molesta*. Giant salvinia, *helecho flotador gigante*. Perennial herb. South America.

#### Scrophulariaceae

*Verbascum virgatum*. Wand mullein, *barbasco*. Perennial herb. Africa, Europe.

#### Simaroubaceae

\**Ailanthus altissima*. Tree-of-heaven, *falso nogal*. Tree. Asia.

#### Solanaceae

*Nicandra physalodes*. Apple of Peru. Annual. South America.

*Nicotiana tabacum*. Pima tobacco, *papante*, *macuchi*. Annual. South America.

*Petunia axillaris*. Large white petunia, *petunia*. Annual. South America.

*Solanum lycopersicum*. Tomato, *tomate*. Annual. Mexico to South America.

*Solanum pseudocapsicum*. Jerusalem cherry, *naranjito de amor*. Shrub. Mexico to South America.

*Solanum seaforthianum*. Brazilian nightshade, *bellísima*. Woody vine. Central, South America.

\**Nicotiana glauca*. Tree tobacco, *Juan loco*, *palo loco*. Shrub. South America.

\**Solanum sisymbirifolium*. Sticky nightshade. Perennial herb. South America.

#### Tamaricaceae

\**Tamarix aphylla*. Athel, *pino salado*. Tree. Africa, Asia.

\**Tamarix chinensis*. Saltcedar, *pino salado*. Tree. Asia.

#### Tropaeolaceae

*Tropaeolum majus*. Nasturtium, *mastuerzo*. Annual. South America.

#### Ulmaceae

*Ulmus pumila*. Siberian elm, *olmo*. Tree. Asia.

#### Verbenaceae

*Glandularia pulchella*. South American mock vervain, *alfombrilla*. Perennial herb. South America.

*Lantana camara* Mozelle cultivar. Lantana, *confitura negra*, *negrito*. Shrub. Mexico to South America.

#### Xanthorrhoeaceae

*Aloe vera*. Aloe, *sábila*. Rosette succulent. North Africa.

#### Zygophyllaceae

*Tribulus cistoides*. Jamaican feverplant, *burnnut*, *toboso*. Perennial herb. Africa, Australasia.

*Tribulus terrestris*. Puncture vine, *toboso*. Annual. Old World tropics.