

# *Tucson Area Opuntias*

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## Native Species:

These are species of the genus *Opuntia* that I know grow naturally within the Tucson area (including an area of roughly 30 miles from the city).

***O. blakeana*** – Low spreading plants that have small narrow pads, often a bit squared off at the tip. Areoles are small, spines relatively few, short, usually brown. Stem color is often dark, and often somewhat purplish or bluish. Very closely related to *O. phaeacantha* and *O. camanchica*, but recognizably distinct. Only grows in the Santa Cruz basin (as far as I know).

***O. camanchica*** – A common, widespread, variable species found widely in the Southwest and northern Mexico. It is usually mislabeled as *O. phaeacantha* var. *major*, which is a distinctly different and larger plant. It is very similar to *O. phaeacantha*, being a low spreading smallish plant. Pads tend to be wide, thickish, with areoles widely spaced, and spines stout. Spines are often dark at least at the base, but may be most any color from white or pale yellow to dark red or black. Flowers are yellow, often orange or red in the center, with stigmata usually pale. Fruit smallish, ovoid. This species is found pretty much everywhere below the mountains that isn't too dry from western Texas to southern California, and from southern Nevada, Utah, and Colorado south well into northern Mexico.

***O. cañada*** (= *flavescens*) – Closely related to and similar to *O. orbiculata*, but with pads usually narrower, spines fewer, and with fruit often pale in color (not always). Seedlings are apparently not hairy (and they are strongly so in *O. orbiculata*), but this needs checked out. This species seems to be only in mountain areas and sometimes the valleys between in south-central Arizona and northern Sonora. Not as cold hardy as *O. orbiculata*, but that doesn't apply to Tucson.

***O. chlorotica*** is a widespread bushy smallish tree-like species (though it can reach 8 ft. exceptionally) in inland southwestern US and northern Mexico. It takes on several different appearances, mostly based on differing coloration and size. They have been called different species, but they blend where-ever they meet. All varieties produce both spiny and spineless individuals. Flowers on all are bright yellow, only very rarely with red centers.

**var. *chlorotica*** is the northern variety, with yellow spines and green pads.  
Fruits are large and usually bright red.

**var. *santa-rita*** is found in the western Sonoran Desert in Arizona, Sonora, and a little bit in Chihuahua and New Mexico. It is basically the same, and may be the same color, but usually pads tend to bluish or purplish, and spines are usually more slender and more often reddish or brownish in color. Fruits are smaller and more purplish or pinkish.

**var. *gosseliniana*** is basically a little version of var. *santa-rita* in which the spines are even more slender. It is found in the Sonoran Desert, mostly further west than var. *santa-rita*.

***O. setispina*** – In the Sierra Madre of Chihuahua, Durango, and Sonora is a smallish variety with grayish pads and usually whitish spines. It was named *Opuntia setispina*, which is actually the oldest name for the species, and which should replace *O. chlorotica*, except for that one variety. Since it is a Mexican plant, it has never been associated with our varieties.

***O. confusa*** – Perhaps the most common species in the Tucson area, but known only from here and also far to the east near Las Cruces and Alamogordo in New Mexico. It is a relatively low bushy species with rounded pads that tend to be grayish in color with almost “black and white” spines (really deep brown and cream). The spines come mostly in two arrangements. Often on the same plant. Some pads will have three or more long stout angular spines radiating from the areoles, and often some radiating small whitish spines around them. Other pads will have only the small spines and one or two whitish spines that point almost straight down. There are intermediate conditions, but they aren’t as commonly seen. The flowers are showy, opening yellow (often with fine orangey veining), but usually deepen in color as they age until they are orange or nearly red. When yellow first day flowers are mixed with older varied colored flowers, the show can be incredible.

***O. discata*** (= ?*microcarpa*) – relatively large bushy rigidly woody plants with wide rounded pads that have pale (usually white with a brown base) spines that are up to roughly an inch long, that are stout, and that radiate out in a distinctive “bird’s-foot” pattern. Flowers are bright yellow with deep green stigmata, but may fade to red before they close. Fruit are rounded, often a bit lumpy, dark, and sweet.

***O. dulcis*** (= *eocarpa*) – A relatively large bushy species (sometimes lower and spreading) with fairly large pads. It is often confused with *O. engelmannii*, but has spines, flowers, and fruits more like *O. phaeacantha* (except the flowers and fruits are larger). The areoles are small with neatly and tightly arranged glochids, that on new pads form a central clump and a ring around it. Spines tend to be whitish with brownish bases, but can be dark or yellowish. A very common species in the Tucson area.

***O. engelmannii*** (= *recurvospina*) – A name widely mis-applied to nearly any large bushy US *Opuntia*. In reality, other species are often more abundant, but this one has a wide distribution. It is usually a fairly tall and wide bushy plant with obovate pads that have large areoles and a variable number of stout spreading spines. Spines are usually white to yellowish with darker bases. Some plants are quite spiny and others nearly spineless. Plants with dark reddish-brown spines were named *O. arizonensis*. The fruit is fairly large ovoid, dark, juicy and sweet. Flowers bright yellow with faint orange veining (often turning orange) with large green stigmata. Seedlings are hairy.

***O. flavispina*** (while distinct, has never yet been raised to species ranking).

Legally this is a varietal name, and should not be used as a species name (until somebody formalizes it as a full species). However, it is a very distinctive species, and so that's how I list it. It is another rather average, moderately large (perhaps not as tall as many) bushy plant. The pads are often yellowish-green (and look more yellowish because of the yellow spines). The spines are yellowish to bright yellow, sometimes dark at the base, long, often twisting, usually with most areoles having one spine distinctly longer than the rest. The flowers are quite showy bright yellow.

***O. gilvescens*** – Perhaps there are more than one species included here, but they are all similar. These are low, spreading, bushy plants, sometimes up to waste high, with relatively large pads that tend to be a bit yellowish but often turn purplish when stressed). Areoles are closer together than in most of the native species, with small areoles and few relatively slender short spines (usually not much over an inch) that are usually some shade from white to brownish or gray in color. The ovaries and fruit have more areoles than average (to match the pads). The flowers are large and often a bit ruffled, with usually pale green stigmata and often just a touch of brassy orange in the center. A common widespread species that is always called something else. Similar to *O. orbiculata*, but smaller and pads usually not as round. Similar to *O. cañada*, but again smaller. Sometimes amazingly similar to *O. macrocentra*, but pads differently shaped and never quite as bluish or purplish, and with shorter spines, and no red center in the flower. Seedlings aren't hairy.

***O. laevis*** – A distinctive nearly spineless species with mostly narrow pads and with narrow fruit, known only from mountains of southern Arizona and northern Sonora. Can be confused with *O. cañada*, and often found with it, but pads of that one are wider, and fruit are rounder, usually (not always) it is spinier. Seedlings not hairy.

***O. affinis lubrica*** (native or not?) – An interesting puzzle here. Is it native to the Tucson area or not? It is highly variable here (varying from green to purple pads), but does grow wild over a fairly large area. Could it be a hybrid of *O. microdasys* with other native species? It is much like *O. rufida* in appearance, but perhaps a bit larger on average, with the flowers larger, with the epidermis smooth and fairly shiny, and with glochids mostly yellow to reddish instead of white to dark reddish brown or black. The species was described from northeastern Mexico, where it could also be derived from *O. microdasys* hybridizing with other species (mostly likely *O. cacanapa*). It is unclear whether Mexican and Arizona populations should be called the same thing, but they are very similar. Mexican plants are always bright green (often a bit yellowish). Some plants have a few thin yellowish spines.

***O. macrocentra*** – Hard to tell from most varieties of *O. azurea* (not native to Arizona), but generally pads have more areoles and thicker spines that are often even blacker. The flowers average more intense in coloring. The species often produces crested pads on scattered plants, but this seems to be a sporadic thing, and the pads just grow into normal plants if they are cut and rooted. Found mostly north of Mexico from West Texas and New Mexico to southeastern Arizona. *O. azurea* is mostly further south, but they often grow together and remain distinct. The chromosome number is different (*O. macrocentra* 2n=44. *O. azurea* 2n=11).

***O. orbiculata*** (= *dillei*; = ?*microcarpa*) – Common and widespread in northern Mexico and sw. US. A moderately large bushy species with mostly rounded pads (often wavy) of dark, sometimes yellowish green. Areoles are small (except on very spiny plants) with glochids usually short and neat (on younger pads anyway). Spines relatively slender and relatively short (usually not much over 1 inch) and one or few (or none) per areole. Spine color varies a lot, but often yellowish or whitish with darker bases. Glochids usually dark. This is confused for *O. engelmannii* in Arizona and New Mexico and for *O. lindheimeri* in Texas. It ranges from the Dallas area to mountains of southern California and Nevada.

***O. phaeacantha*** – The catch-all name for everything under the sun. The real plant is low, spreading, and small. It is not at all woody (unlike most related species of similar or larger size). It usually doesn't shrivel in winter like some of the even smaller northern species, but it can if things get really cold. Areoles are moderately far apart on obovate pads that are often dull green in color. Spines vary tremendously in color, but pale tips with brownish bases are normal. Flowers vary a lot in color too, but yellow or with orange to red centers are most common.

***O. pottsii*** – A small clumping plant of silt flats, grasslands and mountain woodlands. The pads vary in shape and color depending on the variety (var. *montana* in the mountains usually has wide dark green pads, and var. *pottsii* lower down usually has smaller, more spatulate and stipitate pads that average paler and grayer or bluer in color). Every population looks a little different, and the species is found statewide except in the Sonoran Desert in the southwest. Flowers and fruits vary in color too, and fruits are slender and stipitate at low elevations but short and barrel-shaped at higher elevations. The large tuberous central taproot is characteristic. This is usually mislabeled as *O. macrorhiza* in Arizona, but this is a very different plant. *O. roseana* from Texas is a mystery name, but it may turn out to be the same or very near to *O. pottsii* var. *Montana*. Other names for *O. pottsii* include *O. ballii*, *delicata*, *loomisii*, *plumbea*, & *filipendula*.

***O. riparia*** (= ? *angustata*) – Found near the upper edge of the desert from north of Phoenix to Superior and south to Tucson. I don't now if *O. angustata* is the same species, but it is definitely similar. *O. riparia* may only occur in Arizona, but I have seen a few similar plants near Alamogordo, NM.

***O. tortispina*** – Similar to *O. cymochila* on one hand and to *O. phaeacantha* on the other. The plants have areoles a little further apart on average than in *O. cymochila*, and spines less slender, with fewer small radials and more stout centrals. Flowers and fruits are very like those of *O. phaeacantha*, and easy to tell from those of *O. cymochila*, are varied in color, often with darker centers, and with stigmata always green (often, but not always very pale, to white in *O. phaeacantha*, always green in *O. cymochila*). Compared to *O. phaeacantha* this species averages a little smaller, areoles closer together, spines more numerous and a bit less stout, flowers larger, fruit smaller. This is primarily a grassland species, widespread in all but the Sonoran and Mojave desert parts of Arizona (but it is in upland grassland areas within the deserts).

***O. toumeyii*** – This is another of the “not really *O. phaeacantha*” types. It is a spreading somewhat bushy plant, not too tall, but pads relatively large. It is common in the Tucson area, but seems to grow nowhere else (it may be in Sonora). Pads are distinctly longer than wide, obovate; areoles widely spaced and small on younger pads. Larger spines are usually distinctly brownish, and one or sometimes more spines are distinctly longer than the others and point straight out from the areoles, often twisting somewhat, and often well over 2 inches long. Flowers are relatively large and yellow, sometimes orange or red in the center. Fruit are similar to those of *O. phaeacantha* and *O. camanchica* but average larger and a bit narrower.

***O. “valencia” (undescribed species)*** – A common species found over a wide area of the Southwest, but never named. It is very like *O. engelmannii*, but smaller, and spreading instead of more upright. It has pads that average wider, and there are usually more spines and glochids. Flowers and fruits are the same, but a bit smaller. Some plants are very showy, with lots of stout brightly colored spines. Others are more non-descript with more whitish or more slender spines. Spine bases are usually brownish. Seedlings are not hairy. There are lots of these on the loop drive in the east unit of Saguaro National Park.

***O. affinis valida*** – I’m not certain if Arizona plants are really *O. valida* or just related. They are very similar to New Mexico plants, but spines are lighter and often more yellowish in color. These plants tend to have pads narrower than those of *O. engelmannii*, and often they are rhomboid. They tend to be a bit grayish or bluish, especially when young. Spines are generally more numerous and are longer, with most of the main spines rigid and angular, and similar to one another. Spines increase in number on old stems and make the “trunks” very spiny. Flowers are very showy, often with orange highlights, and fruit are sweet, somewhat spiny, dark in color, and elongate. Seedlings are hairy. This species is very common around Phoenix and grows in Arizona from the southeast to the east edge of the Mojave. It is in some of the Sonora Desert Mountains. The “typical” form from New Mexico has spines cream colored with deep chocolate bases, and nearly black areoles. Arizona plants have the dark coloring not so pronounced.

***O. species nov. affinis pottsii*** (sometimes mistakenly called *O. “setispina”* in Chihuahua) – This is a low plant that shrivels in winter. It is similar to *O. pottsii* in having usually stipitate pads that grow from a central underground tuberous taproot. The spines are usually few per areole, slender, rather long, and vary from white to multi-toned shades of brown and white. Ovaries and fruits are long and slender (fruit about 2 inches long) and tend to be darker than those of *O. pottsii*. Flowers are fairly large and yellow to yellow with a red center, with pale greenish stigmata, and they often fade orangey. This plant is found in scattered locations mostly in gypsy flats in southeastern Arizona, and southward to west-central Chihuahua. It has never been studied, but is an interesting unnamed species.

## **Introduced Species:**

***O. microdasys*** – Everyone knows the “Bunny Ears”.

***O. lindheimeri*** (incl. cv. ‘*Linguiformis*’) – *O. lindheimeri* is a lot like *O. engelmannii*, but a bit “softer”. It has the same growth habit, and similar traits, but pads usually a richer green, and spines are yellow (or reddish with yellow tips). Spines tend to be longest along the lower side of the pad. Flowers are a deeper brighter yellow (or they may be bright orange or red). Fruit more likely to have a neck, more likely to be rounded off instead of pitted at tip, and less likely to have a waxy bloom; sour, not sweet. This species is found almost entirely east of the Pecos River in New Mexico and Texas (south in eastern Mexico to near Victoria). Compared to *O. alta* and *O. gomei*, usually has fewer spines and glochids, seeds are larger, fruit less spiny, and pad edges not undulate; it averages smaller. Leaves on new growth are not so recurved (or not at all). The “Cow’s Tongue” or cultivar ‘*Linguiformis*’ has been called a species, a subspecies, and a variety, but really it is just an abnormal growth form. Cow’s Tongue plants may produce Cow’s Tongue seedlings (so the trait is inheritable), but many seedlings are normal. Also, Cow’s Tongue plants can produce stems with normal pads that will grow into normal *O. lindheimeri* plants if grown as cuttings. The western variety from higher drier climates is stouter (but not bigger) with thicker woodier pads and usually shorter stouter, and fewer spines. This is *O. lindheimeri* var. *subarmata*, and a nearly spineless cultivar (the “clonotype” of the name actually) is common in Tucson gardens. Seedlings are hairy.

## **Additional Common Garden Species**

***O. (Nopalea) cochenillifera*** – There are several species of *Nopalea*, and they are sometimes lumped into *Opuntia*. They mostly have narrow pads with areoles far apart and few spines. Flowers are distinctive, with short petals that don't open, and stamens and stigmata that stick straight out the end. They are usually some shade of red. Fruit are smallish and fairly typical for *Opuntia*.

***O. aciculata* (= *flexospina*)** – Commonly grown and well-known, but more varied than most realize. It is usually spineless with lots of yellow to dark reddish glochids in tight clumps, but many plants do have spines, relatively short and slender yellow to reddish ones that tend to point out or down. The name *O. flexospina* was given to plants with spines (and has nothing to do with *O. strigil*). Flowers are moderately large, show, and bright yellow, orange, or red (rarely purplish). Fruit are dark, smallish, and ovoid to fat-pear-shaped. I've never tasted them, but animals take them quickly, so they are probably sweet. Seedlings apparently not hairy.

***O. alta*** – A large upright species from the Northeast coast of the Gulf of Mexico that wants to be a tree, but often breaks down. Usually has one main trunk with lots of branches, and has wide oval to round pads usually undulate at the margin. Areoles large, prominent, with long usually yellow glochids of mixed lengths. Flowers generally not very large, and mostly light yellow (but may be other colors). Stigmata pale, and ovaries short with bristle-like spines. The fruit is dark when ripe, smallish, fat, and rounded to pear-shaped. Usually very sweet, and seeds inside are tiny. Leaves on new growth are bright green and curve strongly down. Other species are often confused for this one, and are often similar. *O. cantabridgiensis* (= *cuija*) may be just a smaller inland form of the same species, as it is nearly identical, just more compact. *O. gomei* is related, but remains distinct where they both grow together (see below). Seedlings hairy.

***O. basilaris* hybrids** (mostly with *O. microdasys*, *O. macrocentra* and *O. santa-rita*) – Several Beavertail hybrids have caught on in gardens, and all tend to combine traits of *O. basilaris* with the other parent. Many other hybrids are found in gardens, involving many other species, but few are common. One fairly new cultivar called “Mini Rita” is becoming very common. It is said to be *O. basilaris* x *O. [chlorotica] santa-rita*, but this is not possible, as it looks nothing like those species, looks nothing like other such hybrids, and is way too cold hardy. It is likely a hybrid of a small dry-fruited species and a larger (but still small) low-growing juicy-fruited species. I would make a guess at something like *O. vaseyi* x *O. fragilis*, but this could be way wrong. For comments on *O. basilaris* see below.

***O. bergeriana*** (often mistakenly called *O. elatior*) – a Central American tree-like species with smallish dull green narrow pads that may bear some yellowish or brownish spines, or not. Small flowers are usually bright red (may be orange), and fruit smallish, round, with prominent clumps of short glochids.

***O. bravoana*** – An open branching smallish bushy Mexican species with oval thick pads that almost always show distinct purplish coloring around the areoles (but it may cover the pad when the plant stressed).

***O. cacanapa*** (incl. “*Ellisiana*”) – Upright bushy plants with young pads bluish, usually wide, rounded, and a bit narrowed at the base. They usually have small areoles with only few glochids and one or two straight terete yellow spines from some of the areoles. Plants with dark spine bases were named “*Opuntia tricolor*”. A commonly grown cultivar with no spines (rarely a yellow spine here and there), and with usually narrower pads was named “*O. ellisiana*”, but is only a garden selection. This diploid species often will not set fruit unless there are more than one distinct individuals present. Flowers are yellow, fruit pear-shaped usually with the areoles white few and crowded near the top. From northeast Mexico and south Texas. Seedlings hairy.

***O. dillenii*** – A Caribbean species badly confused with other species (notably with very different *O. stricta*), and which has been introduced to mild climate areas all over the world. It is very similar to *O. alta*, but less robust with pads usually smaller and with fewer areoles. Spines may be few, but are usually numerous, stout, curving and yellow. The flowers are small and usually yellow (sometimes other colors) and have pale stigmata. The fruits are smallish and pear-shaped, with areoles far apart. Unlike many larger US species (but like most species), the seedlings of this one are not hairy.

***O. elata*** – A South American type that has smallish very thick “lumpy” pads, usually dark shiny green, with a few long very stout brownish to white spines. Flowers are small and usually orange. Fruit is smallish, usually ovoid or pear-shaped and purple.

***O. ficus-indica* / *megacantha* / *maxima* / *streptacantha* / etc.** – These are all very similar large upright often tree-like plants with large juicy fruit that we all know well. The main differences between the various names are in number and thickness of spines. Some of the spineless cultivars have the largest fruits (which vary in color and flavor). Flower color varies too. *O. streptacantha* has the thickest spines and is a wild type that occurs in the grasslands and hills of high north-central Mexico.

***O. gomei*** (usually mistaken for *O. alta*) – This is a large bushy spreading species that may through up a few upright tree-like branches, only to have them collapse when it gets cold or too dry. The pads tend to be large and wavy with undulating margins. Areoles are large with long glochids that are usually yellow, and stout but not long yellow spines. The flowers are large, showy, varied in color, with green stigmata. Fruits are like those of *O. lindheimeri* except sweeter, and they bear bristle-like spines (though these may have fallen off by the time the fruit is ripe). New growth has bright green leaves that curve down (like those of related *O. cacanapa*, *O. alta*, and *O. cantabridgensis*). There are several synonyms for this species, as David Griffiths seemed to be overly concerned with the variations in color that occurs from plant to plant, and he named several of the variations. The most recent name for it is *Opuntia lindheimeri* var. *lehmannii*, which Lyman Benson described, and which displaces all the other names at varietal ranking (but I consider it a species, and *O. gomei* is the oldest name). Seedlings hairy.

***O. leucotricha* / *lasiacantha* / *durangensis*** – These are likely all the same species. They look the same when mature, forming tree-like plants, usually with a single trunk, with many areoles that bear several short relatively slender spines each (usually pale in color, but often fading to black in age). The fruits are highly varied in color and are known as “Duraznillo” (little Peach). They are rounded with numerous areoles that usually bear short bristles. The young plants and trunks of *O. leucotricha* usually bear long hair-like spines, but these are not on new growth of mature plants, and they fall off of trunks of older plants. These occur in a large area of upland central and northern Mexico. Young plants (but ?never? youngest seedlings) are hairy.

***O. pilifera*** – A tall bushy tree-like plant. Pads oval, thick, with many areoles close together, and each with a few short stiff spines and several fine hair-like spines. Spines usually nearly white. Flowers vary in color, but usually pink. Ovary and later fruit very spiny. Fruit small and usually pink in color. Hails from central Mexico

***O. pycnantha*** – A low spreading bushy plant with mostly upright very thick pads with many areoles very close together and all with several short yellow to reddish-brown spines. Flowers yellow.

***O. quimilo*** (= *O. distans*) – A tree-like plant with pads oval, very thick, and bluish in color. Spines when present (especially on trunk and young plants) few but very long (up to 4 inches or more long sometimes), and very thick and stout. Spine color usually whitish to tan, but may fade to near black in age. Flowers small, wide open, usually orange to red (rarely yellow). Fruit large and pear-shaped, usually greenish to pinkish, with very large seeds (often around 8 or 10 mm in diameter).

***O. robusta*** – A large semi-upright bushy plant often with very large broad bluish pads (sometimes up to 2 ft. long). Flowers large, yellow, with spreading pale yellowish stigmata. Fruit large, rounded, a bit “lumpy”, juicy and sweet.

***O. rufida*** – A relatively large spineless upright shrub with oval to round pads that are grayish pubescent and have many small areoles with clumps of usually dark red to black glochids (may be white or tan as well). Flowers yellow, fruit red and small. Often confused with smaller *O. microdasys* which usually has more slender pads. Very similar to *O. lubrica*, but that species has smooth shiny pads and more often yellowish to orangey glochids and larger flowers.

***O. scheeri*** – A large shrubby plant with areoles numerous and very close together, with several very short slender spines in all the areoles, usually with spines yellowish.

***O. stenopetala*** (older name may be *O. grandis*) – Resemble *O. phaeacantha*, but often has distinct reddish or purplish coloring around areoles, and has unusual small yellow to red flowers that don't open widely.

***O. tomentosa*** – Tall upright plant with smallish thick narrow pubescent pads. Flowers smallish and varying from yellow to red. Fruit usually red, nearly round and also very pubescent.

***O. vaseyi*** (= *O. magenta*; = *austrorcalifornica*) – Somewhat similar to *O. phaeacantha* and *O. blakeana*, a low spreading plant with pads tending to be held upright. Pads tend to be longer than wide, often a bit squared off, areoles relatively close together and small with neat glochids on younger pads. Spines may be none to 4 or 5 per areole, most similar, short, slender, most often tan, brownish, reddish, or sometimes yellowish. Flowers are showey, usually orange or red, sometimes magenta or yellow. Fruit are large for the plant (about an inch and half) and round, ripening to red then very dark.

***O. vulgaris*** (= *O. monacantha*) – Upright rather “loose” plant with branches often drooping. Pads usually dark green, a bit elevated around areoles, few relatively stout spines are usually whitish to brown. Yellow flowers often have red highlights, especially on back side. Fruit red to purplish usually pear-shaped and with areoles far apart. Very similar to *O. stricta*, which usually has more yellowish green thicker pads and yellowish spines (or no spines). Flowers are larger and usually have no reddish coloring.



## **Other native Arizona species**

***O. angustata*** (= *O. magnarenensis*) – This species may be a variant of *O. riparia*, which it replaces to the northwest. It has fairly narrow oblong, often rhomboid pads that tend to be bluish, with relatively stout radiating pale spines (brownish bases) from the areoles. There is more of a tendency for one spine to be longer than the others in this species. The flowers are yellow, and fruits are elongate. Found in the area north from Bagdad north to near Kingman. Found only in Arizona? Seedlings not hairy.

***O. caesia*** is found in the mesa country north of the Grand Canyon and west of the Kaibab Plateau. It is similar to *O. toumeyi*, but usually there are more than one central spine that may be darker when young. Plants tend to be somewhat a little more compact with branches a little less spreading, and pad color is less yellowish with younger pads usually distinctly glaucous. Pads are mostly elongate obovate, and have pale spines with brownish bases. Flowers are probably always yellow (may be orange or red in center). This “species” needs more study. Grows with and can be confused with *O. woodsii* when not in flower or fruit.

***O. curvospina*** – Similar to *O. chlorotica* in growth habit; upright compact bush with one to a few trunks, glochids & spines increasing on trunk, but with fewer areoles further apart on both fruit and stems, and with stouter spines. Found in the upper Mojave Desert and lower mountains in Mojave and perhaps La Paz Counties.

***O. cymochila*** – Low spreading plants with wide pads that have one or two main (usually cylindrical) central spines that may be yellow, white or brown, and a smaller few radiating slender (often flat) white. Flowers vary in color, but always have green stigmata and the petals tend to roll under at the margins, giving a crisped or ruffled look to the flowers. Flowers only rarely have centers distinctly darker than the rest. Fruit tend to have sharp edge rims at the top, are often brownish, seeds are large with wide rounded rims, and the pulp tend to be very sweet. Only occasionally found north of the Grand Canyon and Little Colorado River. A Great Plains species that finds an occasional home in Arizona and Utah. This is one of the non-woody species that shrivels in winter.

**?*O. macrorhiza* var. *stenochila*** (probably in Apache County) – I have never found this in Arizona, but have found it within 3 feet of the state line! It likes sandy areas with cold winters and adequate rainfall. It is most likely to be found in Apache County. Low spreading plants root down as they form chains of pads along the ground. The oval pads are non-woody pads and shrivel in drought and winter. Spines are few, usually only one or two (Sometimes three or four) in upper areoles. Pale spines often have a yellowish tinge, darker, often brownish toward the base. Flowers have a satiny quality that is hard to describe, and stigmata are usually pale green to white. This species’ name is often misapplied to *O. pottsii* in Arizona. It is closely related to, similar to, and perhaps only a variety of eastern *O. humifusa*.

***O. martiniana*** – Smallish bushy plants that sometimes tend to grow a short upright trunk. Very similar to, and probably related to *O. macrocentra*, except with yellowish spines, and with flowers that don’t have a red center. Very pretty, well-behaved, spiny plants for the garden. These are found in uplands of the eastern part of the Mojave Desert (particularly in and near the Hualapai Mountains), and may be endemic to Arizona. There is a chance this name is misapplied here, it may be a synonym of *O. gilvescens*, but we’ll ignore that for now.

***O. woodsii*** – These are moderately large spreading bushy plants that tend to have pads narrower than long. Spines are usually fairly long and pale in color. Large showy flowers are usually orange to red (but can be yellow or pink), and have distinctly green stigmata. These plants grow mostly on volcanic slopes in sw. Utah, but lap into both Arizona and Nevada. They follow the east margin of the Mojave Desert south into the Grand Canyon, where they are again common in some places. A great garden plant that isn’t grown enough. When it reaches up into high country, it grows low and spreading, but still has large pads (and grows the same way in northern gardens). In lower elevations it forms a bushy plant similar to many others in habit. Seedlings not hairy.

**?*O. wootonii*** – This is a species of the mountains of the northernmost Chihuahuan Desert. It usually has long relatively slender yellowish spines (often white near the tip and blackish at the base) from large areoles that bear glochids of mixed lengths. Some plants have shorter spines that may be yellow, white, blackish, or a combination. It is easily confused with other species of similar size. The pads are usually somewhat elongate, often somewhat rhombic, and tend to be a darkish yellowish green that can fade to yellowish when the plant is stressed (but new pads are often bluish. It is a pretty plant for gardens, and flowers are yellow, often with orange highlights that follow the veins. Plants with yellowish spines that are similar occasionally found in mountains of sw. New Mexico and se. Arizona, and may belong to this species. Seedlings apparently variably hairy or not (needs more observation).

***O. polyacantha* group** – There are Arizona native varieties of this species, but many found in gardens are not native. They vary from very spiny to spineless, all are small and clumping to spreading plants with thickish, non-pubescent, non-woody, flat, firmly attached pads that shrivel and lie flat during extreme cold (Tucson is often too warm for this to happen). Most small plants with dry, often spiny small fruit are going to be this species. Flowers are varied in color and very showy, with stigmata always green. *O. polyacantha* probably is normally tetraploid everywhere ( $2n = 44$ ), but identifications of counted samples is sometimes confused, and other counts have been recorded.

In Arizona, the following varieties of *O. polyacantha* occur in the wild, but other varieties occur outside the state, and are grown in gardens. All the varieties blend with one another where they meet in nature, so plants can be very confusing.

**var. *erinacea*** (incl. *ursina*) – Clumping often upright plants with thick, often narrow pads. There are several slender (often hair-like) spines per areole. In the Mojave and canyons of the Colorado and San Juan Rivers. In higher mountains some plants have fewer spines and look different (but grow the same way when brought into gardens).

**var. *juniperiana*** – Low spreading plants of mostly wooded areas in northeast Arizona. Pads usually relatively wide with few short spines mostly in only upper areoles. Areoles are small. Ovary and fruit often (not always) spineless.

**var. *hystricina*** – Similar to var. *erinacea*, but lower spreading plants with fairly wide pads. Many spines, with centrals often very long and fairly stout. Grasslands and deserts of northern Arizona.

**var. *schweriniana*** – Tiny plants with rounded to oval thickish flat pads that are mostly less than 2 inches long. Flowers small (usually under 1.5 inches across). Otherwise very similar to vars. *hystricina*, *juniperiana* and *polyacantha* (depending on number and length of spines). These are high mountain plants mostly from Utah and Colorado, but the highest areas in northeastern Arizona also have populations.

**Also in this group** are the following Arizona native species, which are all native in northern Arizona (but not near Tucson). These are all cold-winter species.

***O. aurea*** (includes *O. basilaris* var. *woodburyi*; some plants are spiny) is a sand-loving species, very similar to *O. polyacantha*, but usually spineless or with few thick almost “corky” looking spines – and with 66 chromosomes. ***O. nicholii*** from the Marble Canyon area, is basically a giant *O. aurea* with long often twisting spines. Flower color varies, and seeds are usually very large. This is a species of northern Arizona and southwest Utah. There are isolated populations in Nevada and California.

***O. basilaris*** is usually spineless, has white stigmata in white to magenta flowers, (never yellow or orange). The pads are often wider at the top than the base and branch from the base to form tight clumps. Normally diploid with 22 chromosomes. There are several distinctive varieties. In Arizona there is var. *basilaris*, common in the Mojave Desert, and occasional in some of the Sonoran Desert. It tends to have wide spatulate pads that almost always grow from the base of another pad. Variety *ramosa* is in mountains near the Sonora Border in sw. AZ, also found along the west edge of the deserts in California and n. Baja California. It is small with pads that branch both from the base, and stack up on top of one-another. The variety *longiareolata* (= var. *heilii*) occurs in the Grand Canyon, Marble Canyon, central Utah, and formerly under Lake Powell. It has areoles that tend to be less sunken making glochids clumps more prominent, and new young pads often have thin spines that fall off as the pads mature. Other varieties are in California.

***O. fragilis*** is tiny spiny or rarely spineless species (pads average under an inch long, but may be larger in gardens with extra water). Pads break off easily and bear slender but stout barbed yellowish to reddish or brown spines. Flowers are tiny (mostly under 1.5 inch) and always yellow, but may have an orange to red center. Recorded as having 66 chromosomes.

***O. debreczyi*** has smallish thick variable-shaped pads that tend to be “lumpy”, and average about double the size of those of *O. fragilis*, but usually well under 3 inches long. These fall apart easily during part of the year, and bear stout spines (may be none to several per areole). Flowers like those of *O. polyacantha* (larger than *O. fragilis* and likewise varied in color). 66 chromosomes.

***O. pinkavae*** has double the chromosome number and bluish pads that tend to be brown when young and growing, pads usually wide with slender pale often yellowish spines and bright pink to magenta flowers

***O. trichophora*** has hair-like spines on the fruit and usually on the pad (always on older pads), areoles are close together, small, and spines very slender (usually white to yellow), flowers always yellow (but may fade orange). *O. trichophora* is diploid.

## Some Pests of Pricklypear

- Cochineal (*Dactylopius* species)
- Pricklypear or Cactus Scale (*Diaspis echinocacti*)
- Leaf-foot Bugs (*Narnia* and
- Green Cactus Bug, Cactus Coreid (*Chelinidea vittiger*)
- *Cactoblastis cactorum* (and other related species such as *C. doddi*)
- Blue Cactus Borers (*Melitaria* species)
- Several other smaller Lepidoptera borers
- Cholla Moth (*Euscirrhopterus cosyra*)
- Long-horned Beetles (*Moneilema* and *Coenopaeus* species)
- Weevils (*Gerstaeckeria* and *Cactophagus* species; the second looks like related Agave/Yucca Weevils – *Scyphophorus*)
- Pricklypear Gall Midges (*Asphondylia* species)