Key to Prickly-pear Cacti (Opuntia, subgenus Opuntia in the strict sense) in and around Tucson, Arizona

Allan D. Zimmerman, 31 May 1996

1a. Epidermis puberulent (a unicellular trichome protrudes about 0.2 mm. from each cell):

2a. Yellowish green; tepals yellow; intricately branched shrubs up to 1/2 meter tall [common in horticulture, and feral near habitation; native to east-central Mexico]:
   *Opuntia microdasys* (Bunny-ears Prickly-pear)

2b. Blue-green or gray; tepals purple; branches mostly at ground level, plants usually reaching only one or two joints above ground [rare in horticulture; native to w. Arizona and California]:
   *O. basilaris* (Beavertail Prickly-pear)

1b. Epidermis smooth:

3a. Individual "pads" elongated and narrowed distally (owing to indeterminate growth), up to 1 meter long or larger; spines yellow, conspicuous; sprawling shrub 2 to 5 meters in diameter [grossly abundant in horticulture, and feral near habitation; native to San Antonio, Texas, where presumably extinct in the wild]:
   *O. lindheimeri*, mutant form "linguiformis" (Cow-tongue Cactus)

3b. Individual pads round, oval, or rhomboid (owing to determinate growth, all "programmed" to stop growing at a species-specific size/shape); growth-habits various, but if "pads" up to 1 meter long (in one form of *O. ficus-indica*) then plants strictly erect and tree-like:

4a. Stems uniformly purple or blue-grey:

5a. Inner tepals uniformly yellow; pads relatively elliptical (bases broadly obtuse-angled to rounded); spines yellow, orange, or brown, rarely black-and-white; erect shrubs, identical in growth-habit to *Opuntia chlorotica* [native, cultivated, and feral populations; the domesticated type is almost spineless]:
   *O. santa-rita* (Purple Prickly-pear)

5b. Inner tepals yellow with red bases, giving the flower a sharply defined red center; pads broadly obovate (bases varying from right-angled to broadly obtuse-angled); sprawling shrubs, intermediate with *Opuntia phaeacantha* in growth-habit:
   *O. macrocentra* (Black-spined Prickly-pear)

   [one taxonomic species containing two biological species; see couplet below]

6a. Pads 2 to 6 inches long [in horticulture; native to Big Bend region of Texas]:
   diploid *O. macrocentra*

6b. Pads 4 to 8 inches long; [native plants, seldom seen in horticulture]:
   tetraploid *O. macrocentra*

4b. Stems basically green (sometimes purplish, but only under stress):
7a. Stems wrinkling transversely under stress, leaving permanent marks after the first winter; low-growing plants, less than a foot tall:

8a. Spines 0--2 (rarely 4) per areole, not hiding the stem surface; root system semi-succulent, the largest roots usually 1 cm. or more thick [native in woods and prairies above the desert]:

   O. macrorhiza (Tuberous-rooted Prickly-pear)

8b. Spines up to 10 per areole, nearly hiding the stem surface; roots all fibrous [native to Mohave Desert & Rocky Mountain region, rarely grown as an ornamental in Tucson]:

   O. polyacantha (Grizzly-bear Cactus, Plains Prickly-pear)

7b. Stems wrinkling irregularly, or remaining smooth, under stress; plants at maturity usually more than a foot tall:

9a. Areoles on flower/fruit 40--70; plants arborescent (2 to 5 meters) [south-central Mexican origin; abundant in horticulture, and even grown agriculturally; rarely feral near Tucson]:

   O. ficus-indica (Indian-fig Prickly-pear; Nopal)

9b. Areoles on flower/fruit 12--35; plants shrubby, not exceeding 2 meters tall:

10a. Pads long and narrow (2 to 4 times longer than wide) [grown in old yards in Phoenix and Tucson; wild origin unknown but not from USA]:

   O. sp. "Angel Wings"

10b. Pads round, rarely up to 1.5 times longer than wide:

11a. Glochids of all areoles large (spine/glochid transition-forms, up to 1 cm. long, forming a large, loose, star-like cluster, reddish brown or brown with yellow tips); normal spines absent, replaced by the extra-large glochids; inner tepals always bright red [native to s. Texas, uncommon in horticulture in Tucson]:

   O. aciculata

11b. Glochids all small (larger on the rims of the pads); normal spines present or not; spines and glochids variously colored; inner tepals mostly yellow:

12a. Completely spineless, even the glochids few and inconspicuous; leaves strongly decurved [strictly confined to dooryard horticulture, unknown in the wild]:

   O. ellisiana (South Texas Spineless Prickly-pear)

12b. Spines present in at least a few areoles of every plant; leaves straight, directed upward or outward; wild plants, also cultivated:
13a. Spines and glochids all pale yellow; spines all slender and bristle-like (none more than 0.5 mm. thick); largest spines on the flat faces of the pads tending to be directed downward instead of radiating evenly in all directions; pads often nearly round, their bases rounded or obtusely angled; erect shrubs (sometimes having a single six- or eight-inch-tall trunk); reproduction strictly from seed [uncommon native plants]:

*O. chlorotica* (Pancake Prickly-pear, Silver Dollar Prickly-pear)

13b. Largest spines mostly white and/or brown; glochids yellow or brown; largest spines rigid and needle-like (usually 0.5 to 1.0 mm. thick); largest spines all projecting straight out or else spreading indiscriminately in all directions; pads obovate or rhomboid, their bases cuneate (weakly obtuse- or broadly acute-angled); sprawling shrubs, rooting adventitiously and ultimately forming clonal thickenets:

14a. Fruit pulp green or colorless; fruit rind brick-red to dull rose-pink; seeds greater than 4 mm. wide; inner tepals yellow with red bases; plants 0.1 to 0.5 meter tall; spines of seedlings normal (straight and sharp); glochids (on representative areoles--on faces of the stems, not on the rims) arranged in dense tufts (having a semicircular or crescent-shaped basal outline) in the upper halves of the areoles, with a cylindrical tuft near the center of each areole (after the first year), relatively small and uniform; seeds relatively large; stems often turning purplish red under stress; spines (at least the largest ones) reddish brown [abundant native plants, also in horticulture]:

*O. phaeacantha* (Brown-spined Prickly-pear)

14b. Fruit pulp beet-red; fruit rind dark beet-red to magenta; seeds less than 4 mm. wide; inner tepals unicolored (yellow, rarely changing to apricot-orange on second day); plants at maturity 0.5 to 2 meters tall; spines of seedlings (in the cylindroid stage, before flat "pads" are produced) hair-like and soft; glochids scattered throughout the areoles, relatively large (some of them transitional to normal spines); seeds relatively small; stems remaining green under stress; spines white or yellow [abundant native plants, also in horticulture]:

*O. engelmannii* (Engelmann's Prickly-pear; O'Odham names include Gook Eepai & Wetik Eepai)

**NOTE:** This key omits *Opuntia quimilo*: Glossy green, glabrous, erect shrub, usually 1 to 2 m. tall, spineless except for a few of the uppermost areoles on well-developed pads; these contain a single spine (usually at least 4 cm. long) projecting straight out from the stem surface, gray or white; pads smooth and turgid; flowers are smallest of all Tucson p-pear species; inner tepals are bright orange (different from any other Tucson prickly-pear cactus); often male-sterile (anthers present, but lacking pollen) [native to n. Argentina or a nearby region; uncommon in horticulture in Tucson].
NOTE: This key also omits an unidentified Opuntia, probably O. vulgaris: Glossy green, glabrous, erect (but often flopping over, weak or wilted), usually 0.5 to 2 m. tall (often requiring physical support to exceed 1 meter in height); areoles few (about 35 or 40 per pad?); pads thin and often slightly tuberculate (having slightly elevated areoles); spines absent, or very few per plant [Flowers not seen on the Tucson plants, but those of O. vulgaris are supposed to be large and yellow.] [strictly in dooryard horticulture, where rare in Tucson, often in semi-shade in sheltered patio environments; O. vulgaris is native to Brazil, Argentina, Uruguay, and Paraguay]