Key to the Cactus Genera in San Diego County

1. Areoles with glochids deciduous to touch, persistent spines present or absent; seed encased in hard, bony aril, whitish, tan, or brownish when dry, rarely stained purplish from juice of fruit [subfamily Opuntioideae]
   2. Stem segments cylindric; spines with epidermis separating into thin, paper-like, tardily deciduous sheaths….*Cylindropuntia*
   2’ Stem segments bilaterally flattened, circular, ovate, or obovate; spines without epidermal sheaths….*Opuntia*

1’ Areoles without glochids, persistent spines usually present; seeds black or brown, never enclosed by any aril (large corky strophiole at one end of seed in *Mammillaria tetrancistra*) [subfamily Cactoideae]
   3. Stem ribs 0 or inconspicuous, tubercles prominent….*Mammillaria*
   3’ Stem ribs prominent, tubercles 0 to prominent
      4. Spines 30-45 per areole, straw yellow, aging brown; stem length > 8 times width; inner tepals yellow; plants forming thickets; coastal….*Bergerocactus*
      4’ Spines (0-)2-28 per areole, various colors including yellow; stem length < 8 times width; inner tepals white to red, or yellow; plants unbranched to many branched and forming clumps; widespread
         5. Ovary and young fruit spiny, glabrous; branches gen few-many, often densely clumped….*Echinocereus*
         5’ Ovary and young fruit either spineless or woolly; branches gen 0, often solitary and columnar, sometimes forming many-headed mounds
            6. Scales of ovary and flower tube spine-tipped, axils woolly, wool hiding flower tube and ovary at anthesis….*Echinocactus*
            6’ Scales of ovary and flower tube obtuse, axils naked, scaly flower tube and ovary exposed at anthesis….*Ferocactus*
Key to *Cylindropuntia* in San Diego County

1. Fr spiny, gen dry at maturity
   2. St < 1 cm diam, tubercle < 2 mm high…. *C. ramosissima*
   2’ St > 1.5 cm diam, tubercle > 3 mm high
      3. Terminal st segment gen < 1 dm, tubercle length < 2 × width…. *C. echinocarpa*
      3’ Terminal st segment gen > 1 dm, tubercle length > 3 × width
         4. St gen branched only above; trunk gen 1, inner tepals yellow…. *C. acanthocarpa var. coloradensis*
         4’ St gen branched near base; trunks several-many, inner tepals yellow, bronze, to red
         5. Filaments red to magenta, tepals yellow, bronze, to red…. *C. wolfii*
         5’ Filaments green to yellow, tepals yellow to greenish yellow
            6. St decumbent to erect, spination appearing sparse, tubercles oval, gen < 20 mm long; plants found near
               coast, below 250 m…. *C. californica var. californica* (2)
            6’ St erect, spination rather dense or if appearing sparse then tubercles gen > 20 mm, elliptic to elongate;
               plants of mountains and deserts, gen above 250 m
               7. St segments 10-26 cm long, tubercles 11-23 mm, spines prominent, obscuring stems…. *C. ganderi*
               7’ St segments 14-43 cm, tubercles 16-35 mm, spines gen not prominent, not obscuring stems…. *C. californica var. parkeri* (2)
1’ Fr spineless (sometimes with a few deciduous bristles), gen fleshy at maturity (sometimes slow-drying in *C. californica*)
   9. Fr gen bearing fls, perianth purple-red…. *C. prolifera*
   9’ Fr not bearing fls, perianth yellow, greenish, or red-brown
      10. Terminal st segment > 3 × longer than wide
          11. St decumbent to erect, spination appearing sparse, spines of stem areoles gen subequal, tubercles oval, gen < 20
              mm long; plants found near coast, below 250 m…. *C. californica var. californica* (2)
          11’ St erect, spination rather dense or if appearing sparse then tubercles gen > 20 mm and elliptic to elongate, spines
             of stem areoles commonly with 1-3 longer central; plants of mountains and desert transition, gen above 700 m…. *C. californica var. parkeri* (2)
10’ Terminal st segment gen < 3 × longer than wide
   12. Tubercle length +- = width…. *C. bigelovii*
   12’ Tubercle length +- 2 × width…. *C. fosbergii*
Subfamily Opuntioideae

2. Stem segments cylindric; spines with epidermis separating into thin, paper-like, tardily deciduous sheaths…. *Cylindropuntia*

2’ Stem segments bilaterally flattened, circular, ovate, or obovate; spines without epidermal sheaths…. *Opuntia*
Key to *Opuntia* in San Diego County

1. Perianth pink to magenta; filaments red; st gen minutely papillate-hairy, spines 0….*O. basilaris* var. *basilaris*

1’ Perianth gen yellow to dull red (rarely pink); filaments white, yellow, red, or pink; st glabrous, gen bearing spines

2. Fr becoming dry, tan, gen spiny; perianth yellow to pink-magenta….*O. polyacantha* var. *erinacea*

2’ Fr feshy or juicy, gen with some deep purple (rarely yellow), spines 0; perianth yellow, orange, or red

3. Trunk 1, erect; areoles gen > 38 per ovary

4. Mature pl tree-like, gen > 3 m; escapes from cultivation

5. St obovate, 25-60 cm long, spines usually 0, fr 6-10 cm long….*O. ficus-indica*

5’ St oblong to round, 15-30 cm long, spines usually present, fr 4-6 cm long….*O. leucotricha*

4’ Mature pl gen < 2.5 m; natives

6. Longest spines gen 32-47 mm; style white when fresh; seed 3 mm….*O. chlorotica*

6’ Longest spines 19-25 mm; style red or pink when fresh; seed 3.5-4 mm….*O. oricola*(2)

3’ Basal branches several, + decumbent to ascending; areoles < 36 per ovary

7. St minutely papillate-hairy, spines 0; escapes from cultivation….*O. microdasys*

7’ St glabrous, spines usually present; mostly natives

8. Style and filaments white

9. St round, glaucous blue-green, robust; escapees from cultivation….*O. robusta*

9’. St elliptic to obovate, green (rarely gray-green); natives

10. St segment > 15 cm wide; glochids sparse, of irregular lengths, encircling (or nearly so) areole margins, also in subapical region; perianth base yellow; fr red inside….*O. engelmannii* var. *engelmannii*

10’. St segment < 15 cm wide; glochids dense, subequal or increasing in length toward adaxial margin of crescent, also dense in subapical tuft; perianth base usually red; fr green inside….*O. phaeacantha*

8’. Style pink or filaments yellow (or both)

11. St round to broadly obovate, areoles 8-10 per diagonal row across midstem segment, spines 5-13 per areole….*O. oricola*(2)

11’. St elliptic to obovate (often round in *O. ×occidentalis*, but then spines less than 6 per areole), areoles 5-7(-8) per diagonal row across midstem segment

12. St segment > 15 cm wide….*O. ×occidentalis*

12’. St segment < 15 cm wide

13. St segment oblong-elliptic or narrowly obovate; major spines gen round, 4-11 per areole….*O. littoralis*

13’. St segment obovate; major spines gen flat, 1-4 per areole….*O. ×vaseyi*
Key to *Mammillaria* species in San Diego County

1. Radial spines > 30; axillary bristles 0; seed with corky aril; perianth deep pink to lavender…. *M. tetrancistra*

1’ Radial spines < 30; bristles present in axils of tubercles; seed without corky aril; perianth cream to white…. *M. dioica*
5’ Ovary and young fruit either spineless or woolly; branches gen 0, often solitary and columnar, sometimes forming many-headed mounds

6. Scales of ovary and flower tube spine-tipped, axils woolly, wool hiding flower tube and ovary at anthesis…. **Echinocactus**

6’ Scales of ovary and flower tube obtuse, axils naked, scaly flower tube and ovary exposed at anthesis…. **Ferocactus**
Key to *Ferocactus* species in San Diego County

1. Ribs 13-21[-34]; stems usually 10-20 × 10-20 cm; spines < 5 cm long; coastal habitats….*F. viridescens*

1’ Ribs (18-)21-31; stems usually 45-150 × 25-40 (-50) cm; spines > 5 cm long; desert and desert transition habitats….*F. cylindraceus*