

What Kind of Cactus is it?

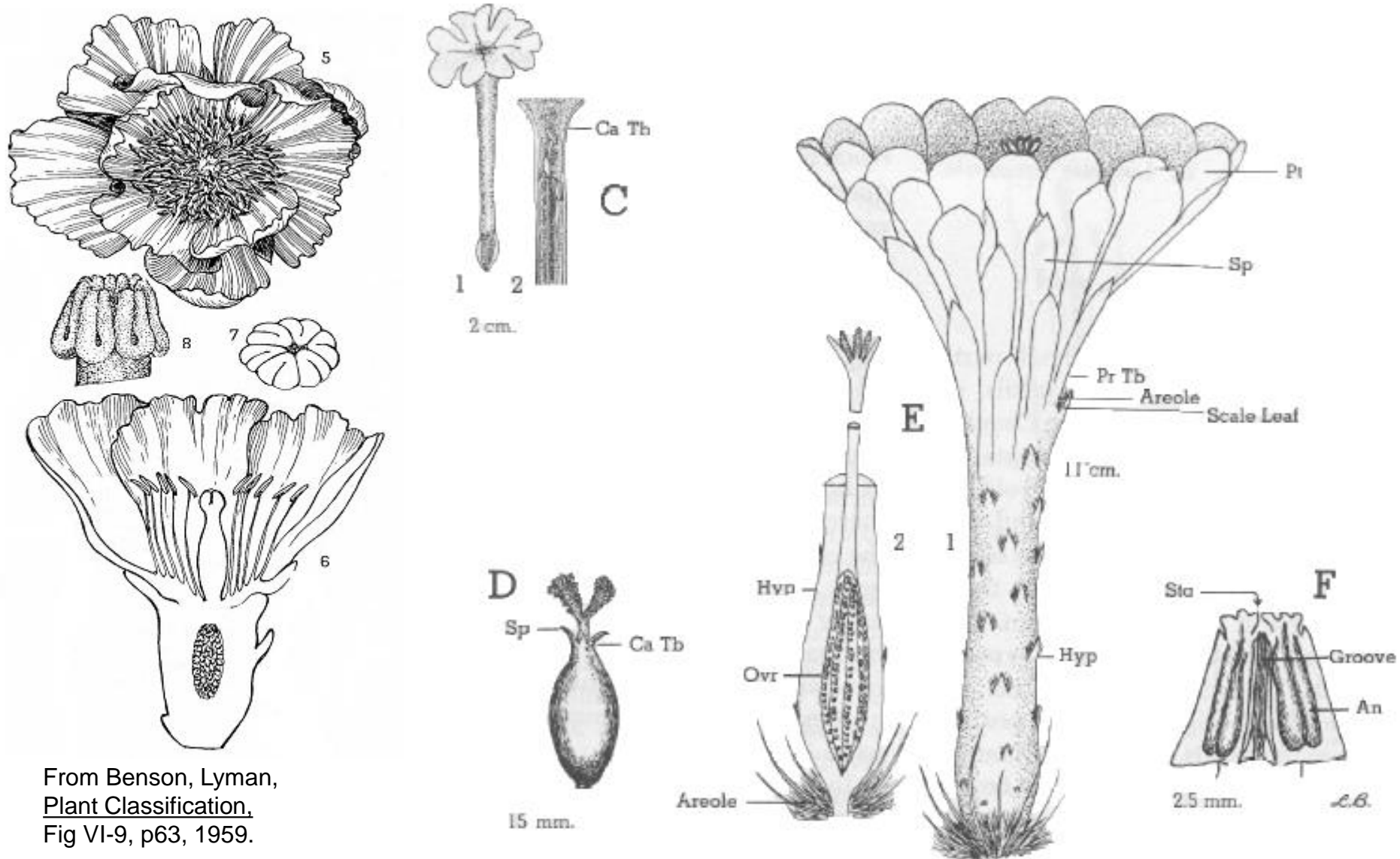
Or Gary Duke's Cactus Taxonomy for Dummies

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Instagram: garyduke53

What distinguishes a cactus from the rest of the plant world?

1. Segments of stems are succulent
 - All sizes and shapes with ribs or tubercles
 - Some have tuberous roots
2. Areoles – No other plant Family has areoles
 - Small felted pad, either circular or elongated, often fuzzy or hairy
 - Spine bearing area
 - Flowers originate here
 - New joints or pups originate here
 - Some cacti have 2 areoles – a primary for spines & another for flowers
3. Petals intergrade with sepals (continuum)
4. Transpire at night (stomata opens at night)
5. DNA sequences

Cactus Flower Structure



From Benson, Lyman,
Plant Classification,
 Fig VI-9, p63, 1959.

4 Subfamilies within Family Cactaceae

- **Cactoideae** (9 Tribes)
 - All tall cereus as well as most globular cacti and epiphytes
- **Maihuenioideae**
 - Small round jointed cacti from South America
- **Opuntioideae** (5 Tribes)
 - Have pads and glochids
- **Pereskioideae**
 - Have leaves

9 Tribes of Cactoideae

- Browningieae (0 of 5) – Tall columnar cacti from South America
- Cacteae (25 of 25) – Small globular and odd-ball cacti from North America
- Calymmantheae (0 of 1) – Tree-like cactus from Peru
- Cereeae (2 of 12) – Tall columnar cacti from South America, plus 2 small cylindrical ones
- Hylocereeae (0 of 6) – Climbing vine like cacti
- Notocacteae (8 of 10) – Mostly South American globular with couple of columnar cacti
- Pachycereeae (1 of 17) tall columnar cacti from North America, with 1 small caespitose genus
- Rhipsalideae (0 of 4) – hanging basket cacti, incl Christmas cacti and Rhipsalis
- Trichocereae (8 of 25) – Mixture of tall and globular South American cacti

Acharagma

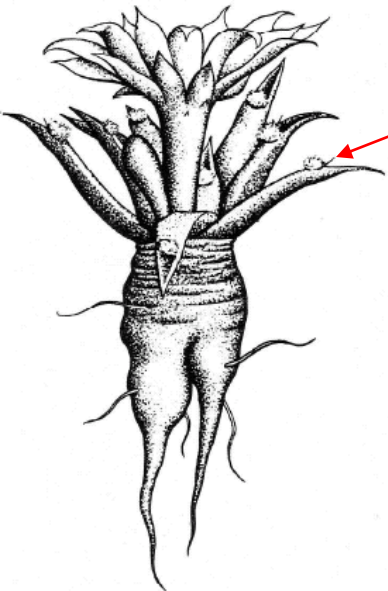
(was under Escobaria)

- Globular, small 1 – 3” dia
- Usually solitary, but may form clumps
- Ribs have tubercles w/o grooved areoles
- FL – from apex, cream to pink & yellow
- Only 2 species, raised to Genus in 1998 by C. Glass
 - *A. aguirreana*
 - *A. hausteca*
 - *A. roseana*

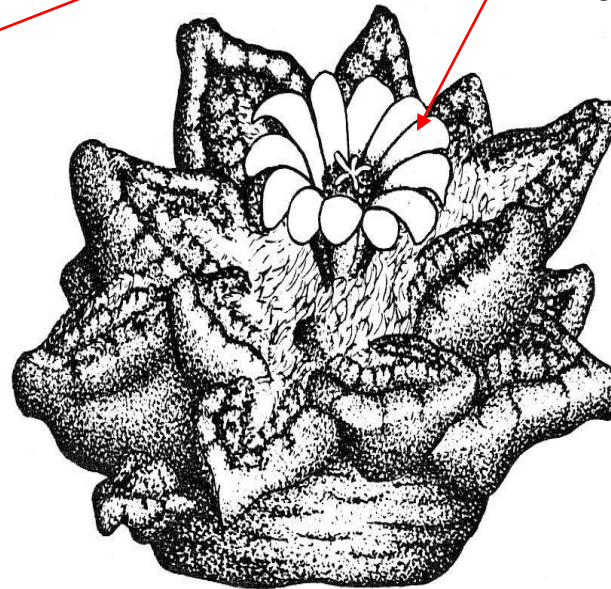
Native to N. Mexico

Ariocarpus

- Flat stem, leathery tubercles, large, tuberous root
- Spineless with elongated areoles
- FL – Center of plant,
- FT - Naked
- FR – Smooth white to pink or yellow
- 8 Main species



A. agavoides

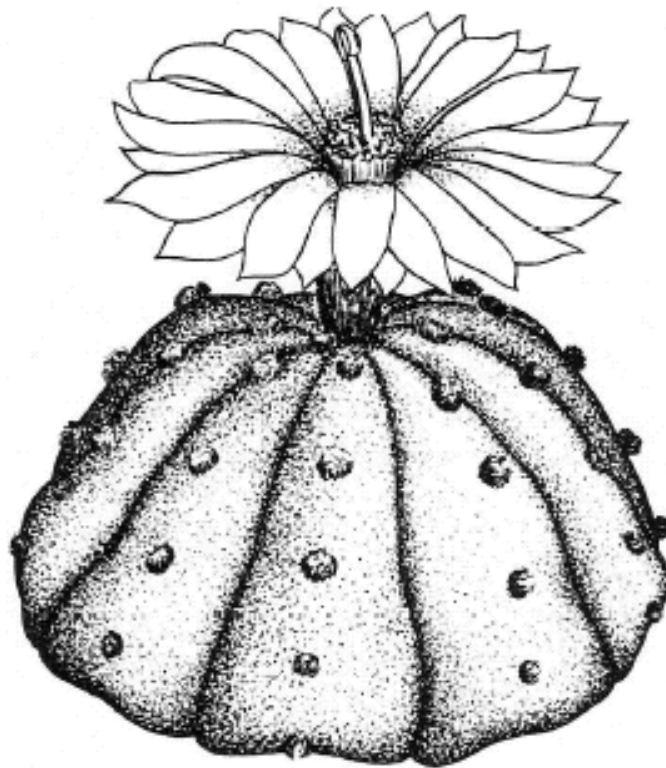


A. fissuratus

Native to TX & Mexico

Astrophytum

(Grk aster = star & phyton = plant)



- Usually globular, most appear powdered/flecked
- Few prominent ribs
- Turnip-type roots
- FL – large yellow, some w red centers, near apex
- FR – reddish, woolly or hairy
- 4 species w numerous variants/hybrids
- 6 Main species

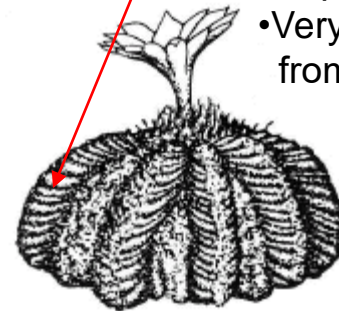
Native to TX & Mexico

A. asterias

Aztekium

(name dedicated to Aztec people - plant's shape resembles certain Aztec sculptures)

- Grooved ribs
- Few spines, lost with age
- Body – pale green to grayish-green
- FL – white w pinkish sepals or magenta
- 3 species
- Very slow growing, from seed ~2 yrs to 0.1”



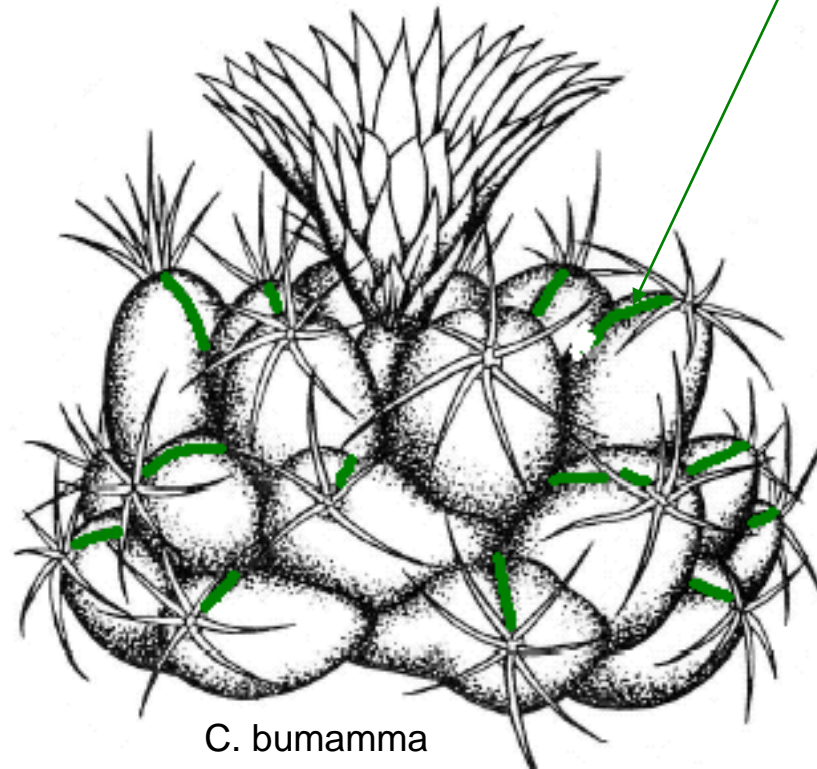
A. ritteri

Native to Mexico, Nuevo Leon

Coryphantha

(Grk Koryphe = summit/apex & anthos = flower)

- Globular & cylindric
- Solitary & clustering
- All tubercled w grooves
- FL – at base of grooves on young growth (near top)
- FR – berry-like, greenish ripens slow w persistent perianth



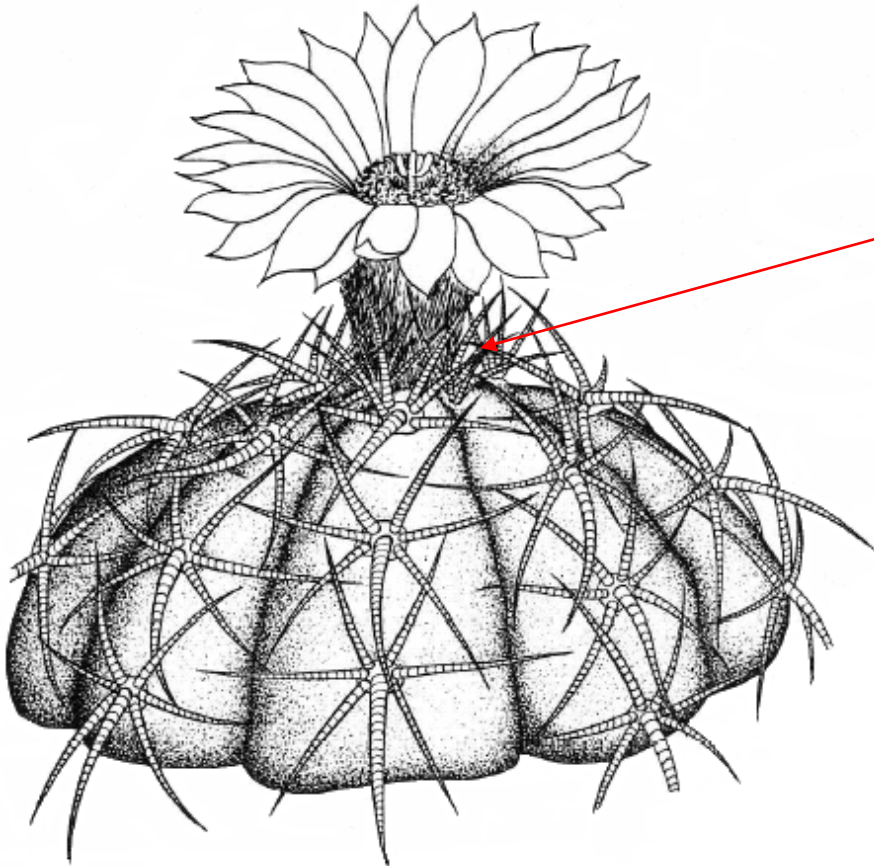
C. bumamma

Native to Mexico, AZ, CA, KS, NM, NV, TX & UT

Echinocactus

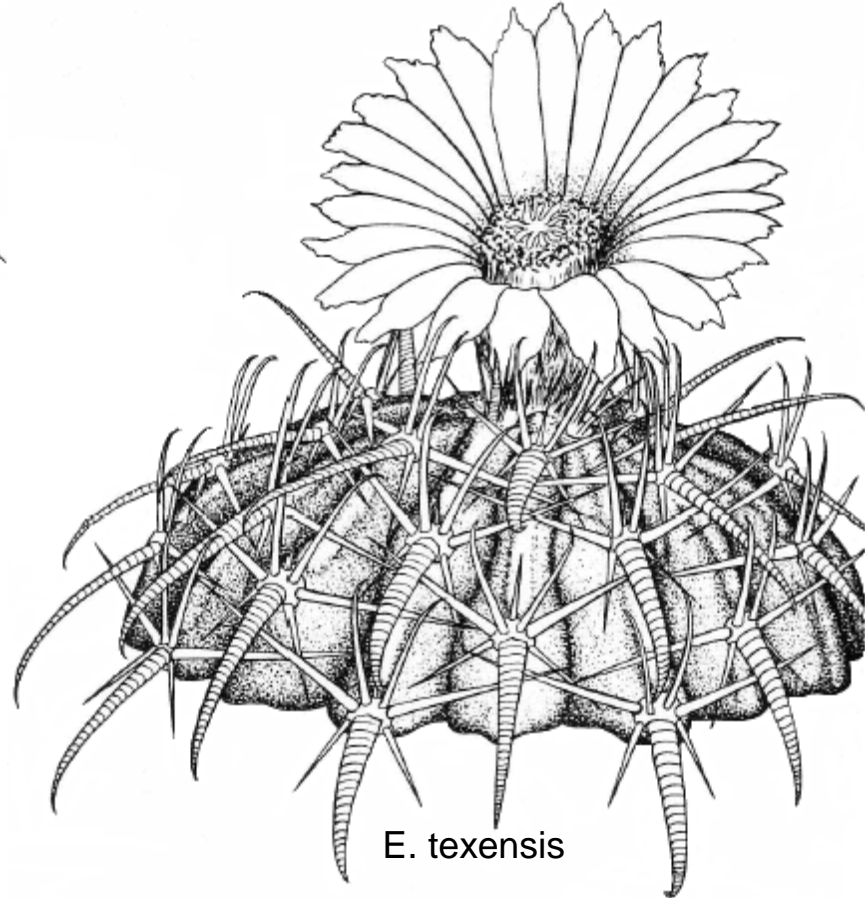
(Grk echino = spiny & cactus)(incl Homocephalia)

- Globular, many ribbed
- Top woolly
- Central spine usually hooked
- FL – similar to Ferocactus
- FR – densely woolly
(main diff from Fero)
- 5 main species



E. horzonthalonius

Native to Mexico, AZ
CA, NM, NV & TX

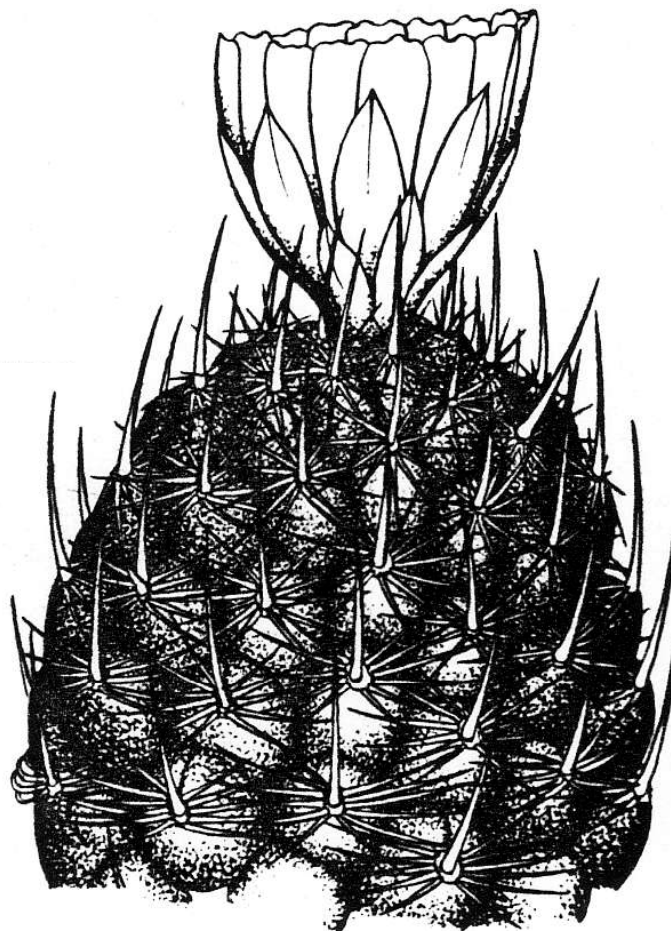


E. texensis

Echinomastus

(Grk echino = spiny & mastos = breast)

- Egg-shaped < 6" tall, 1– 4" dia usually solitary
- FL – from grooves of young tubercles at apex, white, pink/red to purplish
- FR – berry-like, greenish
- 8 Main species

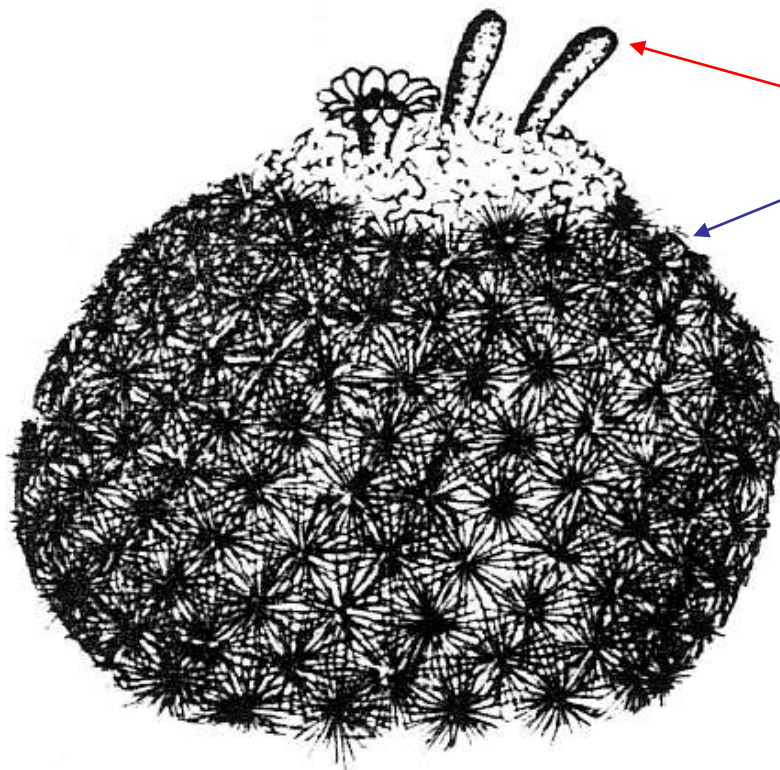


E. erectocentrus

Native to Mexico, AZ ,
NM, & TX

Epithelantha

(Grk = flower on the nipple/tubercle)

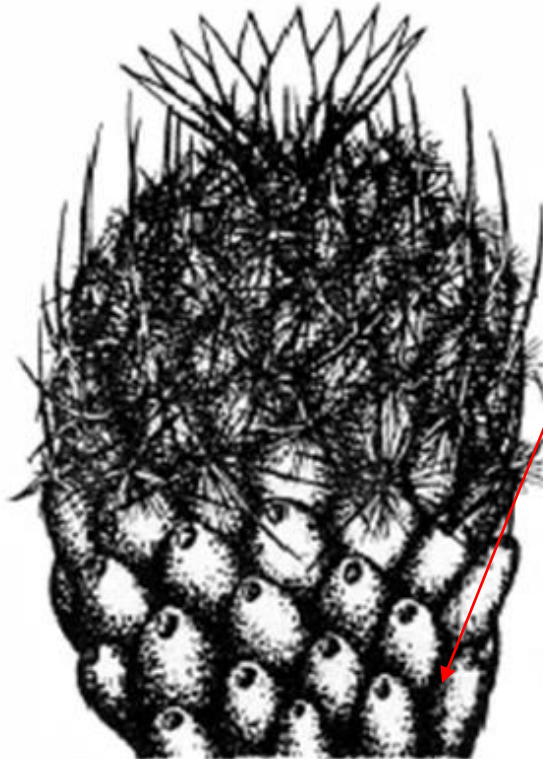


- Globular, <1.5" dia, numerous tiny nipples, numerous tiny white spines
- FL – very small, white to pink, from spine areoles at apex
- FR – red, club shaped
- 7 Main species

E. micromeris

Escobaria

(incl Neobesseya
JL – Left Neobesseya separate)



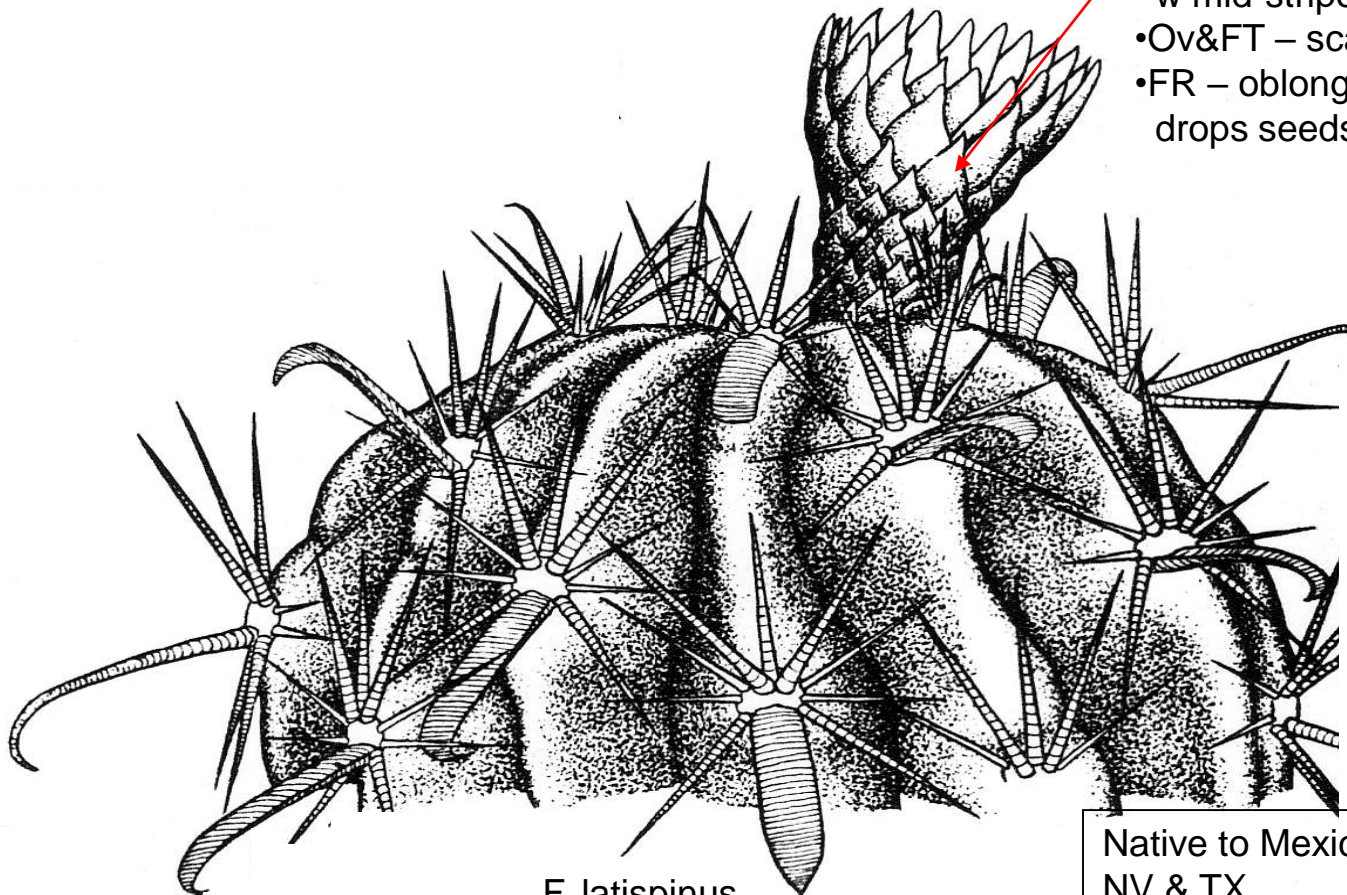
- Globular to egg-shaped
- Grooved tubercles like Coryphantha, old tubercles lose spines – look knobby
- FL – small, pink to green or yellow from apex
- FR – normally red
- Most have tap roots
- Some are difficult to grow – Keep dry
- 9 Main species

E. tuberculosa

Native to 3 Canadian provinces, Cuba, Mexico, AZ, CA, CO, ID, KS, LS, MN, MO, ND, NE, NM, NV, OK, OR, SD, TX, UT & WY

Ferocactus

- Barrel-shaped, upto 12' tall x 4' dia, strongly ribbed
- Central spine hooked
- FL – bell-shaped near apex, most bloom in the fall, pink, red, yellow & purple, frequently w mid-stripe of different color
- Ov&FT – scaly, but not spiney
- FR – oblong w thick walls, drops seeds thru basal pore



Native to Mexico, AZ, CA, NM, NV & TX

Geohintonia

(named after George S. Hinton)

- Globular w prominent ribs up to 4" tall x 4" dia, solitary
- Gray-green in color
- Central spine pointed up close to the rib
- FL – pink
- 1 species (disc in 1992)

Native to Mexico,
Nuevo Leon

Leuchtenbergia

- Long finger-like tubercles w tuberous root
- Long papery spines
- FL – large yellow, fragrant
- 1 species, 1 variant



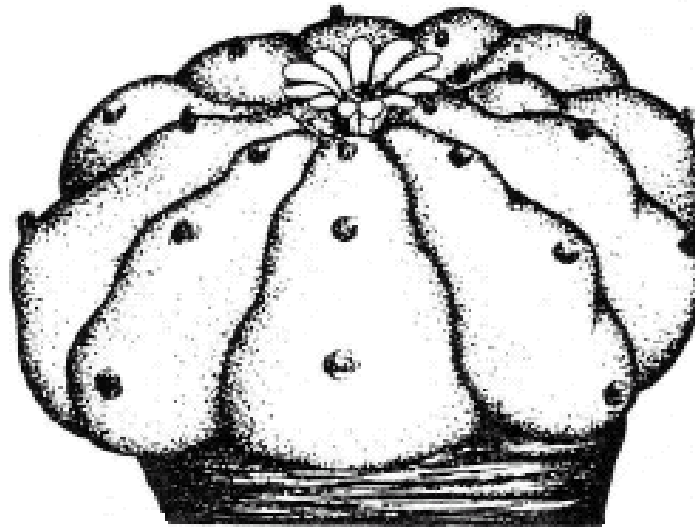
L. principis

Native to Mexico

Lophophora

(Grk Lophos = crest, phoreo = to carry)

- Button-like up to 3" dia
- Spineless, tufts of hair from aeroles
- FL – white to pinkish or yellowish from apex,
- 5 Main species
- Very slow growing



L. williamsii

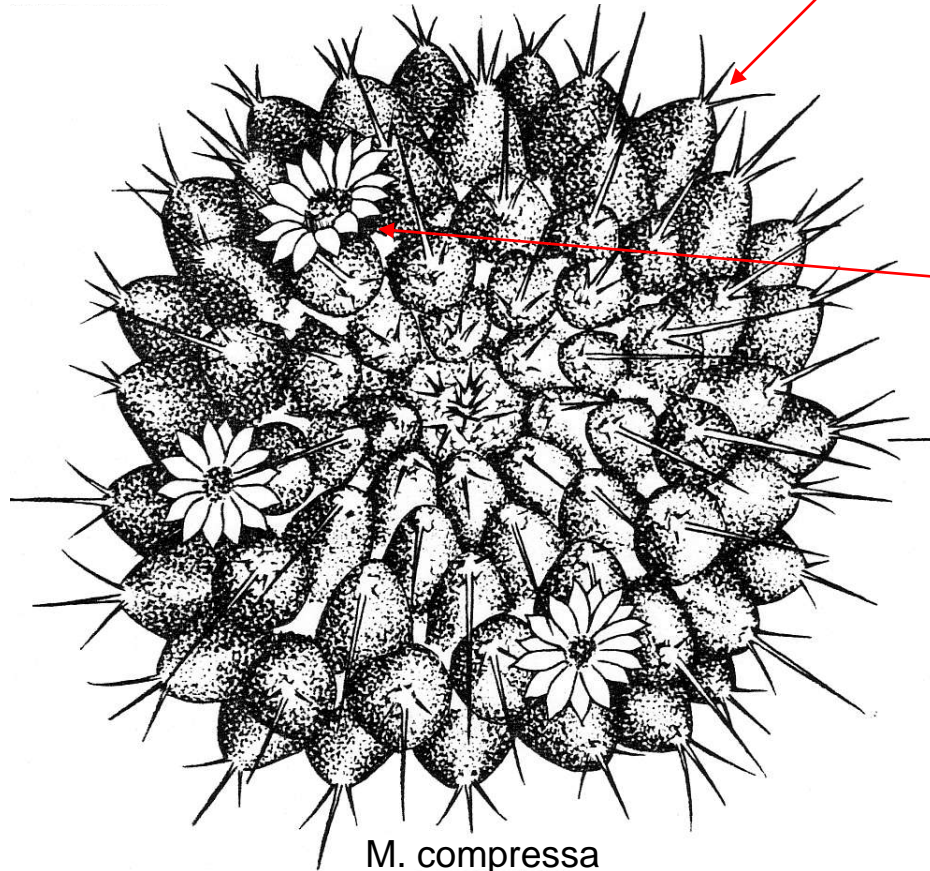
Native to TX & Mexico

Mammillaria

(incl Bartschella, Cochemiea, Dolichothele, Krainzia, Mammillopsis, Porfiria & Solisia)

JL – Kept Cochemiea separate

- >200 species
- Strongly tubercled, no groove
- Globular to elongated some singular, others clustering
- Central spine both straight and hooked
- Some have milky sap, others clear
- FL – from axil areole, usually rings near top
- OV – red/green, smooth, juicy, long

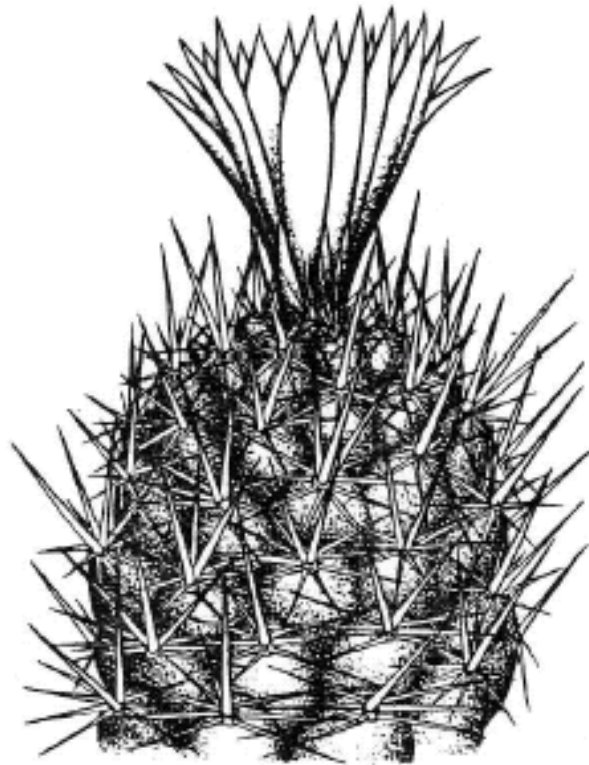


M. compressa

Native to Cuba, Guatemala, Mexico, Venezuela, Lesser Antilles, AZ, CA, NM & TX

Neolloydia

- Single, egg-shaped, clustering w age
- Conical tubercles
- Dimorphic areoles w groove
- 1-2 awl-shaped centrals, radials usually have black tips
- FL – from secondary areole at base of tubercle, near apex, pink to purple
- 3 species
 - *N. conoidea*
 - *N. inexprctata*
 - *N. matehualensis*

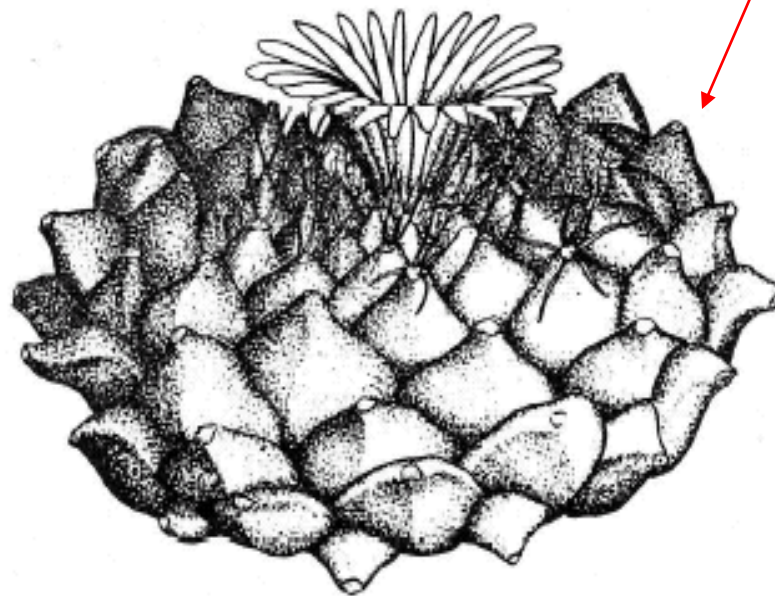


Native to TX & Mexico

N. texensis

Obregonia

- Globular, center woolly
- Tubercles are leaf-like
- Weakly spined
- FL – funnel-shaped from apex, white
- OV/FR - naked
- 1 species



O. denegrii

Native to Mexico

Ortegocactus

- Small, clumping, unmistakable lime-green-gray colored epidermis
- Segments grow longer w age, making large bushes in habitat
- Tubercles – low, rhomboid shaped, arranged in a spiral
- Areoles – Dimorphic w white felt
- Central spine – black/white w black tip
- Radial spines - same
- FL – Diurnal, funnel-shaped, yellow
- FR – globular, dry, red
- 1 species
- Harmless orange discoloration frequently occurs at the base

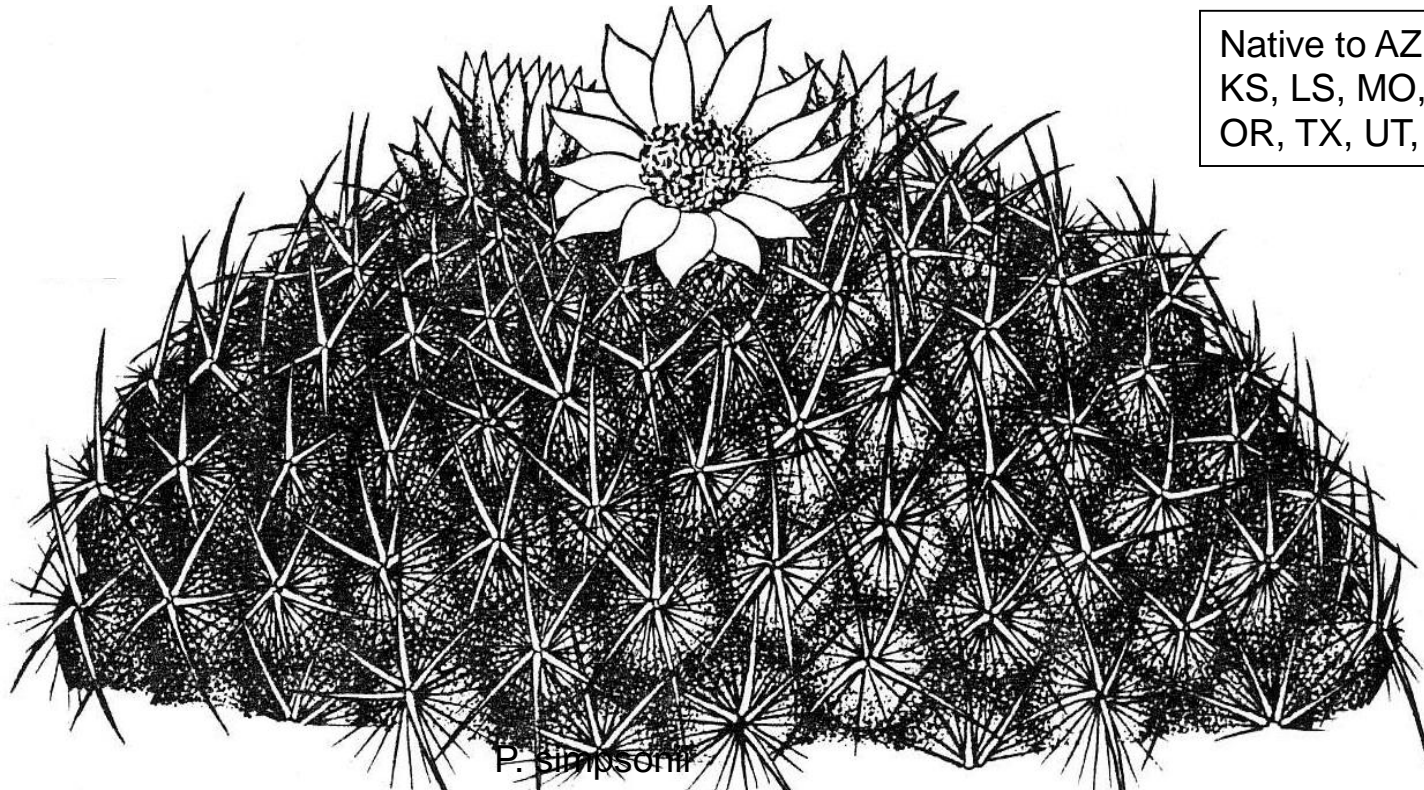
Native to Mexico, Oaxaca

Pediocactus

(incl Navajoa & Pilocanthus)

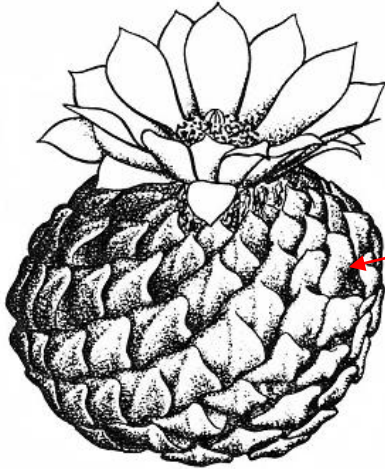
- Tubercled like Mam
- Spines needle-like
- FL – near apex from spine bearing areoles, pinkish to white
- FT – few scales to naked
- Hardy
- 9 Main species

Native to AZ, CO, ID, KS, LS, MO, NM, NV, OR, TX, UT, WA & WY



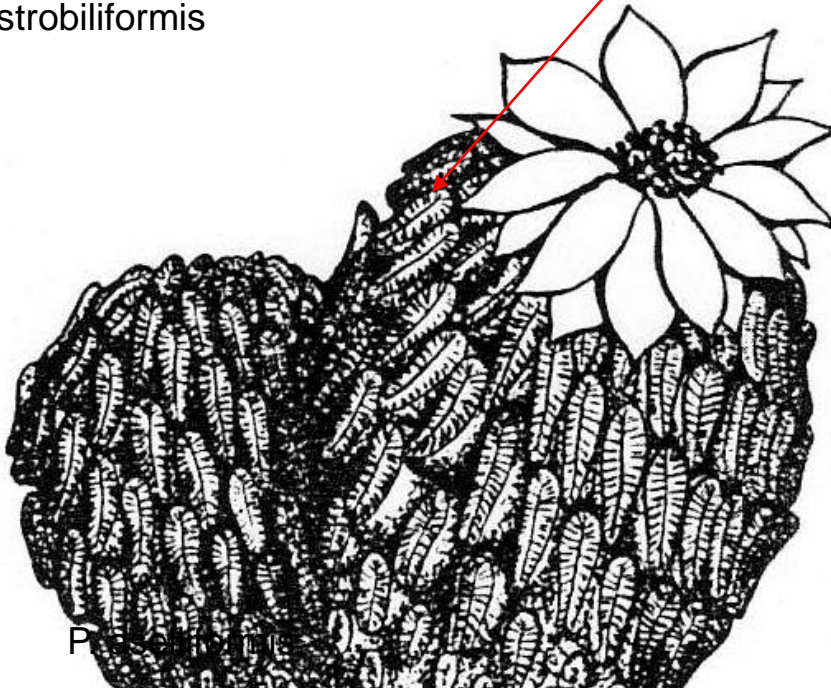
Pelecyphora (syn Encephalocarpus)

(Grk pelekus = hatchet & phors = bearing)



P. strobiliformis

- Solitary, clustering w age, globular, < 2.5" dia
- Flattened or hatchet shaped tubercles, arranged in a spiral
- Areoles dimorphic w groove
- Spines pectinate, sometimes lost w age
- FL – bell shaped w mass of wool/hair from apex, pink to violet, lighter outer petals
- 2 Species

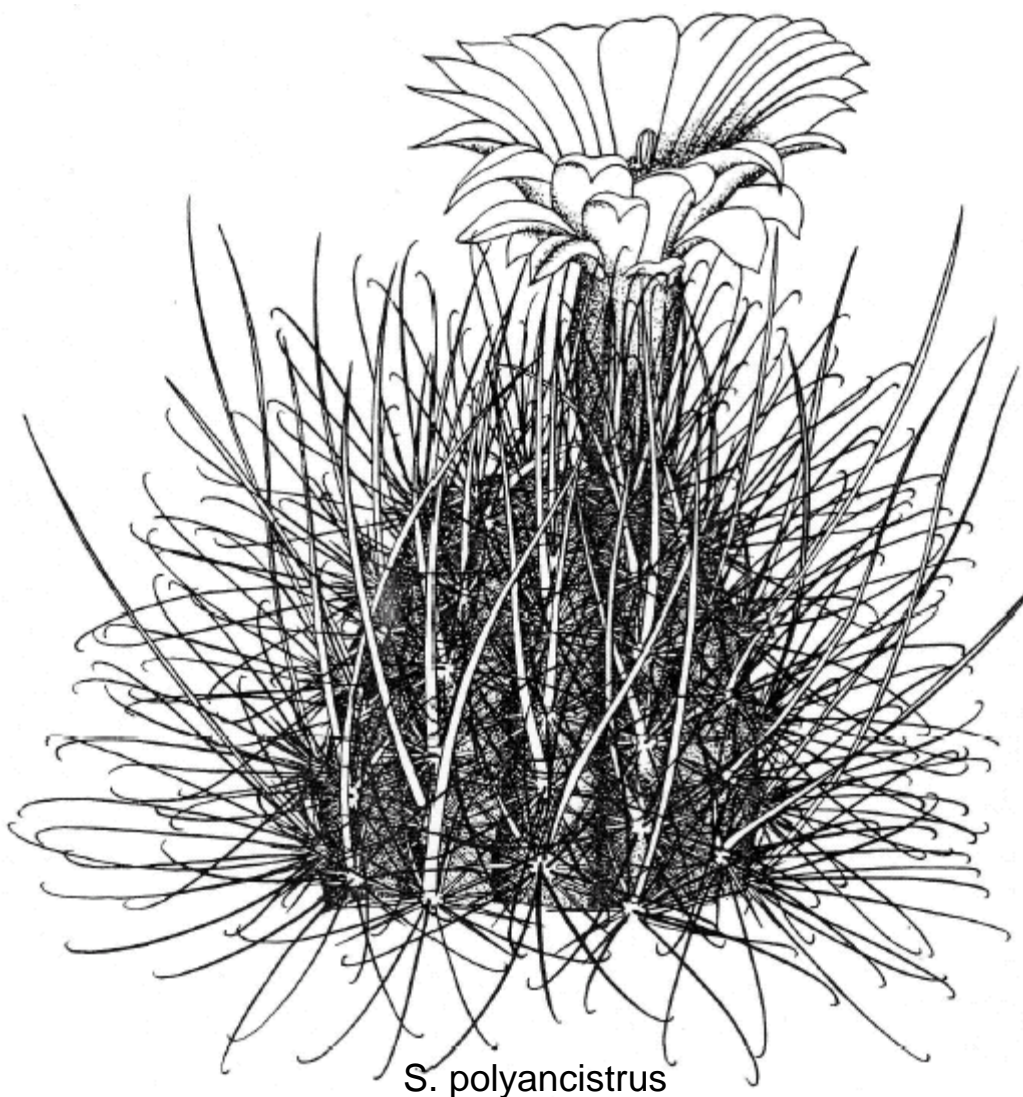


Native to Mexico,
San Louis Potosi

Sclerocactus

(syn *Ancistrocactus*, *Coloradoa*, *Glandulicactus* & *Toumeyia*)

JL – Kept *Ancistrocactus* & *Glandulicactus* separate



S. polyancistrus

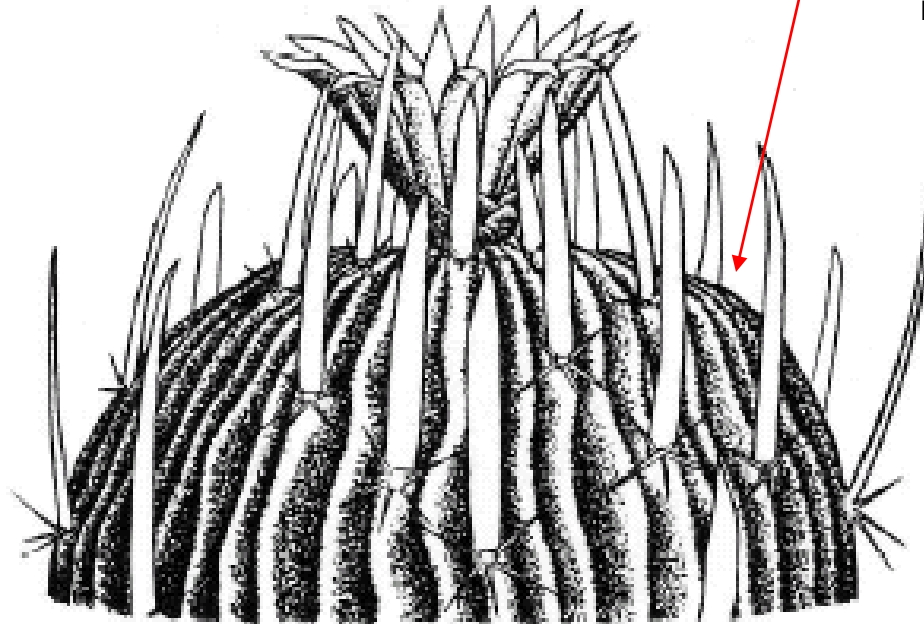
- Globular to cylindric
 - Strongly tubercled coalescing into ribs, areoles oval
 - Radial spines w central often hooked
- FL – buds pointed w overlapping scales, pink, cream or yellow
- OV – few scales and naked axils
- FR – Small, red - green

Native to Mexico, AZ,
CO, NM, NV, TX & UT

Stenocactus

(JL – Kept as Echinofossulocactus)

- Globular, many wavy thin ribs
- Spines straight, central usually flat or papery
- FL – small, white to pink with lavender stripe
- FR – papery scales
- Species hard to identify, large variation w/l species, far more names than species



Native to Mexico

S. lamellosus

Strombocactus

- Globose, generally solitary up to 5" tall, 4" dia
 - Young areoles woolly w 1 – 4 silky gray spines, older areoles are bare
 - FL – white to pinkish from younger areoles, red stripes on outer petals
- (1 species)

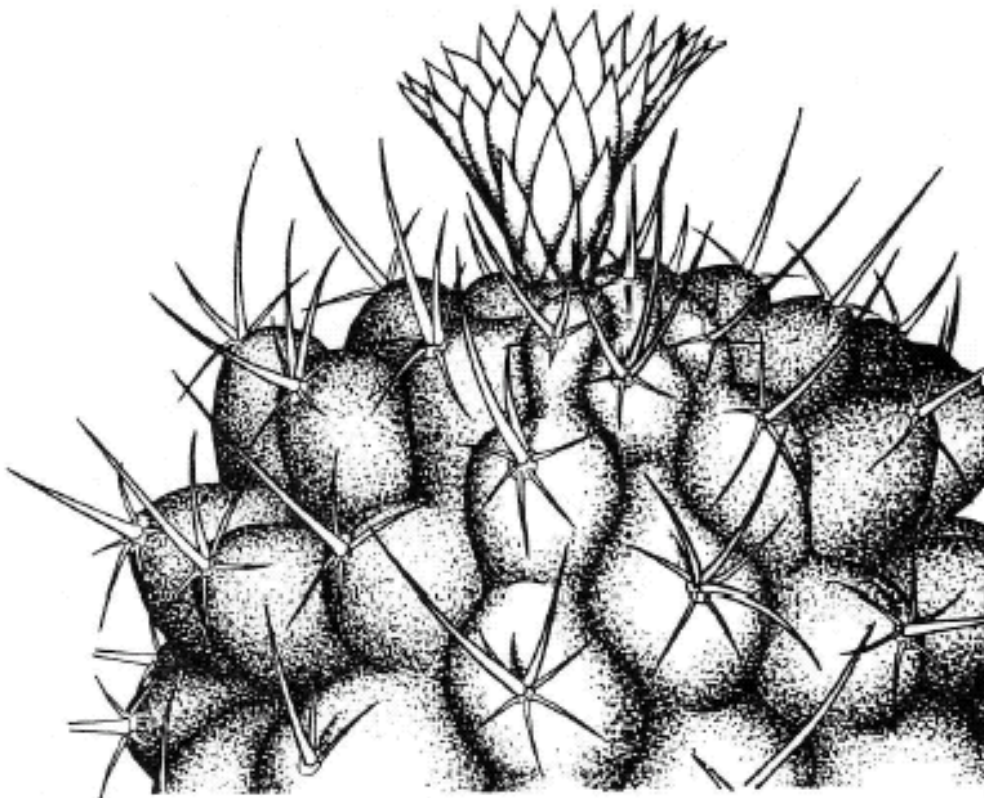
Native to Mexico

Thelocactus

(incl Hamatocactus)

(JL – Kept 2 species under Hamatocactus)

- Globose, ovoidal or cylindrical, 1 – 16” tall, 1 – 8” dia
- Tubercles, rounded to conical
- Areoles at tip of tubercles, occasionally elongated into a groove
- Spines usually straight, -Hamatocactus are hooked
- FL – large, showy, white, yellow, pink magenta, rarely red or orange, borne on grooves of young tubercles
- FR – scaly, dry otherwise similar to Echinomastus, opens via basal pore, greenish to reddish
- Intergrades w Echinoc & Coryph, but more ribbed



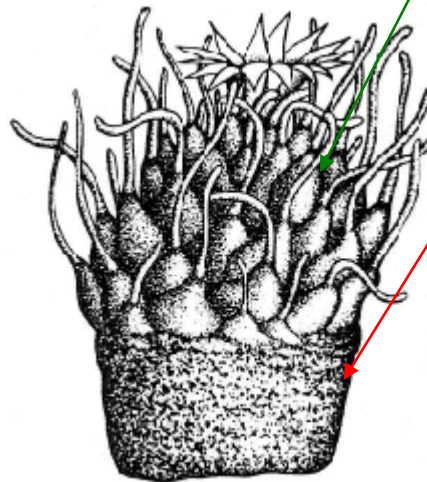
T. tulensis

Native to Mexico & TX

Turbinicarpus

(incl *Gymnocactus* & *Normanbokea*) JL – Moved most *Gymnocactus* into *Rimacactus* 6

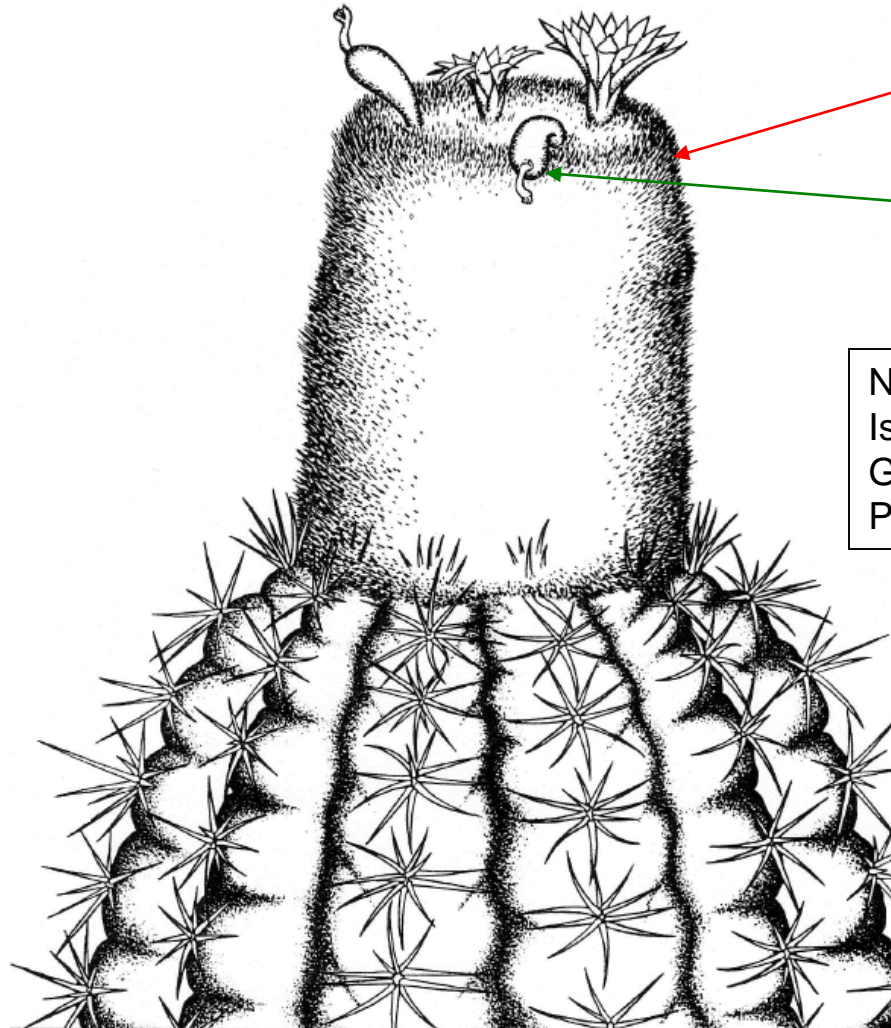
- Small, globular to short cylindric, occasionally sprouting from sides or base
- Tubercles short w curved, twisted, or papery central spines
- FL – small, funnel shaped w short tube, white to pinkish or yellowish, from apex
- FR – ovid, berry-like, later dry, splits at base
- Large tap root
- Difficult to grow – Keep dry
- Grows mostly on limestone, never on volcanic soil



T. schmiedickeanus

Native to Mexico

Melocactus



- Barrel-shaped, smaller than Fero
- Cephalum w bristles up to 14" tall
- FL – small red
- FR – red, club-shaped, pushed out of cephalum

Native to Brazil, Caribbean Islands, Columbia, Cuba, Guatemala, Honduras, Mexico, Peru & Venezuela

M. intortus

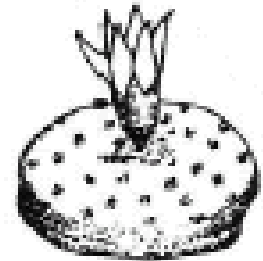
Ubelmannia

- Globular, upto 30" tall x 6" dia, elongated in cultivation
- Stem dark reddish-green to purple w white specks
- Areoles closely set forming an almost continuous felty line
- Spines close set, like a comb, no radial spines
- FL – very small greenish yellow
- FR – dark red, dry, globular
- 3 Main species

Native to Brazil, Minas Gerais

Blossfeldia

- Smallest of all cacti – 1 specie
- Tiny flattened disks, no ribs
< 0.5” dia
- Areoles scattered in spirals,
w tufts of wool, no spines
- Tuberous roots
- FL – diurnal, whitish from apex
self-fertile
- Seeds - like dust
- Poikilohydric – can rehydrate
- Astomate – fewest stomata of
any terrestrial flowering plant



B. liliputana

Native to N Argentina &
S Bolivia

Cintia

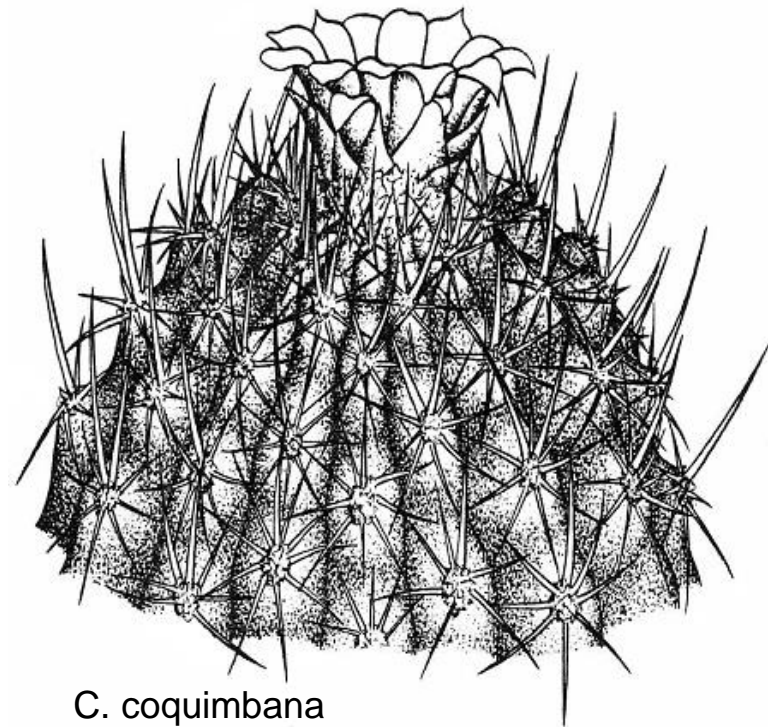
(Named after Cintia, Bolivia, species after Karl Knize)

JL – Renamed Weingartia cintia

- Small, globose, 1-2" dia
- Areoles sunken between tubercles, woolly w no spines
- FL – yellow from apex
- Tuberos roots upto 4"
- 1 species

Copiapoa

- Globular to cylindrical
- Stems spirally ribbed
- Top woolly
- FL – small, usually yellow or red
- FR – Depressed at apex crowned by sepal-like scales



C. coquimbana

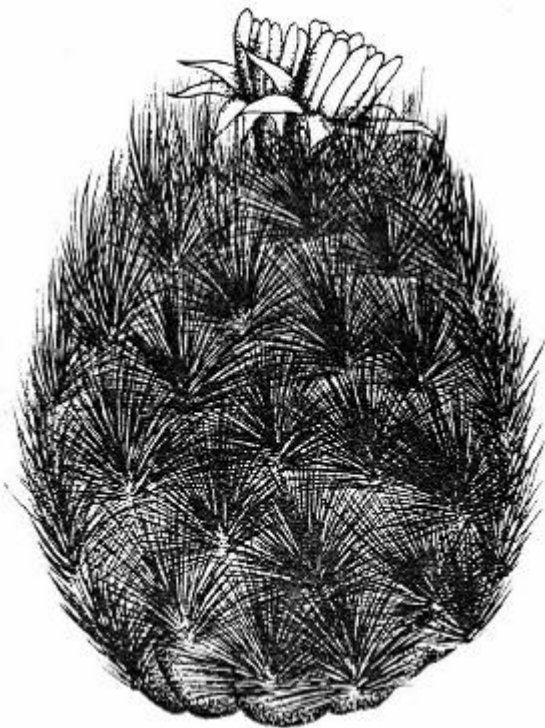
Native to Chile

Eriosyce

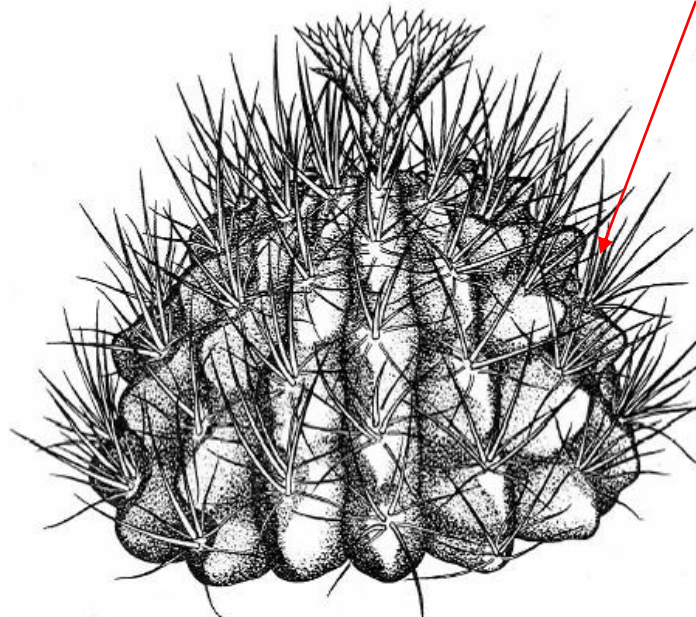
(Syn. Chileniopsis, Chileorebutia, Delaetia, Horridocactus, Islaya, Neochilenia, Neoportia & Pyrrhocactus)

Grk Erion = wool & Sykos = fig (fruit)

JL – Left 3 species in Eriosyce,
kept 40 species in Neopteraria,
kept 5 in Islaya, and
created 1 specie under Rimacactus



E. nidus



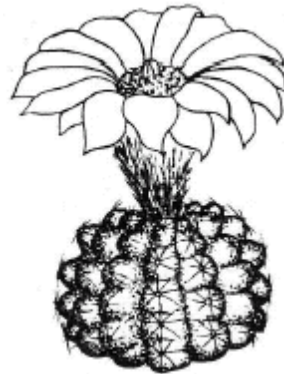
E. fusca

- Globular to elongated w tuberculate ribs
- Usually bare of spines at apex
- Areoles sunken between tubercles, woolly w no spines
- FL – funnel-shaped to almost tubular
- OV/FT – scales w wool/bristles
- FR – small, open via basal pore

Native to Chile, Peru
& Argentina

Frailea

- Small, disc-like to globular, < 2" dia depressed at apex, offsetting freely, ribbed, very flat tubercles
- Spines short, usually bent downwards
- FL – small, yellow or white, frequently don't open, are self fertile w/o opening, only open on very hot days
- FT – wooly like Parodia
- FR – Dry, detach & break easily releasing seeds
- About 17 species

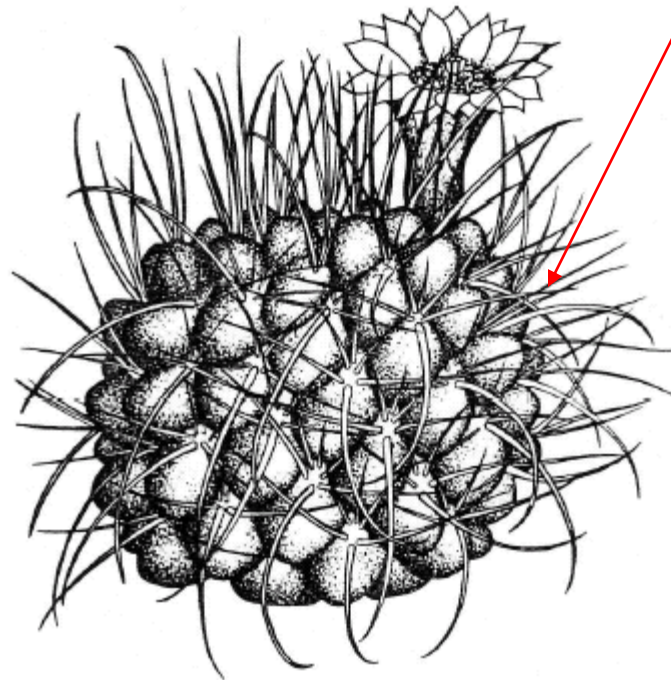


F. grahliana

Native to Argentina, Brazil,
Columbia, Paraguay & Uruguay

Neowerdermannia

- Small, globular, solitary
- Spines ~0.5",
from base of tubercles
- FL – Pink or white
- FT – Sepals striped
- 2 Species

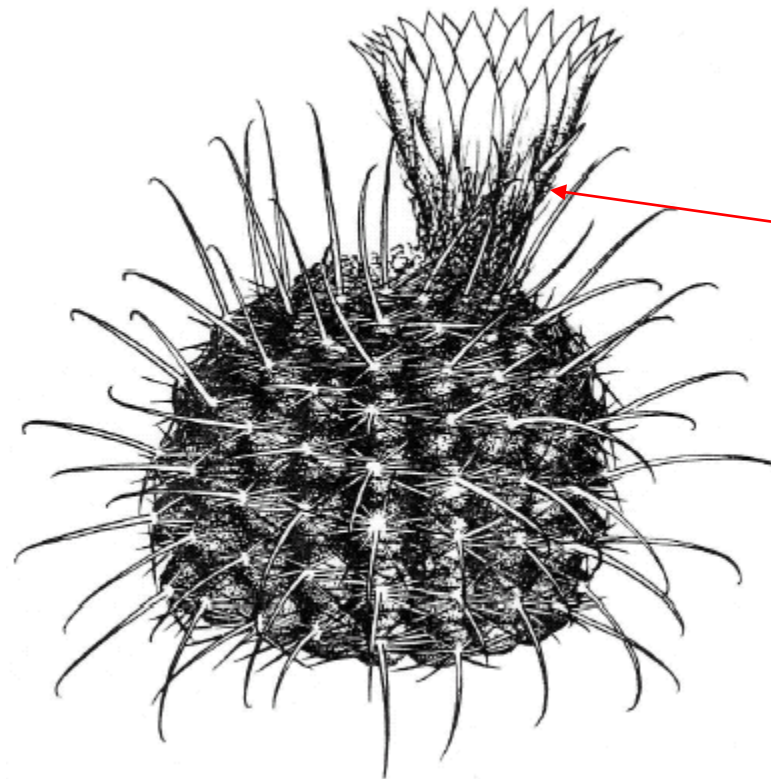


N. vowerkii

Native to Argentina, Bolivia

Parodia

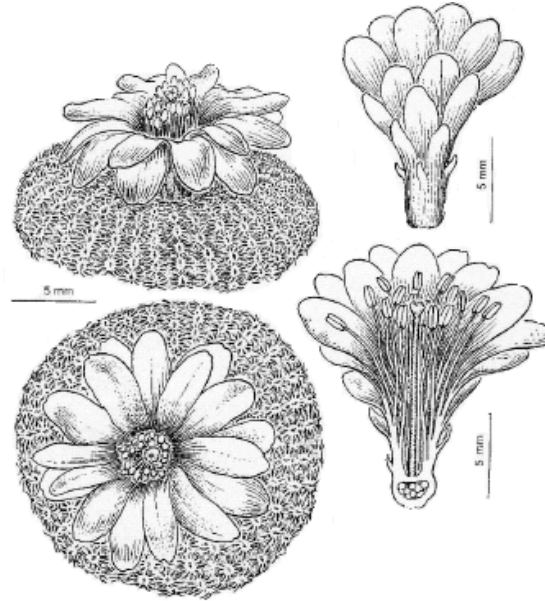
(syn. Acanthocephala, Brasiliparodia, Eriocactus, Eriocephala, Hichenia, Malacocarpus, Notocactus & Wigginsia) JL – divided species among Acanthocephala 2, Braziliparodia 2, Eriocephala 6, Notocactus 29, Parodia 10, Wigginsia 8, Bolivicactus 16



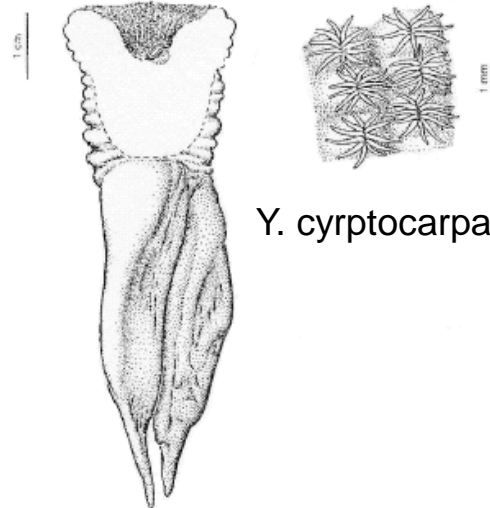
- Usually small & globular, few cylindric to 39" tall
- Spines – needle-like, somewhat recured on Parodia, straight on Noto's
- FL – narrow to wide funnel-shaped, stigma frequently red
- FT – densely covered w scales & copious hair/wool

Native to Argentina, Brazil, Paraguay & Uruguay

Yavia



- Small, globose, 1-2" dia w flat top and woolly depressed center
- Ribbed w tiny spines, 0.1" long
- FL – pink, from apex
- FR – formed inside the plant's body, only visible when plants shrink in drought periods
- 1 species discovered in 2001



Y. cryptocarpa

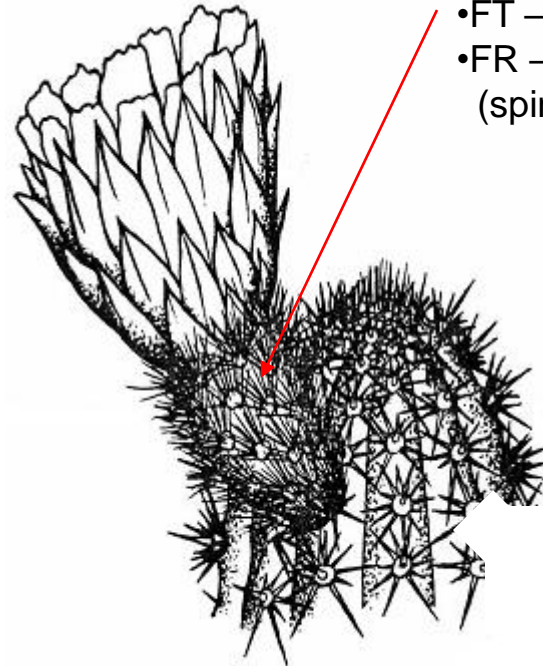
Pictures & drawing copied from:
<http://www.bcass.org.uk/yavia.pdf>

Native to Argentina

Echinocereus

(Grk Echinus = porcupine/hedgehog & Cereus = large wax candle)

- Low erect or prostrate
- Very spiny
- FL – large, day blooming, bell-shaped, all colors
- FT – spiny, stigma usually green
- FR – Thin skinned, colorful, spiny (spines detach easily)

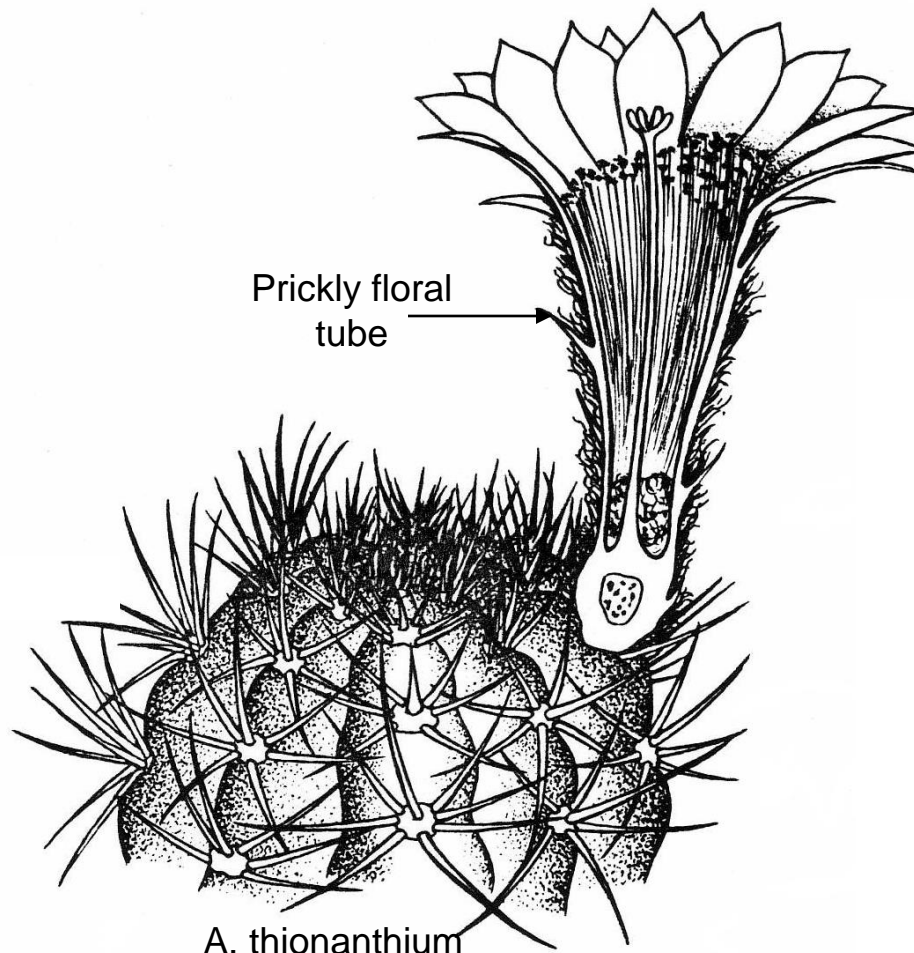


E. dasyacanthus

Native to Mexico, AZ, CA, CO, NM, NV, OK, TX, SD & WY

Acanthocalycium

(Greek “akantha” = prickly & “kalyx” = buds)



- Globular to cylindric
- Ribs straight, occ spiral
- FL – funnel shaped, yellow to rose, white from younger areoles
- FT – Ring of wool inside
- FT just above ovary
- Rigid, prickly scales w wooly hairs
- FR – No spines
- Some taxonomists include this family under Echinopsis
- 5 Species

Native to Argentina

Denmoza

(Anagram for Argentinian province of Mendoza)

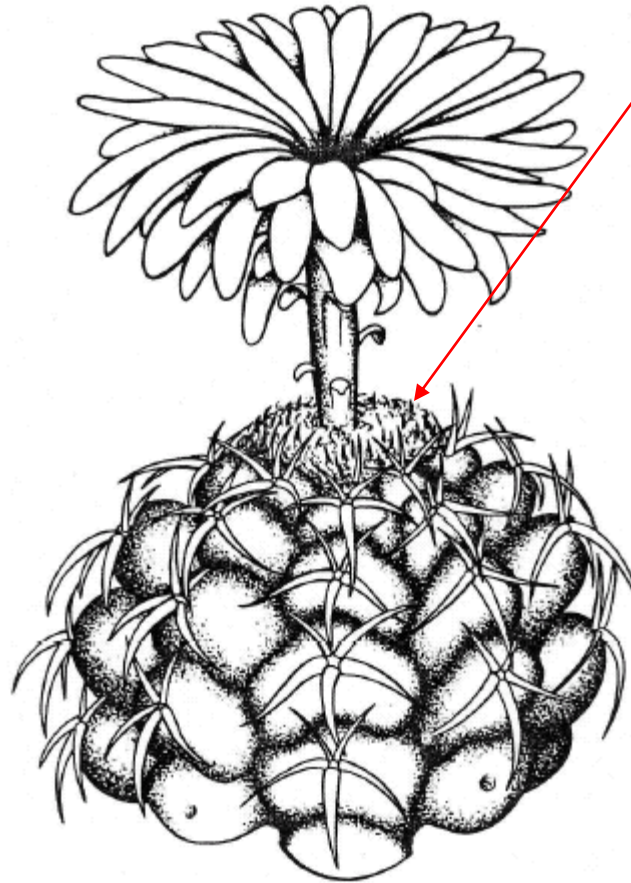
- Globular to cylindric, upto 5' tall x 12" dia
- Ribs straight, occ spiral
- Spines red, orange or yellow turning gray with age, may grow white hair w age
- FL – reddish, zygomorphic, 3" long
- FT – Contains white hair
- FR – Spherical, 1" dia, usually green
- Very slow growers
- 1 Specie



Native to Argentina

Discocactus

- Disc-shaped – difficult to grow
- Ribs w large tubercles
- Heavy spines, wooly apex w bristles
- FL – Nocturnal, large white-pinkish, fragrant
- FR – red/yellow berry



Native to Brazil, Bolivia
& Paraguay

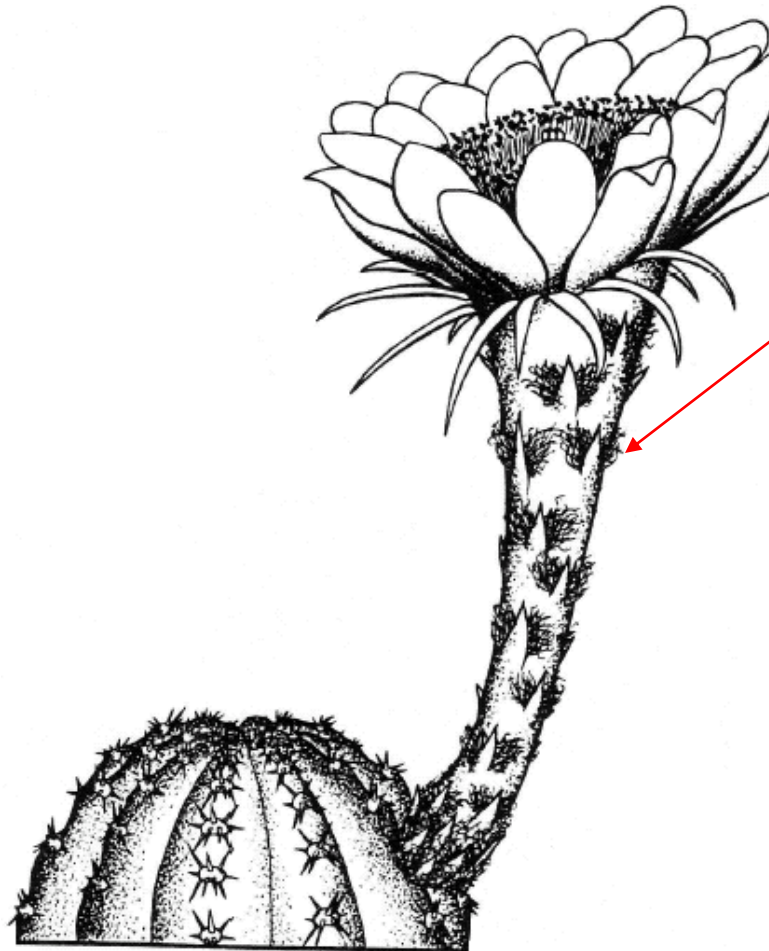
D. alteolens

Echinopsis

(syn. Acantolobivia, Chamaecereus, Helianthocereus, Leucostele, Lobivia, Pseudolobivia, Setiechinopsis, Soehrensia, & Trichocereus)

(Grk Echino = hedgehog & Opsiis = covered with)

JL – broke out into Echinopsis, Lobivia, Trichocereus & Setiechinopsis 1



E. tubiflora

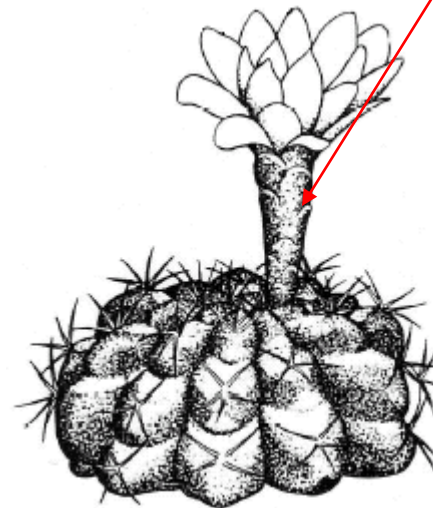
- Globular to columnar & tree-like
- Ribs straight, occ spiral
- FL – large, funnel shaped, yellow to rose, white from younger areoles, nocturnal
- FT - scales w wooly hairs
- FR – No spines
- Echinopsis FT are longer & slimmer – favorite of hybridizers
- Trichocereus are more columnar plants, shorter FT
- Lobivia are similar to Echinopsis with shorter FT

Native to Argentina, Brazil, Bolivia, Chile, Ecuador, Peru, Paraguay & Uruguay

Gymnocalycium

(Greek – “naked bud”)

- Globular, w “chin”, usually singular , < 6 – 8’ dia
- FL – bell-shaped w short tube, near apex, large wrt to plant size, white, green, yellow, pink or red
- FT – naked, broad scales, no hair or spines

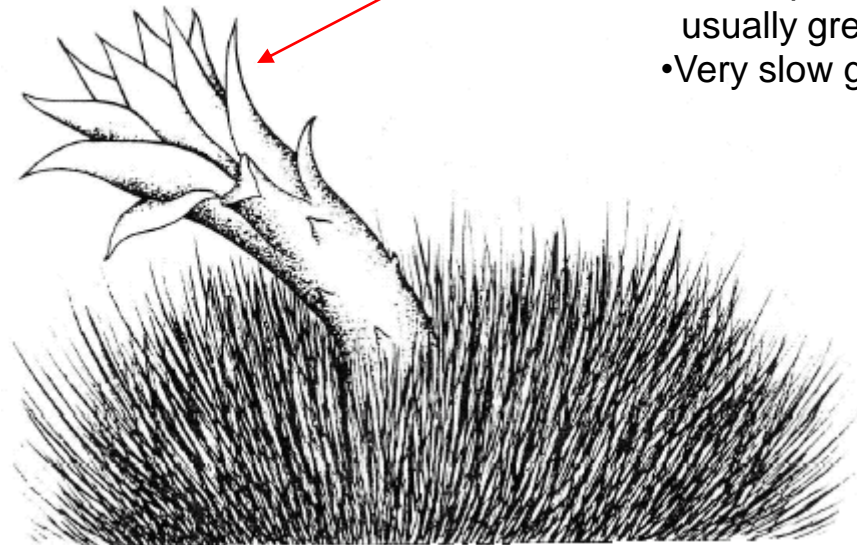


G. mihanivichii

Native to Argentina, Brazil, Bolivia, Paraguay & Uruguay

Matucana

- Low, globular, slightly cylindrical solitary or clustering
- FL – diurnal, subapical, zygomorphic, mainly red, yellow or pink.
- FT – Contains white hair
- FR – Spherical, 1" dia, usually green
- Very slow growers

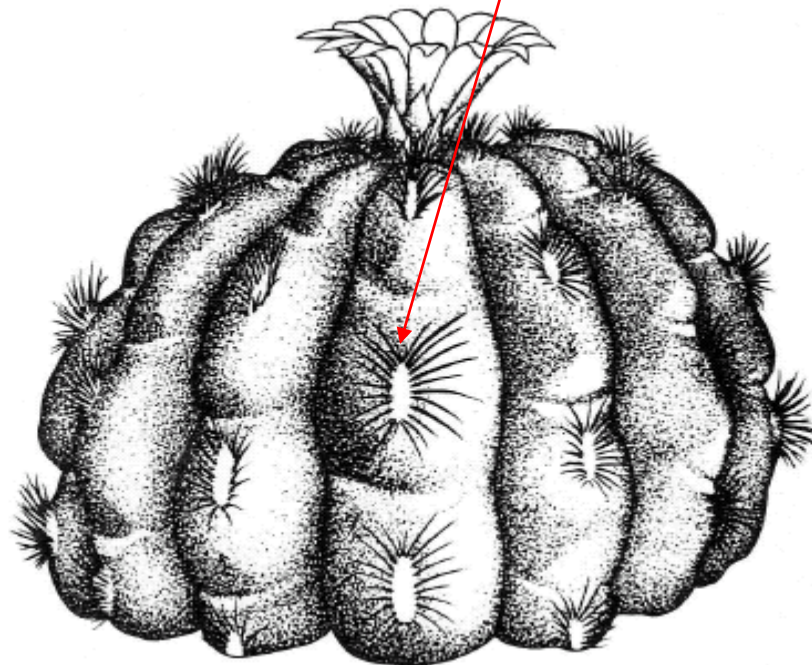


M. haynei

Native to Peru

Oroya

- Flattened globe-shaped, ribbed (drawn underground during drought)
- Aeroles long, oval
- Spines – long, curved
- FL – short, funnel form near apex, red to pink or yellow
- FT/OV – no spines or bristles
- 2 Species



Native to Peru

O. peruviana

Rebutia

(syn. Aylosteria, Mediolobivia, Sulcorebutia & Weingartia)

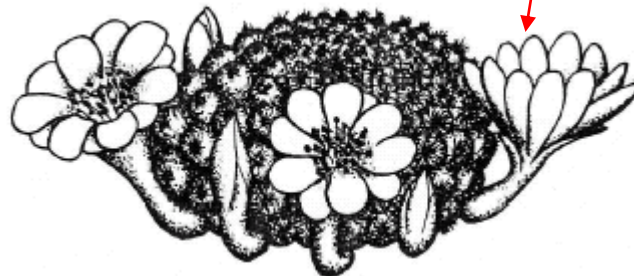
JL – Redistributed under Aylosteria 31, Rebutia 5 & Weingartia 42

- Small, globular to cylindric, forming groups of heads
- Lacks definite ribs
- Areoles round or elongated on small tubercles
- FL – most arise from base/side of plant usually quarter sized red, orange & yellow
- FT/OV – short, scaly, not papery

Rebutia – round areoles

Sulcorebutia - elongated areoles

Weingartia – FL on side of body, not base w beet-like roots separated by a neck from body



R. miniscula

Native to Argentina & Bolivia