

KEYS TO SELECTED WOODY MONOCOTS AND CACTI

In southeastern Arizona, southern New Mexico, and the Guadalupe Mountains of West Texas.

1a.	Leaves fleshy, succulent, relatively thick in cross-section.	Go to 2; <i>Agave</i>
1b.	Leaves fibrous, not succulent, relatively thin in cross-section.	Go to 3
2a.	Leaves narrow (2-4 cm at base); inflorescence cylindrical; S New Mexico and W Texas.	Lechuguilla; <i>Agave lechuguilla</i>
2b.	Leaves broad (≥ 5 cm at base); flower clusters stalked umbels; widespread genus in region.	Agaves; <i>Agave</i> spp.
3a.	Leaf margins with prominent teeth.	Go to 4; <i>Dasyliirion</i>
3b.	Leaf margins with fine teeth or fibrous.	Go to 5
4a.	Teeth on leaf margins curved toward leaf tip; widespread in region.	Wheeler Sotol; <i>Dasyliirion wheeleri</i>
4b.	Teeth on leaf margins curved toward leaf base or straight; S New Mexico and W Texas.	Smooth Sotol; <i>Dasyliirion leiophyllum</i>
5a.	Leaves flexible, narrow and grass-like, not spine-tipped; widespread genus in region.	Beargrass, Sacahuiste; <i>Nolina</i> spp.
5b.	Leaves rigid, spine-tipped.	Go to 6; <i>Yucca</i>
6a.	Leaves narrow (≤ 1.5 cm); fruits dry.	Go to 7
6b.	Leaves broad (about 5 cm wide); fruits fleshy.	Go to 8
7a.	Trunk tall and branched; inflorescence spreading panicle; widespread in region.	Soaptree Yucca (Palmilla); <i>Yucca elata</i>
7b.	Trunk short, leaves clumped at ground level; inflorescence narrow raceme; E of continental divide.	Great Plains Yucca; <i>Yucca glauca</i>
8a.	Trunk short (< 25 cm), leaves clumped at ground level; fruit > 12 cm long; widespread in region.	Banana Yucca (Datil); <i>Yucca baccata</i>
8b.	Trunk tall, can be > 1 m; fruit < 12 cm long; not widely distributed.	Go to 9
9a.	Margins of leaves without coarse fibers (fine fibers on old specimens); S Arizona and SW New Mexico.	Schott Yucca; <i>Yucca schottii</i>
9b.	Margins of leaves with coarse fibers; S New Mexico or W Texas.	Go to 10
10a.	Plant tall, often exceeding 2.5 m; trunk might be branched; pistil ≥ 45 mm; W Texas.	Faxon Yucca; <i>Yucca faxoniana</i>
10b.	Plant usually < 2 m; trunk not branched; pistil ≤ 40 mm; S New Mexico and W Texas.	Torrey Yucca; <i>Yucca treculeana</i> (= <i>Y. torreyi</i>)
1a.	Plant comprised of distinctly jointed segments that are round (chollas) or flattened, orbicular pads (prickly pears); elongation of segments permanently terminated each dry season.	Chollas & Prickly Pears; <i>Opuntia</i>
1b.	Plant not segmented (might be branched); growth indeterminate.	Go to 2
2a.	Stem tuberculate.	Pincushions & Fishhooks; <i>Mammillaria</i> , <i>Coryphantha</i> , <i>Escobaria</i>
2b.	Stem ribbed.	Go to 3
3a.	Mature plants branch in this region; stems much longer than broad (columnar cacti).	Saguaro, Carnegiea gigantea, and Queen-of-the-night, Peniocereus greggii
3b.	Mature plants typically do not branch, but might grow in clusters.	Go to 4
4a.	Flower buds develop above areoles; stems generally cylindrical and growing in clusters of many stems; central spines never hooked.	Hedgehogs; <i>Echinocereus</i>
4b.	Flower buds develop in areoles; stems usually expanded in center or globular, growing singly or in clusters of few stems; central spines hooked in several species.	Barrels; <i>Ferocactus</i> , <i>Echinocactus</i> , <i>Echinomastus</i> , etc.

KEY TO SPECIES OF GYMNOSPERMS: CUPRESSACEAE AND PINACEAE

Colorado Plateau–Southern Rocky Mountains through southern Arizona and New Mexico and the Guadalupe Mountains of Texas.
Common name in **bold** print is species occurring in southern part of region visited on the fieldtrip.

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- 1a. Needles scale-like, short, usually pressed against twig (might be erect on new growth); needles awl-like and erect on common juniper; mature female cones (1-2 years; 3 years for common juniper) necessary for some couplets. Cupressaceae; Go to 2
- 1b. Needles round, square, or flat in cross-section, long, erect on twig. Pinaceae; Go to 9 (second page)
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- 2a. Mature female cones remain on tree several years, large (19-32 mm in diameter), woody; monoecious; S Arizona and SW New Mexico. **Arizona Cypress;**
Cupressus arizonica
- 2b. Mature female cones (1-2 years, 3 years for common juniper) relatively small (3-18 mm in diameter), usually fleshy; species here are dioecious; widespread genus. *Juniperus*; Go to 3
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- 3a. Needles awl-like, erect; low-growing shrub, usually <1 m tall; grows at high elevations (2,200-3,500 m = 7,500-11,500 feet); N Arizona and N New Mexico through Canada. Common Juniper;
Juniperus communis
- 3b. Needles scale-like, usually pressed against twig; mature shrub or tree exceeds 1 m; usually grows at middle to high elevations (<2,700 m = 9,000 feet). Go to 4
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- 4a. Mature female cones (2 years) 8-18 mm wide. Go to 5
- 4b. Mature female cones (1-2 years) 4-8 mm wide. Go to 6
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- 5a. Bark broken into thick squares; female cones usually 3-5 (2-6) seeded; S Arizona, S New Mexico, W Texas. **Alligator Juniper;**
Juniperus deppeana
- 5b. Bark shredding; female cones 1-2 seeded; central Arizona through Colorado Plateau & Great Basin. Utah Juniper;
Juniperus osteosperma
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- 6a. Mature female cones blue to blue-black. Go to 7
- 6b. Mature female cones red, pink, or reddish-brown. Go to 8
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- 7a. Twigs <1 mm thick, droop at tips; upper branches (12-20 mm wide) reddish under peeling bark; usually a single trunk; widespread species. **Rocky Mountain Juniper;**
Juniperus scopulorum
- 7b. Twigs about 1.5 mm thick, generally erect; upper branches not red under peeling bark; usually several trunks or low branches; S Rocky Mountains and W Oklahoma through N Mexico. **One-seed Juniper;**
Juniperus monosperma
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- 8a. Female cones lack white bloom; usually several trunks or low branches; SE New Mexico and W Texas through S High Plains. **Redberry Juniper;**
Juniperus pinchotii
- 8b. Female cones with white bloom; usually one trunk; S Arizona, SW New Mexico, W Texas (but not in Guadalupe Mountains). **Rose-fruited Juniper;**
Juniperus coahuilensis
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KEY TO SPECIES OF CUPRESSACEAE AND PINACEAE (continued)

9a.	Needles without papery sheath at base, attached singly to branches.	Go to 10
9b.	Needles with papery sheath at base, usually in bundles of 2 or more.	<i>Pinus</i> ; Go to 14
10a.	Needles square in cross-section, attached to wooden peg.	<i>Picea</i> ; Go to 11
10b.	Needles flat, attached directly to branch.	Go to 12
11a.	Female cones 12-50 mm long; needle tips blunt; upper montane forest to tree-line.	Engelmann Spruce; <i>Picea engelmannii</i>
11b.	Female cones 60-100 mm long; needle tips pointed; middle montane (mixed conifer) forest.	Blue Spruce; <i>Picea pungens</i>
12a.	Female cones hang down and have 3-pronged bracts between cone scales; buds pointed; N Mexico to SW Canada.	Common Douglas-fir; <i>Pseudotsuga menziesii</i>
12b.	Female cones upright on branches, lack 3-pronged bracts; buds blunt.	<i>Abies</i> ; Go to 13
13a.	Needles 40-65 mm; mid-montane (mixed conifer) forest; widespread in SW USA.	White Fir; <i>Abies concolor</i>
13b.	Needles 20-40 mm; upper montane forest to tree-line; S Arizona and S New Mexico north to SW Canada.	Rocky Mountain Subalpine Fir; <i>Abies bifolia</i> (<i>A. lasiocarpa</i>)
14a.	Needles in bundles of 5.	Go to 15
14b.	Needles typically in bundles of 2-3 (1-4).	Go to 17
15a.	Needles 100-250 mm; basal leaf sheath persistent; SE Arizona and SW New Mexico.	Arizona Pine; <i>Pinus arizonica</i>
15b.	Needles 40-90 mm; basal leaf sheath deciduous.	Go to 16
16a.	Scales of cones strongly reflexed and acute at apex; S Arizona, S New Mexico, and W Texas.	Southwestern White Pine; <i>Pinus strobiformis</i>
16b.	Scales of cones broadly truncate (not reflexed) at apex; N Arizona and N New Mexico north into SW Canada.	Limber Pine; <i>Pinus flexilis</i>
17a.	Needles 20-70 mm long; seeds without wings.	Piñon Pines; Go to 18
17b.	Needles 50-380 mm long; seeds with wings.	Go to 20
18a.	Needles typically 2 per bundle; N Arizona, New Mexico, and Guadalupe Mountains (Texas) north to Colorado and Utah.	Two-needle Piñon; <i>Pinus edulis</i>
18b.	Needles usually 3 per bundle (2-4); Mexican border region.	Go to 19
19a.	Stomata on both surfaces of needle; open cones 3-4 cm long, 3-6 cm wide; SE Arizona, SW New Mexico, W Texas (igneous substrates).	Mexican Piñon; <i>Pinus cembroides</i>
19b.	Stomata on ventral needle surface only; open cones 2-3 cm long, 3-4 cm wide; SE Arizona (e.g., Santa Catalina Mountains).	Border Piñon; <i>Pinus discolor</i>
20a.	Needles 50-110 mm long; basal leaf sheaths deciduous; SE Arizona and SW New Mexico.	Chihuahua Pine; <i>Pinus (leiophylla var.) chihuahuana</i>
20b.	Needles 100-380 mm long; basal leaf sheaths persistent.	Go to 21
21a.	Needles 240-360 (200-380) mm long; SE Arizona and SW New Mexico.	Apache Pine; <i>Pinus engelmannii</i>
21b.	Needles 110-220 (100-250) mm long; one species widespread, one limited to SE Arizona and SW New Mexico.	Go to 22
22a.	Needles with 2-6 resin canals; 2-3 needles per bundle; widespread in western USA.	Ponderosa Pine; <i>Pinus ponderosa</i>
22b.	Needles with 6-10 resin canals; 3-5 needles per bundle; SE Arizona and SW New Mexico.	Arizona Pine; <i>Pinus arizonica</i>