

A Vegetative Key to the Willows of Colorado: A Preponderance of the Evidence

A key of vegetative characteristics for mature (or fully expanded) leaves and twigs. These characteristics are highly variable. Look at several leaves and twigs on one shrub to get an overall feel (an average) for their size, shape, and color.

Ignore stipules and leaves of sucker shoots. Stipules, cute miniature leaves that grow in pairs at the base of the leaf petiole, are common to all *Salix* species, and therefore do not aid in distinguishing among them. Sucker shoots are vigorous, non-flowering twigs that grow from the base of the shrub, and can have really huge leaves, far beyond the parameters listed here.

While this key is based only on vegetative characters, distinguishing catkin characteristics are occasionally noted. Two catkin characteristics are useful even when the catkin is over mature: the stipe length and the catkin length. I often find catkins late in the season still dangling on the shrub, or lying on the ground underneath the shrub.

Also Included here are:

- Species descriptions (page 9)
- List of willows by habitat (page 14)
- Glossary (page 15)
- References (Page 16). Nomenclature follows Dorn (1977, 1997). Synonyms listed are those found in commonly used keys to Colorado flora.

Key to Groups

1. Trees. Either large shade trees or at least tall, single trunk (occasionally spilt into two) trees up 30 feet (10 meters), occurring on the eastern plains or in the lower parts of the western valleys, can occur in the foothills **Group A**

1. Shrubs. Usually multi-stemmed, if single trunk than diameter not more than 10 inches (5 cm). Height from less than 10 cm creeping on the ground to large shrubs of stream banks and floodplains, up to 15 feet (5 meters) tall2

2(1). Tall shrubs, usually > 3-4 feet (1.5-2 meters), often over 8 feet (2.25 meters), occurring at plains, foothills and montane altitudes..... **Group B**

2(1). Shrubs generally 3 feet or less, can be as tall as 5 feet, restricted to subalpine and alpine habitats3

3(2). Shrubs at least 0.5- 5 feet (>10 cm – 2 meters) tall, usually in subalpine environments, can occur in alpine environments up to 1 foot tall **Group C**

3(2). Shrubs creeping on the ground, < 5 inches(< 10 cm) in height, restricted to alpine environments **Group D**

Group A—Tree willows

1. Tree crown is nearly spherical, as if prunedglobe willow, *Salix matsudana*
.....(in towns in the lower Arkansas and Colorado River valleys, introduced)

1. Tree crown may form a large shade canopy, but not nearly a perfect sphere.....2.
2. Branches as well as leaves are pendulous, leaves long and linear, not more than 1.5 cm wide, long acuminate tips. The true weeping willow, only in cultivated gardens, lawns and other landscaped places. weeping willow, *Salix babylonica* (introduced)
2. Branches not pendulous, or if so only at their tips, leaves may or may not be pendulous, otherwise not as above in all respects3.
3. Leaves linear to oblong to lanceolate, usually more than 10 cm in length, with no obvious widening in the middle 4.
3. Leaves lanceolate, elliptic, to ovate, usually less than 10 cm long, if longer, then not linear nor oblong, but obviously wider in the middle or below. Leaf petiole weak, causing the leaf to dangle from the petiole attachment. Leaves with finely serrate margins, acuminate tip, pale green, thin, and glaucous on the back. Bark is dark and furrowed, trunk almost never straight and upright tree, often twisted or lying horizontally on the ground before reaching upwards. (At Warren Air Force Base in Cheyenne, Wyoming, *S. amygdaloides* was observed crossing with *S. fragilis*. The only distinguishing feature was the way the petioles dangle, while the leaf size, teeth coarseness and leaf thickness were more like *S. fragilis*.) peach-leaf willow, *Salix amygdaloides*
4. Leaves coarsely serrate, thick, strongly glaucous on the back, twigs olive, yellowish-brown, to bright orange-yellow, brittle, easily snapping off at the base..... crack willow, brittle willow, *Salix fragilis* (introduced) (synonym *Salix alba*)
4. Leaves serrulate, not coarse and thick, not glaucous on the back, 1-2 cm wide. Native to Utah, coming into Colorado in Mesa and Montrose counties. Apparently part of the *Salix nigra* complex. Gooding willow, *Salix gooddingii*

Group B – Tall (>1.5 m, 5 ft.), usually multi-stemmed, shrubby willows

1. Leaves mostly opposite or nearly so, branches erect. Leaves narrow (0.5-3.0 cm wide), escaping from cultivation around Colorado Springs, the Pikes Peak region, also known from Denver and Boulder area.....basket willow, *Salix purpurea* (introduced)
1. Leaves clearly alternate.....2.
2. Twigs pruinose (white, waxy bloom. Like that on a plum, it can be easily rubbed off with a thumb)), even if slightly so (look on this year or last year's growth, if light, best seen behind buds), glabrous, or if hairy only sparsely so3.
2. Twigs not pruinose, may or may not be pubescent (use a lens), and may have a layer of semi-transparent exfoliating skin6.

3. Twigs red to dark red, pruinose-ness is thin, more or less restricted to last years branches or behind the buds and not does not obscures the twig color. Leaves glabrous, shiny, entire, glaucous below. Montane and subalpine elevations *Salix planifolia*.
3. Twigs not red. Can be so strongly pruinose they appear white. Twig color is pale green, yellow or gray, never red4.
4. Twigs pruinose usually only on previous year's growth, not so on the current year twig (terminal end), although some specimens do have it on all stems, if so than leaf margins are toothed. Bud scales can be black. Leaves are long and linear, dark green. Grows only in the foothills and plains bluestem willow, *Salix irrorata*
4. Twigs pruinose on current year's growth (may also be on older twigs), the terminal part of the branch (if so and leaf margins toothed, go to *S.irrorata*, above).....5.
5. Leaves are greater than 13 mm wide (about the width of a pinky finger), dark green. Will grow on very steep (>8%), bouldery streams, as well as low gradient floodplains and streambanks, catkins >1.5 cm long Drummond willow, *Salix drummondiana*
5. Leaves are never more than 13 mm wide, light to pale yellowish green. Generally found on low gradient floodplains, catkins <1.5 cm long
.....Geyer willow, *Salix geyeriana*
6. Leaves linear, long and narrow, several times (6 x) longer than wide7.
6. Leaves not linear, or if so then not as much as 6 x long as wide8.
7. Leaves glabrous or nearly so, serrulate, sometimes entire, western slope and mountain counties, not on the Front Range or eastern plains Dusky willow, *Salix melanopsis*
7. Leaves pubescent, rarely glabrous. If glabrous then of eastern slope counties, foothills and plains. The most common willow in Colorado, grayish-green color, usually forms loose thickets from rhizomes. Woody stems pinkish to pale-reddish, usually with a thin, exfoliating layer of whitish to transparent skin coyote willow, sandbar willow, *Salix exigua*.

Two subspecies (where they come together there are many intermediates):

Leaves glabrous or glabrate, prominently toothed, more veiny then the next, on the eastern plains..... sandbar willow, *S. exigua* ssp. *interior*
.....(Kartez (1999) has elevated this to species: *Salix interior* Rowlee.)

Leaves persistently pubescent, sometimes entire, or nearly so, in the mountains and foothills coyote willow, *S. exigua* ssp. *exigua*

8. Leaves lanceolate with an acuminate tip (from 0.5 - >2 cm long, often like the tip of a whip, tapers unevenly), shiny upper surfaces, bright green, may or may not be glaucous underneath.....9.
8. Leaves sometimes lanceolate but short acuminate at most, leaves not particularly shiny or if so dark green, leaves elliptic, lanceolate, or otherwise,10.
9. Leaves 3-20 cm long (average 8 cm), shiny upper surface, with a long acuminate tip (average length 2.6 cm), serrate to serrulate (average 10 teeth per cm), petioles 1.3-3.0 mm long, a few hairs may be present. Widespread, tall (>2.5 m) shrub of the mountains, foothills, and western valleys. Tall stature and long, shiny leaves that catch the sunlight makes this willow unmistakable. whiplash willow, *Salix lasiandra* (= *S. lucida*)
 Two varieties:
 Leaves glaucous underneath var. *lasiandra*.
 Leaves not glaucous underneath var. *caudata*.
9. Leaves 4-10 cm long (average 6 cm), shiny upper surface, with an short acuminate tip (average length 0.7 cm) (not as long as *S. lasiandra*) finely-glandular serrate (average 14 teeth per cm), petioles 4-11 mm long, glabrous. Rare, local willow of cold marshes and bogs. The most reliable distinguishing characteristic is the timing of the presence of mature catkins and the size of the capsules: For *S. serissima*, catkins mature after Aug. 1, often well into Sept., much later than any other willow in Colorado, capsules are glabrous and 6-12 mm long. (For *S. lasiandra*, catkins mature before Aug. 1, capsules are glabrous, 4-7 mm long.) Currently known from only a few populations in Boulder, Larimer, Park, and Routt counties
 autumn willow, *Salix serissima*
10. Leaves glaucous underneath11.
10. Leaves not glaucous on the underneath side, not hairy (except when young), mostly not toothed, not involute, not glaucous on the twigs, not particularly yellow, red, or any distinct color, just a nice plain green willow “boring boothii” Booth willow, *Salix boothii*.
11. Leaves consistently obovate, with obtuse tips, leaf bases sharply cuneate, grows away from stream banks, usually on forested slopes, freshly stripped bark can have a skunk-like odor.....
Scouler willow, *Salix scouleriana*
11. Leaves broadly elliptic to obovate, tips acute, leaf bases often rounded, but can be cuneate to sharply so, never grows on shaded hillslopes, always in full sun, steamside, floodplain, lake or beaver pond habitats.....12.
12. Leaf margins toothed (most leaves have obvious teeth, look at several).....13
12. Leaf margins entire (some leaves may have a few teeth, but not consistently so on all leaves)
14.

13. The difference between the next two species of willow (actually, this would apply to any choice of willows) depends upon the “preponderance of the evidence”. Rather than a dichotomous choice, several factors must “add up”. You need to get 4-5 “Clues”, in any order, to match the species. The clues are listed in order of least variation, however, ANY COMBINATION of AT LEAST 4 will get you to the species. Clue #1: Leaves coarsely to finely serrate to serrulate; Clue #2: leaves are elliptical to elliptic-ovate (distinctly broader at the middle); Clue #3: leaf bases usually rounded (but not always); Clue #4: leaf tips usually sub-acute to obtuse (not as sharp as the next), Clue #5: Leaf color yellowish-green; Clue #6: young twigs yellowish (both species can have one side of the twig with a reddish streak, as if sunburned, discount this color, and look for the predominant twig color over the entire shrub). Very common, multi-stemmed willow forming large thickets around beaver ponds, narrowly lining lower gradient streams on relatively wide floodplains in the mountains mountain or yellow willow, *Salix monticola* (= *S. pseudomonticola*. Dorn (1997) considers *S. pseudomonticola* a valid species but it does not occur in Colorado.)

13. Clue #1: Leaves finely serrulate, to sub-entire; Clue #2: leaves oblong elliptical, strap-shaped, or lanceolate (not broadest at the middle, with nearly parallel margins); Clue #3: Leaf bases often cuneate (but not always); Clue #4: leaf tips often acute (sharply so, the way a young child draws the roof of a house, with a classic steep pitch “^”); Clue #5: Leaf color darker and more bluish-green than *S. monticola* (green and blue are more predominant in the leaf than yellow or pale greens); Clue #6: young twigs reddish to greenish. (both species can have one side of the twig with a reddish streak, as if sunburned, discount this color and look for the predominant twig color over the entire shrub). Clue #7: Older twigs can be densely pubescent with very thick, coarse hair (trichomes) (but this is an uncommon feature in Colorado). A common willow generally found near stream edges, but can form floodplain thickets strapleaf willow, *Salix eriocephala* var. *ligulifolia* (= *S. ligulifolia*, = *S. lutea*)

14. This year’s twigs pubescent at maturity.....15.

14. This year’s twigs glabrous at maturity.....16.

15. Leaves small, 1-4 (7) cm long, and more or less of a consistent size on the shrub. Most mature leaves (at least 4-6 weeks old, not just emerging from the bud) and twigs pubescent with a fine peach fuzz type hair (sometimes not at the very tip, look at several leaves), individual hairs not distinguishable with the unaided eye. Surface of the leaf is textured, the veins impressed into the leaf’s upper surface (this more easily seen by bending the leaf over your finger), leathery. Petioles are pink to red. Previous years twigs are streaked (red and tan, as the thin bark is beginning to split). Hint: the catkins have distinctive, very long (> 3 mm) stipes (stalk that holds the individual flower), such that the flowers stand away from the main axis of the catkin. This is easily seen with the naked eye, even on old twigs already fallen on the ground.Bebb willow, *Salix bebbiana*

15. Leaves generally larger than the former and more variable in size. Mature twigs pubescent but leaves glabrous. Twigs reddish to greenish (often one side of the twig has a reddish streak, as if sunburned, discount this color and look for the predominant twig color over the entire

shrub). Older twigs (last year's growth) can be densely pubescent with very thick, coarse hair (trichomes). Leaves finely serrulate, to sub-entire; oblong elliptical, strap-shaped, or lanceolate (not broadest at the middle, with nearly parallel margins); leaf bases often cuneate (but not always); leaf tips often acute (sharply so, the way a young child draws the roof of a house, with a classic steep pitch “ ^ ”); leaf surface not textured, veins not impressed into leaf surface. A common willow generally found near stream edges, but can form floodplain thickets
 strapleaf willow, *Salix eriocephala* var. *ligulifolia* (= *S. ligulifolia*, = *S. lutea*)

16. Leaves dark shiny green, glaucous beneath, often slightly involute, thickish. Twigs red, ranging from bright red to dark blood red to nearly purple-black, and consistently shiny. Twigs can be slightly glaucous (best seen behind buds), especially if in the vicinity of glaucous-twigged willows, with which it hybridizes.....plane-leaf willow, *Salix planifolia*

16. Leaves lighter green, not noticeably thickish, and not as above in all respects.....17.

17. The difference between the next two species of willow (actually, this would apply to any choice of willows) depends upon the “preponderance of the evidence”. Rather than a dichotomous choice, several factors must “add up”. You need to get 4-5 “Clues”, in any order, to match the species. The clues are listed in order of least variation, however, ANY COMBINATION of AT LEAST 4 will get you to the species. Clue #1: Leaves with no teeth, but if you find some, they are coarsely to finely serrate to serrulate; Clue #2: leaves are elliptical to elliptic-ovate (distinctly broader at the middle); Clue #3: leaf bases usually rounded (but not always); Clue #4: leaf tips usually sub-acute to obtuse (not as sharp as the next), Clue #5: Leaf color yellowish-green; Clue #6: young twigs yellowish (both species can have one side of the twig with a reddish streak, as if sunburned, discount this color, and look for the predominant twig color over the entire shrub). Very common, multi-stemmed willow forming large thickets around beaver ponds, narrowly lining lower gradient streams with relatively floodplains in the mountains mountain or yellow willow, *Salix monticola* (= *S. pseudomonticola*. Dorn (1997) considers *S. pseudomonticola* a valid species but it does not occur in Colorado.)

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 strapleaf willow, *Salix eriocephala* var. *ligulifolia* (= *S. ligulifolia*, = *S. lutea*)

Group C—Low stature willows (less than 5 feet tall).

1. Leaves pubescent, pretty obviously hairy.....2.

1. Leaves glabrous, there may be a few stray hairs, but for the most part hairless.....5.
2. Leaves glaucous underneath (waxy white coating underneath the hairs).....3.
2. Leaves not glaucous below4.
3. Leaves densely white-wooly hairy underneath, upper surface dark, shiny green, strongly revolute margins, thick twigs. Rare, on hummocks of nutrient-rich fens and in thickets at the edges of ponds and stream banks silver willow, *Salix candida*
3. Leaves equally hairy on both sides of leaf (use hand lens), grayish-green, upper surface not shiny, margins not revolute, twigs not especially thick. Common willow of well drained habitats, often forming very large thickets in subalpine basins. This willow can grow at lower elevations, and when it does, it grows taller. The leaf characteristics, however, distinguish this willow regardless of its height short-fruit willow, barren willow, *Salix brachycarpa*
..... (this intergrades with *Salix glauca*, whose leaves are less pubescent)
4. Leaves equally hairy on both sides, tips are acute to acutish, olive-green color, leaves narrowly elliptic to elliptic. Common willow of wetter habitats in subalpine valleys, forming small patches on the eastern side of the Continental Divide and up to very large thickets on the western slope Wolf willow, *Salix wolfii*
4. Leaves sparsely villous to glabrous, 1.5-3 cm wide, young twigs densely hairy, less than 0.5 m tall. Rare, on calcareous lakeshores at 12,000 ft elevation.....
..... lime-loving willow, *Salix lanata* ssp. *calcicola*
5. Leaves entire, glaucous underneath, slightly revolute, thickish, petioles 3-13 mm long, twigs dark red to purple-black, glabrous, shiny. Common willow forming extensive thickets in the subalpine basins above 10,000 ft. and below, where it occurs as a much taller shrub (>1 m)
..... plane-leaf willow, *Salix planifolia*
5. Leaves finely serrate, sometimes only toward the base6
6. Leaves not glaucous to slightly glaucous underneath, petioles less than 5 mm long, young twigs not shiny red, sparsely short pubescent. Petioles 1.5-8 mm long. Rare, found only in calcareous fens low blueberry willow, *Salix myrtilifolia*
6. Leaves glaucous on underside, mostly elliptic to oblanceolate, 3-8 cm long, sparsely hairy to glabrous. Petioles 3-10 mm long Gray willow, *Salix glauca* var. *villosa*
(this intergrades with *Salix brachycarpa*, whose leaves are usually quite pubescent)

Group D—Alpine willows (prostrate, creeping, less than 10 cm tall)

1. Leaf apex generally obtuse, leaves oval to suborbicular to elliptic, glaucous below, strongly reticulate below. Leaves clustered at the ends of creeping, slender branches, 10,500 to 12,500 ft elevationssnow willow, *Salix reticulata* ssp. *nivalis*

1. Leaf apex generally acute, leaves elliptic, not glaucous to only slightly glaucous below, veins less pronounced below. Long, heavy, woody horizontal stems, 11,000 to 13,500 ft. elevationsarctic willow, alpine willow, *Salix arctica* var. *petraea*

Species Descriptions (in alphabetical order) * denotes one of the most commonly encountered 12 species.

****S. amygdaloides*—Peachleaf Willow**

Habitat: Eastern plains and lower southwestern valleys, 3,500-7,700 feet in elevation.

Size: Small tree, often with 3-4 ascending trunks 4-10 (12) m tall.

Leaves: Petioles droop, leaves elliptic to lanceolate with a distinct acuminate tip, entire to serrulate, glaucous underneath, pale green and thin.

Twigs: Branches slender, yellowish-green to ashy-white.

? Catkins: (1.5) 2.5-8 cm long, 13-20 mm wide, capsules 4-7 mm long, glabrous, stipe 1.2-3 mm long, style around 0.2 mm long.

Synonyms: none.

***S. arctica* var. *petraea*—Alpine Willow**

Habitat: Alpine environments. 11,000-13,000 feet in elevation.

Size: Prostrate shrubs, creeping along the ground (10-20 cm tall or less).

Leaves: Elliptical, narrowly elliptical, leaf tip mostly acute. Not strongly glaucous underneath.

Twigs: Thickish.

? Catkins: 1.5-7 cm long, 10-12 mm wide, capsules 4-7 mm long, pubescent, stipe about 1 mm long, style 1-2 mm long.

Synonyms: *S. arctica*

***S. babylonica*—Weeping Willow**

(introduced)

Habitat: Introduced tree, planted in gardens and lawns. Rarely escapes.

Size: Large tree, up to 12 m tall .

Leaves: Linear-lanceolate, 3-13 cm long, acuminate, serrate, glaucous, glabrous.

Twigs: Branchlets are long and hang downward.

? Catkins: 1-2.5 cm long, capsules glabrous, sessile, styles lacking or 0.5 mm long.

Synonyms: none.

****S. bebbiana*—Bebb Willow**

Habitat: Montane valleys and wet areas. 5,000–9,000 (9,800) feet in elevation.

Size: Medium shrub to small tree, (1-4 m), often single stemmed.

Leaves: Elliptic to occasionally obovate or oblanceolate, consistently sized on one individual shrub, 1-4 cm long, veins impresses into the leaf surface, giving the leaf a textured look, much like a mat-finish on a photograph.

Twigs: Reddish, peach-fuzz type pubescence, older twigs often cracked, giving a streaked, red and tan, appearance.

? Catkins: 1.5-4 (5) cm long, up to 2 cm wide, capsules 6-8 (10) mm long, pubescent,

loosely arranged, not concealing the rachis, stipe 2-3.5 mm long, style 0.1-.2 mm long.

Synonyms: *Salix depressa* ssp. *rostrata*

****S. boothii*—Booth Willow**

Habitat: Seepage areas and stream banks, floodplains. 5,000-10,300 feet in elevation.

Size: Medium to tall shrub (1-4 m tall).

Leaves: Elliptical to lanceolate, not glaucous beneath, sparingly to moderate pubescent when young, becoming glabrate with age, entire.

Twigs: Young twigs finely hairy, glabrate with age.

? Catkins: (1) 2-4 (6) cm long, capsules 3-6 mm long, glabrous, stipe 1.5-2 mm long, style 0.3-1 mm long.

Synonyms: *Salix pseudocordata*, *Salix pseudomrysinites*

****S. brachycarpa*—Shortfruit Willow**

Habitat: Subalpine valley bottoms, hillsides, dry rocky and talus slopes. 7,500-12,000 feet in elevation.

Size: Short (0.4-1 (2) m tall).

Leaves: Densely hairy on both sides, glaucous underneath, grayish-green color, elliptic shape.

Twigs: Current year twigs tomentose.

? Catkins: 12-20 mm long, capsules (3) 4.5-5 mm long, densely pubescent, sessile or on stipes up to 0.5 mm long, styles 0.5-1.0 mm long.

Synonyms: none.

***S. candida* –Hoary Willow**

Habitat: Rare, on hummocks of rich fens, edges of ponds. 8,800-10,600 feet in elevation.

Size: Low shrub (0.2-1 m tall)

Leaves: Oblong to elliptic, revolute, upper surfaces very dark, shining green, densely white-wooly underneath.

Twigs: unknown.

? Catkins: 1-3 (4) cm long, capsules 5-7 mm long, densely tomentose, subsessile, styles 1 mm.

Synonyms: none.

****S. drummondiana*—Drummond Willow**

Habitat: Montane valley bottoms, stream banks, along the edges of beaver ponds and dams, and hillside seeps. Often grows on very steep, boulder strewn streams. 7,500-11,000 feet in elevation.

Size: Medium to tall stature multi-stemmed shrub (1-5 m tall).

Leaves: Narrowly elliptic to oblong, more than 13 mm wide, glaucous and pubescent underneath, dark green above.

Twigs: Strongly glaucous on current year's growth, and on previous season's growth.

? Catkins: 2-4.5 (6) cm long, 3-13 mm wide, capsules 3-6 mm long, pubescent,

sessile or stipe up to 1 mm long, style 0.5-0.7 mm long.

Synonyms: *Salix subcoerulea*

****S. eriocephala* var. *ligulifolia*—Strapleaf Willow**

Habitat: Montane stream banks and floodplains and other wet places. 5,000 – 9,500 feet in elevation.

Size: Tall (2-5 m).

Leaves: Oblong to narrowly elliptic, acute at both ends, margin entire to subserrate, glabrous and glaucous beneath

Twigs: Yellowish to reddish, often pale on one side and reddish on the other

? Catkins: 2-4 cm long, 1 cm wide, capsules glabrous, stipes 1-1.5 (2) mm long, styles 0.2-0.6 mm long, stigmas short.

Synonyms: *Salix ligulifolia*, *Salix lutea*

****S. exigua*—Coyote Willow, Sandbar Willow**

Habitat: Sand and cobble bars within the active channel, overflow channels, ditches and seeps. *S. exigua* var. *exigua* 3,500-9,200 feet in elevation, *S. exigua* ssp. *interior*, 3,000-5,800 feet in elevation.

Size: Multi-stem thickets, (1) 2-3 m tall, rarely up to 8 m. Not usually forming a distinct basal area.

Leaves: Linear, more than six times longer than wide, entire to serrulate dentate with glandular teeth. Glabrate to densely white sericeous.

Twigs: Reddish to pinkish, especially older twigs, often with flaking semi-transparent epidermis.

? Catkins: 1.5-6 cm long, 8-16 mm wide, capsules 4-7 mm long, mostly glabrous, sessile or the stipe up to 0.8 mm long, style obsolete.

****S. fragilis*—Crack Willow (introduced)**

Habitat: Introduced tree in towns, parks and homesteads. 4,500-6,800 feet in

elevation. Known to hybridize with *Salix alba*.

Size: Large shade tree (up to 20 m tall, trunk up to 1.3 m diameter).

Leaves: Lanceolate to narrowly elliptic, 3-17 cm long, coarsely serrate, strongly glaucous underneath.

Twigs: Branches ascending, not pendulous. Branchlets very brittle, break easily with a loud snap when bent back.

? Catkins 2.5-8 cm long, 13-20 mm wide, capsule 4-7 mm long, glabrous, stipe 1.2-3 mm long, style about 0.2 mm long.

Synonyms: Many *Salix fragilis* specimens in Colorado miss-identified as *Salix alba* var. *vitellina* or the hybrid *S. alba* x *S. fragilis*. Dorn puts all specimens in *S. fragilis*.

****S. geyeriana*—Geyer Willow**

Habitat: Montane valley bottoms, stream banks, along the edges of beaver ponds and dams, and hillside seeps. Above 6,500 feet in elevation.

Size: Medium to tall stature multi-stemmed shrub (1-5 m tall).

Leaves: Narrowly elliptic, less than 13 mm wide, glaucous and pubescent underneath, pale yellowish-green color to medium green.

Twigs: Strongly glaucous on current year's growth, and on previous season's growth.

? Catkins: 1-1.5 cm long, nearly as thick, capsules 4-7 mm long, pubescent, stipes (1) 2-3 mm long, style 0.2-0.3 mm long.

Synonyms: *Salix geyeriana* var. *argentea*, *Salix macrocarpa*

***S. glauca*—Gray Willow**

Habitat: Alpine or subalpine meadows and slopes

Size: small low shrub usually less than 1 m tall

Leaves: Glaucous beneath, elliptic to oblanceolate, sometimes serrulate towards the base, sparsely hairy to glabrous.

Twigs: unknown.

? Catkins: 2-5 cm long, capsules hairy, 4-8 mm long, styles 0.3-1.5 mm long, stipes 0.0-2.5 mm long

Synonyms: included in *Salix brachycarpa* in Weber and Wittmann 1992.

***S. gooddingii*—Goodding Willow**

Habitat: Along rivers and drainages, 4400-5200 feet in elevation.

Size: Large tree to 30 m high

Leaves: 6-13 cm long, .8-1.6 cm wide, glabrous or becoming so, not glaucous on the underneath side, linear or oblong to lance-linear or narrowly elliptic, serrulate or serrate.

Twigs: Yellowish

? Catkins: 3-7 mm long, hairy, flower bracts pale, deciduous in fruit

Synonyms: None.

***S. irrorata*—Bluestem Willow**

Habitat: Foothill stream banks and cobble bars along the Front Range. Does not occur on the eastern plains or in the mountains. 5,500-7,500 (9,500) feet in elevation.

Size: Medium (1-2.5 m) tall.

Leaves: Long and linear to narrowly elliptic, dark green, glaucous below, toothed.

Twigs: Not glaucous on current year growth (although some populations are) and strongly glaucous on last year's growth.

? Catkins: 2.5-4 cm long, about 1 cm thick, capsules glabrous, 3-4 mm long, styles 0.4-0.7 mm long.

Synonyms: none.

***S. lanata* ssp. *calcicola*—Lime-loving Willow**

Habitat: Rare, calcareous lakeshores, 12,000 feet in elevation.

Size: Low shrubs (up to 0.5 m tall)
Leaves: Leaves sparsely villous to glabrous, 1.5-3 cm wide, entire or toothed.

Twigs: Young twigs densely hairy.

? Catkins: More than 4 cm long, capsules glabrous.

Synonyms: *Salix calcicola* is Dorn's preferred name.

***S. lasiandra—Whiplash Willow**

Habitat: Stream banks and wet meadows. *S. lasiandra* var. *caudata* 4,100-10,000 feet in elevation, *S. lasiandra* var. *lasiandra* 5,400-8,900 feet in elevation.

Size: Tall shrubs to small trees (2-6 m (10) tall), almost always multi-stemmed.

Leaves: Lanceolate with long acuminate tip (0.1-10.5 cm, avg. 2.6 cm), glandular-serrate (7-15, ave. 10 teeth per cm), shiny and glabrous above, glaucous below in var. *lasiandra*, not glaucous below in var. *caudata*.

Twigs: Glabrous, long.

? Catkins: 3-7 cm long, 1-1.5 cm wide, capsules 4-8 mm long, glabrous, stipe 1-2 mm long, style 0.5-1 mm long.

Synonyms: *Salix lucida*, *Salix caudata*

S. matsudana –Globe Willow (introduced)

Habitat: In towns along the lower Colorado and Arkansas River valleys (Grand Junction, Pueblo.)

Size: Large tree, >15 m tall, spherical crown, as if pruned.

Leaves: unknown

Twigs: unknown

? Catkins: unknown

Synonyms: none.

S. melanopsis – Dusky Willow

Habitat: Montane Valleys on the western slope, stream banks and flood plain. Approx occurring between 6,000-8,800 feet in elevation.

Size: Multi-stem thickets, to 5 m tall. Not usually forming a distinct basal area.

Leaves: linear, not glaucous, glabrous or nearly so, mostly serrulate or sometimes entire.

Twigs: Reddish to pinkish, especially older twigs, often with flaking semi-transparent epidermis.

? Catkins: 1.5-6.5 cm long, glabrous capsules, style 0-.4 mm long, stipes 0-.7 mm long. Bract pale.

Synonyms: Easily overlooked as *Salix exigua*. Dorn may change the name to *S. fluviatilis*.

***S. monticola—Mountain Willow**

Habitat: Montane stream banks and floodplains and other wet places. 5,700-12,500 feet in elevation.

Size: Tall shrubs (2.5-5 m tall).

Leaves: Mostly elliptical to elliptic-obovate, crenate-serrate or sub-entire, glaucous beneath, leaf bases usually rounded.

Twigs: Often yellow to yellow-green, drying blackish.

? Catkins: 2-6 cm long, 1-1.5 cm wide, capsules 4-7 mm long, glabrous, subsessile, stipe less than 1 mm long, style 0.7-1.8 mm long, longer than the stigma.

Synonyms: *Salix pseudomonticola*. Dorn (1997) considers *S. pseudomonticola* a valid species that does not occur in Colorado.

S. myrtilifolia—Blueberry Willow

Habitat: Rare, calcareous fens, 9,300 feet in elevation.

Size: Low shrubs, less than 1 m tall.

Leaves: Finely serrate, glabrous, petioles less than 5 mm long.

Twigs: Young twigs not shiny red, sparsely short pubescent.

? Catkins: 2-3 cm long, capsules glabrous.

Synonyms: none.

***S. planifolia—Planeleaf Willow**

Habitat: Subalpine and montane valley bottoms and hillside seeps. 8,000 – 13,000 feet in elevation.

Size: Tall shrub (1-5 m tall) in the montane, short (0.4-1 m tall) in the subalpine.

Leaves: Shiny dark green, thick, glabrous to sparsely hairy, glaucous underneath, leaf margins revolute, rarely toothed. (2) 4-5 (6.5) cm long, (0.5) 1-1.5 (2) cm wide.

Twigs: Glabrous to sparsely hairy, smooth shiny bright red to dark red to purple to purple- black.

? Catkins: (1.5) 2-4 (6) cm long; capsules hairy, 3.5-6.5 mm long, style 0.4-1.5 mm long, stipes 1 (1.5) long.

Synonyms: *Salix phylicifolia* ssp. *planifolia*

***S. reticulata* ssp. *nivalis*—Snow Willow**

Habitat: Alpine environments. 10,500-12,500 feet in elevation.

Size: Prostrate, creeping shrub (less than 0.4 m tall)

Leaves: elliptic to ovate, leaf tip mostly rounded, glaucous and strongly reticulate underneath.

Twigs: slender, creeping along the ground, leaves tend to be clustered at the ends.

? Catkins: 5-15 mm long, 5-8 mm wide, capsules 1.5-3 mm long, pubescent becoming glabrate with age, stipe 0 to 0.5 mm long, style obsolete or up to 0.2 mm long.

Synonyms: *Salix reticulata* var. *nana*, *Salix nivalis*

***S. scouleriana*—Scouler Willow**

Habitat: On forested slopes away from stream banks and wet places. (6,500) 8,000-10,000 (11,000) feet in elevation.

Size: Medium tall (1.5-4 m), sparsely branched shrub.

Leaves: Consistently obovate, glaucous underneath.

Twigs: Skunk-like odor when freshly stripped.

? Catkins: 2-6 cm long, 13-17 mm wide, capsules (5) 6-9 mm long, pubescent, subsessile or stipe 1-3 mm long, style 0.3-0.4 mm long.

Synonyms: none.

***S. serissima*—Autumn Willow**

Habitat: Cold bogs and swampy areas, known from a few populations (Boulder, Larimer, La Plata, Park, Routt counties), 7,000-9,000 feet in elevation.

Size: Tall shrubs (2-5 m tall).

Leaves: Elliptic to elliptic lanceolate, short acuminate tip (0.1-1.5 cm, ave. 0.7), finely glandular-serrate margin (10-19, ave. 14 teeth per cm), dark shiny green above, glaucous below.

Twigs: Twigs of the season reddish brown, contrasting with whitish branches.

? Catkins: 1.5-3 cm long, 1.5-2 cm wide, capsules 7-12 cm long, glabrous, stipe 1-1.5 mm long, style 0.3 mm long.

Synonyms: none.

***S. wolfii*—Wolf Willow**

Habitat: Subalpine valley bottoms and hillside seeps. 7,500-11,000 feet in elevation.

Size: Short (< 1 m tall).

Leaves: densely to sparsely hairy on both sides of leaf, not glaucous underneath, olive-green color, elliptic with an acute tip, in outline like a kite.

Twigs: Yellow to orange when young, chestnut brown when older, glabrous and shining except those of the season often villous-puberulent.

? Catkins: 8-20 (30) mm long, capsules 3-5 mm long, glabrous or rarely pubescent, stipe less than 1 mm long, style about 0.5 mm long.

Synonyms: none.

Willows by habitat

Groups within elevation zones are not mutually exclusive, there is wide overlap, but can be used as a general rule of thumb.

Eastern Plains and lower-most reaches of Western River valleys

- Streams, ditches, not necessarily wet all season long, in sand, gravel, or cobbles
 - Salix exigua ssp. exigua
 - S. exigua ssp. interior
 - and their intergrades
- Broad floodplains, backwaters of streams, swampy areas and wetlands, in fine sands, clay or silt
 - Salix lasiandra
 - S. eriocephala var. ligulifolia
 - S. eriocephala var. familia (extreme NE Colorado)
- Broad floodplains, stream banks
 - Salix amygdaloides
 - S. nigra (extreme SE Colorado)
- Farm/ranch house yards, streams and ditches within 100 yards of a farm/ranch house, gardens
 - Salix fragilis (*introduced species*)
 - S. babylonica (*introduced species*)
 - S. matsudana (*introduced species*) (west slope only)

Foothills

- Steeper streams, gullies, and ditches
 - Salix exigua
 - S. irrorata
- Floodplains and wetlands
 - S. eriocephala var. ligulifolia
 - S. lasiandra
 - S. monticola

Montane

- Fast moving streams
 - Salix exigua
 - S. drummondiana
 - S. eriocephala
- Slow gradient streams, wet, wide floodplains
 - S. geeyeriana
 - S. lasiandra
 - S. bebbiana
 - S. planifolia
 - S. monticola
 - S. eriocephala
 - S. boothii
- Dry, shaded slopes, not on or near a stream or seep
 - Salix scouleriana
- Specialized Wetlands (cold bogs, rich fens)
 - Salix serissima—floodplains with deep soils
 - S. myrtilifolia—calcareous fens
 - S. candida—nutrient rich fens, thickets at edges of ponds and river terraces

Subalpine

- Moist and saturated soils
 - Salix planifolia
 - S. monticola
 - S. wolfii
- Moist to well drained soils
 - Salix brachycarpa
- Specialized Wetlands (cold bogs, rich fens)
 - S. candida—nutrient rich fens, thickets at edges of ponds and river terraces
 - S. lanata ssp. calcicola—calcareous lakeshores

Alpine

- Dry or wet habitats, singly or intermingled
 - Salix reticulata
 - S. arctica

Glossary:

Acute = sharply pointed, tapering to the apex with straight sides.

Acuminate = with long tapering tip and concave sides.

Capsules = single carpel ovary of willow flowers that open upon drying to release the seeds.

Carpel = simple pistil.

Catkin = compact spike or raceme of usually unisexual flowers. The inflorescence of any member of the Salicaceae family (cottonwoods, aspens, and willows).

Cuneate = wedge-shaped, pointed toward petiole

Elliptic = a flattened circle, more than twice as long as broad, widest at the center and the two ends equal.

Glabrate = becoming glabrous with age.

Glabrous = without hairs

Glaucous = a white waxy bloom on leaves that can be rubbed off, like that on a plum. This can be very strong, looks very white, contrasting with the green side of the leaf to very slight, so thin as to be almost transparent. If glaucousness is present, then the leaf is glaucous. Be aware that on dried specimens, this character can be very hard to see.

Involute = rolled, not flat.

Lanceolate = lance-shaped, much longer than broad, tapering from below the middle to the apex and to the base.

Linear = long and narrow of a uniform width, as the leaf blades of grasses.

Obovate = egg-shaped, widest near the tip.

Oblong = longer than wide with nearly parallel margins.

Obtuse = blunt to almost rounded at the end.

Pruinose = having a waxy powdery surface; covered with a whitish dust or bloom

Pubescent = bearing hairs.

Petiole = stem of a leaf.

Reticulate = with a network, net-veined.

Revolute = margin rolled toward the underside.

Rhizomes = an underground stem or rootstock.

Serrate = teeth along the leaf margin

Serrulate = minutely serrate.

Stipe = stalk that holds the capsule (main ovary, or seed bearing fruit of a single willow flower).

Sub- = a prefix usually signifying somewhat, slightly, rather, or almost.

Suborbicular = nearly round in outline.

Units of Measurement:

ft = feet.

m = meters.

cm = centimeters (1 cm = 0.39 inches)

mm = millimeters (1 mm = 4/100 inch,
13 mm = 1/2 inch)

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