

Frangula purshiana (DC.) J. G. Cooper

Standardized Common Name: Cascara Sagrada

Other Common Names: Cascara, Chittam Bark, Sacred Bark

Family: Rhamnaceae

Taxonomy: *Frangula* includes a dozen species that are segregated from *Rhamnus* based on several shared morphological features (cf. *Rhamnus cathartica* L.). Both genera are widely distributed in the Northern Hemisphere. When *Frangula* and *Rhamnus* are combined into a single genus, the correct name for this species is *Rhamnus purshiana* DC. It is native to the northwestern United States, extending to California, Arizona and western Canada.

Description: Large shrub to small tree, (1–)3–10(–15) m tall. Trunk 15–50(–90) cm in diameter, usually dividing into multiple branches within 3–5 m, irregularly branching. Bark gray to dark reddish brown, smooth to longitudinally furrowed or scaly, especially at base of trunk. Young twigs greenish, softly pubescent; older twigs reddish-brown and nearly glabrous; winter buds lacking bud scales, no terminal bud present. Leaves alternate and clustered at ends of twigs, stipulate with stipules small and quickly lost, petiolate; blade elliptical to ovate, oblong-ovate or obovate, (2.5–)5–18(–20) cm long; base obtuse to cordate; apex variable, acute to obtuse or rounded; margins nearly entire, usually minutely serrate, often undulate; venation pinnate, with 9–16 pairs of secondary veins, curving forward near margins, conspicuous beneath; lower surface paler than upper, somewhat pubescent. Inflorescences lateral, cymose. Flowers small (3–4 mm in diameter), bisexual or unisexual, greenish; sepals 5, basally fused; nectar disk present inside calyx; petals 5; stamens 5, opposite petals rather than alternating with them; ovary 2–4-loculed, with 1 ovule per locule. Fruit a drupe, berry-like, 6–12 mm in diameter, black or purplish black at maturity, with 3 (2–4) pyrenes.

Parts in Commerce: Bark, usually aged for at least a year

Identification:

- 1–4(–6) mm thick
- Occurs in broad, nearly flat pieces (from trunk) or curved pieces or quills 0.5–2.0 cm wide (from branches); frequently processed into small cut pieces
- Outer surface commonly bearing irregular flattened coating of white to grayish lichen and occasionally growths of moss or liverworts, with brownish to reddish cork visible beneath when scraped; otherwise, brown to purplish or reddish brown, often

longitudinally ridged

- Lenticels absent or present, pale, elongated, with the long axis perpendicular to the branch or trunk
- Inner surface of bark yellowish when fresh, often pale reddish brown or purplish-brown after drying, longitudinally striated or barely ridged
- In cross-section, contains brownish or purplish external cork (10 or more cell layers thick); narrow yellowish-brown to yellowish-gray cortex; thick yellowish-brown secondary phloem
- If observed with a light microscope, cortex and outer portion of phloem contain calcium oxalate crystals and pale, irregularly shaped or roughly elliptical clusters of thick-walled sclereids; secondary phloem in transverse section contains numerous parenchyma rays (perpendicular to surface, (1–)2–4(–5) cells thick, irregularly curving) and short narrow bands of fibers parallel to surface (these features cannot be seen clearly with a dissecting microscope)
- Fracture short, somewhat fibrous in inner portion, with broken fibers projecting from surface of inner bark
- Odor weak, characteristic
- Taste bitter and nauseating; tinges saliva yellow

The inner surface produces a reddish color when treated with a drop of dilute alkali (lye) or ammonia solution.

Adulterants: *Frangula californica* (Eschsch.) A. Gray, or *Rb. californica* Eschsch. (California Coffeeberry), once considered to be a variety of *F. purshiana*, has the longest history of any *Frangula* or *Rhamnus* species from the western United States. The two plants are very similar, and material of “*F. purshiana*” from southern California frequently contains *F. californica*. *Frangula californica* has broader parenchyma rays in the phloem, and the inner surface of the cork cambium, the thin growing layer immediately below the cork, is crenate rather than nearly flat. (These characters are not readily observed without the use of a light microscope.) Twigs tend to remain densely pubescent to a later stage of growth than those of *F. purshiana*, and remains of hairs may be visible even on rather large branches.

***Frangula alnus* Mill. (Frangula):** The bark of this European species, also known as *Rb. frangula* L., differs from

F. purshiana in several features:

- Bark always <2 mm thick
- Outer surface variable in color; when scratched, exposed inner cork is deep crimson or purple
- Lenticels numerous, sometimes rounded
- Inner surface yellowish to dark red with purple blotches or brown
- No clusters of stone cells present in cortex; calcium oxalate crystals present
- Taste only weakly bitter, mucilaginous

This species likewise produces a reddish color when the inner surface is moistened with an alkaline solution, as would other species containing the same active compounds.

References:

Bolmgren K, Oxelman B. Generic limits in *Rhamnus* s.l. (Rhamnaceae) inferred from nuclear and chloroplast DNA sequence phylogenies. *Taxon*. 2004;53:383–390.

Elias TS. *The Complete Trees of North America. Field Guide and Natural History*. New York, NY: Gramercy Publishing Co.; 1987.

Evans WC. *Trease and Evans' Pharmacognosy*, 14th ed. London: WB Saunders Company Ltd.; 1996:239–242.

Hayes DW, Garrison GA. *Key to Important Woody Plants of Eastern Oregon and Washington*. Washington, DC: U. S. Department of Agriculture; 1960. Agriculture Handbook, No. 148.

Hickman JC, ed. *The Jepson Manual: Higher Plants of California*. Berkeley: University of California Press; 1993.

Kraemer H. The medullary ray cells in *Rhamnus Purshianus*. *J Am Pharm Assoc*. 1912;1:846–849.

Taylor RL, Taylor S. *Rhamnus purshianus* in British Columbia. *Davidsonia*. 1980;11:17–23.

World Health Organization. *WHO Monographs on Selected Medicinal Plants*. Vol. 2. Geneva: World Health Organization; 1999–2002:259–268.

Youngken HW. *Text-Book of Pharmacognosy*, 5th ed. Philadelphia, PA: The Blakiston Company; 1943:551–560.