THE BURSERACEAE IN NORTH AMERICA NORTH OF MEXICO

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BURSERACEAE

Plants deciduous, shrubs or trees, dioecious, older bark peeling off in thin, papery sheets. Leaves imparipinnate, alternate, usually crowded at ends of branches or twigs. Leaflets opposite or subopposite, sessile to petiolulate, entire to irregularly crenulate, glabrous. Petioles alate or not, glabrous to pubescent. Rachises alate or not. Inflorescences axillary or subterminal, racemose, paniculate, glabrous to puberulent, appearing just before or simultaneously with new leaves. Flowers functionally unisexual. Sepals 3 or 5, connate basally, deciduous or persistent, glabrous. Petals 3 or 5, recurved and spreading, glabrous. Stamens 6 or 10. Filaments distinct, free, subulate, insertion at base of disc, glabrous. Anthers smaller and abortive in carpellate flowers. Disc 6- or 10-lobed, glabrous. Ovaries 1, superior, sessile, ovoid, glabrous, lobes 3, locules 3, abortive in staminate flowers. Ovules 2 per locule. Styles 1. Stigmas 1, capitate, lobes 3. Fruits drupes, ellipsoid, ovoid, or subglobose, more or less triangular in cross-section, coriaceous, 5–12 mm long, loculicidal, valves 3, glabrous; pyrenes 1(–2).

A primarily tropical family of about 20 genera and 600 species.

BURSERA Jacq. ex L., Sp. Pl. ed. 2. 471. 1762, nom. cons. [TYPE: *B. simaruba* (L.) Sarg. (*Pistacia simaruba* L.)].

Terebinthus P. Br., Civ. Nat. Hist. Jamaica 345. 1756, non *Terebinthus* P. Mill., Gard. Dict. Abr. ed. 4.1754.

Simaruba Boehmer in Ludwig, Def. Gen. Pl. ed. 3. 513. 1760.

Elaphrium Jacq., Enum. Syst. Pl. Carib. 3. 1760.

The only genus occurring in North America north of Mexico.

About 100 species in the tropics and subtropics of the Americas. The copious resin of the trunks and branches has been used in making incense.

KEY TO BURSERA IN THE UNITED STATES

Leaves and inflorescences borne on short lateral twigs; leaves 2–11 cm long; petioles to 2 cm long, glabrous.
  Leaflets 7–15, lanceolate to ovate or obovate, 15–40 mm long, 3–15 mm wide . . . . . *B. fagaroides* var. *elongata*
  Leaflets 7–35, narrowly oblong, narrowly elliptic, or spatulate, to 5 mm long, to 1 mm wide . . . . . *B. microphylla*
Leaves and inflorescences borne on main axes; leaves 9–32 cm long; petioles 2.5–8.5 cm long, pubescent to glabrate . . *B. simaruba*

BURSERA FAGAROIDES (H.B.K.) Engl. var. ELONGATA McVaugh & Rzed., Kew Bull. 18:371. 1965 [TYPE: Nayarit, 12 mi SE of Acaponeta, *McVaugh 21752* (MICH)].

B. odorata T. S. Brandeg., Proc. Calif. Acad. Sci., ser. 2, 2:138. 1889. *Terebinthus odorata* (T. S. Brandeg.) Rose, Contr. U. S. Natl. Herb. 10:121. 1906. *Elaphrium odoratum* (T. S. Brandeg.) Rose, N. Amer. Fl. 25: 250. 1911. [TYPE: Baja California, San Gregorio, *Brandegee s. n.* (UC)].

B. tenuifolia Rose, Contr. U. S. Natl. Herb. 3:314. 1895, non *B. tenuifolia* Engl. ex O. Ktze., Rev. Gen. Pl. 1:107. 1891. *Terebinthus tenuifolia* Rose, Contr. U. S. Natl. Herb. 10:122. 1906. *Elaphrium tenuifolium* (Rose) Rose, N. Amer. Fl. 25:252. 1911. [TYPE: Sinaloa, Lodiego, *Palmer 1581* (US)].

Elaphrium covillei Rose, N. Amer. Fl. 25:250. 1911. [TYPE: Sonora, ca 6 mi W of Torres, *Coville 1640* (US)].

B. lonchophylla Sprague & Riley, Kew Bull. 1923:168. 1923 [TYPE: Sinaloa, Cerro del Muerte de Quelele, Tasajera, Choix, *González Ortega 896* (K)].

Plants shrubs or small trees; bark gray-brown. Leaves 5–11 cm long, borne on short lateral twigs. Leaflets 7–15, lanceolate to ovate or obovate, opposite, sessile, 15–40 mm long, 3–15 mm wide, acute to rarely rounded apically, slightly oblique basally, margin irregularly crenulate. Petioles not alate, glabrous. Rachises slightly alate. Inflorescences axillary or subterminal, 1–2-flowered, 2–3 cm long, glabrous, borne on short lateral twigs. Staminate flowers 5-merous. Carpellate flowers 5-merous. Sepals deciduous. Drupes ovoid, 7–9 mm long; pyrenes 1.

In the United States known only from a few populations at ca 1000 m elevation in the mountains of Pima County, Arizona: semiarid limestone cliffs, hillsides, and slopes; flowering July-August. Occurring in like habitats in Mexico at 50–1600 m from Sonora to Guerrero.

BURSERA MICROPHYLLA Gray, Proc. Amer. Acad. Arts 5:155. 1861. *Terebinthus microphylla* (Gray) Rose, Contr. U. S. Natl. Herb. 10:120. 1906. *Elaphrium microphyllum* (Gray) Rose, N. Amer. Fl. 25:250. 1911. [TYPE: Sonora, Sierra Tule, *Schott 1855* (GH)].—Elephant Tree, Torote, Copál.

Plants shrubs or small trees; bark pale grey or white. Leaves 2–3 cm long, borne on short lateral twigs. Leaflets 7–35, narrowly oblong, narrowly elliptic, or spatulate, opposite or subopposite, sessile, to 5 mm long, to 1 mm wide, obtuse apically, margin entire. Petioles narrowly alate, glabrous to rarely pubescent basally. Rachises narrowly alate. Inflorescences subterminal, 1–3-flowered, 5–15 mm long, glabrous, borne on short lateral twigs. Staminate flowers 5-merous. Carpellate flowers 3-merous. Sepals deciduous. Drupes more or less ellipsoid, 5–8 mm long; pyrenes 1.

Locally abundant at low elevations in rocky soils in the Lower Colorado Valley subdivision of the Sonoran Desert in southeastern California and southwestern Arizona; desert canyons, hillsides, and slopes; flowering June-July. Occurring in like habitats in the same subdivision in northeastern Baja California and northwestern Sonora.

BURSERA SIMARUBA (L.) Sarg., Gard. & Forest 3:260. 1890. *Pistacia simaruba* L., Sp. Pl. 1026. 1753. *Terebinthus brownei* Jacq., Enum. Pl. Carib. 18. 1760, nom. illeg. *B. gummifera* L., Sp. Pl. ed. 2. 471. 1762, nom. illeg. *T. simaruba* (L.) W. F. Wight in Rose, Contr. U. S. Natl. Herb. 10:122. 1906. *Elaphrium simaruba* (L.) Rose, N. Amer. Fl. 25:246. 1911 [TYPE: Jamaica, *Sloane s. n.* (BM.)]—Gumbo Limbo, Almácigo.

Elaphrium ovalifolium Schlecht., Linnaea 17:248. 1843. *B. ovalifolia* (Schlecht.) Engl., Bot. Jahrb. 1:43. 1881. *Terebinthus ovalifolia* (Schlecht.) Rose, Contr. U. S. Natl. Herb. 10:121. 1906. [TYPE: Mexico, *Schiede s. n.* (B)].

Elaphrium integerrimum Tul., Ann. Sci. Natl. Bot., sér. 3, 6:369. 1846. *B. integerrima* (Tul.) Triana & Planch., op cit., sér. 5, 14:303. 1872. [TYPE: Colombia, Alto del Machin, Quindio, *Goudot s. n.* (P)].

Plants trees or shrubs; bark copper-red. Leaves 9–32 cm long, borne on main axes. Leaflets 5–11, broadly ovate to ovate-oblong or obovate, opposite, petiolulate, 27–115 mm long, 15–50 mm wide, acuminate apically, oblique basally, margin entire. Petioles not alate, pubescent to glabrate. Rachises not alate. Inflorescences axillary, many-flowered, 2.5–10 cm long, glabrous to puberulent, borne on main axes. Staminate flowers 5-merous. Carpellate flowers 3-merous. Sepals persistent. Drupes subglobose, 9–12 mm long; pyrenes 1(–2).

Frequent to infrequent in calcareous soils near sea level in southern Florida and the Keys; hammocks and thickets; flowering April-June. Widespread throughout the Caribbean region, occurring from Florida and northeastern Mexico through Central America and the West Indies to Panama, Colombia, and Venezuela.

LITERATURE CITED

BRIZICKY, G. K. 1962. The genera of Simaroubaceae and Burseraceae in the Southeastern United States. J. Arnold Arbor. 43:173–186.

PORTER, D. M., R. W. KIGER, and J. E. MONAHAN. 1973. A guide for contributors to Flora North America, part II. An outline and glossary of terms for morphological and habitat description (provisional edition). Fl. N. Amer. Rept. 66:i–x, 1–120, G1–32.

NOTES AND NEWS

AN OBSERVATION OF SOME SUGAR PINE RELICTS.—Near the shore of Anne Lake in the Minarets Wilderness Area of the Sierra National Forest, in Madera County, California, at 2,900 m, stands a sugar-pine snag of about 1.5 m diameter at ca 1.4 m above ground level, and about 30 m in height. A companion snag, also sugar pine (*Pinus lambertiana* Dougl.), about half that diameter and about 23 m in height, leans toward the larger snag close by. The strange thing about these snags is that there are no living sugar pines in their vicinity, nor other dead ones. Moreover, the larger of the two has a greater diameter than any tree, living or dead, in its vicinity. The neighbors of the two snags are trees of western white pine (*Pinus monticola* Dougl.), lodgepole pine (*Pinus contorta* Dougl. var. *murrayana* Engelm.), and mountain hemlock (*Tsuga mertensiana* (Bong.) Carr.). George B. Sudworth (*Forest Trees of the Pacific Slope,* 1908) gives 2,740 m (7,000 ft.) as the maximum elevation for sugar pine in the southern Sierra Nevada, and Willis L. Jepson (*The Trees of California,* second edition, 1923) gives 2,580 m. (8,500 ft.). Moreover, there are no sugar pines along the Fernandez Trail into the Anne Lake vicinity from Clover Meadow, 17.6 km to the southeast at 2,140 m. Anne Lake is shown on the Merced Peak Quadrangle of the U. S. Geological Survey's 15-minute series of topographic maps at Longitude 119°22′ W and Latitude 37°36′ N.

I identified the snags from bits of bark clinging to the trunks and more bark scattered on the ground around the snags, also from chips of wood cut from the larger snag. The identification of the bark was verified by Prof. Robert A. Cockrell, School of Forestry and Conservation, University of California, Berkeley. A sample of the wood was ground and analyzed by Dr. Arthur Anderson, of the Forest Products Laboratory, University of California (situated in Richmond, near Berkelay). He reported the presence of pinitol, which would suggest that the sample was sugar pine. No old cone parts were in evidence on the ground around the snags.

The two sugar-pine snags are situated among granite outcrops on an east-facing moderate slope on the west side of Anne Lake. Most of their small branches have fallen off. One of the larger snag's several tops has fallen to the ground and is well advanced in rot. This top may have been knocked off by lightning. No galleries of pine beetles were apparent on the weathered wood surface. It is difficult to estimate when the death of these trees occurred, but perhaps in the range of 25 to 50 years—certainly in decades rather than centuries. The larger may have been as much as 400 to 500 years old at death; the smaller, evidently suppressed, may have been about as old.

How does sugar pine happen to have grown at this elevation? We may theorize that this part of the Sierra had a definitely warmer climate several centuries ago, and that sugar pine became established and thrived. Perhaps birds or mammals including man (prehistoric Indians) in some way brought in the sugar-pine seed, which germinated under favorable conditions. The trees then survived during a period sufficiently favorable to grow to maturity.

It was most amazing to find these dead pines (in July 1972) far above the present elevational range of living sugar pines. I would appreciate knowing if others have made similar discoveries. A comparison of the annual rings of the sugar-pine snags with rings of the bristlecone pine (*Pinus aristata* Engelm.), in the White Mountains about 100 km airline to the east, would no doubt serve to date the period when these trees grew.—RICHARD H. MAY, 7 Neila Way, Mill Valley, California 94941.