

Vernicia fordii (Hemsl.) Airy-Shaw

tung-oil tree

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Synonyms. *Aleurites fordii* Hemsl.

Occurrence and uses. Tung-oil tree *Vernicia fordii* (Hemsl.) Airy-Shaw is a native of central Asia. The species was introduced into the southern United States in 1905 as a source of tung oil (a component of paint, varnish, linoleum, oilcloth, and ink), which is extracted from the seeds. The use of this ingredient has declined in recent years in this country, but there are numerous research and breeding programs still underway in Asia. Extensive plantations were established along the Gulf Coast from Texas to Florida, and the tree has become naturalized in some areas (Brown 1945; Brown and Kirkman 1990; Vines 1960). It has also been planted in Hawaii (Little 1979). Tung-oil tree is small, with a rounded top, and seldom reaches more than 10 m in height in the United States (Vines 1960).

Flowering and fruiting. Flowering is monoecious, but sometimes all staminate, or rarely all pistillate (Potter and Crane 1951). The white pistillate flowers with red, purple, or rarely yellow throats appear just before the leaves start to unfold in the spring. Borne in conspicuous, terminal cymes approximately 3.7 to 5 cm in diameter, the flowers create a showy display in large plantations. The fruits are 4-celled indehiscent drupes (figure 1), 3 to 7.5 cm in diameter, that ripen in September to early November (Bailey 1949; Potter and Crane 1951; Vines 1960). The seeds, 2 to 3 cm long and 1.3 to 2.5 cm wide, are enclosed in hard, bony endocarps (figures 2 and 3). They are sometimes referred to as stones or nuts. There may be 1 to 15 seeds per fruit, but the average is 4 to 5 (Potter and Crane 1951). The seeds are poisonous. Fruit production begins at about age 3, with commercial production by age 6 or 7 (Potter and Crane 1951). Good trees will yield 45 to 110 kg of seeds annually (Vines 1960).

Collection, cleaning, and storage. Fruits are shed intact in October or November (McCann 1942) and seeds may be collected from the ground. The fruit hulls should be removed as there is some evidence that hull fragments delay germination (Potter and Crane 1951). Cleaning is not a major problem. There are no definitive storage data for tung-oil tree seeds, but they are considered short-lived and are normally planted the spring following harvest. Their high oil content suggests that storage for long periods may be difficult.

Germination. No pretreatments are usually needed for germination. Seeds may be planted dry, or soaked in water for 2 to 5 days before sowing. The latter treatment is said to speed emergence (Potter and Crane 1951). Seeds typically germinate in 4 to 5 weeks (Vines 1960). Some growers have stratified seeds overwinter in moist sand at 7 °C (Potter and Crane 1951), but there does not appear to be much need for this treatment. There are no standard germination test

prescriptions for this species.

Nursery practices. Seedling production of tung-oil tree is usually in row plantings instead of beds. Seeds should be planted 5 cm (2 in) deep, 15 to 20 cm (6 to 8 in) apart, in rows 1.5 m (5 ft) apart (Potter and Crane 1951). A good transplant size is 30 to 60 cm (1 to 2 ft). The tree can also be propagated vegetatively with hardwood cuttings (Vines 1960).

Literature Cited

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Figure 1 *C Vernicia fordii*, tung-oil tree: immature fruit, $\times 0.5$.

Figure 2 *C Vernicia fordii*, tung-oil tree: cross-section of a fruit, $\times 0.75$ (adapted from McCann 1942).

Figure 3 *C Vernicia fordii*, tung-oil tree: longitudinal (a) and median (b) cross-sections of seeds, $\times 0.75$