ProteaceaeCProtea family

Grevillea robusta A. Cunningham ex R. Br.

silk-oak

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Synonym. *Stylurus robusta* (A. Cunn.) Deg.

Other common names. silver-oak, lacewood.

Growth habit, occurrence, and use. Silk-oakC*Grevillea robusta* A. Cunningham ex R. Br.Cis a medium to large evergreen tree native to coastal regions of eastern Australia (Skolmen 1990). Silk-oak is commonly planted as an ornamental for its showy orange blossoms, and in reforestation programs in many warmBtemperate, subtropical, and tropical locales worldwide. In the United States, it has been planted in Hawaii (since about 1880), California, Florida, and Puerto Rico, and has become naturalized in Hawaii and southern Florida, where it is considered by some to be a noxious weed (Skolmen 1990). The species has adapted well to Hawaii=s varied climates and grows vigorously from sea level to 1,200 m (Neal 1965). Its prolific seeding, wide dissemination of the seeds by wind, and its tolerance of diverse site conditions have enhanced its ability to proliferate (Wong 1974). The tree attains heights of up to 35 m and diameters up to 0.9 m (Wong 1974).

The pale pinkish brown wood has a beautiful, well-marked silver grain, making it desirable for furniture and cabinet work (Magini and Tulstrup 1955; Skolmen 1990). However, care must be taken when machining and finishing this wood because the sawdust contains a skin irritant that produces an uncomfortable rash lasting a week or more. Hydrocyanic acid has been detected in the fruit and flowers (Wong 1974).

Another speciesCKahili flower, *Grevillea banksii* R. Br.Cis less common because reforestation attempts with it have failed in Hawaii. Only on Kauai and Maui are remnant stands of early plantings found (Wong 1974). It is a smaller tree, up to 10 m in height. The flowers and fruits of this species also contain cyanogenic compounds that produce a rash similar to that from poison ivy (Magini and Tulstrup 1955; Wong 1974). A white-flowered form of this speciesCwhite Kahili flower, *G. banksii* forma *albiflora*Cis also found in Hawaii (Wong 1974) and is officially classified there as a noxious weed (Haselwood and Motter 1966).

Flowering and fruiting. Silk-oak is monoecious and flowers from early March through October, reaching its peak during the months of April through June in Hawaii (Little and Skolmen 1989; Skolmen 1990; Wong 1974). Trees in Hawaii usually begin to produce flowers and seeds when 10 to 15 years old (Wong 1974). In Jamaica, trees seed profusely from 10 years of age (Streets 1962). The bright orange blossoms are borne on horizontal racemes, 8 to 18 cm long, which are on short, leafless branches arising mostly from the trunk (Little and Skolmen 1989). The fruit, turning from green to black on maturity, is a slightly flattened, leathery, dehiscent follicle, 15 to 25 mm long, tipped with a slender, recurved, stiff style (figure 1) (Little and Skolmen 1989; Wong 1974).

The follicles remain on the tree for a year or so after the seeds are dispersed (Neal 1965). Two brown, elliptical, flattened seedsCeach 10 to 15 mm long with light, winged marginsCare found in each follicle (figures 1 and 2). Seed crops of Kahili flower resemble those of silk-oak. The blossoms of silk-oak are orange, those of Kahili flower are red, and those of white Kahili flower are creamy white.

Collection, extraction, and storage. The fruits of silk-oak are gathered from the tree before opening, when the first hint of brown color appears, indicating that the seeds are mature (Wong 1974). The seeds are extracted by air-drying the fruits in trays under shade for 5 or 6 days or until the follicles open and release the seeds. The seeds are then separated by means of a seed cleaner (Wong 1974). Purity has averaged 87% (Goor and Barney 1968; Magini and Tulstrup 1955). Moisture content of fresh seeds collected in Hawaii was 28.5% (ETSL 1969). The numbers of seeds/weight for 3 locations are as follows: Hawaii, 64,700/kg (29,350,000/lb) (ETSL 1969); East Africa, 66,000 to 154,000/kg (29,950 to 69,850/lb) (Parry 1956); and Australia, 79,200 to 99,000/kg (35,925 to 44,9000/lb) (Goor and Barney 1968). Seeds of silk-oak are orthodox in storage behavior and are easy to store in cool, dry conditions (Schaefer 1991). Seeds stored for 2 years at –7 and 3 °C had germination rates ranging from 60 to 70% when seed moisture was maintained below 10% during storage in airtight containers (Jones 1967).

Germination. Testing procedures for official purposes call for a 21-day test at alternating temperatures of 20/30 °C with no pretreatment (AOSA 1993). Two pregermination treatments have been found to increase substantially the germination of stored seeds (ETSL 1969): a 48-hour water soak, and stratification at 3 °C for 30 days were equally effective. Pretreated seeds were germinated on moist Kimpak at diurnally alternating temperatures of 30 °C during an 8-hour light period and 20 °C during the dark period. The average germination rate of 8 samples 38% after 17 days and 70% after 72 days. Germination of stored, untreated seeds, however, was only 26% (ETSL 1969). Fresh seed in Australia had a germination rate of 60 to 80% (Goor and Barney 1968). Germination of fresh, unstratified seeds require about 20 days (Skolmen 1990). Germination in silk-oak is epigeal.

Nursery practice. Nursery practices vary among countries where silk-oak is grown (Skolmen 1990). In some countries 4- to 6-week-old wildlings are lifted and potted and later replanted. Seedlings grown in Sri Lanka are outplanted when they are about 40 cm (16 in) tall, whereas those in Jamaica are outplanted when about 60 cm (24 in) tall (Streets 1962). Elsewhere, plants are grown to 45-cm (18 in) heights in large baskets so that they can compete more effectively when outplanted. In Hawaii, silk-oak seeds are sown in flats or containers at a depth of 0.6 cm (1 2 in) without mulch (Wong 1974). Seedbeds are treated with insecticides and fungicides before sowing. Seedling density ranges from 200 to 300 seedlings/m^2 (19 to 28/ft^2). Seedlings grown in flats are outplanted when they are about 9 months old (Wong 1974), while container-grown seedlings reach a plantable size of 20 cm (8 in) in height in 12 to 14 weeks (Skolmen 1990).

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Figure 1—*Grevillea robusta,* silk-oak: follicle and seed, × 2.

Figure 2—*Grevillea robusta,* silk-oak: longitudinal section through a seed, × 4.