

Native Tree Sheet:

Lignum Vitae

Guaiacum officinale

Caltrop Family (ZYGOPHYLLACEAE)



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Common Names

Lignum vitae (Virgin Islands), guayacán (Puerto Rico), palo santo (Cuba), bois saint (Haiti).

Description

A small, multi-stemmed, evergreen tree reaching up to 30 feet in high. Canopy is dense, spreading and rounded with dark green foliage. Trunk divisions begin low on the trunk, resulting in many strong branches. The trunk is covered in a dark brown, smooth bark which peels off in large, thin scales, exposing patches of gray and light brown. Compound leaves are olive green, thick, waxy and have rounded leaflets. The 5-petaled flowers have a subtle fragrance and the color varies in shades of blue to purple and occasionally white. Fruits are flattened, heart-shaped, two chambered capsules containing one or two seeds. The black seeds pushed from the fruit when ripe (dehiscence) and are covered with a bright red, fleshy coating called an aril.

Distribution and Ecology

The tree's native range extends from the Bahamas, through the



Figure 2. *Lignum vitae* leaves, flowers and fruit (Illustration from Vozzo).

Greater and Lesser Antilles to Aruba. On the mainland it is native from Panama to Venezuela below 1,000 feet and planted as an ornamental from Florida to Trinidad and Tobago and elsewhere in the tropics. In the Virgin Islands it is found primarily on the drier east ends of all three islands and is most abundant on St. Croix where it is regenerating naturally.

Flowering and Fruiting

Flowering lasts for over a month and occurs throughout the year with a peak from March to May in the Virgin Islands. However, flowering is somewhat irregular as not all trees in a stand will flower at the same time and individual trees may bear flowers on only a portion of the canopy. As a result, there is often a lesser flowering period in January and February. The fruit can take 2 months to mature, with peak production from July to September with a lesser number maturing in March and April.

Seed Collection and Processing

Mature seeds can be collected directly from the tree when they are pushed out of the orange fruit. Large quantities of viable seeds are more easily obtained underneath mature trees, but must be collected shortly after they fall, as they begin to lose viability after only one



Figure 1. An adult tree in full bloom. Inset: The copious blue and purple blooms are an uncommon color for tropical plants.



Figure 3. Mature seeds covered by a fleshy, red aril emerge from ripe fruit.

month. Manually extracting seeds from mature fruit is tedious and time consuming and should be avoided. All seeds should have the fleshy red aril removed, leaving only the cleaned, dry, semi-porous, black seed. The coating is easily removed by soaking the seeds in water for 10 minutes and agitating them. There is an average of 1,460 seeds per pound (3,200/kg).

Seed Treatments and Germination

Start germination in deep trays with a single layer of seeds because they are relatively small and germination rates can be relatively low if seeds are not treated. Germination trials at UVI indicate that germination begins in 15 to 20 days and is rather uniform, concluding in 5 weeks. Without any treatment 30% of seeds will germinate. Soaking them in water for 24 hours increases the rate to 50%. Seeds treated for one hour in a 2,000 ppm concentration of Gibberellic acid will germinate with over 75% success. Rapid, even germination at high rates make this species well suited to commercial production by local nurseries.

Greenhouse Management

Seedlings should be transplanted into pots after they have formed their second or third true leaf. Seedlings should also be transplanted before the young roots touch the bottom of the tray and become deformed, about two weeks after germination. As a general rule, the roots grow to double the length of the plant height. After one month, seedlings should be gradually acclimated to partial sun outside of the greenhouse/shadehouse. Care should be taken that the tap root does not grow out of the pot and into the ground. Seedlings reach 30 inches in 12 to 14 months.

Outplanting and Growth

Seedlings are very hardy and drought tolerant. They transplant into the field with a high success rate once they reach 25-30 inches (60-75 cm). Supplemental water is only required during initial establishment



Figure 4. The cleaned black seed and early development stages of *lignum vitae* seedlings.

and periods of prolonged drought. Lignum vitae plants in a UVI-AES establishment study averaged 1 foot (30 cm) of growth per year. After 30 months, trees averaged 32 inches (80 cm) of new growth, and began to produce flowers and fruit.

Landscape Uses

Lignum vitae is an attractive tree, with dense dark green foliage, abundant blue blooms and attractive fruit. It is well suited for planting in house lots, under power lines and even as a large hedge. The plant will tolerate shade but prefers full sun. One must consider that these trees will continue to grow over a period of 100 to 150 years, eventually reaching 30 feet in height.

Traditional Uses

The wood of *lignum vitae* is extremely dense and rich in natural oils. It is so heavy it sinks in fresh water. Before the advent of synthetic materials the wood was highly sought after because it is very resistant to decay in salt water and was the only tree that could be used for ship propeller drives. Today the highly prized, two toned wood is still used for carvings.

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Additional Reading

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