

# *Diphysa americana* (Mill.) M. Sousa

E. M. FLORES and W. A. MARÍN

Academia Nacional de Ciencias, Costa Rica and

Escuela de Biología, Universidad de Costa Rica, Costa Rica, respectively

## FABACEAE (BEAN FAMILY)

*Colutea americana* Mill. (The Gardeners Dictionary, eighth edition, Colutea 5; 1768);

*Diphysa robinoides* Benth. (Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i Kjøbenhavn 1853: 11; 1853)

Achivare, arate, bolsa de gato, carate, cascabelillo, cuachepil, guachipeli, guachipelin, guiloche, huachipilin, huiloche, macano, macano amarillo, naguapate, negrito, palo amarillo, palo santo, retama, retama de cerro, sikró, singrá, stutztzuk, susuk, tsikrá, tsutsuc, urxk, vivaseca, wild ruda, xbalalché, xsusuc (Record and Hess 1949)

*Diphysa americana* is an American species extending from Mexico to Panama.

*Diphysa americana* is a slow-growing deciduous tree that reaches 6 to 20 m in height and 30 to 50 cm d.b.h. The crown is spreading, open, and irregular. The bole is rarely straight, basally channeled, and branched; young twigs are grayish green, with numerous elevated, verrucose, longitudinal lenticels. The bark is brown or grayish brown, fissured, and rough; the inner bark is thin, whitish or yellowish, and exudes nonsticky mucilage (Holdridge and Poveda 1975, Salas 1993). Leaves are compound, alternate, imparipinnate, with 11 to 21 membranaceous, peciolate, oblong or oval, and glabrous leaflets; they are entire and eglandular, shiny adaxially and dull, almost grayish green abaxially, and bear small stipules (Allen and Allen 1981, Holdridge and Poveda 1975). The species grows well in well-drained fertile soils as well as in periodically inundated areas with clayey soils. The species is common on flatlands or moderate slopes in tropical dry forests at elevations of 5 to 800 m (Salas 1993). The annual rainfall is under 2500 mm, and the temperature ranges from 24 to 32 °C.

The heartwood has a waxy or oily aspect; it is greenish yellow and turns olive or yellowish brown with drying; the sapwood is yellowish. The dry wood is odorless and tasteless. It is very hard, heavy (basic specific gravity 0.62 to 0.72), tough, and strong, with medium texture, low to medium luster, and irregular grain (Record and Hess 1949). Working properties are moderately good; wood finishing is smooth, and polishing is good. The wood keeps its form and has an excellent natural

durability (Record and Hess 1949). Wood properties resemble those of black locust (*Robinia pseudoacacia* L.) and can be used for the same purposes: general carpentry, general construction, floors, furniture, fenceposts, poles, railroad ties, stakes, insulator pins, machine parts, wooden ware, boxes, crates, planing-mill products, treenails, and mine equipment (Allen and Allen 1981, Record and Hess 1949). In Costa Rica, the wood has been used widely to make wood sculptures. In several countries, the timber is used as fuel (Mabberley 1997). The tree is commonly used as an ornamental in parks and along sidewalks. The wood yields a yellow dye (Allen and Allen 1981, Holdridge and Poveda 1975).

Flowering primarily occurs in the dry season, from November through February. In some years, a minor flowering can be observed during the rainy season. Flowers are showy and congested in small, lax, axillary racemes. The calyx is green, campanulate, pentalobed, subtended by two caduceous bracteoles, and turbinate at the base (Allen and Allen 1981). Calyx lobes are unequal: the upper pair is broad and the lower three narrow, the central being longer. The corolla is typically papilionaceous. Petals are deep yellow and unequal; the standard is orbicular, reflexed, and clawed; the wings are oblong and curved, and the keel petals are lunate (Allen and Allen 1981). The androecium has 10 diadelphous stamens. The gynoecium is monocarpellar and stipitate; the ovary is oblong and flattened, with many ovules. The style is curved and glabrous, and the stigma is small (Allen and Allen 1981). Fruits are produced from December through May. Fruit dispersal is anemochorous. Fruits are stalked, flattened, weightless, pale brown,

indehiscent pods. The epicarp is papery and expands laterally, forming air chambers (bladders) between successive seeds.

Fruits are collected from the tree in March and April, and seeds must be extracted by hand. Seeds are reniform, light brown or whitish. Seeds average 1,600 to 1,650 per kilogram (Brenes 1994). They are orthodox and can be stored 6 months under ambient temperature in a dry, aerated location. Seeds should be screened and small, malformed, or damaged seeds must be discarded.

Seeds do not require pretreatment. Root protrusion occurs 8 to 10 days after sowing, and the percentage of germination is 80 to 86 percent. Germination is epigeal and seedlings are phanerocotylar.

Seeds can be sown in greenhouse beds or directly in plastic bags filled with soil and sand. In experimental plots or mixed plantations, 6-month-old seedlings are sown at a planting distance of 3 by 3 m. Survival is excellent but growth is

slow (Brenes 1994). Branching must be corrected and pruning is recommended in 2- or 3-year-old saplings.

#### ADDITIONAL INFORMATION

The name *Diphysa* (two bladders) refers to the pair of inflated chambers characterizing the sides of the pod epicarp. The name derives from the Greek di (two) and physa (bladder) (Allen and Allen 1981).

Pericarp expansion occurs in both sides, between the ventral and dorsal sutures. In the mature pod, sutures are found along the center of the flat faces; internally, a central column to which the seed funiculus is attached unites the sutures. The chambers form in the mesocarp aerenchyma. Successive seeds are separated by small septa, which interrupt the lateral air chambers (bladders).

