

Erythrina edulis

poroto, chachafruto

Triana ex M. Micheli

Fabaceae - Papilionoideae

LOCAL NAMES

Spanish (sachaporoto,sacha purutu,pashuro,pajuro,guat,chachafruto,basul/balú,basul sachaporoto,basul,balú); Trade name (poroto,chachafruto)

BOTANIC DESCRIPTION

Erythrina edulis is a leafy tree growing up to 14 m tall with stem diameter up to 37 cm and crown diameter up to 7 m. The stem and branches are covered with stout prickles.

Leaves alternate, trifoliate with long petioles and two nectar-producing glands at the base of each leaflet.

Flower cluster (raceme), supported on a stout stalk, consists of 180-200 short-stalked flowers arranged in threes around the axis. The flowers have a reddish-green calyx and a crimson corolla with an upper petal (standard) and two lateral petals forming the keel. The pistil is surrounded by 10 stamens. The two-petaled flowers face upward, forming a large cup in which nectar gathers.

Fruits hang in bunches of 9 and 18 cylindrical pods. Pod size varies widely, but averages 32 cm long and 3 cm in diameter with six seeds. The seed coat is generally brownish-red but is sometimes yellow or black.

Erythrina comes from the Greek word 'eruthros'-red, alluding to the showy red flowers of the *Erythrina* species.

BIOLOGY

E. edulis is cross pollinated by sucking insects, bees, wasps and birds. Seeds mature in about 3 months after flowering.



Illustration of pod and seed (Krukoff)

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ECOLOGY

E. edulis is a pioneer species that grows best in full sunlight, but trees can tolerate some shade in the early stages of growth. In Colombia, the species occurs from elevations of 1 200-2 600 m, with an optimum range from 1 600-2 200 m. In Peru, *E. edulis* grows from 900-3 200 m. In the species's native range, annual rainfall varies from 450-1 800 mm and temperatures are between 5-25 deg C. The trees grow well in loose-textured sandy loams and in heavy clay soils but not in strongly acidic soils (pH below 4.5). *E. edulis* does not tolerate long periods of drought, especially during early stages of establishment and does not tolerate frequent frosts.

BIOPHYSICAL LIMITS

Altitude: 900-3 200 m

Mean annual temperature: 5-25 deg C

Mean annual rainfall: 450-1 800 mm

Soil type: The trees grow well in loose-textured sandy loams and in heavy clay soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: Argentina, Bolivia, Colombia, Ecuador, Peru, Venezuela

Exotic:



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

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PRODUCTS

Food: The seed is a component of many diets and contains 23% protein, 1% fat, 8% crude fiber and 84% moisture. Seeds have a good balance of amino acids and a digestibility of about 50% after cooking. Seeds must be boiled for at least 45 minutes or fried thoroughly before being eaten. As a paste, they provide a nutritious base for tortillas, desserts, pies, soups and food for infants. They are also boiled, sun dried, ground and added to flour. Research indicates that uncooked *E. edulis* seeds can be toxic if consumed over a long period.

Fodder: The leaves and tender branches can be fed to cattle, goats, horses, pigs, guinea pigs and rabbits. Leaves contain 24% protein, 29% crude fiber (dry weight) and 21% total carbohydrates. They are rich in potassium but low in calcium. Seeds and pods can be fed fresh to cattle and goats, but should be cooked before feeding to pigs, chickens, rabbits or fish. The pods contain 21% protein, 23% crude fiber (dry weight), 24% carbohydrates and 91% moisture. Cooked seed can replace up to 60% of the concentrate fed to chickens and fish.

Fuel: The tree is used as firewood.

Timber: The wood is used for construction.

Medicine: In Colombia, a soap made from the bark, branches and leaves of *E. edulis* is used to wash dogs with skin disease. In Peru, the seed is mixed in a liquid concoction to treat inflammation of the bladder. The flowers are used to treat eye irritations.

SERVICES

Shade or shelter: The trees also provide shade in coffee and cacao plantations.

Nitrogen fixing: *E. edulis* forms a nitrogen-fixing symbiosis with *Rhizobium* in the cowpea miscellany. Large nodules form in the upper soil surface and decrease in size with increasing soil depth.

Soil improver: The fallen leaves provide leaf litter.

Boundary or barrier or support: Live fence posts are established from stakes as support for vine crops.

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TREE MANAGEMENT

E. edulis has a normal life span of 30-40 years, its seedlings grow rapidly (2.5 m in the 1st year) and begin producing fruit in approximately 24-27 months. Cuttings begin producing fruit about 18 months after planting.

For maximum fodder production, the trees can be planted in protein banks at a close spacing (1 x 0.5 m). They are first pruned at 10 months and then at 6- or 4-month intervals. A 2-year-old protein bank can produce up to 80 tons of leaves and tender branches per ha, or the leaves can be dried and ground to produce 6 tons of chicken feed rich in carotene.

In Colombia, live fence posts are established from stakes at 2 m intervals and allowed to grow for 30 months before pruning or attaching barbed wire. Pruned at four-month intervals, leafy branches from 1 km of fencing can provide up to 30 tons of fodder per year; unpruned, the same fence posts can provide up to 85 tons of fruit.

GERMPLASM MANAGEMENT

Seed should be removed from pods immediately and stored in paper bags in a cool, dark place. Seeds lose viability quickly and should be planted within 8 days of harvesting. Viability can be extended up to 20 days by dipping seeds in molten paraffin so that a thin layer of paraffin coats the entire seed. Seed size varies widely and there are 60-146 fresh seeds/kg.

PESTS AND DISEASES

Stem borers damage terminal shoots and cause lateral branching. Butterfly larvae (*Terastia meticolosalis*) bore into seeds. Trees are also susceptible to nematodes (*Helicotylenchus* sp., *Hoplolytus* sp. and *Meloidogyne* sp.).

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FURTHER READING

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SUGGESTED CITATION

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