

Erythrina poeppigiana (Walp.) O.F. Cook

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FABACEAE (BEAN FAMILY)

Erythrina micropteryx

Amasisa, elequeme, gallito, helequeme, poró extranjero, poró gigante, (Geilfus 1994, Gentry 1993, Holdridge 1970, Holdridge and Poveda 1975, León 1987, Salas 1993)

Erythrina poeppigiana, a tree native to the Tropics of America (from Panama to Bolivia), Africa, and Asia, has been planted in many parts of Central America and the Caribbean (Geilfus 1994, Holdridge 1970, Holdridge and Poveda 1975, León 1987).

Erythrina poeppigiana is a fast-growing tree, reaching 30 to 35 m in height and more than 1 m d.b.h. The gray bark has conical thorns, primarily on the branches and young twigs. The leaves are made up of three wide folioles gathered in long petioles, with two prominent glands among the leaflets; the petiole of the terminal leaf is widened near the lamina. The species grows well in tropical and subtropical zones, in wet and dry forests (Gentry 1993). *Erythrina poeppigiana* is not demanding of soils, growing very well in heavy soils poor in nutrients and adapting to acid soils. It grows in wet and dry areas with a range of precipitation of 800 to 1880 mm, temperatures from 22 to 24° C and elevations from 300 to 1150 m in Nicaragua (Salas 1993).

Erythrina poeppigiana is a species with multiple uses. It is widely used as a shade tree for perennial plantings. It produces a great amount of foliage and when pruned at 4 or 5 m, provides excellent shade for coffee and cacao plantings. Generally, the species is very important in the development of agroforestry systems. The trees grow very quickly, producing a great amount of biomass. Because the roots develop abundant nodulation that allows them to better fix nitrogen, the trees are used in soil conservation and recovery programs (Russo 1984). Used as green manure, they yield abundant foliage (Nygren 1995, Nygren and Ramirez 1995). The species is also used frequently to drain very wet soils (Geilfus 1994). In Costa Rica, up to 20 tons of leaves and stems per ha per year of *Erythrina spp.* have been collected, which is close to 450 kg of nitrogen (approximately 60 sacks of nitrogen, phosphorous, and potas-

sium at 15 percent). The yields of perennial plantings and pastures may be notably improved in association with *Erythrina* species. The species is also used as posts in hedges, wind breaking curtains, props for vegetables, and forage (Geilfus 1994, León 1987). Because the wood is light and lacks durability, its use is limited to general carpentry and the manufacturing of tools, chairs, toys, decorative objects, and kitchen utensils. The bark, seeds, and roots have medicinal properties because they contain some alkaloids. They are also used in insecticides. The roots and parts of the tree are macerated and used to stun fish so they can be caught easily. The trees are planted as ornamentals and the seeds are used in necklaces and ornaments. The flowers are used in apiculture and as a condiment (Gentry 1993, Salas 1993).

Flowers cover the crown during the dry season in February and March, before the tree leafs out. The red or orange flowers are in erect racemes and the upper petal is wide and open. The fruits are pods 10 to 25 cm long, generally twisted, with orange-gray to coffee-colored seeds (Geilfus 1994, Gentry 1993, Holdridge 1970, Holdridge and Poveda 1975, León 1987, Salas 1993).

Erythrina poeppigiana is commonly propagated through the stem cuttings from pruning management in agroforestry systems. The stem cuttings must come from branches no less than 2 years old, in trees 5 to 8 years old. Fortunately, the trees can withstand periodic pruning, sprout quickly, and develop vigorous shoots. Stem cuttings 0.5 to 2 m long are used, and branches that grow vertically or the apex of the main stem are preferred. When propagated through seeds, which may be stored for a long time, the species germinates easily without pretreatment; the seeds may be planted directly in the field (Geilfus 1994, Russo 1984). Seeds number 200 to 7000 per kg.

ADDITIONAL INFORMATION

The genus *Erythrina* has been located in the subtribe *Erythrinae* of the Phaseolaceae tribe (Fabaceae - Faboideae), along with eight other genera: *Strongylodon*, *Mucuna*, *Butea*, *Sphatolobus*, *Apios*, *Cochliantus*, *Rhodopis*, and *Neorudolphia* (Lackey 1981).

Its value as a nitrogen-fixing plant, its rapid growth, its ability to sprout, and its adaptability to relatively acid soils make this a useful alternative in wet tropical areas. Esnaola and Ríos (1994) obtained weight increases of 326 to 820 g per animal per day as they increased the amount of *E. poeppigiana* in the diet of goats raised in stables. They conclude that *E. poeppigiana* leaves are a valuable resource in the nourishment of nursing goats. The studies showed good increases in the weight of milk goats, young goats, and growing kids without the animals showing any signs of toxicity. Rodríguez and others (1984) recommend comparative tests at different locations to establish possible consumption tendencies. *Erythrina poeppigiana* foliage has a raw protein content of more than 100 percent compared to the grasses commonly used in Central America (Benavides 1994, Benavides and Alarcon 1990). Excellent results are obtained when the foliage is combined with high energy foods, such as bananas, because it increases animal weight faster when it is combined with sources of starch rather than simple sugars.

When *E. poeppigiana* is well nodulated with *Bradyrhizobium spp.* it is one of the most efficient nitrogen fixers of all species used in agroforestry (Nygren 1995, Nygren and

Ramírez 1995). Its nodules are restored by pruning and apparently, branch pruning influences the economy of nitrogen in the whole system. A large reserve of carbohydrates encourages vigorous sprouting after pruning. If the interval between each pruning is too short to restore this reserve the trees lose vigor.

The dependency of *E. poeppigiana* on mineral nitrogen from the soil during the weeks after pruning indicates that competition for nitrogen is a potential disadvantage of the species. Nygren (1995) found that *E. poeppigiana* and the coffee bean (*Phaseolus vulgaris* L.) compete for nitrogen at the beginning of the cultivation cycle. However, the yield of the bean has been excellent during 10 years of testing. The initial competition may favor the nodulation of the bean, resulting in a good supply of nitrogen in the pod-filling stage, when there is more demand for it. The apparent intolerance of the species to frequent pruning justifies the tradition of pruning only twice per year in coffee plantations.

A smaller biomass of underbrush has been reported growing under the shade of *E. poeppigiana* in contrast to other species, such as the *Gliricidia sepium* (Jacq.) Kunth ex Walp. This smaller biomass can be attributed to a decomposition rate of *E. poeppigiana* leaves that is lower than that of the *Gliricidia*.

Using *E. poeppigiana* to shade coffee and cacao plants is questionable for three reasons. First, the trees lose their leaves during the dry season; second, the tree's system of superficial roots does not withstand strong winds; and third, the branches are brittle (Geilfus 1994, Salas 1993). If used to shade plantations, pruned trees should be spaced at 6 by 6 m; if they are allowed to grow unpruned, the spacing should be 12 by 12 m.

