



Gaogao

Erythrina variegata var. *orientalis*

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CHamoru Common Names: Gaogao, Gabgab
English Common Names: Coral Tree, Tiger's Claw
Family: Fabaceae

Introduction

Gaogao, also locally known as *gabgab*, is a medium-tall deciduous tree that can grow up to 50 feet or more in height. (Note: *Gabgab* is also the local name for another local plant, *Tacca leontopetaloides*, which is sometimes differentiated as “*gagap asiento*,” the latter word meaning “starch” in reference to the plant’s tubers.) This tree is native to many tropical and subtropical regions, including the Mariana Islands, and is valued for its medicinal uses and attractive scarlet red flowers (Figure 1). In the Mariana Islands, leaves and bark are used for several traditional medicines. *Gaogao*’s light, soft wood has also been used to create a living fence and for making water troughs for domestic animals.



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Figure 1.
A Marianas fruitbat (*fanihi*) in Guam feeding on gaogao flower nectar.



Figure 2.
An *Erythrina variegata* growing in India. Source: Wikipedia

General Description

Leaves	Shape: Cupssate Arrangement: Alternate Type: Pinnately Trifoliolate
Flower	Color: Scarlet red Arrangement: Raceme Flowering period: Typically when this deciduous tree drops its leaves.
Fruit	Type: Bean pod Size: Up to 5 inches in length Color: Matures from green to brown (Figure 5) No. seeds: Up to 10 per pod (Figure 7)

Historically, gaogao was never considered abundant in Guam but could be found growing naturally throughout the island along the coast and inland forests. It could also be seen growing in agroforest systems and urban landscapes. Today, gaogao is becoming increasingly rare throughout Guam.

Trunk and branch characteristics

The tree trunks and branch stems contain blackish prickles, or small, sharp thorns (Figure 3). The prickles



Figure 3.
Blackish prickles on a gaogao branch stem.

tend to fall off as trunks and branches become older and larger in girth. Gaogao in Guam typically grows a spreading canopy, but some cultivars grow more erect.

Pests and threats

Gaogao is one of two native plants that is host to the invasive fruit-piercing moth (*Eudocima phalonia*), the other host plant being *Tinospora homosepala*, a plant endemic only to Guam that is listed as endangered. Fruit-piercing moths typically lay their eggs on the leaves, and upon hatching, the caterpillars feed on the leaves. Adult moths feed on many types of popular local fruits when they are ripe, such as papaya, star fruit, and mango, resulting in poor fruit quality and early fruit drop;

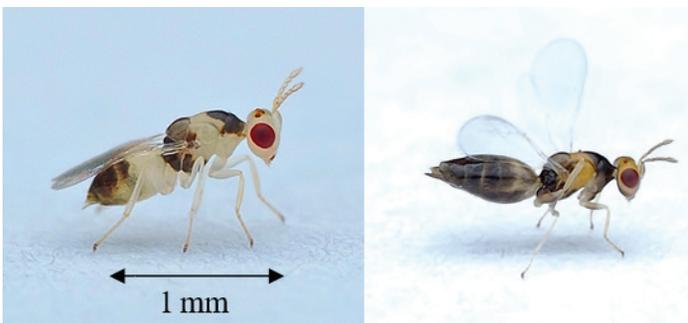


Figure 4.
Adult male (left) and female (right) *Erythrina* gall wasps in Guam.
Photo credit: Alfred Daniel Johnson

however, larval foraging of leaves does not kill well-established plants.

The rapid decrease of Guam's gaogao population is likely due to the more recent introduction of the invasive *Erythrina* gall wasp (*Quadrastichus erythrinae*) (Figure 4). Adult *Erythrina* gall wasps insert their eggs into young leaves and stems. The larvae of the wasps develop in plant tissue resulting in galls on leaves, petioles, and



Figure 5.
Galls formed by *Erythrina* gall wasp larvae on gaogao leaves and stems. Source: Australian Centre for International Agricultural Research



Figure 6.
Galls formed on a gaogao tree by *Erythrina* gall wasp resulting in die-back. Source: Australian Centre for International Agricultural Research

stems (Figure 5). Gall formations result in poor plant growth and development (Figure 6). A heavy infestation can kill plants at all growth stages.

Propagation

Seed: Seeds should be harvested from healthy plants. They can take up to 6 months to germinate without any seed treatment. Germination can occur within two weeks when seeds are scarified or soaked in water for 1-2 days. (See case study described below.)

Seed sowing depth: No deeper than 1 inch.

Stem cuttings: Stem cuttings from almost all growth stages have the ability to produce roots. It can take up to two months for roots to emerge. Semi-hardwood stems are recommended for cuttings. For 1-gallon pots, choose stems that are ½- to 1-inch in diameter. Cut stems at 8- to 10-inch lengths and stick them individually into 1-gallon pots filled with potting mix media. Ensure media is kept moist, but not saturated. Fertilize occasionally as soon as roots are produced.

Seedlings and cuttings from 1-gallon pots will be ready for transplanting approximately 3-4 months after initial germination from seed and root emergence from stems.

Production conditions

Drought tolerance: Medium-high once transplants are well-established

Salt tolerance: High

Wind tolerance: Medium

Soil type: Limestone, coralline, and volcanic soils

Light: Moderate shade to full sunlight

Growth rate: 3 or more feet per year

Fertilizer: For outplants, apply small amounts of complete fertilizer once every 3-4 months for one year. Plants reared under plant nursery conditions are recommended to be hardened for 1-2 weeks before transplanting into identified out-planting sites.

Pruning: Prune dead branches. Prune as necessary for structure and crown thinning. Structural pruning can be conducted plant every 4 to 6 months. Do not remove more than 25% of living branches during a pruning session.

Pollinators: Birds, insects, fruit bat

Plant uses

Agroforestry: Medicinal (leaves, bark), windbreaks, living fence, livestock fodder, landscape/ornamental

Wildlife: Food source

Case study: Efficacy of different seed treatments

A case study was conducted by the UOG Center of Island Sustainability (CIS) in collaboration with the



Figure 7.
Mature gaogao fruits (pods). Source: "Coral tree (*Erythrina variegata*) leaves and pods, Midway Atoll, USA," Feedipedia



Figure 8.
Mature gaogao seeds. Photo by Jacob Concepcion

UOG Land Grant Extension Service at the CIS plant nursery in Dean's Circle on the University of Guam campus. The study consisted of a seed germination test with the objective of evaluating the efficacy of seed treatments of mature *Erythrina variegata var orientalis* (gaogao) seeds. Seeds were collected on March 25, 2025, from a single adult tree just north of the Ricardo J. Bordallo Governor's Complex in Hagåtña.

Thirty healthy seeds were selected for this case study. Three methods of seed treatment were used on batches of 10 seeds in this experiment:

1. Treatment 1: No treatment
2. Treatment 2: Soaked in regular tap water for 48 hours
3. Treatment 3: Scarified with sandpaper to break seed coat and expose cotyledon



Figure 9. Gaogao seed germination after receiving three different seed treatments: no treatment, soaked in water, and scarification. Photos by Jacob Concepcion

After seed treatments were completed, all seeds were sown in seedling flats filled with potting mix on March 29, 2025 (Figure 9). The effects of seed treatments on rate and speed of germination were observed from March 29, 2025, to April 12, 2025. The results of this germination rate and speed experiment are shown in Table 1.

Results and discussion

Throughout the duration of the observation period (March 29, 2025 – April 12, 2025), seeds that received no treatment (Treatment 1) never germinated nor did any of the seeds of this treatment show signs of any germination stages, like bloating. Three out of 10 seeds that received water-soaking (Treatment 2) germinated during the observation period. Germination occurred between 6-10 days after sowing. Some seeds that did not germinate showed swelling (bloating) while some rotted. Rotting may have resulted from over-soaking the seeds. Seeds that were scarified (Treatment 3) all germinated within 6-10 days after sowing and were transplanted into individual pots not long after (Figure 10).

For this study, scarification was clearly the most successful germination method for gaogao seeds. Water-soaking showed potential with three seeds germinating at the same speed of the scarified seeds. More trials of water-soaking times should be tried to identify what is best for germination rates, as water-soaking is much less tedious than scarifying seeds. Nevertheless, this study has proven that manipulation of the seed

Table 1. Germination speed and rate of *Erythrina variegata var. orientalis*. Seeds received no treatment (Treatment 1) or were soaked in water (Treatment 2), or scarified (Treatment 3).

Treatment	Average Germination Speed (Days)	Germination Rate (%)
1	0	0
2	8	30
3	8	100

*All seeds were sown on March 29, 2025, and observed for germination until April 12, 2025.



Figure 10. Gaogao seedlings transplanted from flats into individual pots. Photo by Jacob Concepcion

coat is necessary to produce seedlings in a timely and uniform basis. This is important to increase efficiency of plant nursery management, out-planting projects, and overall knowledge of producing new plants from seeds. Gaogao is an important ecological and cultural plant of Guam. Efforts need to improve to re-establish Guam's population.

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