PLANTS OF GUAM

i tinanom guahan siha

university of guam
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Contents

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Preface

Plants of Guam is an ethnobotanical survey of the plant communities of Guam. The species described are the most interesting and in many cases the most common ones in each of the various communities.

The authors have designed this book as a field guide. It is hoped that the reader will be able to identify the major species of each community.

KEY TO LETTER SYMBOLS

A - Scientific Name
B - Family Name
C - Common Name
D - Chamorro Name
È - Description
F - Distribution
G - Comments

Use of the term "Guamanian" or "Chamorro Guamanian" instead of the broader term "Chamorro", is meant to distinguish specifically between the indigenous people of Guam and those of other islands in the Marianas.

Introduction

Guam is the largest and southern-most island in the Marianas chain. It lies about 13° North latitude and has a wet and dry season of approximately equal lengths. The island is about 30 miles long and ranges from four in the middle to eight miles in width and is oriented in a northeast, southwest direction. The prevailing winds are easterly and bring an average annual rainfall of about 85 inches. A range of hills extends from the waist toward the south on the western side. The highest of these hills, 1300 feet, is Mt. Lamlam which lies toward the south end and commands a view of the entire island. A fringing reef on the western side extends from north to south and to the middle of the island on the east. A number of beautiful bays and sandy beaches occur in this section of the coast line. On the north end, sheer limestone cliffs rise to 600 feet elevation and descend in a series of wave-cut terraces to an algal bench just above sea level. The bench, composed of coral and coralline algae, is flat and contains numerous tidal pools rich in marine algae and invertebrates.

Guam is a volcanic island, originating from the eastern rims of extinct blown-out volcanoes that lie to the south and west of the island. The northern half consists of a raised limestone plateau ranging from 600 feet at the north end to 200 feet near the middle of the island and extending well to the south on the eastern side. The tops of the highest hills are capped with limestone and truncated limestone bluffs rise high above southern and southeastern bays, such as Talofofo. The middle and southwestern hills are eroded volcanic material. The soils of Guam vary somewhat in mineral content, but are basically of two types--volcanic and limestone.

Archaeological evidence has shown that the island's first inhabitants, the Precontact Chamorro, migrated from the direction of islands in Southeast Asia. The red-stained teeth of burial remains display the prevalence of betelnut *Areca cathecu* which originated in India and its use spread throughout Malaysia and eventually into the Pacific region.

The earliest inhabitants fully appreciated the value of plants as a dietary necessity as they brought rice, breadfruit, sugar cane, bananas, coconuts and taro on initial voyages to balance a heavy protein intake of fish. Besides a crucial starch-fish dietary balance, subsistence use of flora involves medicinal plant uses and the art of material culture such as woven mats, housing thatch, fishing line,canoes, plaited sails, wooden tools and fish poisons. Using previous knowledge of plants brought on voyages and recognition of familiar indigenous species, a knowledge of other plant uses was developed as the Chamorro islander familiarized himself with a new island environment. A prime example is the practice of removing deadly cyanic acid (cyanide) from fadang *Cycas circinalis* in order to render starch used as a staple food. This cycad is indigenous to the Mariana Islands and knowledge of its usefulness had to be developed after arrival of the islanders, which points out their effective struggle to gain increasing knowledge of the plant segment of the ecosystem.

The Precontact Chamorro prospered within multiple chiefdoms for several thousand years before the encroachment of the Spanish colonists. Their population,

estimated at 80-100 thousand was soon decimated to about 1,000 individuals as the result of warfare and disease. Being on the trade route between Mexico and the Philippines, the islander intermarried with people of Spanish, Mexican and Filipino heritage and thereby established contact with other island groups. The introduction of new plant species and knowledge of their uses, particularly farm plants, accompanied the varied ethnic influx.

Hence, the present day Chamorro Guamanian still possess traditional plant knowledge, but in addition crosscultural influence has erased some past knowledge and added others. Despite these events and rapid westernization, a complex of traditional cultural activities still exists on the island and plant usage is an integral facet of the present cultural system. The activities that involve the Chamorro Guamanian's adaptive efforts to maintain subsistence and in which knowledge of local flora is essential include:

1. Fishing and food gathering
2. Ranching and gardening
3. Outdoor cooking and fiestas
4. Suruhano curing and taotaomona belief

Drying Aggak (Pandanus tectorius) for weaving

In the belief in the taotaomona spirits, the fear of risking the wrath of the spirits if one willfully destroys a segment of the jungle environment definately has the function of providing a conservation measure for the defense of the delicate island ecosystem. The spirits are thought to mostly reside near the nunu tree *Ficus prolixa* and if offended, may cause illness in an individual. Then, a person may visit a suruhano or suruhana, the male and female traditional curers on the island.

The suruhano folk curers have managed to survive multiple phases of colonial heritage as a result of the continued support of community members. The Guamanian seems to find it an optimum cultural pattern to maintain a choice of going to either the folk curer or the western physician. The suruhano utilizes an integrated system of curing that involves plant medicines, body lotions, message, dietary advice and curing powers.

The outdoor cookhouse on Guam is another example of adaptation on a cultural level. Before the advent of gas and electric stoves, all cooking was done with natural fire. The Precontact Chamorro islanders cooked with clay pottery and firepits, but the arrival of steel cookware and new cooking methods with the Spanish caused a shift to cooking over open fire. The barbecue method of cooking today is done in an outdoor, sheltered cookhouse that is usually equipped with a large grill, food preparation tables and running water. It is a common sight to see Guamanians collecting firewood, mostly talan tayan *Leucaena leucocephala* along roadsides for fuel for the outdoor barbecue.

The Guamanian ranch house spans two extremes in subsistence--traditional horticulture and a dependence on western economic production. During the prewar years on Guam, the islander grew crops and raised chickens around his village homesite. Postwar economic developmental change found land prices skyrocketing, population increasing and a greater number of people moving closer to trade centers for lucrative employment opportunities. The Guamanian, living in a residential area, found it more profitable to sell his land or

fill it with apartments for rent. This increased the crowding of homesites--hardly optimum conditions for subsistence gardening. Thus, many Guamanians purchased or leased a small plot of land in a secluded undeveloped area. Hence, they could continue the traditional raising of vegetables, fruit trees and chickens. Ranches, as they are called by the Guamanians are usually tended on weekends, holidays and after working hours, depending on the distance of the ranch from the owner's house. Thus, the popularity of ranching on the island has resulted in an extensive modification of the environment to necessitate the distinction of a separate plant community--the farm.

The various natural plant communites are fairly well defined and lines of convergence are, in places, quite distinct. For example, where limestone and volcanic soils meet there is little integration of species or in marshy places, near the coast, indicators of fresh water and brackish water are sharply divided. It should not be inferred that no common species exist, but in general it can be said that a particular species belongs to one plant community or another and if found elsewhere it is obviously tolerant of varying conditions and soil types.

References

Information on distribution was taken from the following sources:

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Limestone Forest

The northern plateau and old wave-cut terraces are covered by a thin layer of lateritic soil, in most places not more than a few centimeters thick. The limestone substrate is porous and water precolates down from the surface rapidly so that no streams or rivers exist north of the island's center. Such soil conditions support a surprising diversity of plant species in the few places that have escaped the ravages of man. This "original" forest,according to authorities, is not a climax vegetation, but one step short of climax. The final stage is prevented from ever occuring due to periodic typhoons that sweep over the island. Most of the plateau, having been altered in various ways by man is occupied by what might be called secondary vegetation with patches of locally dominant species.

Such patches may contain pure stands of *Pandanus* or *Artocarpus* (wild breadfruit), others may consist of native *Hibiscus* or the introduced species of *Leucaena*. On the exposed northeastern escarpment nearly pure stands of *Mammea odorata* (chopak) occur. In other places a mixture of species can be found consisting of *Elaeocarpus* (joga), breadfruit and *Ficus* (banyan) as dominant plants with *Neisosperma, Guamia, Premna, Aglaia* and *Cynometra* as understory vegetation. Such stands of native plants can be found in isolated areas that have been preserved by individuals that own the land or by the Government of Guam and probably represents a type of forest that may have covered the whole northern plateau in earlier times. A good example of such a forest is the Government of Guam Conservation Area No. 2 just off Marine Drive between Yigo and the front gate of Andersen Air Force Base.

On military bases and inaccessible areas along the edges of the northern plateau, the before mentioned typhoon controlled forest can be found. In these areas most, if not all, species of plants are native to Guam and probably preceded man to the island.

The limestone forest has become the habitat for the introduced Marianas deer *Cervus mariannus* and the wild pig *Sus scrofa*. These animals have altered the understory vegetation with their feeding habits and

are probably responsible for the near extinction of numerous native species. Their existence has also contributed to man's increasing activity within the limestone forest as hunters frequent the community in search of these animals as well as fruit bats *Pteropus mariannus* and coconut crabs *Birgus latro*. Almost every species of bird found in the limestone forest is considered edible by the Guamanian, so that the number of birds to be found there is minimal. Medicinal plants are collected in all of the plant communities on Guam, but the majority of species are taken from the limestone forest in the northern half of the island. Extensive collection of medicinal plants has caused the rarity of some species. The existence of the giant African snail *Achatina fulica* , introduced during the Japanese occupation, has also confirmed the near extinction of many species of understory vegetation.

The plants described below represent the most common species generally associated with the limestone forest community.

A. *Guamia mariannae*
B. Annonaceae
D. Paipai

E. Paipai is a small, many branched tree with simple, alternate leaves. The leaves are dark green, rather small, rounded at the base and arranged in one plane. The flowers occuring singly on short branchlets in leaf axils, are yellowish green with six petals and three sepals that are broadly triangular and thickish. The fruit consisting of numerous carpels that radiate out from a central disc, are cylindrical and conspicuously ringed between each seed. The fruit is green when young, becoming brown with age.

F. Mariana Islands.

G. Some authorities consider this plant to be endemic to Guam, others believe it to be not different from trees occuring in other islands of the area. The young leaves are pinkish.

A. *Neisosperma oppositifolia*
B. Apocynaceae
D. Fagot

E. This is a medium-sized tree with milky sap and rather small, horizontal, whorled branches. The leaves are elliptic, dark green and slightly concave on the dorsal side as though they were wilted. The midvein is prominent with many indistinct, parallel side veins. The flowers are white, fragrant and inconspicuous, several occurring together at branch tips. The fruits are elliptic-oblong, about 8 cm. in length and occur singly or commonly in twos.

F. Malaysia and the Tropical Pacific.

G. This is one of the commonest trees in the Tropical Pacific. The exterior husk of the fruit decays soon after falling, exposing a network of vascular tissue that is easily recognizable. The fruit contains two flat, edible seeds that taste rather like coconut.

A. *Ochrosia mariannensis*
B. Apocynaceae
D. Langiti

E. This is a small tree with milky sap and smallish, oblong leaves, acute at the tip and whorled in groups of three. The glossy leaves have a conspicuous midrib with many more or less parallel side veins. The tubular, white, rather small flowers occur in axillary cymes. The attractive twinned fruits are red or yellow, keeled along the margins and about 5 cm. long.

F. Mariana Islands.

G. Taxonomists have not differentiated between the plants with yellow fruit and those with red fruit. However, from my observations, the yellow-fruited type has larger leaves and slightly smaller fruit.

A. *Asplenium nidus*
B. Aspleniaceae
C. Bird's Nest Fern
D. Galak Dangkulo, Galak Feda

E. This is a fern with very large straplike fronds and a wide, black midrib. It can be either epiphytic or terrestrial, reaching massive proportions and the debris that accumulates around it may support other species. The spores are arranged in oblique lines toward the outer end of the frond.

F. Paleotropical.

G. The leaf and root of this fern is often used as an ingredient in local medicinal preparations. This species is also used as a decoration for wedding fiestas and the religious rituals known as Novenas. It will transplant easily and grows well in the shade.

A. *Cordia subcordata*
B. Boraginaceae
D. Niyoron

E. *Cordia* is a small to medium-sized tree that is one of the dominant species on the northwestern coast. The leaves are pale green and broadly ovate with a coarse, stiff texture. The flowers are orange and occur, mostly at the ends of branches. The fruits are rounded with a pointed calyx and occur several together on 2.5 cm. stems.

F. Indomalaysia and the Pacific, also in E. Africa and Madagascar.

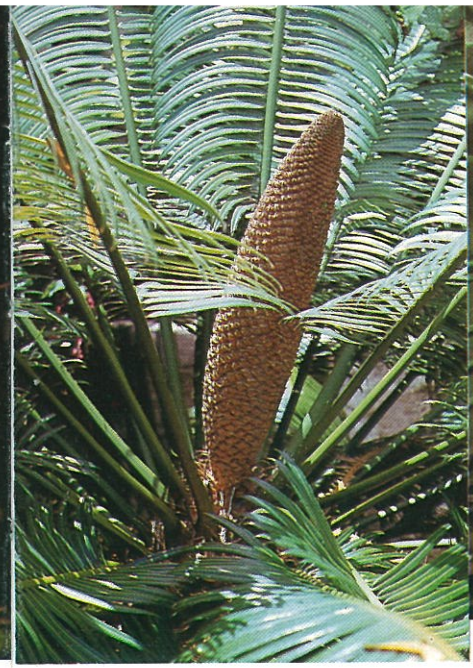
G. The wood is soft, but durable with dark and light bands that make it attractive for carving. It was used by the early Hawaiians for this purpose.

A. *Maytenus thompsonii*
B. Celastraceae
D. Luluhot

E. A shrub or small tree with alternate, smooth, bright green, rounded leaves. The leaf petioles are reddish and about 1.5 cm. long. The flowers are white and grow in clusters from the leaf axils. The fruit is a three-parted, light brown capsule that bursts open to discharge the seeds.

F. Endemic in the Mariana Islands.

G. This is a common shrub of the limestone community of Guam. It seems to grow best in open places. It is an attractive plant, particularly when in bloom and would make a good addition to the gardens of Guam. The leaves are occasionally added to the all-purpose medicinal combinations of some of the local suruhanas.



Left- Male Up-Female

A. *Cycas circinalis*
B. Cycadaceae
C. Federico Nut, Cycad
D. Fadang

E. *Cycas* is a palmlike, usually unbranched tree that reaches a height of 3-5 meters with a thick trunk. The pinnate leaves or fronds are crowded at the crown and arranged in spirals. The large cone that grows out of the crown of the male tree is tan-colored. Modified leaves or megasporophylls grow out in a rosette from the crown of the female tree bearing ovules in their margins.

F. Indigenous in the Mariana Islands.

G. The hard-shelled, glossy, brown seeds of the female plant are extremely poisonous, containing hydrocyanic acid (cyanide), however, when they are split and repeatedly soaked in water, the poison is released. The pulp can then be dried and ground into a flour that probably was a staple food of the ancient Chamorros. It is still occasionally used for making (tatiyas) tortillas. The preparation of fadang should only be attempted under the supervision of a knowledgeable Guamanian.

A. *Davallia solida*
B. Davalliaceae
D. Pugua'Machena

E. This is a common epiphytic fern with finely divided and thickish, creeping rhizomes. The fronds are variable in length and several times pinnate.

F. Indigenous from Malaysia to Fiji and the Marianas.

G. The ornate leaf of this fern is used in floral decorations for fiestas and religious rituals. The leaf and rhizome are a popular ingredient in the combination medicines of local curers.

A. *Macaranga thompsonii*
B. Euphorbiaceae
D. Pengua

E. This is a small tree with large, alternate, dark green, rounded, peltate leaves. The reddish brown branches and trunk are conspicuously marked with leaf scars. The small, greenish, axillary flowers grow from leaf axils near the ends of branches and are unisexual.

F. Endemic in the Mariana Islands.

G. The large, peltate leaves of this small tree make it easy to recognize. The only other tree with a peltate leaf growing in the limestone community is *Hernandia nymphaeifolia* which is a larger tree.

A. *Melanolepis multiglandulosa*
B. Euphorbiaceae
D. Alom

E. This is a small to medium-sized tree with coarsely toothed, palmately veined, three-lobed leaves. The flowers grow in panicles from leaf axils near the tips of branches. The male and female flowers appear on the same tree. The pendant fruits are pea-sized, green at first, becoming brown. They are a favorite food of the white-headed dove. The seeds are brown.

F. Found throughout the Marianas, growing mostly on limestone soil.

G. This is a common plant of the limestone community. The large, sharply lobed and long petioled leaves and clusters of hanging fruits are easily recognizable characters of this plant.

A. *Phyllanthus marianus*
B. Euphorbiaceae
D. Gaogao Uchan

E. This is a small, woody shrub with few narrow branches. The small, dark green leaves are arranged along the branchlets in one plane, like a pinnate leaf. The flowers and fruits are axillary and occur in clusters along the underside of the branchlets.

F. Marianas and Western Caroline Islands

G. The glossy leaves of this low-growing shrub are included in some of the all-purpose combination medicines of the local curers. When it is boiled into a tea, it is reputed to have analgesic qualities that alleviate back pains. Besides being found in the limestone forest, it is also seen on the savannah, where the leaves are a lighter green due to exposure to sunlight. Another common species on the savannah is *P. saffordii*. It is taller than *P. marianus* and has reddish brown branches.

A. *Flagellaria indica*
B. Flagellariaceae
C. False Rattan
D. Beyuko halomtano'

E. *Falgellaria* is a creeping or climbing vine with long, narrow, tendril-tipped leaves. The flowers are creamy white and occur in large terminal panicles. The fruits are pea-sized, green while immature, becoming light brown when they ripen.

F. Paleotropical.

G. This plant is common on the savannah, but perhaps more frequently found in the limestone community.

A. *Mammea odorata*
B. Guttiferae
D. Chopak

E. This is a large tree with a wide, spreading crown and large, leathery leaves. The leaves are obovate and rounded at the apex, dark green above and somewhat lighter colored beneath. The midrib is yellowish with many indistinct, parallel side veins. The flowers are white with numerous stamens and appear along the branches below the leaves. The woody fruit is 5-8 cm. in length, oblong and slightly curved.

F. Malaysia and the Pacific Islands.

G. Chopak is a coastal tree that reaches its largest proportions on the sheltered side of the island. On the windward side, it grows in nearly pure stands of uniform size. The dark red wood is hard and durable. It was used in the past for building and making tool handles and also in the construction of bull carts.

A. *Abrus precatorius*
B. Leguminosae
C. Crab's Eye, Prayerbead, Coral Bean
D. Kulales

E. *Abrus* is a slender, branching, woody, deciduous climber. The leaves, 8-10 cm. long, are pinnately compound with many small leaflets. The flowers, in axillary racemes, are pink or white. The pods up to 5 cm. long, contain 3-6 beadlike, glossy red seeds, each with a black spot.

F. Pantropical species.

G. The attractive seeds are extremely poisonous, causing blindness or death if ingested. The name prayerbead comes from the practice of strining them for a rosary. Caution should be exercised when stringing the seeds. In India, the seeds are used as a measure of weight, as each one weighs almost exactly one grain. The root of this plant is used by some suruhana curers in the preparation of medicine. This and other medicinal plants should only be used under the supervision of trained and experienced practitioners of traditional medicine.

A. *Caesalpinia major*
B. Leguminosae
C. Wait-a-bit
D. Pakao

E. This is a woody climber with pinnately compound leaves and yellow flowers in terminal racemes. The stems and leaves, bearing recurved spines, make a thicket of this species practically impossible to move through. The pods are 2-4 seeded, short, inflated and covered with prickles. The seeds are nearly round, glossy gray and about 1.5 cm. in diameter.

F. Pantropical.

G. Any encounter with this plant will recall the name wait-a-bit in no uncertain terms. It is most often found at the edge of the jungle or in abandoned fields. Another similar species, *C.crista* also grows on Guam. The gray seeds of pakao are comcomly used in a medicinal preparation for the treatment of diarrhea. Three of the seeds are cracked and boiled with three young fruits of lada *Morinda citrifolia* and three plants of maigo lalo *Phyllanthus amarus*. The resultant tea is very bitter and is taken internally.

A. *Canavalia megalantha*
B. Leguminosae
D. Akangkang

E. This is a course, woody vine with alternate, trifoliate leaves and pink to purplish, pealike flowers that grow in racemes from leaf axils. The pods are pale brown, 15-16 cm. long and about 5 cm. wide with sutured ribs. The seeds are flat, elliptic and pale brown.

F. Endemic in the Marianas.

G. Two or three other species of *Canavalia* occur on Guam, but this one is the most common. Most of the species of *Canavalia* are known locally as akangkang and are used in medicinal preparations. It is, many times, difficult to distinguish between the species unless the flower or seed pod is seen because they have similar, green, trifoliate leaves.

A. *Cynometra ramiflora*
B. Leguminosae
D. Gulos

E. *Cynometra* is a small tree of the limestone forest with alternate, compound leaves. The leaves consist of two large and two small asymmetrical leaflets, pale pink when new, turning dark green with maturity. The white flowers occur in axillary racemes. The pod is oval, nearly as thick as it is long, with grooved, rounded ridges.

F. Tropical Indo-Malaysia and the Pacific Islands.

G. This tree is common in the limestone region of Guam where it is a component of the limestone forest understory vegetation. In places, it is one of the dominant species in the jungle.

A. *Intsia bijuga*
B. Leguminosae
C. Ifil
D. Ifit

E. The ifil is a medium to large tree with gray bark and often buttressed base. The compound leaves are dark green with 1-2 pairs of asymmetrical, opposite leaflets on short stems. The flowers grow in terminal clusters, each with a single, pinkish white petal and three stamens. The fruit is a leathery pod, 10-30 cm. long with brown, flattened seeds.

F. Indian Ocean, eastward to Polynesia.

G. The extremely dense and reddish wood is highly termite resistant and was once extensively used for interior woodwork such as flooring, window frames and corner posts. Cutting boards and other accessories were also fashioned from the durable wood as it can be highly polished. If planted in numbers, it could once again become a valuable timber resource, but it is slow growing and vulnerable to periodic typhoons.

A. *Leucaena leucocephala*
B. Leguminosae
D. Talantayan, Tangantangan

E. *Leucaena* is a small tree with finely divided, light green, bipinnate leaves. The leaflets, about 15 pairs, are 1-1.5 cm. long, opposite, asymmetrical and slightly curved. The flowering heads grow in clusters from branch ends. The individual flowers are white, the head turning brown as it matures. The pods are flat, about 15 cm. long, green when immature, turning brown with age. The oval seeds are flat and glossy.

F. Pantropical, native to Tropical America.

G. The native *L. insularum* is very similar to *L. Leucocephala*, but is smaller in all respects. The best way to distinguish between the two species is to count the leaflets. The native species has 15-50 pairs and the individual leaflet is smaller. Talantayan is a popular source of firewood on the island and it is common to see Chamorros gathering it by pickup along the roads. It is also used as feed for cattle and pigs. Being a legume, it is able to fix nitrogen in the soil. A handful of leaves placed under transplants provides a source of fertilizer.

A. *Hibiscus tiliaceus*
B. Malvaceae
C. Hibiscus Tree
D. Pago

E. Pago is a small tree with low spreading branches and smooth gray bark. The long-stemmed leaves are rounded, heart-shaped, with several major veins and covered with downy hair. The axial or terminal flowers are large and conspicuous, bright yellow in the early morning,turning dark reddish purple before dropping off in the evening.

F. Pantropical.

G. Besides being found in the limestone forest, pago is also found along muddy or sandy coasts and in mangrove swamps. It grows on limestone or volcanic soil in thickets.

The fibrous bark of the long, erect water sprouts is stripped from the wood, soaked in water and dried to be woven into cordage. The unprocessed bark is also used by hunters or farmers as an immediate source of cordage for binding game or produce.

The crushed flowers have a local medicinal use. They are applied topically to abscesses of the skin.

A. *Aglaia mariannensis*
B. Meliaceae
D. Mapunao

E. This is a small tree, usually found in the deep jungles as an understory plant, with pinnately compound leaves of 5-7 leaflets. The youngest leaf parts are conspicuously covered with reddish brown hair which is absent on the mature leaves. The pinkish flowers occur in panicles in leaf axils. The fruit is elliptical, one-seeded and orange colored at maturity.

F. Endemic in the Mariana Islands.

G. The large compound leaves, reddish young leaf parts and clusters of orange colored fruits are reliable distinguishing characteristics.

A. *Artocarpus mariannensis*
B. Moraceae
C. Breadfruit
D. Dugdug, Dukduk

E. The wild breadfruit is a medium to large, many branched tree with variously lobed leaves--smaller and not as deeply lobed as in *A. altilis*. The leaves are shiny on the upper surface, the lower surface covered with brownish hairs. The fruit is cylindrical with many large seeds that look like small chestnuts.

F. Pacific Islands.

G. The large trunk of this tree was used to make the canoes of the Precontact Chamorro islanders. The fruit was a staple food. The seed is edible, tasting much like a chestnut when roasted. Some evidence of hybridization with *A. altilis* has been noted.

A. *Ficus prolixa*
B. Moraceae
C. Banyan, Strangling Fig
D. Nunu

E. This is a medium to large tree with numerous prop roots. The ovate leaves are small and smooth, light green in color with rather prominent midvein. This is the well-known strangling fig that reaches very large proportions throughout Polynesia. The fruits are small, globose or slightly depressed and occur in leaf axils. Galls, similar in shape to the fruit appear along the prop roots.

E. Pacific Islands.

G. This plant often begins life as an epiphyte in the crotch of a host tree. From there, a tangle of branches and prop roots surround the host and kills it.

The taotaomona spirits of the ancient people are thought to reside around the tree. For this reason, the trees are rarely removed from property. Local curers sometimes use the sticky sap in medicinal preparations designed to stop the bleeding of external or internal injuries.

A. *Eugenia reinwardtiana*
B. Myrtacae
D. A'abang

E. This is a small understory tree of the limestone community. The leaves, 6-8 cm. long, are light green, elliptic and pointed at both ends. The flowers are white and grow (usually) singly in the leaf axils. The fruit is yellow, globose and capped with a persistent calyx.

F. Native of Malaysia and some Pacific Islands.

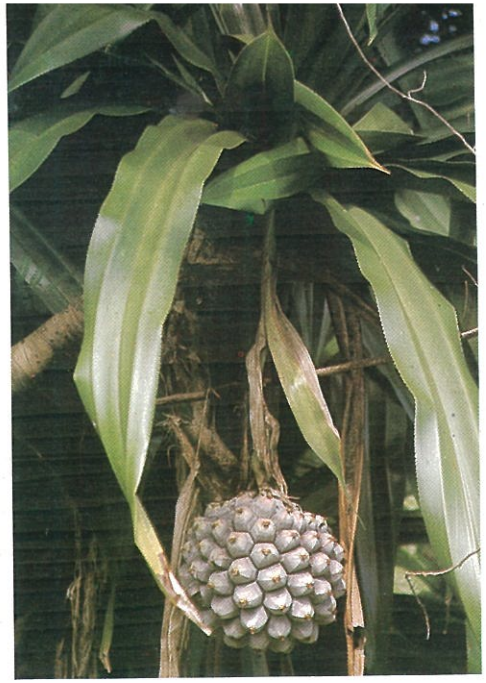
G. This is a common tree of the northern half of the island. The fruit is edible when mature, but not very flavorful. A good identification feature is the light brown trunk with thin outer bark that constantly sloughs off in irregular shaped pieces. The wood is hard and makes excellent firewood. The wood is also used to make coconut husking stakes and was once used to make rice-pounding pestles.

A. *Pisonia grandis*
B. Nyctaginaceae
D. Umumu

E. *Pisonia* is a large, stocky tree with a gray trunk and very soft wood. The leaves are pale green and smooth with conspicuous veins and are crowded at the ends of branches. The flowers occur in cymes in the leaf axils and the sexes are separate. The fruit is 1-1.5 cm. long, ridged and very sticky.

F. Pacific Islands to Australia.

G. This is usually the largest tree to be found in the limestone forest.



A. *Pandanus dubius*
B. Pandanaceae
C. Pandanus, Screw Pine
D. Pahong

E. This is a small tree with prop roots and thick, forking stems. The leaves are broad and 2.5 or more meters long, coming to an abrupt point. The flowers are enclosed in white or yellowish, conspicuous bracts--the male and female on separate trees. The fruiting head grows from a thick stem, is large and has many seeds. The young fruits are pale green, growing darker with a bluish or purple color as it approaches maturity.

F. Southeast Asia to the Pacific Islands.

G. On Guam, this species of pandanus grows on limestone soil and may be found in the south on limestone outcroppings.

The waxy leaves are dried and woven into water-resistant mats. The seeds are edible and may be eaten raw. The entire fruit cluster is often used for fiesta decoration.

A. *Pandanus fragrans*
B. Pandanaceae
C. Pandanus, Screw Pine
D. Kafo, Fatsao

E. This is a small to medium-sized tree with prop roots and usually forked trunks. The leaves, clustered at the top and ends of branches,are long and narrow, coming gradually to a sharp point at the tip. The midrib and margins are armed with short, curved teeth. The flowers are enclosed in conspicuous white bracts. The rounded, fruiting heads, borne on thick stalks, may be 30 cm. or more in diameter and contain many seeds.

F. Endemic in the Mariana Islands.

G. This pandanus is abundant in Guam, particularly on limestone, but may also be found on volcanic soils in the grasslands. The seeds are edible, but rarely eaten. The seeds of a cultivated variation from the Caroline Islands, locally called fatsao are preferred for eating because of their larger size.

A. *Peperomia mariannensis*
B. Piperaceae
C. Peperomia
D. Potpupot

E. This is a small, fleshy herb growing from pockets of soil in dissected limestone boulders. The leaves are glossy green with three veins from the base. The fruiting spikes are longer than the leaves.

F. Endemic in the Mariana Islands.

G. The succulent leaves may be chewed by hunters for their moisture. The local suruhanos also add the leaves and stems to combination medicines. Its primary function, probably, is that it adds moisture to the curative mixture.

A. *Piper guahamense*
B. Piperaceae
C. Wild Piper
D. Pupulun Aniti

E. This is a common shrub of the limestone community. The broad, long-petioled, palmately-veined leaves grow from enlarged nodes along the green stems. The flowering spikes occur in leaf axils. The fruits are bright red and fragile when mature.

F. Indigenous to Guam.

G. The red flowering spikes and large, glossy leaves easily identify this species. The leaves and stems are often added to the all-purpose medicinal combinations of some of the local curers as an aromatic and curative ingredient.

A. *Microsorum punctatum*
B. Polypodiaceae
C. Strapleaf Fern
D. Galak Dikike', Galak Dalalai

E. This fern may be terrestrial or epiphytic and has large straplike leaves with flat or wavy margins. The fertile fronds have small dot-like sori.

F. Paleotropical.

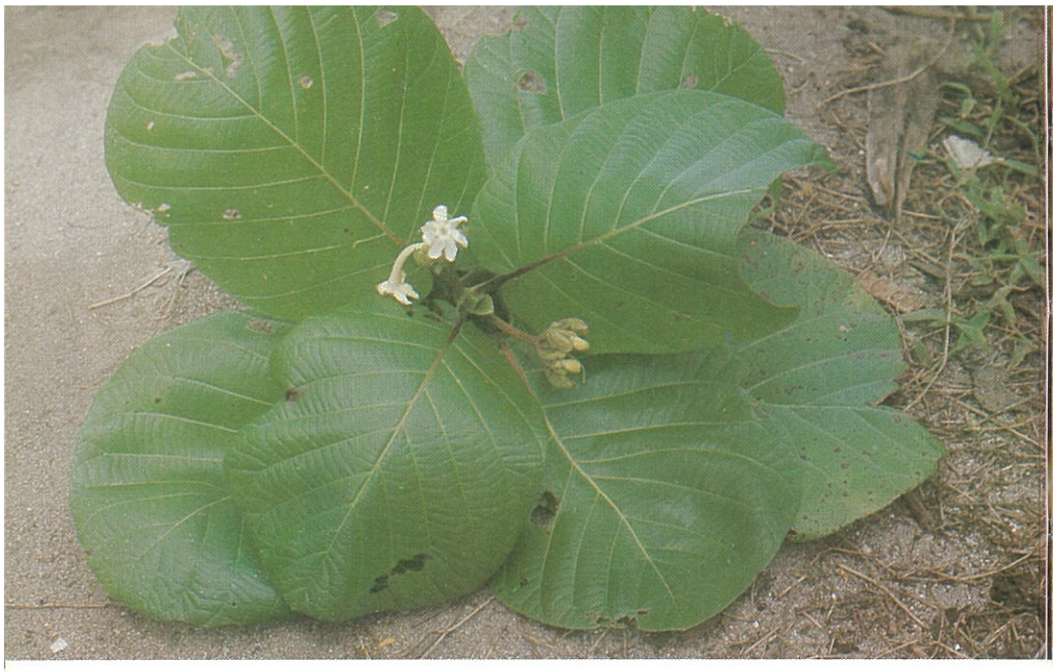
G. The leaf and rhizomes of this fern are commonly used as an ingredient in the all-purpose medicinal combinations of local curers. The leaves are also used as decorations for the religious rituals known as Novenas

A. *Phymatodes scolopendria*
B. Polypodiaceae
D. Kahlao

E. This is a terrestrial or epiphytic fern with pinnately lobed leaves that are variable in shape. Fertile fronds have scattered, light brown, rather large sori. This is one of the most common ferns on the island.

F. Paleotropical.

G. The leaf and rhizomes of this fern are used in the all-purpose combination medicines of some of the island's curers.



A. *Guettarda speciosa*
B. Rubiaceae
D. Panao

E. This is a small tree with dark green leaves, 20-25 cm. long, usually blunt, but sometimes acute at the end. The leaf narrows at the base and broadens toward the tip. The midrib and 7-10 pairs of lateral nerves are prominent. The small, yellowish white, tubular flowers are 2.5-5 cm. long and grow from the leaf axils. The fruit is rounded, faintly ribbed and about 1.5 cm. in diameter.

F. Tropical Asia to the Pacific Islands.

G. The flowers are pollinated at night by moths. This species is widespread over the entire north end of the island.

A. *Morinda citrifolia*
B. Rubiaceae
C. Indian Mulberry
D. Lada

E. *Morinda* is a shrub with large, opposite, dark green, glossy, elliptic leaves. The flowers are white--growing from a head in the axils of the leaves. The fruit is fleshy, many-seeded, 4-7 cm. long and looks somewhat like a small pineapple.

F. Tropical Asia and the Pacific.

G. The fruit is edible, but has an unpleasant taste and smell. It should be eaten only in dire emergency. The immature fruits have an analgesic quality and are boiled in many home remedies to cure a variety of ailments.

A. *Psychotria mariana*
B. Rubiaceae
D. Aplokating

E. *Psychotria* is a small tree with dark green, obovate, opposite leaves. There are broad stipules at the leaf bases, enlarged nodes and conspicuous scars along the branches. Small, white, trumpet-shaped flowers occur in groups of three and grow in cymes from branch tips. The fruits are pea-sized, red and rounded-ellipsoid. The calyx remains attached to the fruit.

F. Endemic in the Mariana Islands.

G. This small tree or shrub is a common species of the limestone community. It grows more treelike in the forest as an understory plant, but is most often found in transition zones as a large, thickish shrub. The white flowers and red clusters of fruit are conspicuous.

A. *Randia cochinchinensis*
B. Rubiaceae
D. Sumak

E. *Randia* is a small tree with smooth, glossy dark green, wavy-edged leaves that have a leathery texture. The flowers are axillary with many together in cymes. The petals are white, long and narrow. The fruit is pea-sized and purple to black when ripe.

F. Tropical Asia and the Pacific Islands.

G. This plant is common in the limestone community and occurs frequently on the western coast. The leaf and stem are used in a medicinal combination made by the local curers.

A. *Triphasia trifolia*
B. Rutaceae
C. Limeberry
D. Lemondichina, Lemonchina

E. This dark green, low plant grows as a shrub having trifoliate leaves with paired spines in the axils. The flowers are white and fragrant. The fruits are bright red with 1-3 seeds.

F. Native to Southeast Asia and Malaysia, Naturalized in Guam.

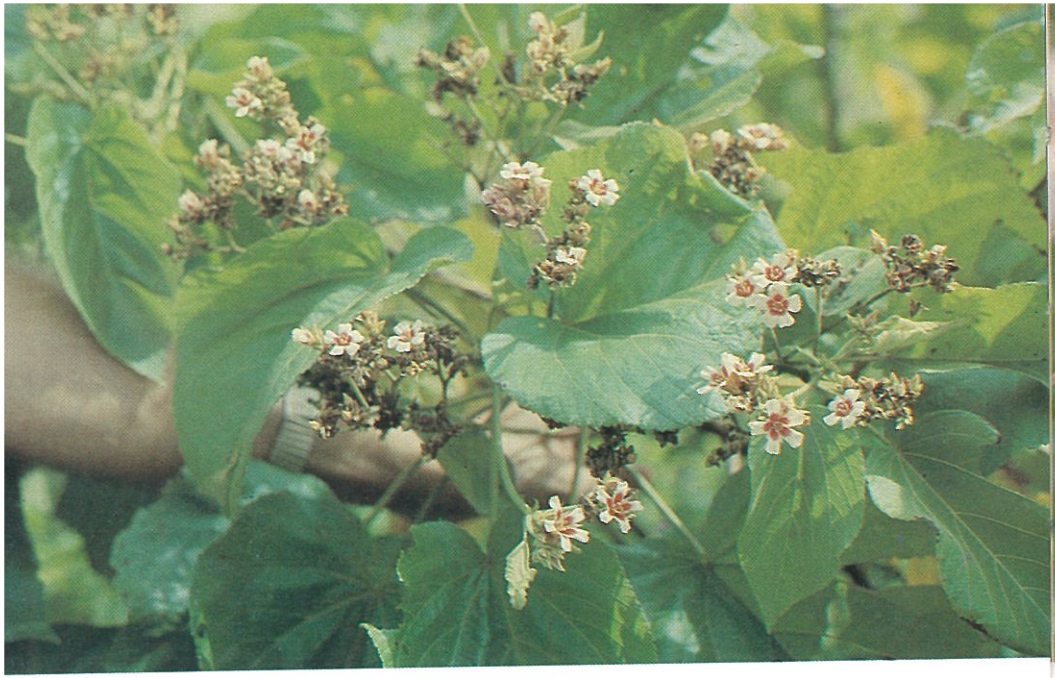
G. This is a common species in thickets along exposed cliffs. It grows somewhat taller as an understory plant where it has to reach for light and tends to get crowded out by other vegetation. The fruits are edible with an acid, limelike flavor. Eating too many of the fruits can cause stomach discomfort but when cooked they make an excellent preserve. The wood is extremely hard and is often used for making coconut husking stakes.

A. *Cestrum diurnum*
B. Solanaceae
C. China Inkberry
D. Tintanchina,

E. *Cestrum* is a low growing, many branched shrub, 1.5-2 meters tall, with dullish, pale green, oblong leaves. The white, tubular flowers grow terminally or from leaf axils in racemes. The fruits are pea-sized, green or whitish when immature, turning purple as they ripen.

F. Tropical America, naturalized on Guam.

G. The flowers have 5-6 elongated petals that roll under at the end. The fruits contain a purple juice that can be used for ink. Inkberry is common on abandoned fields or pastures as a secondary component of the northern limestone community.



A. *Melochia compacta*
B. Sterculiaceae
D. Sayafe'

E. This is a large, often spreading shrub with heart-shaped leaves that are finely toothed along the margin. The leaves are covered with fine gray hair, giving them a moldy appearance when mature. The flowers are small with pink petals and many occur together at branch ends.

F. Tropical Asia.

G. This is commonly a roadside or open field plant.

A. *Elaeocarpus sphaericus*
B. Tiliaceae
D. Yoga

E. This is a large tree with a smooth, dark trunk and tiered branches. The crown is dense, bearing many small, dark green leaves. Red leaves dotted here and there over the crown is a distinctive feature of this tree and the young growth is reddish. The flowers are white, growing in racemes from leaf axils. The fruit is blue, spherical and about 1 cm. in diameter.

F. Mariana Islands and Palau.

G. This tree is highly recommended as an ornamental for gardens. According to E.J.H. Corner, the blue color of the fruit is an optical illusion and the result of the reflection of blue light owing to the shape of the epidermal cells. A thin section of epidermal tissue shows it to be green in transmitted light and no blue pigment is present.

A. *Elatostema calcareum*
B. Urticaceae
D. Tapun Ayuyu

E. This is a fleshy herb with asymmetrical or unequal-sided leaves. The leaves have three, more or less parallel veins--the margins wavy. The flowers grow on short-stemmed heads from leaf axils.

F. Southeast Asia and the Pacific, endemic in Guam.

G. This herb is one of the ingredients of an all-purpose medicinal tea of one of the local curers. The succulent consistency of the stem gives the crushed medicine added moisture. This herb is most commonly found in damp areas of the limestone forest, but can also be found on the strand as part of the understory vegetation under larger trees.

A. *Pipturus argenteus*
B. Urticaceae
D. Amahatyan

E. This is a small tree with coarsely serrated, palmately veined leaves that are green above and gray beneath. The leaf petiole (or stem) is 5-8 cm. long. The small flowers are borne in spikes from leaf axils. The fruit is fleshy.

F. Malaysia to Polynesia.

G. This is a common plant in Guam and may be seen on most beaches around the island as well as in the limestone community.

A. *Procris pedunculata*
B. Urticaceae

E. *Procris* is a fleshy herb, found on the strand and in limestone forests. The leaves are alternate and unequal in size. The flowers grow in short-stemmed, rounded heads; males white and females orange when mature.

F. Malaysia to the Pacific.

G. *Procris* is often found growing with *Elatostema calcareum* and can be distinguished by its thicker leaves and the orange-flowering heads when it is in bloom. Otherwise, the two herbs are very similar in appearance.

A. *Premna obtusifolia*
B. Verbenaceae
D. Ahgao

E. *Premna* is a small to medium-sized tree with opposite, broadly ovate, smooth leaves, rounded or obtuse at the base. The flowers are small and greenish, occuring in many branched, crowded corymbs. The fruits are small and green, becoming purple when mature.

F. Malaysia and the Pacific Islands

G. Distinguishing characteristics of this small tree are the obtuse base of the leaf, the broadly flat-topped corymbs and the usually present galls on the surface of the leaves.

The leaves are boiled into medicinal tea that is reputed to have analgesic effects. This home remedy is used mostly in the treatment of backaches.

A. *Vitex parviflora*
B. Verbenaceae
D. Lagundi

E. This is a small tree, richly branched, with trifoliate leaves. The flowers, which grow in terminal or axillary panicles, are violet-colored. The fruits are pea-sized and dark purple to black.

F. Philippines, introduced to Guam.

G. The habitat of this tree includes both limestone and volcanic soils. The tree can be found in several places around Guam and seems to do well wherever it has been planted. A good stand can be seen near Pott's Junction or near the Earth Station behind Yona village.

The undersurface of the leaflet is smooth, lacking the mat of light gray hair that contrasts the upper and lower surface of the leaves of the two other species of *Vitex* growing here.

Savannah

The savannah or grassland community covers a rather large portion of the island's surface and is continuous from about the middle to the south end. The southern hills form a broken terrain of ridges and valleys and have obviously been at different elevations in the past, as is evidenced by old limestone cliffs along the truncated edges of ridges, or in places like Mt. Almagosa where limestone overlies volcanic material. Between the ridges, where water has cut deeply through volcanic rock the exposed limestone supports a ravine community of limestone vegetation in sharp contrast to the adjacent savannah.

The savannah is maintained in its present condition by fire which destroys large areas every year during the dry season. This and the increasing prevalence of crosscountry motorcycling are causing widespread erosion and damage to the vegetation. If left untouched, this area would undoubtedly be forested as it probably was before the arrival of man.

The grassland soil is of volcanic origin, having been deposited under water by now extinct volcanoes and is in an advanced state of decay due to many thousands of years of weathering. It is deep red in color, quite acid and contains very little organic material.

Erosion in the Savannah

Several plant communities can be distinguished on the savannah, the largest being sword grass. Other grasses occur here also and may be dominant in places or mixed with sword grass or with other species of grass. For example, *Dimeria* or *Pennisetum* may form pure stands, but are often found mixed with sword grass. In places where the vegetation has been removed, by a landslide or a wash-out, a succession of plants appear to cover it. This is accomplished first by soil binders that are very soon replaced by a weed community consisting of numerous herbs and woody shrubs. These, in turn, will be invaded by grasses which will eventually replace the weeds. The succession of plant species is not well understood at the present time and further data is required before any positive statements can be made. However, recent changes in the savannah may have long range effects. These include increasing numbers of motorcycles, reforestation programs, ranching, housing developments and the constant introduction of new weed species to the island. One noticeable change is the increasing area covered by *Pennisetum* within the last few years.

Reed communities also exist on the savannah in places where drainage is blocked and water stands in puddles or small ponds. These may be called freshwater marshes and contain a variety of reeds and sedges as well as marsh type grasses around the edges.

A. *Cerbera dilatata*
B. Apocynaceae
D. Chi'ute

E. This is a small to medium-sized tree with dark foliage and showy, white flowers. The whorled leaves are crowded near the ends of rather thickish branches with conspicuous leaf scars below. The flower petals overlap to the left and are hairy and pinkish in the center. The fruits are often twinned, ellipsoid and speckled green. The seed coat is thin and after falling, soon decays, exposing fibrous vascular tissue. This plant is similar to *Plumeria*, but the leaves are smaller and slightly rolled with a reddish midrib. The flowers are fragrant.

F. Endemic to the Mariana Islands.

G. This tree is found on volcanic soils. A *Cerbera* near the Earth Station at Yona is at least 45 cm. at the base and 9 meters high.

A. *Casuarina equisetifolia*
B. Casuarinaceae
C. Australian Pine, Ironwood
D. Gago

E. The name "Australian Pine" is misleading because this is not a true pine, but a flowering plant. The green branchlets, resembling long pine needles, are jointed at the nodes, each bearing a rosette of tiny, scale-like leaves. The flowers are unisexual in catkins. Male flowers are at the end of the branchlets and females in the axils. The fruit is woody, round and conelike in appearance.

F. Old World Tropics, Native to Guam.

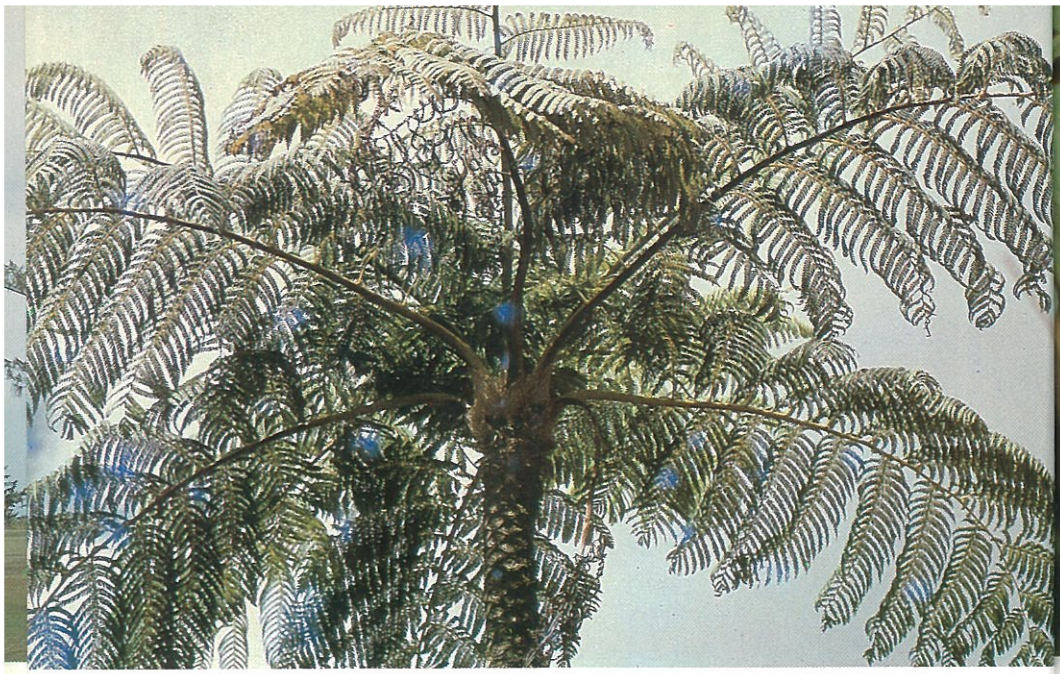
G. This tree grows well on the savannah, but is prevented from reaching a large size due to periodic grass fires. Recent conservation efforts to stop erosion in exposed clay areas of savannah have been facilitated by mass planting of seedlings of this tree, particularly in the Tarzan River area of central Guam.

A. *Elephantopus mollis*
B. Compositae
D. Papago' baka, Papago' Halomtano'

E. *Elephantopus* is a coarse, erect herb with shaggy soft, hairy stems. The leaves are alternate, elliptic, up to 15 cm. long with a wavy or toothed margin. The leaf petioles are winged. The flowering heads are white.

F. Native to Tropical America.

G. This plant grows in most tropical areas as a weed. It is most prevalent on the savannah but can also be found along the fringes of mangrove communities.



A. *Cyathea lunulata*
B. Cyatheaceae
C. Tree Fern

E. The tree fern has a straight trunk that reaches a height of 4-5 meters. The large, lacy fronds are tripinnate and thickly dotted with round sori.

F. Indigenous in Micronesia and Polynesia.

G. This plant is rare on the island but may be found in the hills of southern Guam where it grows on muddy drainage slopes. It can be seen along the trail to Mt. Lamlam.

A. *Euphorbia cyathophora*
B. Euphorbiaceae
C. Dwarf Poinsettia

E. The dwarf poinsettia has green stems and alternate lobed leaves, the uppermost with irregular red blotches near the base. The terminal flowers are yellowish with 1-2 small glands or nectaries.

F. Native to Tropical America, but grows as a weed in many tropical areas of the world.

G. This small herb contains milky sap and reaches a height of 15-70 cm. It is occasionally found on waste ground or as a weed where land has been cleared in the limestone forest.

A. *Glochidion marianum*
B. Euphorbiaceae
D. Chosga, Chosgo, Abas Duendes

E. This is a bushy shrub with shiny, light green, alternate leaves on short petioles. The male and female flowers occur separately in leaf axils. The fruit is a globose, flattened capsule containing several orange-brown seeds.

F. Endemic on Guam, it is also reported from Samoa and Tonga--the distribution is undetermined.

G. This shrub seems equally at home on both limestone and volcanic soils. It is common on open fields in the southern half of the island.

A. *Dicranopteris linearis*
B. Gleicheniaceae
C. Savannah Fern
D. Mana

E. This is a dichotomously branched fern of the open savannah. The plant is pale green, low growing and spreading. It is an important soil binding pioneer species that volunteers after a land slide or other erosion.

F. Pantropical, indigenous on Guam.

G. This fern grows in thick, pure stands that can cover an erosion scar and bind the soil until other species become established.

A. *Dimeria chloridiformis*
B. Gramineae

E. This is a low, tufted grass, densely covered with silvery hairs. The leaves are slender, up to 15 cm. long. The flowering stems have 3-6 spreading spikes.

F. Endemic to Guam.

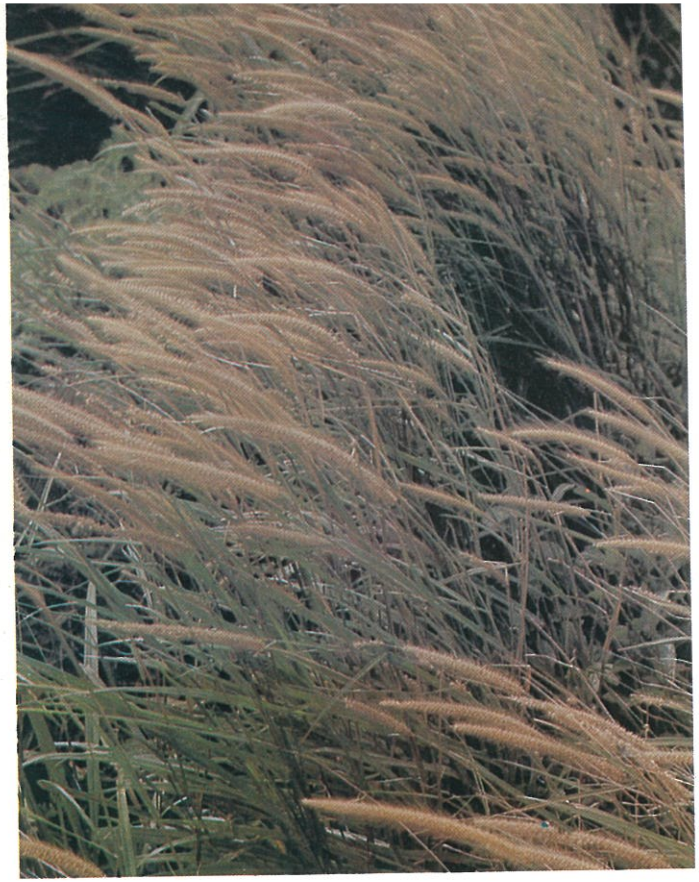
G. This grass is often found growing with swordgrass or in a pure stand on the savannah.

A. *Miscanthus floridulus*
B. Gramineae
C. Swordgrass
D. Nete'

E. This is a large or tall perennial grass with finely-toothed leaves. The paniculate inflorescence is large, loose and white at maturity.

F. Old World Tropics, native to Guam.

G. This is the dominant plant on the savannah. The name "sawgrass" is often used for this species because of the sharp edges on the leaves.



A. *Pennisetum polystachyon*
B. Gramineae
C. Foxtail

E. *Pennisetum* is an erect, tufted grass, 1-1.5 meters tall and growing in large loose clumps. The leaves are hairy, 16 to 40 cm. long, about 1 cm. broad at the base and tapering to a point. The flowering spike is tawny or strawcolored, 12-18 cm. long and 1 cm. broad (excluding the bristles).

F. Old World Tropics, probably native to Guam.

G. This grass is seen in its most dense stands on the savannah, but can also be found growing in sparse patches along many of Guam's roads.

A. *Hyptis capitata*
B. Labiatae
C. Buttonweed
D. Batones

E. *Hyptis* is a coarse, low-growing herb with square stems and acute, serrate leaves. The sessile flowers are white in nearly round heads up to 2 cm. in diameter. The heads turn from green to dark brown when mature, persisting at branch ends. The seeds or nutlets are brown.

F. Tropical America, introduced to Guam.

G. This plant can be easily recognized by the dark brown heads that dry out and remain attached to the stems long after the leaves have dropped off during the dry season. A local medicinal use involves crushing the leaves and applying them to cuts and abrasions for the prevention of infection.

A. *Dianella ensifolia*
B. Liliaceae

E. This attractive herb belongs to the lily family. The plant reaches a height of 60 cm. and has erect, lance-shaped leaves, each with a prominent midrib. The panicled flowers are white with six petals. The fruit is a bluish berry, about 1 cm. in diameter. The seeds are black.

F. Tropical Asia and the Pacific, native to Guam.

G. This small native lily is quite common in the grasslands but is not easily found unless in bloom as the leaves are very grasslike.

A. *Geniostoma micranthum*
B. Loganiaceae

E. *Geniostoma* is a woody shrub with drooping branches and dark green, opposite leaves. The leaves may be 1.5 cm. wide, with short petioles and broad stipules (small leaflike structures at the base of the leaf). The short stemmed flowers grow from the axils of leaves, two or three together with white petals. The 6-7 mm. fruit is elliptical and opens when dried revealing the seeds in an orange pulp.

F. Mariana Islands, Melanesia, Indonesia, Philippines.

G. This shrub is found mostly on the volcanic savannah but may also be found on limestone soils where it becomes a small tree, especially if growing in the shade.

A. *Lycopodium cernuum*
B. Lycopodiaceae
C. Club Moss

E. *Lycopodium* is a creeping, dichotomously branched, light green plant with short, stiff, needlelike leaves arranged spirally along the stems. The spore cases, occuring at the tips of branchlets, are light brown and pointed downwards.

F. Indigenous in Guam.

G. This plant is only found on the savannah.

A. *Melastoma marianum*
B. Melastomataceae
D. Gafao

E. *Melastoma* is a low shrub with many reddish brown branches. The opposite leaves are elliptic and rounded at the base with about 5 more or less parallel veins. The five-petaled, white flowers are rather large for the size of the plant. The fruits are 5-celled with many seeds and occur in clusters at branch tips.

F. Endemic in the Marianas

G. This very attractive plant is quite common on the grasslands of Guam and can be easily recognized by the reddish brown branches and showy, white flowers.

A. *Decaspermum fruticosum*
B. Myrtaceae

E. This is a small, low shrub with shiny, opposite leaves that taper to a long point. The flowers are pinkish white and grow at the tips of branches. The fruit is purple and slightly flattened with many seeds.

F. Native from Burma to Australia and the Pacific Islands.

G. This plant is found on volcanic soils and can be identified by its pointed, mature leaves; pinkish young leaves and purple fruits. It makes an excellent plant for bonsaiing.

A. *Myrtella bennigseniana*
B. Myrtaceae

E. *Myrtella* is a spreading, woody shrub with many slender branches and small, opposite, oblong leaves. The small, white flowers grow from leaf axils near the ends of branches. The small, rounded fruit is dark purple.

F. Marianas and Caroline Islands.

G. This plant is only found on volcanic soils of the savannah and does not occur in the limestone community. It is often part of the weed community that follows a burn or landslide on the grasslands.

A. *Spathoglottis plicata*
B. Orchidaceae
C. Ground Orchid

E. This is a tall, terrestrial orchid with broad leaves, having prominent, parallel veins--smooth and tapering at both ends. The flowers are rose-lavender at the end of a long stalk (up to 1 meter). The fruits are cylindrical, grooved and green--becoming brown with age. The leaves emerge from round pseudobulbs that become increasingly multiple and larger as the orchid matures.

F. Indomalaysia to the Pacific.

G. This orchid is extremely versatile and can be seen growing in almost any plant community as it is at home in sun or shade, along river banks and on limestone soils. It is most commonly seen among the grasses of the savannah, where its brilliant flowers make it easily recognizable.

A. *Areca catechu*
B. Palmae
C. Betelnut Palm
D. Pugua'

E. Betelnut is a small unbranched tree with conspicuous gray rings. The fronds are dark green and rather straggly in appearance. The sheaths are long and ribbed at the base. The flowering stems grow from the trunk well below the leaves. The main axis of the inflorescence branches several times with male flowers toward the tip and female flowers at the base. The fruit is ovoid, up to 5 cm. long, green in the immature state, turning orange as it ripens.

F. Indo-Malaysia, naturalized and cultivated on Guam.

G. Betelnut was introduced early on Guam by the first inhabitants. As well as being common in the river valleys of the savannah, it is often cultivated on ranches and in home gardens. The mature seed is habitually chewed for its mild narcotic effects and astringent quality. It is often chewed with pupulu *Piper betle* and lime powder. This mixture turns red when chewed and stains the teeth. There are two varieties of the fruit, red and white. The red inner fruit is preferred on Guam.

A. *Passiflora foetida var. hispida*
B. Passifloraceae
C. Love-in-a-mist
D. Kinahulo' Atdao

E. This is a climbing, perennial vine with hairy, lobed leaves; white and purple flowers, up to 5 cm. in diameter. The fruits are orange, 2 cm. in diameter, thinskinned and filled with black seeds.

F. A Pantropical weed of American origin.

G. This vine grows on both volcanic and limestone soils and is commonly seen on abandoned land that has been previously cleared. The fruit is edible, but not a common food item because it contains little pulp. It has a sweet taste, similar to the large-fruited *Passifloras* that are popular in other areas of the Pacific.

A. *Passiflora suberosa*
B. Passifloraceae
C. Wild Passion Flower

E. This is a perennial vine with tendrils and commonly three-lobed leaves. The flower, about 1.5 cm. in diameter is mostly green with an inner purple fringe and grows singly from leaf axils. The fruits are purple and nearly round.

F. Native to Tropical America, introduced (probably not intentionally) to Guam following WWII.

G. This vine grows on limestone or volcanic soils, over other vegetation in gardens or waste places and is generally considered a weed. The flowers are attractive, but somewhat inconspicuous.

A. *Timonius nitidus*
B. Rubiaceae
D. Sumak Lada

E. This is a shrub that grows to a height of about 1.5 meters with dark green, opposite, elliptic leaves. The flowers are axillary, cream-colored and trumpet-shaped. The fruit is dark purple to black and slightly flattened.

F. Endemic, known only from Guam.

G. The male and female flowers are separate.

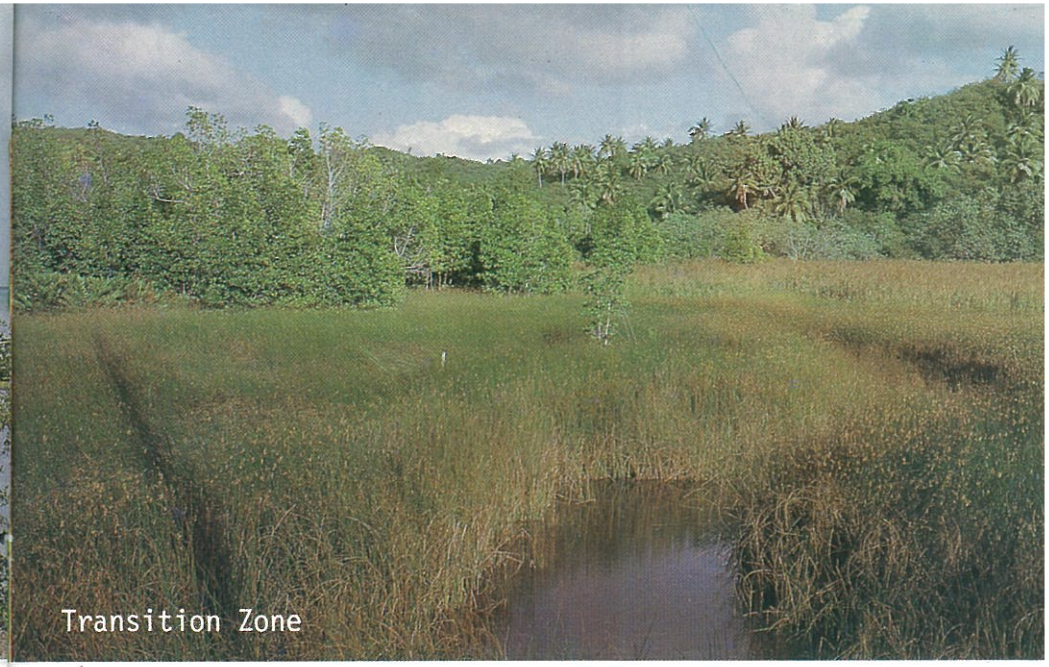
A. *Wikstroemia elliptica*
B. Thymelaeaceae
D. Gapit Atayaki

E. *Wikstroemia* is a shrub with smooth, reddish bark and small, opposite, light green leaves that are rounded at both ends. The small, yellowish green flowers grow in racemes from leaf axils. The fruit is bright red.

F. Native to Guam and Micronesia.

G. This plant grows on both volcanic and limestone soils, but is most frequently found on the savannah. It looks like an escaped, cultivated plant and is easily recognized by its smooth leaves and bark and the bright red, poisonous berries.

Emerging Mangrove Community



Transition Zone

Swamps & Marshes

Mangrove Swamps. These are rather poorly represented on Guam, but what there is here is readily accessible. Small patches occur in the vicinity of Apra Harbor and can be seen at the mouths of the Laguas and Atantano rivers. There is also a small stand just east of Merizo and at the mouths of rivers along the southeast coast.

Nypa Swamps. The nypa palm is used extensively for thatching in other parts of the tropical world, but with the advent of modern housing on Guam, it is only occasionally woven here for decorative purposes. When used as thatch, it is much more durable and can be woven tighter than coconut fronds. Small groves occur at the mouths of rivers along the south and southeast coasts of Guam and at the sides of these streams where they flow through swampy terrain. The Talofofo and Ylig rivers are good examples. The mud around this species of palm is a favorite habitat of the common land crab *Cardisoma carnifex* or panglao that is collected as a food item.

Floodplain Swamps. Several species of plants occur in pure or nearly pure stands on alluvial soil in river valleys such as the Talofofo. Here the stream slows down as it flows through flat land and continually changes course so that broad flat plains are formed. Such swamps support a variety of plants and several distinct types with locally dominant species can be recognized.

Marsh Communities on Guam are usually found near the sea, most often at or close to the mouths of rivers and represent a stage leading to swamp conditions. Eventually as the land is raised by deposition of alluvial material, other plants including trees may become established.

Marsh vegetation is restricted to plants which will grow in standing water or where the water table is very near the surface. The water may be fresh or slightly brackish.

Reed Marshes. This type is dominated by the tall reed *Phragmites karka*. The canes grow 3.5-4.5 meters tall in dense, pure stands. This species is a reliable indicator of fresh water.

A large stand of *Phragmites* occurs at the Agana Swamp and near the mouths of many of the rivers. It grows also at Fena and on the savannah where water

stands due to interrupted drainage. *Phragmites* and a sedge *Rhynchospora* are collected from this community by one of the local suruhano curers and added to *Sporobolus virginicus*, bamboo roots *Bambusa blumeana* and the flower of domestic corn *Zea mays* to make an all-purpose combination medicine that is boiled and taken internally.

Sedge Marshes. Sedges are grasslike, often with triangular green stems and a tuft or whorl of long, narrow leaves at the top. Above the leaves are the green or brown scalelike flowers.

The bullrush, *Scirpus littoralis*, grows in a dense, pure stand in the mouth of the Laguas and other rivers near Apra Harbor. This tall, dark green rush reaches a height of 1.8-2.7 meters and grows from a submerged mass of roots buried in the muddy bottom.

In other places a variety of sedges can be found in small patches where water stands at or very near the surface. Whenever a persistent puddle occurs or where drainage is blocked, sedges can usually be found.

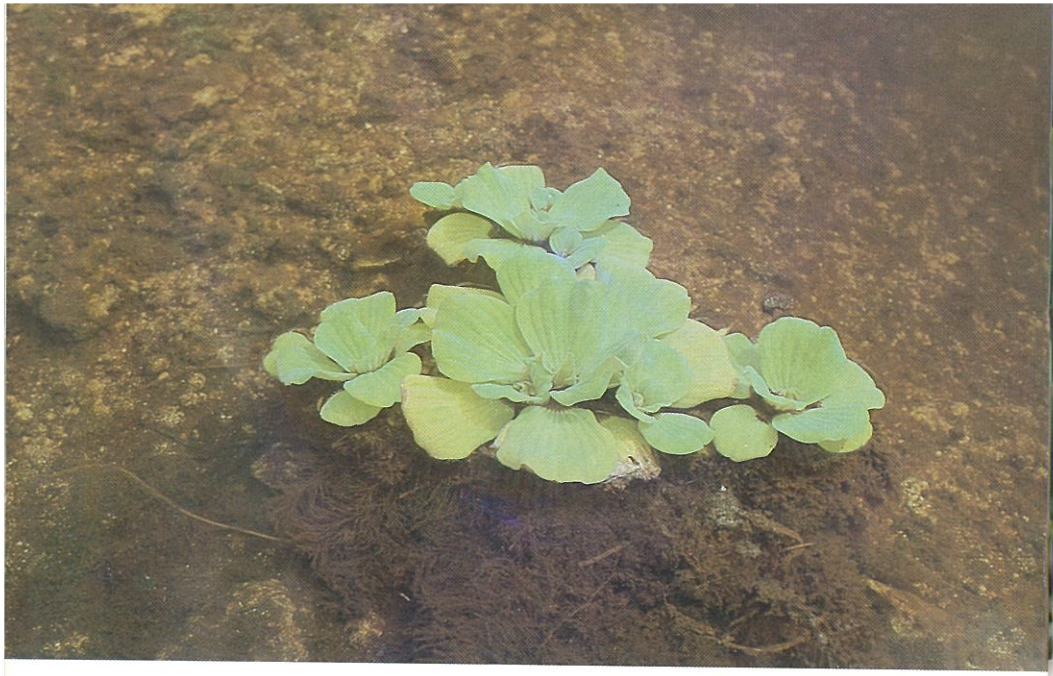
Grass Marshes. *Panicum* grass is meadowlike in appearance. The grass is tall or often trailing and dark green with rather loose tassels. A typical stand is growing near the road just south of Agat and also along the farm road in the Talofofo Valley. This is an important forage grass and was imported for that purpose. In depressed areas next to the beach another type of grass called *Sporobolus* often occurs. The medicinal species mentioned previously can be seen at Adelup Point. At least two kinds grow on Guam.

A. *Alocasia macrorrhiza*
B. Araceae
C. Wild Taro
D. Piga

E. This is a large, fleshy herb with leaves up to 1.5 meters long. Older plants have a thickened stalk or trunk and long-stemmed leaves that point upward or out. The flower is a fleshy, yellow spike (spadix) surrounded by a modified leaf (spathe). The fruits are red.

F. Tropical Asia and the Pacific.

G. The tuber contains oxalic acid crystals, giving it an irritating and acrid taste unless prepared properly. The plant must be handled with care, for all parts contain the irritant. It is only used as a food item in survival situations. When prepared for consumption, a stick is thrust into the tuber to avoid touching the plant. The tuber is then peeled, sliced, soaked and boiled with coconut milk to produce an edible starch food. Piga is not strictly found in wetlands but is also commonly seen on higher ground. It is grown in many yards as an ornamental. The similar *Alocasia indica* with metallic purple leaves is also occasionally seen as a cultivated ornamental.



A. *Pistia stratiotes*
B. Araceae
C. Water Lettuce

E. This is a broad-leafed, light green,floating herblike plant. The rounded, notched leaves form a rosette at the surface of the water. The feathery roots dangle in the water below the plant. The flower grows from the center of the rosette and is surrounded by a hairy bract.

F. Pantropical.

G. This is a common species of freshwater ponds and streams. At times it grows so thickly in the Talofofo River that a boat can hardly pass through. It is sometimes grown as an ornamental or cultivated for pig feed.

A. *Lumnitzera littorea*
B. Combretaceae
D. Nana

E. *Lumnitzera* is a small, shrubby tree with dark green leaves and bright red, terminal flowers. The leaves are small and whorled or spiraled near branch ends. The fruit, crowned with a persistent calyx, is vase-shaped and turns brown with age.

F. Indo-Malaysia to the Pacific.

G. This plant is often associated with mangroves and may be seen from Marine Drive at the mouth of the Laguas River.

A. *Rhynchospora corymbosa*
B. Cyperaceae
C. Sedge
D. Chachachak

E. This sedge grows to a height of 90 cm. The leaves taper to a point and the flowering head consists of several flat-topped clusters. The fruits are one seeded and dark brown.

F. Pantropical.

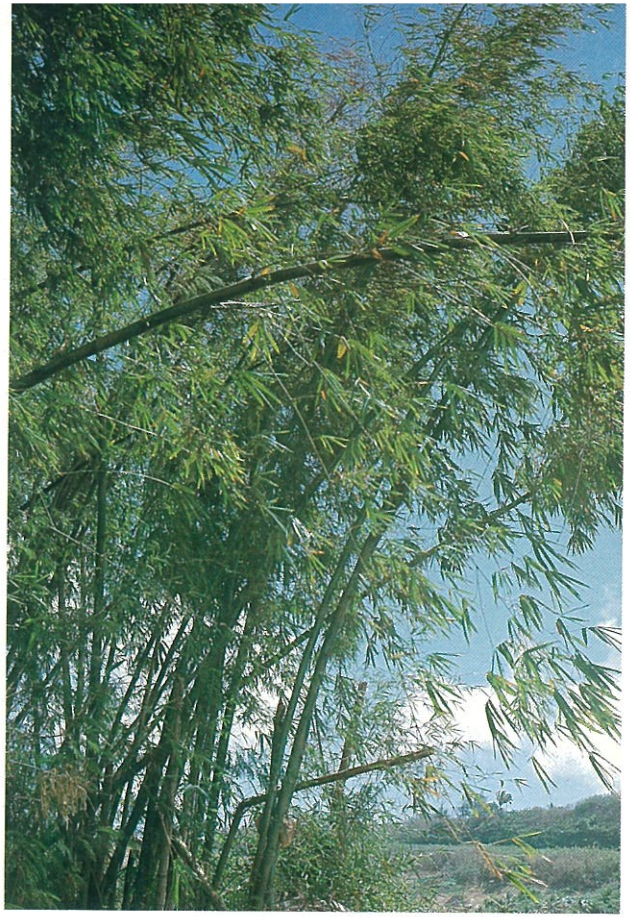
G. At least fifteen species of sedges grow in Guam, about half of which are native. The leaf of this species is boiled with other ingredients in the medicinal tea of one of the local curers.

A. *Scirpus littoralis*
B. Cyperaceae
C. Bullrush

E. This is a tall, erect, dark green reed that may be seen growing at the mouths of rivers on the south-west coast of Guam. It usually grows in thick, pure stands, with its roots buried in the mud in brackish water. The flower grows near the top of the stem in several, loose, light brown spikes.

F. Various varieties occur from Europe through Asia Minor to India, Australia and the Pacific.

G. A good place to see this plant is at the mouth of the Laguas River. Another dense stand is found in a brackish swamp at Sumay on the Naval Station. Gill nets are tied to *Scirpus* in Sumay Swamp to catch bangus *Chanos chanos*, a large milkfish that inhabits this area.

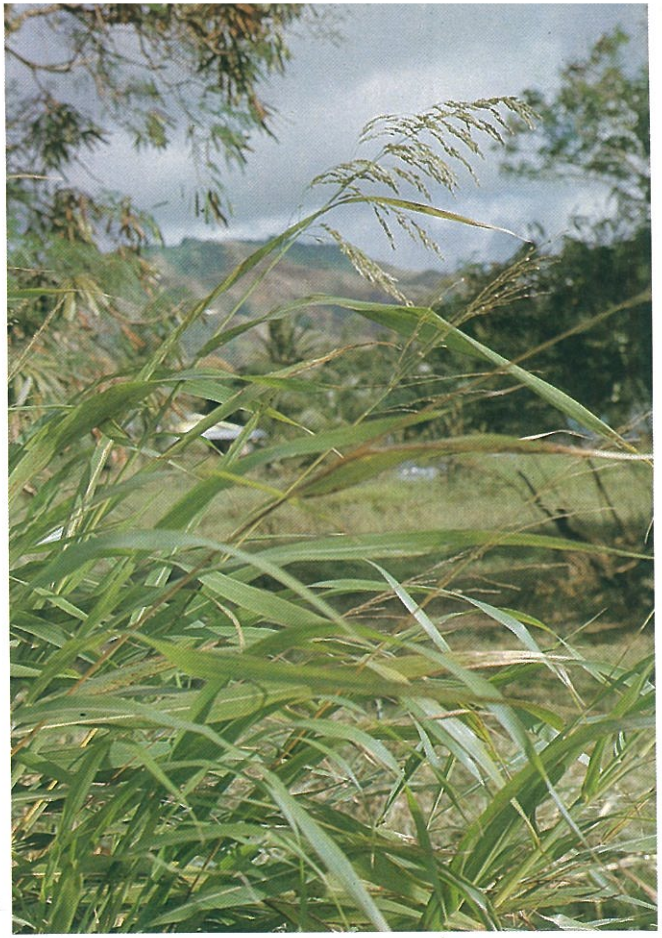


A. *Bambusa vulgaris*
B. Gramineae
C. Bamboo
D. Pi'ao

E. This is the tallest bamboo growing on the island with stems reaching a height of 20 meters and up to 12 cm. in diameter. The stems are glossy green between the nodes.

F. A widely distributed Asian species.

G. The durable poles were once extensively used in housing construction during the prewar era and are still used to build temporary fiesta structures, for fencing and as fishing poles. The young shoots of bamboo are edible, but must be boiled and drained several times to release an irritant contained in the tissues.



A. *Panicum maximum*
B. Gramineae
C. Guinea Grass

E. This is a large, tufted, light green grass. The leaf blades are 30-60 cm. long and 5-6 cm. wide. The flowers are borne in large, dense panicles. Patches of hair occur on the stem where the leaf blade is joined to its sheath.

F. Native to Africa, now introduced to many tropical areas for forage.

G. This is one of the taller, erect grasses growing on the island. At least five species occur here.

A. *Phragmites karka*
B. Gramineae
C. Reed
D. Kariso

E. *Phragmites* is a very tall, jointed grass that grows in thick pure stands on swampy lands. The stems grow up to 5 meters in length and 2-3 cm. in diameter. The flowers form in loose, terminal panicles, green at first, but maturing to a light brown color.

F. Tropical Africa to Malaysia and the Pacific.

G. This plant seems to be a reliable indicator of freshwater. In places, such as at the mouth of the Laguas River, there is a sharp division between the reeds and the plants which grow in brackish water. A dense stand can also be seen in the Agana Swamp or the Atantano River valley. The young sprouts of kariso are included in an all-purpose boiled medicinal tea of one of the local curers.

A. *Sporobolus virginicus*
B. Gramineae
C. Beach Grass, Salt Grass
D. Totoput

E. This is a short-stemmed, creeping beach grass with pointed, inrolled leaf blades that are not over 15 cm. long. The flowering spikelike panicle is pointed and rather pale.

F. Tropical countries of the world. This species is tolerant of salt water and is common in marshy areas near the sea.

G. Another common species known as rat-tail grass, *Sporobolus fertilis* also grows on Guam. The species shown is known locally as totoput and can be seen on the beach at Adelup School. This species is used by one of the suruhanos in an all-purpose medicinal tea.

A. *Hydrilla verticillata*
B. Hydrocharitaceae
C. Hydrilla

E. *Hydrilla* is a dark green, aquatic plant with narrow, whorled leaves; very thick at the terminal ends of of branches. The tiny, white flowers grow on long stems from leaf axils and just reach the surface of the water. They are very difficult to see.

F. Old World Tropics.

G. This is a common species of freshwater ponds and is abundant at Agana Spring. It is very similar to *Elodea* and is often used as an aquaria plant.

A. *Barringtonia racemosa*
B. Lecythidaceae
D. Langasat

E. This is a small to medium-sized tree with large, pointed leaves up to 45 cm. long. The leaves are serrated, spiraled, sometimes crowded near the tips of branches and the bases are red where they join the stem. The flowers are pinkish and hang in racemes from the branches. The fruit is reddish brown, ovoid and slightly four-angled.

F. Native from East Africa to Malaysia and Polynesia.

G. Almost pure stands of this species occur in the Talofofo Valley, each tree standing on a low mound. It is thought to be restricted to swamp conditions but may not be distinct from *B. samoensis* which has been seen growing on higher ground at Naval Magazine and other places.

A. *Dalbergia candenatensis*
B. Leguminosae

E. This is a sprawling climber with smooth, dark red to black bark and alternate, pinnate leaves. The leaflets also are alternate, rounded and 3-5 cm. long. The thick, woody stems wrap themselves tightly around supporting vegetation and are a conspicuous feature of this plant. The flowers are white and grow in clusters from leaf axils. The pods are short, brown and 1-2 seeded.

F. East Africa to the Pacific.

G. This plant grows in or at the edge of mangrove swamps.

A. *Derris trifoliata*
B. Leguminosae
D. Bagin, Deris

E. *Derris* is a creeping or climbing, vinelike shrub with long trailing branches and compound leaves, mostly of 3-5 dark green leaflets. The slightly peltate leaflets are broad and rounded at the base, coming to a long, tapering point. The flowers are white, growing from leaf axils on short stems; several together in racemes. The seed pods are flat, containing 1-3 seeds.

F. Old World Tropics from East Africa to Polynesia.

G. This is a rocky, coastal plant found mostly on the southern end of the island. It is common on the banks of rivers such as the Talofofo or Ylig, growing over vegetation close to the water. The leaf contains rotenone and when crushed and dispersed in streams or on the reef will kill fish and shrimp. An introduced species, *D. elliptica*, however, is the major source of the poison. It is illegal to cultivate the plant or to engage in fish poisoning on Guam.

A. *Entada pursaetha*
B. Leguminosae
C. Large Seabean, Snuff-box Bean
D. Bayogon Dangkulo, Gayi Dangkulo

E. *Entada* is a large, woody, climbing vine with bi-pinnate leaves and small, rounded leaflets. The flowers are white. The pods are light brown, curved and up to 1 meter in length. The seeds are 4-7 cm. broad, brown, glossy and rounded or sometimes rectangular.

F. Tropical, native to Guam.

G. This plant grows mostly in the southern sector of the island, often along stream beds. The long, twisting, woody vines climb high into tree tops and unless the leaves are recognized, it is often difficult to find the pods. The large seeds are often found washed up along the beaches. The seeds are extremely hard and poisonous. The leaf and stem, however, are a common ingredient in the all-purpose medicinal teas of the suruhanos.

A. *Moghonia strobilifera (Flemingia strobilifera)*
B. Leguminosae

E. This is a downy shrub, 1-3 meters tall, with long, narrow, heart-shaped leaves. Long racemes of over-lapping bracts occur terminally on slender branches. The bracts enclosing small, purple flowers are green at first, becoming brown when mature. The seeds are elliptical and about 1 cm. long.

F. Southern Asia and Malaysia.

G. This is an excellent material for dried flower arrangements. The leaves fall off and the bracts, which look much like the shrimp plant, remain on the stem after drying. It is not confined to any particular community and may be found on volcanic or limestone soil, as well as in swamps. Agana swamp is a good place to look for this plant.

A. *Xylocarpus moluccensis*
B. Meliaceae
C. Cannonball Tree
D. Lalanyok

E. This is a small tree usually found in the vicinity of mangrove swamps. The leaves are pinnately compound with 4 or more asymmetrical, dark green leaflets. The creamy white flowers grow in loose panicles from leaf axils. The fruits are the size of a baseball and contain 6-8, odd-angled, brown seeds.

F. Indo-Malaysia and the Pacific.

G. The fruit is sometimes called puzzlenut because of the many odd-shaped seeds that fit together like a jigsaw puzzle and is quite a challenge to reassemble if taken apart. The tree grows only on the leeward side of the island and may be seen at Apra Harbor or on the beach at Adelup School. It is generally associated with mangroves.

A. *Nypa fruticans*
B. Palmae
C. Nypa Palm
D. Nipa

E. *Nypa* is a palm with large pinnate leaves and an underground or submerged trunk. It can be found growing in brackish water at the mouths of major rivers. Both male and female flowers are yellow; the male in thick spikes, the female in a large head. The fruit grows on a thick stalk and is the size of a basketball.

F. Introduced to Guam from the Philippines. Native in the Caroline Islands and Southeast Asia.

G. The fruit cluster resembles, somewhat, that of the pandanus fruit. *Nypa* is commonly used for thatch throughout Southeast Asia and is occasionally woven for fiesta decorations on Guam. Its fronds last longer and are able to be woven tighter than those of the coconut palm. The jellylike center of the seed phalanges is edible, but not very tasty, thus it is rarely collected as a food item.

A. *Eichhornia crassipes*
B. Pontederiaceae
C. Water Hyacinth

E. This is a floating plant with large, clustered leaves on thick petioles (stems). The flowers are pale blue or violet.

F. Native to Tropical America. Introduced to most tropical regions of the world.

G. This plant grows so profusely in rivers, it is sometimes a threat to navigation. In many tropical areas, it clogs waterways to the extent that defoliants must be used to reduce its numbers. The plant is edible and can be used as a source of feed for domesticated animals. It can also be used as a mulch fertilizer around other plants.

A. *Acrostichum aureum*
B. Pteridaceae
D. Langayao

E. This is a large, coarse fern with once-pinnate fronds that grow in huge clumps at the edge of mangrove swamps. The underside of fertile fronds is covered with spore producing structures called sporangia.

F. Pantropical, indigenous to Guam.

G. This species can be found also in swamps or marshes, as it is not confined to brackish water.

A. *Bruguiera gymnorrhiza*
B. Rhizophoraceae
C. Mangrove
D. Mangle' Machu

E. In Guam, this is a small tree of mangrove swamps with dark green, leathery leaves and prop roots. The flowers, usually solitary with a bright red calyx, grow on short stems from leaf axils. The fruit is about 2 cm. long and germinates while still on the branch, producing on elongated, grooved radicle; 20-25 cm. long that lands upright in the mud when it falls and plants itself.

F. East Africa to Polynesia and Micronesia.

G. The bright red calyx and grooved radicle easily separates this genus from *Rhizophora*.

A. *Rhizophora mucronata*
B. Rhizophoraceae
C. Mangrove
D. Mangle' hembra

E. *Rhizophora* is a small tree with dark green, leathery leaves and numerous prop roots that angle down to the mud from the trunk. The leaves are mucronate or tipped with a slender projection about 1 cm. long. The flowers are pale yellowish and grow many together from the leaf axils. The brown fruit is 2.5-3 cm. long and germinates before dropping off. The foot long, green radicle is slender at the base, becoming thicker at the apex so that when it falls it sticks in the mud, right end up, thus planting itself.

F. Paleotropical.

G. Two other species of *Rhizophora* occur on Guam and the easiest way to distinguish between them is by looking at the flowers. *R. apiculata is two-*flowered and in *R. stylosa*, the flowering stalk is forked several times.

A. *Heritiera littoralis*
B. Sterculiaceae
D. Ufa

E. This is a medium to large buttressed tree with elliptic, oblong, pointed leaves that are light green above and gray beneath. The inconspicuous flowers are unisexual and grow from the leaf axils. The fruit is hard shelled, keeled and winged.

F. Pacific Islands and Southern Asia

G. This species may be found growing on river banks, along tidal estuaries or in the vicinity of mangrove swamps. The floating seed provides its means of dispersal. Another species, *H. longipetiolata* locally called ufa halomtano is a rare species and occurs mostly on the northern end of the island where it grows on limestone cliffs, never far from the sea.

A. *Avicennia alba*
B. Verbenaceae

E. This is a small, rather richly branched tree with reddish brown, smooth bark and small, opposite, olive green leaves. It grows on mud flats at the outer edge of mangrove swamps and at low tide, the many oxygen-gathering pneumatophores can be seen sticking up like fingers from the wide, spreading root system. The flowers are yellow and grow, many together, in a head. The fruit is light green, flat and not quite round.

F. Malaysia and the Pacific Islands.

G. This tree is easily recognized by its olive green leaves and odd-looking pneumatophores. It is commonly found in groves or pure stands.

Strand

Being a small island, the total vegetation of Guam may be considered "strand vegetation", but for purposes of this text, it is taken to mean the plants that are found mostoften growing in the immediate vicinity of the sea. With very few exceptions, those plants growing on the strand can also be found elsewhere on the island, but not as the dominant part of a community. Excluded from this section and described elsewhere in the book, are the mangrove and marsh communities which are indeed composed of strand plants, but confined to localized conditions.

Factors governing the distribution of vegetation along the coast are probably many and little accurate information is available. It can be said, however, that the coast receives less rain than the interior and that the west side is more sheltered than the east side. There are plants which have a high tolerance for salt while others are killed by it. Some are shade lovers, others grow best in the direct sunlight. Certain plants will not live past the seedling stage in the shade of the parent plant, but will survive only if the seed is dropped in a more favorable environment. These and other factors involved in the microhabitats are responsible for plant distribution.

Vegetation on the northern and northeastern coast lines is stunted and bent shoreward due to strong winds, often laden with salt spray. It tends to be uniform in height with wide spreading branches that form a dense canopy with little undergrowth. Conditions are harsh and drying is rapid.

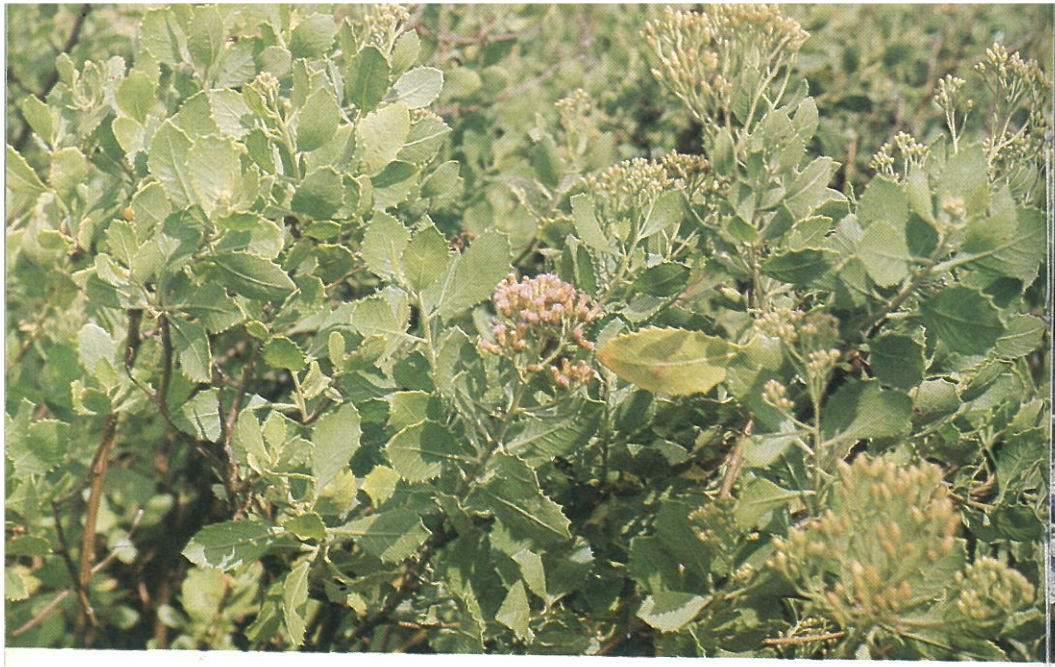
The coastline, from about Uruno Point on the west side, the south end and as far north as Pago Bay on the east is sheltered from the direct force of the easterlies. As mentioned earlier, this section of the coast is additionally protected by a fringing reef and the shoreline is irregular with many bays and sandy beaches. Here the vegetation differs from that of the exposed section, not so much in species as in growth form. Large trees grow close to the sea and provide deep shade where mosses, ferns, lianas and epiphytes of many kinds abound. Unlike the northern exposed strand, this area is damp and supports considerable undergrowth consisting of seedlings of the trees present as well as a dense herb cover including giant taro, *Procris*, *Elatostema* and others.

A. *Messerschmidia argentea*
B. Boraginaceae
D. Hunek

E. This is a small tree with a spreading crown and light green, densely pubescent leaves that are clustered at branch ends. The small, white flowers occur in large, many-branched clusters of coiled spikes at the ends of branches. The fruits are pea-sized, green when immature, turning brown with age.

F. Tropical shores from the Indian Ocean to the Pacific.

G. This umbrella-like tree is one of the most common beach plants on the island.



A. *Pluchea indica*
B. Compositae

E. This is a richly branched shrub with alternate pale green, dentate (toothed) leaves. The terminal flowers are rose-purple and grow in rather loose few-flowered heads.

F. Native of India, South China, Malaysia, Australia and the Pacific.

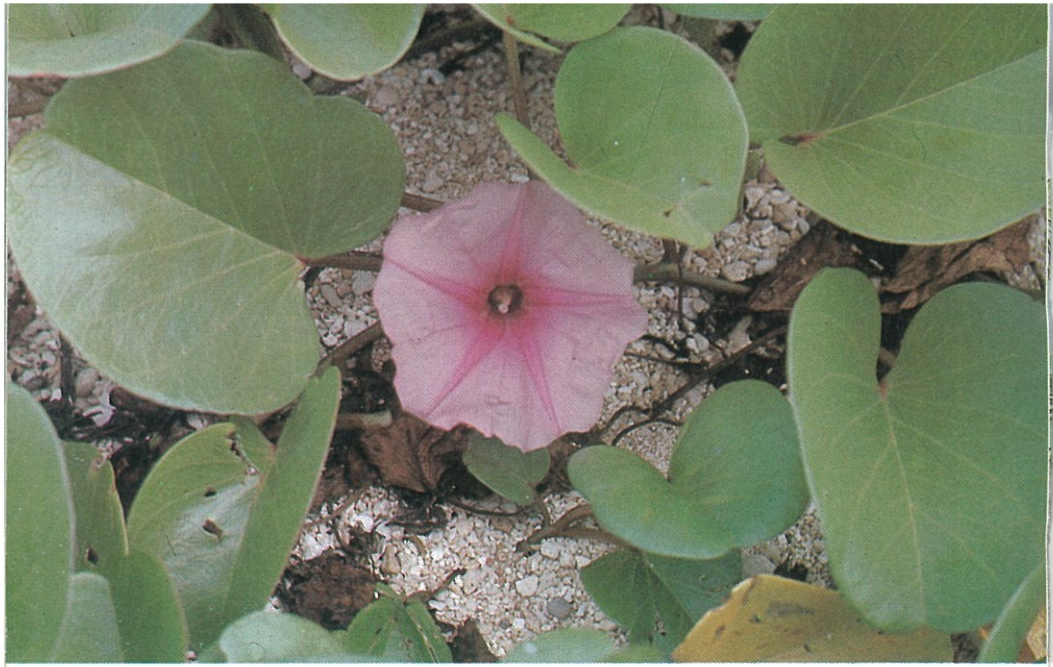
G. A species introduced from Tropical America, *P. odorata* has larger leaves with smooth margins and pinkish flowers. Another species, a cross between *P. indica* and *P. odorata*, is a sprawling shrub with long, prostrate branches and yellow green leaves. The flowers are pale rose. This can usually be found wherever the two species grow close together. These plants are often associated with mangroves.

A. *Wedelia biflora*
B. Compositae
C. Beach Sunflower

E. This is a viney herb with straggling branches and bright yellow, flowering heads. The leaves are serrate, rounded at the base and pointed at the tip.

F. Tropical Asia, Indigenous to Guam.

G. This plant is sometimes called beach sunflower, which seems to suit it very well. It is common on the seacoast here, particularly on the east side of the island.



A. *Ipomoea pes-caprae subsp. brasiliensis*
B. Convolvulaceae
C. Beach Morning Glory
D. Alahai Tasi

E. This species of *Ipomoea* is a creeping, rather fleshy vine with large, glossy, rounded leaves that grow on sandy or rocky beaches and sometimes in open fields. The leaves are dark green and notched at the apex with petioles up to 15 cm. long. The large flowers are rose-colored and purple in the throat. The fruit is a rounded capsule containing hairy seeds.

F. Pantropical.

G. This species is often seen growing in dense mats on sandy or rocky beaches just above the high tide mark. A dense growth can be seen at the Adelup School. The leaves can be boiled into a medicinal tea used in the treatment of chicken pox or crushed and applied directly to skin abscesses to aid in healing.

A. *Scaevola taccada*
B. Goodeniaceae
D. Nanaso

E. This is a large, spreading, many branched shrub with white, half-flowers (several together) and white, globose, fleshy fruit containing 1-2 seeds. The wood is soft and easily broken. The leaves are pale green, spiraled and may be smooth or covered with hair. The flowers are quite varied, some pure white or on other plants they may be tinged with purple.

F. Native from India to Polynesia and Hawaii.

G. This plant is generally associated with the strand, but occurs inland as well, where it grows in dense thickets.

A. *Hernandia nymphaeifolia*
B. Hernandiaceae
D. Nonak

E. *Hernandia* is a tree that grows to 20 or more meters with a buttressed trunk and alternate, peltate leaves. The petioles are long and red where they join the leaf blade. The flowers are white and occur in clusters on short stems. The several bracts at the base of a cluster, called an involucre, enlarge to form a fleshy, white or pinkish cup that resembles a Japanese lantern. The black nut inside is elliptical and contains one seed.

F. Shores of Paleotropical seas.

G. The showy pink or white involucres and large peltate leaves make this tree easy to identify.

A. *Cassytha filiformis*
B. Lauraceae
D. Mayagas

D. *Cassytha* is a parasitic, leafless vine with green or yellow stems that form a tangled mass over the host plant and adjacent vegetation. The flowers are small and inconspicuous. The fruits are pea-sized.

F. Tropical regions of the world.

G. This plant is similar in appearance to the dodder of California, but unrelated. It is seen most often in exposed places growing over strand vegetation in full sunlight. It can also be found growing over the vegetation in almost every other community on Guam. The stems are used as a medicinal ingredient in some of the medicines of the island's traditional curers.

A. *Barringtonia asiatica*
B. Lecythidaceae
C. Fish-kill Tree
D. Puting

E. This is a large tree with long, tapering, obovate, leathery, dark green leaves, crowded near the ends of branches. The basal leaves continually wither and drop off leaving conspicuous leaf scars along the stem. The flowers are large, occuring in erect cymes with white petals and numerous pink and white stamens. The tree blooms almost continuously, but the flowers are rarely seen as they open in the early morning and soon drop off. The one-seeded, fibrous fruit is square and about 10 cm. in length. The calyx is persistent and the pistil remains attached to the fruit long after the rest of the flower has fallen.

F. Indian Ocean and Pacific coasts in tropical areas.

G. The inner seeds were once crushed to prepare a poison used for stupefying fish on the shallow reefs. This method is rarely used today because it is illegal. Ironically, as the tree is used to poison fish, if a person gets fish poisoning from eating certain types of fish, the tree also provides an antidote. The bark of the tree is boiled into a strong tea that is taken internally.

A. *Desmodium umbellatum*
B. Leguminosae
D. Palaga Hilitai

E. This is a shrub or small tree with trifoliate leaves. The leaflets are elliptic, rounded at both ends and grayish beneath with 8-12 prominent lateral veins. The flowers are white and grow from leaf axils in loose umbels (clusters of flowers, flat at the top). The pods, containing about 4 seeds, are flat, slightly curved and constricted between each seed.

F. Tropical Asia, north to Taiwan and Okinawa, east through Micronesia, Melanesia and Polynesia. Native to Guam.

G. This is an understory plant that inhabits southern and western strands of the island.

A. *Mucuna gigantea*
B. Leguminosae
C. Small Seabean
D. Bayogon Dikike' , Gayi Dikike'

E. *Mucuna* is a climbing vine with alternate, trifoliate leaves. The leaves are dull green and the lateral leaflets are decidedly asymmetrical. The flowers, growing in clusters from leaf axils, are pale green on long, hanging stems. The pods are light brown, hairy, about 10 cm. long, flat and winged along the margin. The large seeds are light brown to nearly black, round or nearly so and about 7 mm.thick.

F. India to Polynesia.

G. The seeds can be found floating or washed up along the shore, which might indicate the plant's means of dispersal. This species is usually found growing near the beach, but is also common in the limestone forest, some distance from the sea. When in flower or fruit, the cluster of green flowers or brown pods, on long, dangling stems, make this species easy to identify. The pods remain on the vine until they turn black with age. Without the flowers or pods, however, identification becomes a problem, as the vine is similar to several other species. The leaf and stem are a common ingredient in the fresh medicinal teas of the suruhanos.

A. *Sophora tomentosa*
B. Leguminosae

E. This is a tall shrub with silvery gray, pinnately compound leaves and yellow flowers that grow in racemes from branch ends. The leaflets are elliptic and rounded at both ends. The pods, that hang in clusters, are long, slender and strangely constricted between each seed.

F. Pantropical.

G. This shrub is not very common on Guam, but may be found on sandy beaches or sometimes on rocky cliffs, as at the University of Guam Marine Laboratory. The roots and seeds contain an alkaloid that is used medicinally as a purgative.

A. *Vigna marina*
B. Leguminosae
D. Akangkang Marilasa

E. *Vigna* is a creeping, perennial vine with broad, trifoliate leaves and yellow flowers. The pods are short and slightly curved with 4-5 brown seeds.

F. Pantropical.

G. This is a beach plant that can be readily identified by its leaves and yellow flowers. The leaf and stem are often added to the combination medicines of the local curers.

A. *Pemphis acidula*
B. Lythraceae
D. Nigas

E. This plant grows as a shrub or small tree, always very close to the sea, with small, opposite, gray green leaves and small, white flowers. The fruit is a small, oval capsule containing many angled seeds.

F. E. Africa to the Pacific, indigenous to Guam.

G. On leeward beaches, this plant may grow into a fair-sized tree with gnarled trunk and a large, woody root system. On exposed shores it is bent shoreward or prostrate--twisting its roots into coral crevices for support. It is tolerant to salt spray and sometimes grows below the high tide mark.

A. *Thespesia populnea*
B. Malvaceae
D. Binalo

E. This is a medium-sized tree with a thick crown commonly found close to the beach on the sheltered side of the island. The leaves are heart-shaped with a long, tapering tip, long petioles and crowded near the ends of branches. The flowers are hibiscus-like, yellow in the morning, but turning light purple before they fall off during the day. The fruits are woody, about 2.5 cm. in diameter, flattened at the end, 4-5 celled and green in the unripened condition, turning brown or black with age.

F. Paleotropical.

G. This tree is called milo in Hawaii. The wood is reddish and hence, has also been given the name rosewood. The bark yields a yellow dye.

A. *Cocos nucifera*
B. Palmae
C. Coconut Plam
D. Niyok

E. The coconut plam is a tall, unbranched, graceful palm with conspicuous leaf scars. The inflorescence is borne in leaf axils, appearing as the sheathlike bract opens to reveal a cluster of straw-colored branchlets, each bearing flowers in groups of three. Pistillate flowers are borne near the base and staminate flowers toward the tip of each branchlet.

F. Unknown, the genus is East Asian or Malayo-Polynesian.

G. This versatile tree was the staff of life for most Pacific islanders and its usefulness is still greatly appreciated today. The leaves were used for thatch up until WWII and they are still woven into baskets and used for festive decoration. The husk and shell are used as firewood. The heart is edible and is used to make a crisp salad. The sap from the flower stalk is tapped to make tuba, a mildly intoxicating beverage that turns to vinegar when allowed to ferment. The water in the green nut is a sterile, nutrient-laden liquid that is used for drinking.

A. *Colubrina asiatica*
B. Rhamnaceae
D. Gasusu, Gaso'so'

E. *Colubrina* is a rambling shrub with alternate, shiny, green, dentate leaves. It is often seen growing on limestone near the beach. The axillary flowers are yellow. The fruit is pea-sized, green or dark brown when ripe.

F. Paleotropical, floating seeds govern its distribution.

G. This is a common plant on Guam, especially in the northern half of the island. It forms thickets along forest borders and near the sea. The leaf is used in many local medicines. Its most popular use is for a refreshing and analgesic tea that is made by crushing the fresh, young leaves with water.

A. *Bikkia mariannensis*
B. Rubiaceae
D. Gausali

E. *Bikkia* is a shrub with pale green, rounded, opposite leaves. The long, tubular flowers are pure white, square in cross-section and occur two or three together in leaf axils. The fruit is an elongated, two-celled capsule, dark brown when mature with many small, black seeds.

F. Endemic to Guam, other species of *Bikkia* are found in Tonga, Polynesia, Melanesia and Palau.

G. This species is restricted to exposed, limestone cliff faces and on limestone boulders near the sea. The square, pure white flowers are exceptionally beautiful and *Bikkia* was suggested as the best choice for the official flower of Guam, but unfortunately was not chosen. The stems contain a flammable element and can be used as candles for lighting when cut into short sections.

A. *Allophylus timorensis*
B. Sapindaceae
D. Nger

E. This is a shrub of rocky coastal areas with alternate, trifoliate, toothed leaves and red fruits that grow in a cluster from leaf axils. The plant may reach a height of 4-5 meters in sheltered places away from the beach. The flowers are white and very small.

F. Malaysia to the Pacific.

G. This plant is not common, but is easy to recognize by its trifoliate leaves and conspicuous red fruit.

A. *Callicarpa candicans*
B. Verbenaceae
D. Masiksik

E. This is a sprawling, woody shrub with opposite, oblong leaves, acute at the apex, medium green above and grayish white beneath. The small flowers are mauve and occur, many together in leaf axils. The fruits are in clusters of reddish berries growing close to the stem.

F. Pacific Islands

G. The leaves are a common ingredient in the medicinal combinations of the local curers.

A. *Clerodendrum inerme*
B. Verbenaceae
D. Lodugao

E. This is a trailing shrub with long, woody stems and whorled (in threes) or opposite leaves. The small flowers grow several together from leaf axils and are white with long red stamens. The fruit is black consisting of 4 nutlets.

F. Indo-Malaysia, Australia and the Pacific.

G. This is an attractive plant that grows on rocky coasts, sometimes very near the sea or at the edge of the jungle. The crushed leaves are reported to be effective in preventing the swelling of bruises when applied topically. The roots are used in the treatment of fever.

Slash Burn Technique

Farm

The farm community consisting of the ranch, surrounding useful wild flora and cultivated plants is characterized by cultural activity rather than natural features because it is the result of the islander's modification of the natural environment. Hence, the farmed area can lie amidst the limestone forest, strand or savannah communities depending on the preference of the farmer.

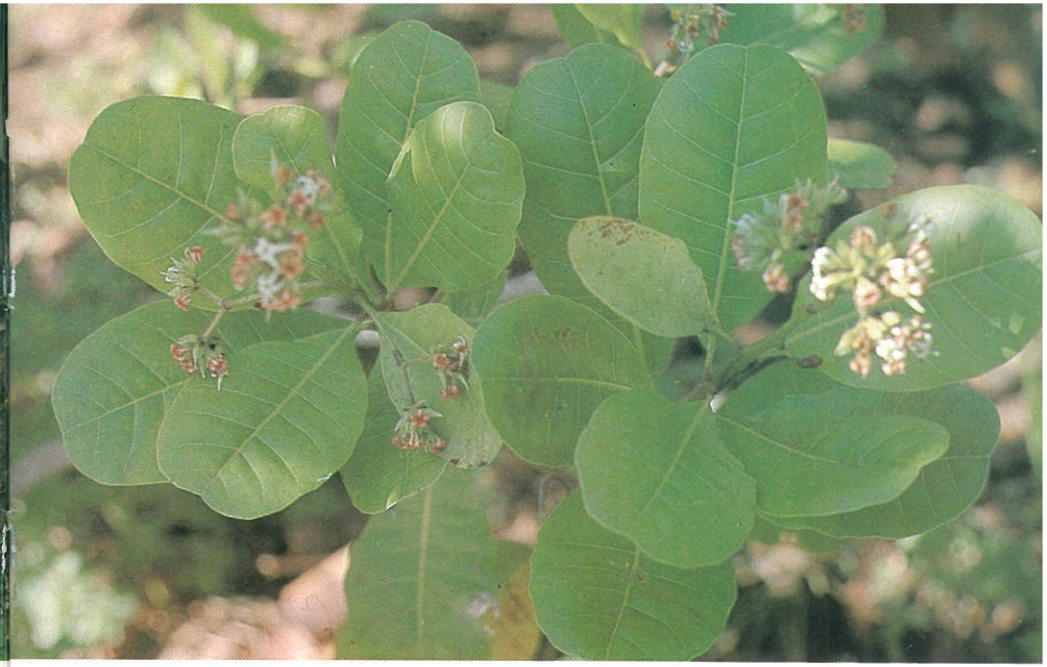
The building of a ranch starts with clearing the land, usually dense undergrowth, by the slow process of slash-burn technique. Trees and shrubs are cut with the machete, piles of debris are formed and later the dried material is burned to rid the land of refuse and to fertilize the soil with ashes. If any wild trees of value are found on the property, they are spared the machete's blade. Such useful trees may be pandanus, coconut, lemon or guava.

When the land is cleared, the rancher plants banana shoots, taro shoots, tapioca, yam tubers and sweet potato leaf tips. Seeds of various vegetables and spices that grow in the lateritic soil of Guam are also planted. The most commonly grown plants are beans, corn, pumpkins, hot peppers and tomatoes. The seeds or shoots needed to initiate a ranch garden are easily obtained from neighbors. The person wishing to start

a garden may spend a day visiting the ranches of various friends and relatives, collecting desired plant specimens from which the garden will be started. This is a retention of some of the reciprocity in traditional Chamorro economic exchange. After the garden is flourishing, the rancher can easily multiply his plants by splitting tuberous roots and drying part of his yield for seed.

Most ranches have a small sleeping hut and an outside cooking area. Ranches are extensively used as the central location for hunting, gathering and fishing expeditions in surrounding areas. There is seldom electricity or water so cooking is done on open wood fires and water is collected in rain barrels. Water is plentiful during the rainy season when most vegetables are grown. During the dry season, vegetable growing is reduced to a minimum, but the land is kept clear and the larger trees are tended. The food produced is mostly for family consumption. There is seldom any effort put into producing a marketable surplus and the erratic production would not meet commercial grocery retailer's need for a consistent flow of produce.

Common vegetables such as tomatoes, green onions, eggplant and cucumbers are not listed in the subsequent descriptions, rather the cultivated flora that is less identifiable and more uniquely Chamorro in usage, is depicted for the reader.



A. *Anacardium occidentale*
B. Anacardiaceae
C. Cashew
D. Kasoi

E. Cashew is a large, spreading tree with leathery, obovate leaves. The flowers are yellowish-pink, fragrant and occur in panicles at branch ends. The edible fruit is yellow and about 8 cm. long with a kidney-shaped seed attached at the end.

F. Native in Tropical America, planted in many warm countries for its edible parts.

G. The fruit is edible, as is the nut after being removed from the poisonous sheath and roasted.

A. *Mangifera indica*
B. Anacardiaceae
C. Mango
D. Mangga

E. The mango is a medium to large tree with a dense crown. The leaves are long, narrow and spirally arranged along the branchlets. The flowers are yellowish and occur in large panicles. The fruit is flattened from side to side, ovoid, pointed at one end and hangs straight down on a long stem.

F. Native of India, introduced to most warm countries of the world. This is the best known of tropical fruits.

G. The immature green fruit is popularly eaten raw with salt and hot pepper, or pickled. The mature fruit is still green when ripe, but is soft and yellow on the inside and has a delicious flavor. Recently, hybrid varieties of a larger size, smoother consistency, and brilliantly colored with red and yellow skins have been introduced to the island.

A. *Annona muricata*
B. Annonaceae
C. Soursop
D. Laguanaha

E. Soursop is a small tree with light green foilage. The flowers are small and yellowish and usually occur singly. The fruit is heart-shaped, curved slightly at the base and covered with fleshy or soft spines.

F. Tropical America, cultivated in Guam and other tropical countries.

G. The soft, green mature fruit is edible when ripe, with a sweet tropical flavor.

A. *Annona reticulata*
B. Annonaceae
C. Custard Apple
D. Annonas

E. Annonas is a small to medium-sized tree with dark green foilage. The flowers are greenish and may occur singly or in groups of 2-3. The fruit is heart-shaped and covered with small depressions.

F. Tropical America, cultivated in Guam as well as other tropical areas.

G. The reddish, mature fruit contains a sweet, fleshy pulp. This species was introduced and is often cultivated but has naturalized in river valleys, especially in central Guam, such as the Maina area.

A. *Annona squamosa*
B. Annonaceae
C. Sugar Apple, Sweetsop
D. Atis

E. Atis is a small tree with narrow, alternate leaves and greenish, axillary flowers. The fruit is rounded, about 10 cm. wide and has the form of an artichoke.

F. Tropical America, planted in many tropical places for the fruit.

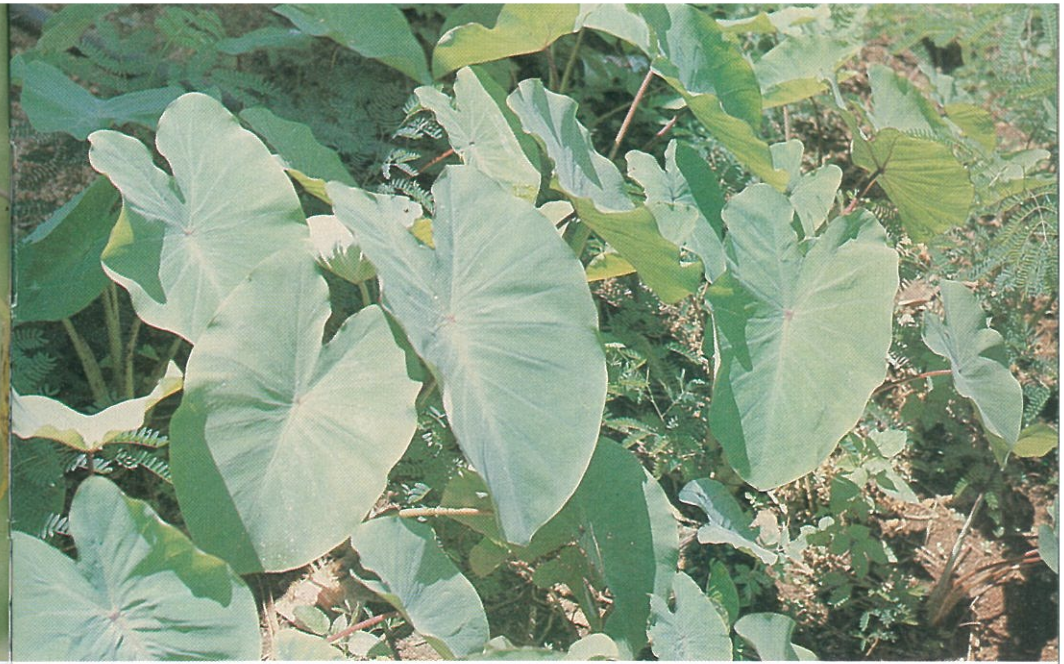
G. When the green, reticulated segments of the fruit split and show a pinkish tinge, the fruit is ripe and edible. The fleshy pulp is slightly sweet with a custard-like consistency. It is a favorite of children.

A. *Cananga odorata*
B. Annonaceae
D. Alangilang

E. This is a medium-sized tree with simple, alternate leaves arranged along one side of the branch so that the branch is flat. The leaves are medium green and oblong-ovate. The flowers are yellow with elongated, narrow petals, rather large and very fragrant (particularly at night). The fruit is many seeded, black and ovoid in shape.

F. Indo-Malaysia.

G. This tree was probably introduced from the Philippines where it is known as ilangilang. The scented flowers are soaked in coconut oil to make a pleasantly perfumed body lotion that is sometimes thought to ward off malevolent spirits to cure spirit-caused illnesses.



A. *Colocasia esculenta*
B. Araceae
C. Taro
D. Sunin agaga'

E. This is a large perennial herb with heart-shaped leaves arising from an underground tuber. The leaves are green or purplish with a down-pointing tip. The flower spike is clothed in a yellow sheath.

F. Tropical Asia and the Pacific.

G. The mature root is boiled as a starchy vegetable. The young leaf and stem can also be eaten and are usually diced and boiled with coconut milk. The early morning dew that collects in the leaf is thought to be an excellent medicinal eyewash. This species of taro grows best in moist soil and is usually planted in a water drainage area such as around the outdoor sink or pig sty.

A. *Xanthosoma sagittifolium*
B. Araceae
C. Taro
D. Sunin Honolulu

E. This is a very large, tuber-bearing herb. The leaves are light green and spearhead-shaped with long petioles. The flower spike grows out of the crown on an erect stem or peduncle and is clothed in a bract that exceeds the length of the spike.

F. New Guinea and the Southern Pacific Islands.

G. This species of taro is not yet as prevalent on Guam as *Colocasia*, but is gaining in popularity because of the excellent quality of its large tubers. It does not need as much moisture as *Colocasia*.

A. *Bixa orellana*
B. Bixaceae
C. Lipstick Plant
D. Achote

E. Achote is a small tree with dark green, alternate, long-stemmed leaves and white flowers about 5 cm. broad. The fruit is a spiny pod which opens while still on the tree, exposing the red seeds.

F. A native of Tropical America and introduced to Guam by the Spanish from Mexico. It is grown in warm countries for its use as a dye.

G. A red coloring and mild flavor are extracted from the small red seeds by squeezing them with water. The coloring is used to make the popular red rice, seen at all fiestas. The coloring is also added to meat as a spice, when the dish becomes known as adobo. This plant is the "arnotto" of commerce and is used extensively as a food coloring.

A. *Ceiba pentandra*
B. Bombacaceae
C. Kapok
D. Atgodon de Manila

E. Kapok is a medium to large, deciduous tree with tiered, horizontal branches and palmately compound leaves of 5-9 leaflets. The fruits are oblong, smooth and light green in color. While still on the tree, the fruits burst open after the leaves have fallen, exposing the cottonlike substance which is the kapok of commerce.

F. A native of India and Africa. Until recently, it was widely cultivated in the tropics.

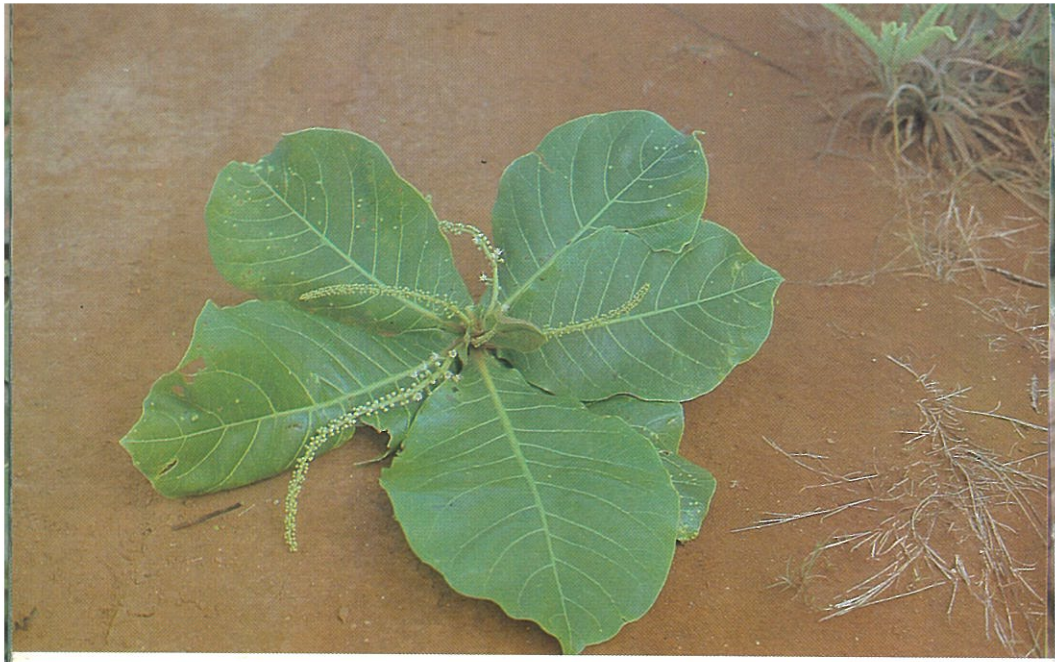
G. The cotton-like substance found in the mature seed pods of this tree was once used for padding in the clothing industry, particularly for women's clothing. It has now been almost entirely replaced by synthetics but is still occasionally used on Guam for stuffing pillows.

A. *Carica papaya*
B. Caricaceae
C. Papaya
D. Papaya

E. This is a soft-stemmed, usually unbranched tree with large, deeply lobed, long petioled leaves. Male and female trees are separate except in some cultivated varieties. The male flowers occur in large-branched panicles; the female flowers, also white, grow singly from leaf axils on very short stems. The fruit is variable in size and orange when ripe. The flesh is yellow or red.

F. Native to Central America and widely cultivated in tropical regions. It is naturalized on Guam.

G. The mature fruit is eaten raw and the immature, green fruit is pickled or boiled as a vegetable. A variety of hybrid types exist and round or elongated fruits can be seen. The wild, naturalized variety has a small, edible fruit, but it is usually used for pig feed as the hybrid varieties are preferred.

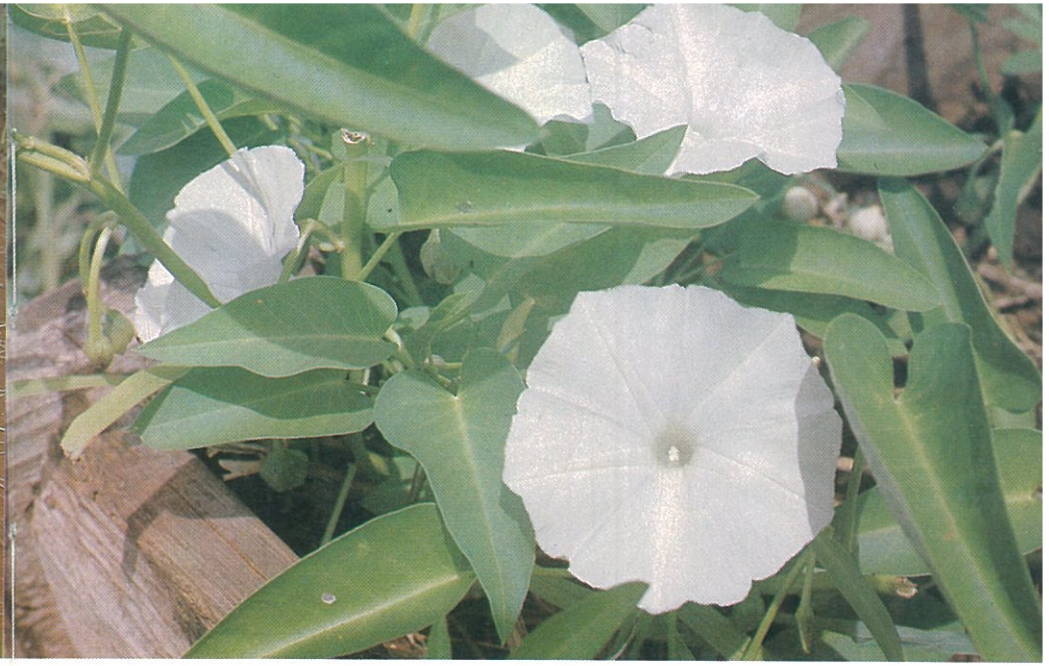


A. *Terminalia catappa*
B. Combretaceae
C. Tropical Almond
D. Talisai

E. This is a small to medium-sized tree with whorled horizontal branches and large obovate, dark green leaves. The flowers are axillary and occur in slender spikes. The fruit is flattened or compressed and narrowly winged. The leaves often turn red before falling and at times may be badly worm-eaten

F. Pantropical.

G. The nutlike seed is edible and is a well known plant to the Guamanians. A native species *T. littoralis* grows here also.



A. *Ipomoea aquatica*
B. Convolvulaceae
C. Swamp Cabbage
D. Kangkun

E. This is a floating vine that grows in fresh water ponds or in very wet soil. The leaves are narrow, heart-shaped or arrowhead-shaped when growing in full sunlight and pale green. The flowers are white and may occur singly or several together.

F. Cultivated in most tropical countries.

G. This cultivated vine grows best in constant wet soil and is valued for the leaf and stem that are boiled or fried as an excellent vegetable, tasting very much like spinach. It is a popular vegetable in the Orient and the Chamorro name (kangkun) is Chinese in origin.

A. *Cucurbita moschata*
B. Cucurbitaceae
C. Pumpkin Squash
D. Kalamasa

E. Kalamasa is a creeping vine with large, 5-6-lobed leaves and branching tendrils. Male and female flowers are separate and are both yellow. The female flowers are solitary. The fruit is large and wider than it is long.

F. Native to Tropical America.

G. The young, green fruit is peeled, sliced and fried as a vegetable. The large, mature, yellow fruit is grated and cooked with sugar as a preserve or pastry filling. The leaf tips of the vine are also used as a cooked vegetable.

A. *Lagenaria siceraria*
B. Cucurbitaceae
C. Vegetable Gourd
D. Kalabasa

E. The vegetable gourd is a climbing vine with 5-angled heart-shaped leaves. The flowers are white and the fruit is variously shaped, smooth, green and sometimes mottled.

F. Native to Tropical Asia and Africa.

G. The long, green mature fruit is peeled, then diced and boiled to provide a watery, relatively tasteless vegetable.

A. *Luffa acutangula*
B. Cucurbitaceae
C. Vegetable Sponge
D. Patola

E. This is a rather coarse vine, bearing forked tendrils and heart-shaped, shallow-lobed leaves. The large yellow flowers grow from leaf axils; male flowers in racemes, female flowers solitary. The fruit is oblong with ten sharp, longitudinal angles.

F. Native to India and widely cultivated in Tropical Asia.

G. The young, green seed pods of this vine are sliced and cooked as a vegetable. The dried seed pods were once used as a fibrous sponge.

A. *Momordica charantia*
B. Cucurbitaceae
C. Bitter Cucumber, Bitter Melon
D. Atmagoso

E. Bitter melon is a cultivated vine bearing tendrils, numerous forked branches and dense foilage. The leaves are heart-shaped, 3-5 lobed and up to 10 cm. wide. The flowers are yellow, solitary and grow from the leaf axils. The fruit is cylindrical, warty and orange when ripe. A smaller wild variety grows here in waste places and along roadsides with a more slender vine and smaller fruit.

F. Southeast Asia, now widely cultivated.

G. The green fruit is edible and is usually pickled before reaching maturity.

A. *Dioscorea alata*
B. Dioscoreaceae
C. Red Yam
D. Dagu

E. The red yam is a high-climbing vine with opposite, heart-shaped leaves and a thick, edible underground tuber. The stems are square and winged. The leaf axils often bear small aerial tubers. Male and female flowers occur separately on the branches

F. Native to Southeast Asia, widely cultivated in the tropics.

G. This cultivated yam is a popular food item. It is usually boiled and then peeled. The taste is sweet and starchy. It is planted at the base of a tree or amidst a network of poles so that it can climb when growing

A. *Dioscorea esculenta var. fasciculata*
B. Dioscoreaceae
C. Wild Yam
D. Nika

E. This is a tuberous vine with heart-shaped leaves, that form a thick mat of vegetation growing out of a stem just under the surface of the soil. Male and female flowers grow separately from leaf axils. This species may or may not have thorns growing from the corm or underground stem.

F. Indigenous or introduced by the Precontact islander on Guam. It is cultivated on farms or found naturalized in the limestone forest.

G. The tuber of this yam is starchy and edible when cooked. It is usually boiled, then peeled to reveal a slightly sweet, white potato-like vegetable.

A. *Dioscorea esculenta var. spinosa*
B. Dioscoreaceae
C. Spiny Yam
D. Gadó'

E. This yam is similar to *var. fasciculata* except for the abundant thorns that grow from the roots and stick straight up from the surface of the soil. The tuberous roots of a single plant number from one to as many as seven and vary in size because of different growth stages. The tubers and stem are also thorny, but the thorns are not as stiff as those in the root structure which can easily penetrate rubbersoled shoes.

F. Indigenous or naturalized on Guam by the Precontact islanders. It can be cultivated or found growing wild in the limestone forest where there is a pocket of soil.

G. This yam is most often found growing in thickets of *Triphasia*. Harvest time is determined by the yellowing of the heart-shaped leaves which stand out against the background vegetation on cliffsides, making lucrative digging areas recognizable. The root system is extremely dense and thorny and to remove it, even with a machete is an arduous task. The tubers that are 15-20 cm. or longer in length are taken and the smaller tubers replanted.

A. *Jatropha cnidoscolus*
B. Euphorbiaceae
D. Kadagan

E. This is a large, succulent shrub with thick stems and dark green, deeply-lobed, long-petioled leaves. The flowers are white and occur at the ends of branches. The plant is not known to bear fruit on Guam and is easily propagated by cuttings.

F. Probably a native of Tropical America.

G. Kadagan is seen on many farms and in backyard gardens. It grows well in either sun or shade, but becomes a much fuller shrub in deep shade. The young, glossy leaf tips are used as a cooked vegetable with the taste and appearance of spinach or collard greens. It is often seen at local fiestas, cooked with chicken soup or baked with fish or other meat, when it is called "eskabeche."

A. *Manihot esculenta*
B. Euphorbiaceae
C. Tapioca, Cassava
D. Mendioka

E. Tapioca is a bushy herb with palmately divided leaves of 3-7 lobes. The flowers grow from leaf axils. The fruit is a rounded capsule. The root system is composed of multiple, elongated tubers.

F. Native to Brazil, Pantropical in cultivation.

G. There are two variations of tapioca cultivated on Guam. The short, fast-growing, green-stemmed, dull-leafed variety produces multiple tubers that are small, but do not need soaking to remove a toxic substance. If in doubt as to whether the tubers of a particular variety must be soaked, it is best to consult a knowledgeable Guamanian. The variety to be soaked takes longer to mature, grows taller and has red stems with glossier leaves. The tubers from both varieties are peeled before cooking with coconut milk to provide a starchy, potatolike vegetable with a slight acrid taste.

A. *Phyllantus acidus*
B. Euphorbiaceae
C. Tahitian Gooseberry
D. Iba'

E. Iba' is a small tree with acute, ovate leaves, 5-7 cm. long, arranged alternately but very close together in one plane, along the twigs. The flowers are reddish and occur along the branches after the leaves have fallen. The fruit is yellow, waxy, about 2 cm. thick and 6-8 ridged.

F. A native of the East Indies, introduced to many tropical countries for its edible fruit.

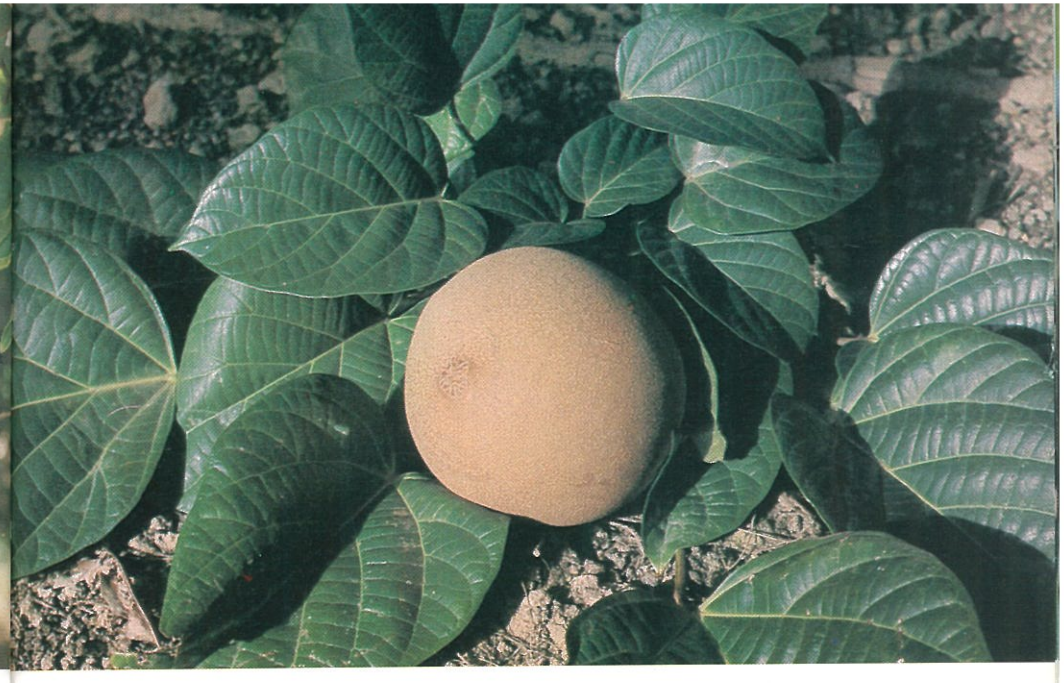
G. The mature fruit is very sour and is eaten raw when it reaches a yellow color. It is a favorite of children

A. *Aberia hebecarpa*
B. Flacourtiaceae
C. Ceylon Gooseberry
D. Ketambilla

E. This is a small, shrubby tree with oblong, pointed leaves and sharp, axillary spines. The flowers grow along the stems and are inconspicuous, with male and female flowers on separate plants. The fruit is dark purple, grapelike and hairy with a persistent calyx.

F. Native to Ceylon, now widely cultivated in the Tropical World.

G. The mature fruit is edible with a taste and consistency similar to the American gooseberry. The fruit can be eaten fresh or made into preserves.



A. *Pangium edule*
B. Flacourtiaceae
C. Football Fruit
D. Lasret

E. This is a medium to large tree with large, glossy, heart-shaped leaves that are conspicuously veined and long-stemmed. The flowers are large and greenish; the sexes are separate. The fruit is oval and about the size of a large husked coconut, brown and rough-surfaced.

F. A Malaysian species, introduced to some Pacific islands for its edible fruit.

G. The mature fruit is edible, however, the seeds are extremely poisonous and should not even be tasted.

A. *Saccharum officinarum*
B. Gramineae
C. Sugarcane
D. Tupo

E. Sugarcane is a tall perennial grass with thick stems and long, broad leaves. The nodding flower panicles are silvery and up to 50 cm. long.

F. Cultivated in most tropical countries. It is thought to have originated in India.

G. Sugarcane was probably brought to Guam by the Pre-contact Chamorro. It is chewed for its sweet taste or can be pressed to render a syrup that is used to make sugar.

A. *Persea americana*
B. Lauraceae
C. Avocado, Alligator Pear
D. Alageta

E. This is small to medium-sized tree, usually richly branched with large, dark green leaves. The flowers are yellowish and occur in large panicles near the ends of branches. The fruit is green or purple with a single large seed.

F. A native of Tropical America, it is widely cultivated in tropical areas of the world.

G. The mature fruit may be either green or purple and is soft when ripe. Once peeled, a rich yellow green pulp is revealed. It is most commonly eaten with salads, but can also be baked. A variety of hybrids can be found on the island, accounting for color variation and the round to elongated shape of the fruit.

A. *Erythrina variegata*
B. Leguminosae
C. Coral Tree
D. Gaogao,Gabgab

E. This is a stocky, deciduous tree with trunk and branches bearing sharp prickles. The leaves are trifoliate and long-stemmed. The flowers are bright red. The pods are 15-20 cm. long, containing several red seeds.

F. Native of India, Malaysia and the Pacific.

G. This tree is often planted for its showy flowers which appear during the dry season after the leaves have fallen. The leaves are used as a supplementary ingredient in the all-purpose medicinal tea of one of the local suruhanos.

A. *Pachyrrhizus erosus*
B. Leguminosae
C. Yambean, Turnip Bean
D. Hikamas

E. Yambean is a high-climbing vine with large, coarsely-lobed, compound leaves and dark blue flowers. The pod is brown, velvety, about 10 cm. long and depressed between the seeds.

F. Native to Tropical America. Cultivated in tropical countries as a food item.

G. The single, tuberous root is peeled and eaten raw. It is sweet and has the appearance of a raw potato. The root can also be cooked or pickled.

A. *Pithecellobium dulce*
B. Leguminosae
C. Camachile
D. Kamachile

E. This is medium-sized, spiny tree with compound leaves composed of two paired, light green leaflets. The flowers are white and occur in rounded heads. The pod or fruit is twisted or coiled and white with reddish streaks.

F. Southeast Asia and the Philippines. Introduced to Guam from Tropical America.

G. This tree has a hard wood that is valued as firewood. It was brought to Guam from Mexico and is most commonly seen in the central part of the island growing where there has been previous scraping of the land. It is common in the Mangilao area. Camachile was introduced as a natural source of tannic acid which is contained in the bark. The bark was stripped from the trunk and formed into a trough-shaped container that was used to soak and cure carabao, cattle and deer skins. The fruit of the tree is also edible when pink and mature, but contains little pulp and is not a popular food item.

A. *Psophocarpus tetragonolobus*
B. Leguminosae
C. Wingbean
D. Sigidiyas

E. The wingbean is a slender, climbing vine with compound leaves and racemes of blue flowers. The pod is four-winged with a wavy margin.

F. Indo-Malaysia.

G. The young seed pods are cooked as a vegetable or pickled. The tuberous root is also edible, but is rarely eaten because the yield of beans is much greater than the food value of a single tuber.

A. *Sesbania grandiflora*
B. Leguminosae
D. Katuraie

E. *Sesbania* is a small tree with long, drooping branches and compound leaves. The flowers are irregular, 7-9 cm. long and white or dark pink. The pods are long and slender and hang down from the branches like icicles.

F. India and Tropical Asia, introduced to Guam from the Philippines.

G. The young, green bean pods are used as a cooked vegetable. The flowers are also edible. The stamens and pistil are removed and the petals are dipped in boiling water for one minute and then baked with meat. The food value of the tree is more commonly realized by the Filipino residents rather than the Guamanians on the island.

A. *Tamarindus indica*
B. Leguminosae
C. Tamarind
D. Kalamendo'

E. This is a medium to large, spreading tree with large, pinnately compound leaves having 10-20 pairs of leaflets. The flowers are yellow with pink veins. The pod is reddish brown, velvety and 5-20 cm. long with few seeds embedded in a brown pulp.

F. Native to Tropical Africa and Asia. It is grown throughout the tropics as an ornamental and for its edible fruit.

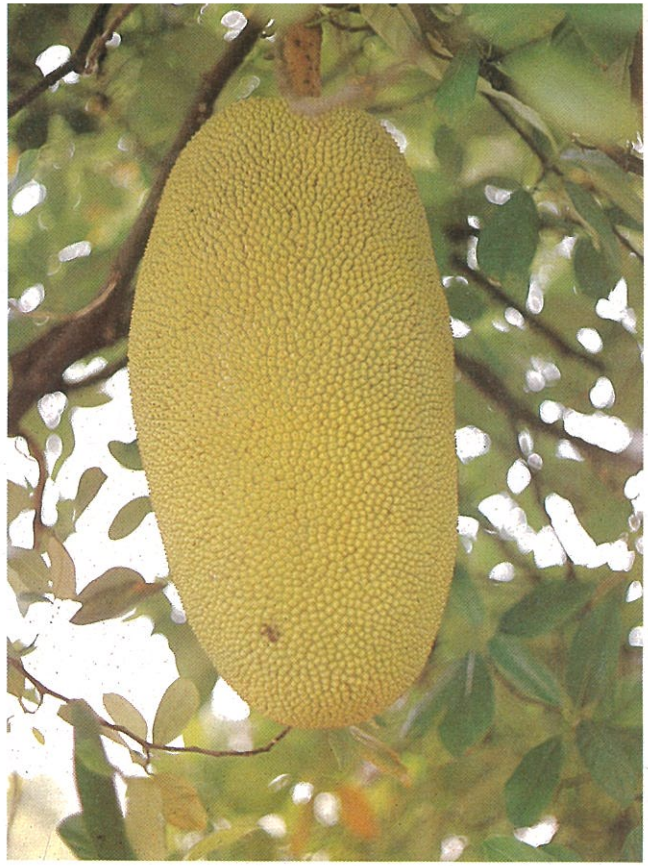
G. The fleshy pulp within the seed pods is eaten raw and is mostly preferred by children. This tree is becoming a rather rare species on Guam.

A. *Artocarpus altilis*
B. Moraceae
C. Infertile Breadfruit
D. Lemai

E. Lemai is a large tree with dark green, deeply lobed leaves that are somewhat lighter green on the underside. The fruit is borne on a thick stem growing from leaf axils on small branches.

F. Malaysia and the Pacific.

G. The fruit contains no fertile seeds and the trees are propagated from young sprouts that emerge from the roots or more recently by air-layering. The slightly sweet, starchy fruit is baked, fried or cooked over an open fire when soft and mature. The green fruit takes on a yellowish tinge when mature. In prewar times, the fruit was preserved in underground pits or sliced and dried over a slow fire and then sealed in containers.



A. *Artocarpus heterophylla*
B. Moraceae
C. Jackfruit
D. Langka

E. The jackfruit is a medium-sized tree with simple, oval or oblong leaves. The fruit, which weighs up to 40 lbs. is green and grows from the trunk or lower branches.

F. Native to Indo-Malaysia. It is planted in many tropical countries.

G. Langka is the Tagalog name for this fruit and has only recently been adopted by the Guamanians so that trees of fruit-bearing age are just beginning to make their appearance on the island. The jackfruit, however, is a common staple food throughout many countries in Southeast Asia. The ripe fruit is eaten raw or preserved with sugar.

A. *Moringa oleifera*
B. Moringaceae
C. Horseradish Tree
D. Moronggaie

E. This is a small tree with light green, pinnately compound leaves. The flowers are white and grow in panicles from the leaf axils. The fruit is an elongated, three-angled pod, up to 30 cm. long.

F. Native to India, it has been widely introduced to tropical countries.

G. This tree makes a handsome ornamental because of its attractive clusters of small white flowers. The tree is also valued as a source of food. The leaf tips, flowers and immature, green seed pods can be used as a cooked vegetable.

A. *Eugenia uniflora*
B. Myrtaceae
C. Surinam Cherry
D. Pitanga

E. The surinam cherry is a shrub with opposite leaves and dark red, longitudinally-grooved fruit. The flowers are white and grow from the leaf axils. The newest leaves are reddish.

F. Native to Brazil, now cultivated in many tropical countries.

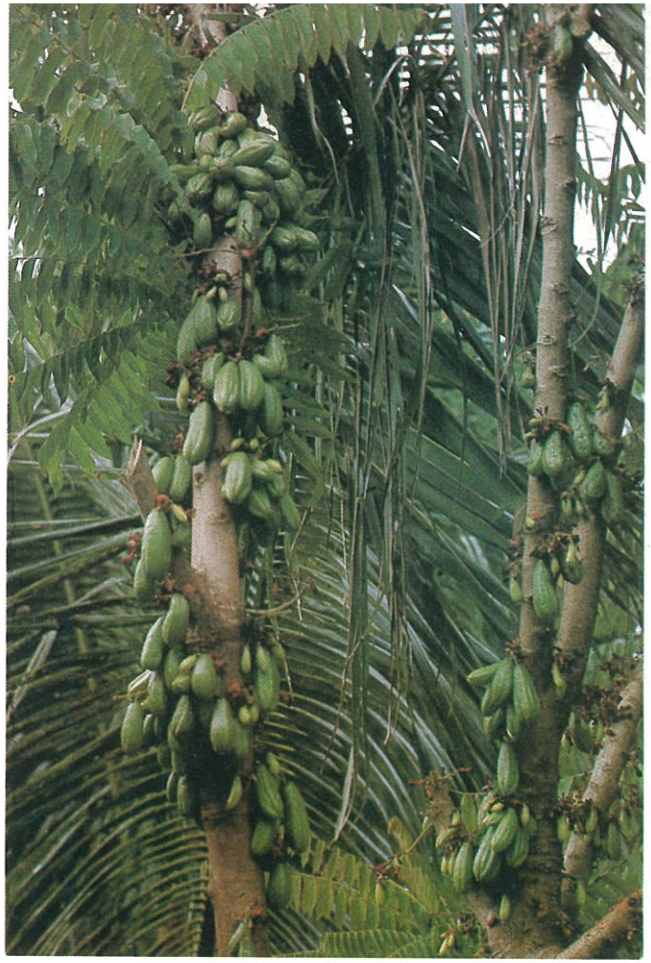
G. As the fruit matures, its successive color changes are green, yellow, orange and finally red, when it is edible and sweet.

A. *Psidium guajava*
B. Myrtaceae
C. Guava
D. Abas

E. Guava is a shrub or small tree with smooth, reddish-brown bark and opposite, oblong leaves. The flowers are showy with white petals, fragrant and about 3 cm. in diameter. The fruit is about the size of a lemon, yellow when ripe and tipped with the remains of the calyx.

F. Native to Tropical America and widespread in cultivation in tropical countries. It is cultivated and has naturalized on Guam.

G. The green or mature yellow fruit is eaten raw. It can also be used to make preserves or wine. Recently, hybrids have been introduced from Hawaii. Occasionally seen are the larger pear guava which, as the name implies is pear-shaped with a white pulp. Also cultivated is the pineapple guava which is larger than the common, naturalized variety and has a bright pink, very sweet pulp. The leaves of this tree are often added to local medicinal combinations.



A. *Averrhoa bilimbi*
B. Oxalidaceae
C. Cucumber Tree
D. Pickle

E. The pickle tree is small with long, pinnately compound leaves that are clustered at branch ends. The leaflets are numerous, pointed and 3-10 cm. long. The flowers are red and white and arise from the trunk and lower branches. The fruit is green, waxy and 5-8 cm. long.

F. Pantropical, widespread in cultivation.

G. The mature, green fruits are pickled or eaten raw. They have a high content of oxalic acid, which makes the fruit distasteful to all except the most hardy.

A. *Averrhoa carambola*
B. Oxalidaceae
C. Starfruit
D. Bilimbinis

E. This is a small, richly branched tree with dense foilage. The leaves are compound with 8-10 paired leaflets, plus a terminal one. The flowers are red and white and occur in clusters along the branches. The fruit is waxy and yellow when ripe, 5-12 cm. long and deeply five-lobed. In cross-section, it is star-shaped.

F. Native to Malaysia, Pantropical and widely cultivated.

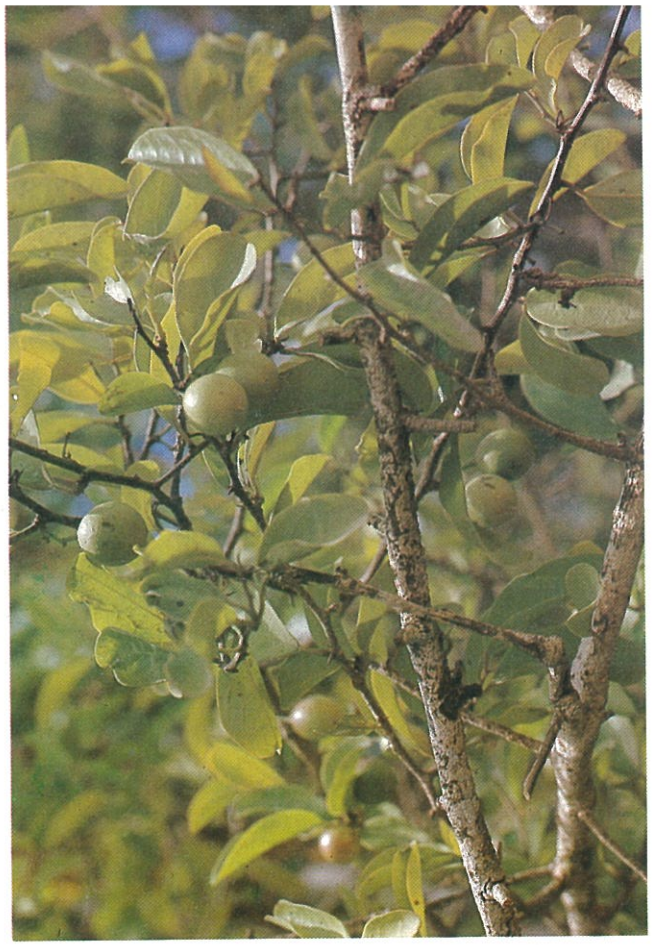
G. The mature, yellow-orange fruit is eaten raw or candied with sugar.

A. *Piper betle*
B. Piperaceae
C. Betel Pepper
D. Pupulu

E. The betel pepper is a high-climbing vine with heart-shaped, dark green, glossy leaves. The flowers are borne in narrow spikes. The fruits are rounded and imbedded in the tissue of the spike.

F. A native of India and eastward through Malaysia to the Pacific. It is cultivated in many tropical regions.

G. The leaf is an aromatic that can be chewed alone for its refreshing taste, but is most often used with a combination of betelnut (*Areca cathecu*) and powdered lime that is rendered by burning coral.



A. *Ximenia americana*
B. Proteaceae
C. Sour Plum
D. Pi'ot

E. This is a spiny shrub or small tree with alternate, elliptic leaves. The flowers are white and fragrant. The fruit is yellow when mature and about the size and shape of an olive.

F. Pantropical.

G. The pulp of the mature fruit is eaten raw as a condiment. The seed is considered toxic and should not be eaten.

A. *Punica granatum*
B. Punicaceae
C. Pomegranate
D. Granada

E. Pomegranate is a spiny shrub, six feet or more tall, with glossy, light green leaves. The youngest leaves are reddish. The flowers are showy, orange-red, about 2.5 cm. in diameter and grow from branch ends in a cluster of four or five. The attractive fruit is red or yellow, 5-12 cm. wide and tipped with a thick calyx. The seeds are enclosed in a pink tissue.

F. A native of Iran, now widely grown in tropical countries for its edible pulp and attractive flowers.

G. The pulp that surrounds the many seeds of the mature fruit is eaten raw. This fruit has been mentioned in historical literature since biblical times. In many countries, the bark of the tree is boiled and the tea taken internally as a vermifuge, killing intestinal parasites. However, it is not used in this capacity on Guam. Here, the leaves are crushed and added to a mixture of other herbs and administered as a suppository for the treatment of rectal infections.

A. *Zizyphus mauritiana*
B. Rhamnaceae
C. Philippine Apple
D. Mansanan Tagalo, Mansanan Potaki

E. This is a small tree or shrub with prickles and small, alternate leaves. The leaves are three-veined, pale green above and covered with white or gray hairs on the underside. The flowers are greenish and the fruit is nearly round and orange-colored when ripe.

F. Native to Asia.

G. The mature fruits are edible and are a favorite of children.

A. *Citrus aurantium*
B. Rutaceae
C. Sour Orange, Seville Orange
D. Kahet, Lemon

E. This is a small, spiny tree with ovate, dark green leaves and broadly winged petioles. The fruit is slightly flattened, rough-skinned and orange when ripe. The pulp is very sour with many seeds. The flowers are white.

F. Native of Southeast Asia, cultivated throughout the tropics.

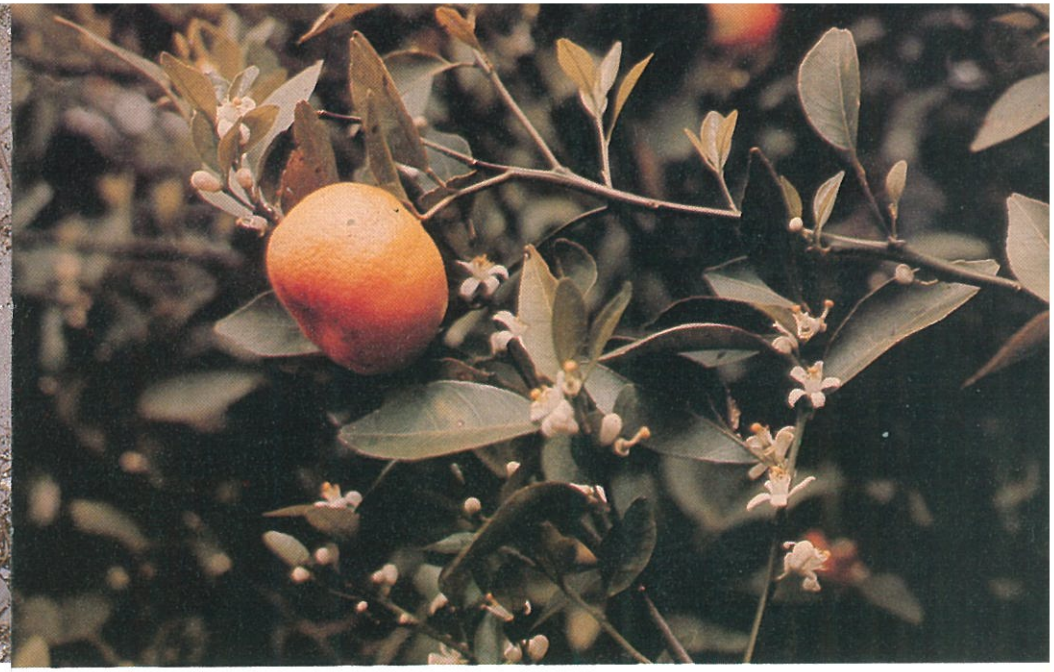
G. The fruit is very sour and used for cooking, making sauces and for orangeade.

A. *Citrus limon*
B. Rutaceae
C. Wild Lemon
D. Lemonchina

E. This is a small thorny tree with dark green leaves. The leaf petioles are winged and jointed with the blade which makes this species distinctive. The flowers are white and fragrant. The fruit is nearly round with a yellow skin and contains many seeds.

F. Native to Asia. Many varieties are known in California, Hawaii, Florida and other tropical areas.

G. The perfumed juice of this many-seeded citrus fruit is used for cooking and most popularly in finadene sauce when it is mixed with onion, salt and hot pepper. The Guamanians dip almost any type of cooked meat or vegetable into this sauce. The juice is also used for making kelequen--the juice is added to raw deer, fish, shrimp or undercooked chicken for a popular Guamanian food. Many times, the yellow skin of the fruit is cut away while squeezing the juice so that the high acid content of the rind will not make the juice bitter. The juice of this lemon was once used extensively by women to shampoo their hair.



A. *Citrus reticulata*
B. Rutaceae
C. Tangerine
D. Lalangita

E. This is a small, spiny tree with dark green leaves. The fruits are orange-colored when ripe, rounded and slightly depressed with an easily removed skin.

F. Originated in Asia, widely cultivated in most tropical countries.

G. This is a common tree found on ranches and around homesites and valued for its edible fruit.

A. *Chrysophyllum cainito*
B. Sapotaceae
C. Star Apple

E. This is a large,densely foliated tree with drooping branches. The leaves are bright green on the upper surface and gold beneath. The flowers are small, growing from leaf axils on the underside of branchlets. The fruit is rounded, 6-8 cm. wide, smooth and purple when ripe. The flesh is purplish and star-shaped in cross-section.

F. Native to Tropical America, grown in many tropical areas for its edible fruit.

G. The mature fruit is very sweet and eaten raw.

A. *Manilkara zapota*
B. Sapotaceae
C. Sapodilla
D. Chikle, Chiko

E. This is a small, compact, thickly foliated tree with dark green leaves and white axillary flowers. The fruit is egg-shaped, with a rough, brown surface when ripe.

F. Native to Central America, introduced to tropical areas for its edible fruit.

G. The mature fruit is eaten raw.

A. *Pouteria campechiana*
B. Sapotaceae
C. Eggfruit

E. This is a medium-sized tree with bright green, narrow leaves and greenish-white flowers. The fruit is ovoid, 5-10 cm. long and yellow, with a thin skin.

F. Native to South America.

G. The fruit is edible when mature, but not very desirable as a food item except in times of starvation. When eaten raw, the fruit has the flavor of a sweet, hard-boiled egg which accounts for the name.

A. *Capsicum frutescens*
B. Solanaceae
C. Hot Pepper, Chili Pepper
D. Done' Machalek

E. Chili pepper is a many branched shrub with alternate leaves and whitish or violet tinted, terminal flowers. The podlike berries are about 3 cm. long and vary in color.

F. Native to Tropical America. It was introduced to Guam and is now considered naturalized.

G. The seed pods, either green, yellow, orange or red in color, are used as a spice in cooking, pickling and in sauces. Rarely does the Guamanian eat a meal without hot pepper. The leaf is also edible and is sometimes cooked with fish.

A. *Theobroma cacao*
B. Sterculiaceae
C. Cacao
D. Kakao

E. Cacao is a small tree with simple, alternate leaves. The flowers are yellow, with about ten stamens and arise, several together, from the trunk and older branches. The fruit is red and yellow, with longitudinal ridges and is about 20 cm. long.

F. Native to South America, now commercially grown in many tropical countries as a source of chocolate.

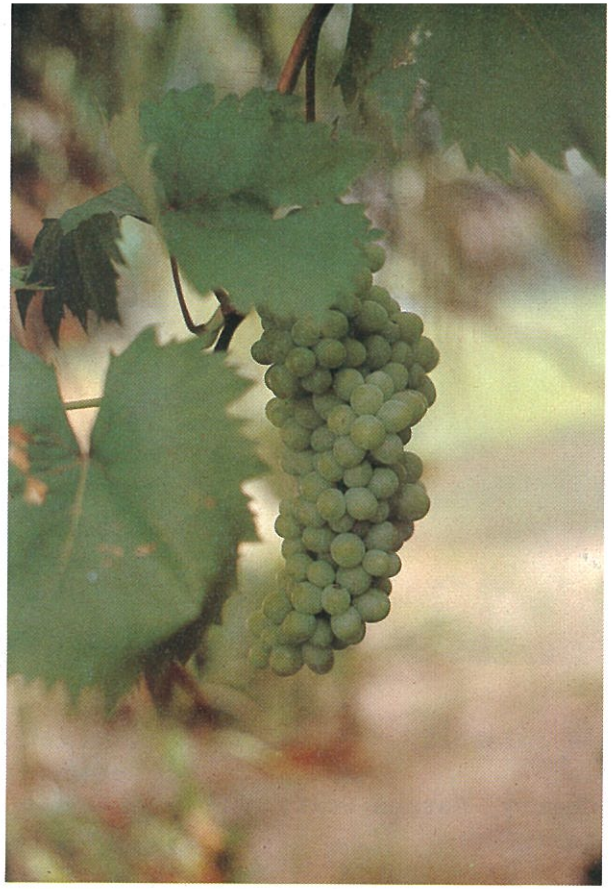
G. The seeds from the mature pod are toasted and ground to make chocolate, usually prepared as a beverage. The tree was grown more extensively during the prewar colonial era.

A. *Muntingia calabura*
B. Tiliaceae
C. Panama Cherry, Parsma Berry
D. Mansanita

E. This is a small tree with tiered branches and numerous, simple, alternate, toothed, asymmetrical leaves. The flowers are white and the fleshy, grapelike fruit is pinkish, slightly flattened and has many seeds.

F. A native of Central America, introduced to Guam.

G. The fruit is edible and may be eaten raw or made into jelly or jam. It is a favorite of small children. The tree is popular around houses as an ornamental. It is a fast-growing shade tree and should be cultivated for this purpose. Having escaped cultivation, the trees can be seen along many of Guam's roads.



A. *Vitis rotundifolia*
B. Vitaceae
C. Muscadine Grape
D. Ubas

E. This is a cultivated, tendril-bearing vine with simple, lobed leaves and clusters of pale green fruits.

F. Native to the Southern U.S. Introduced to Guam.

G. This species of grape is especially adapted for survival in tropical climates and is commonly grown in Hawaii and Southern Florida. The vine is cultivated on trellises and the mature fruit is eaten raw. The fruit is green, with a reddish tinge when mature and is sweet. It could be the basis of a wine industry on Guam as it grows successfully here.

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