USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

TARO

Colocasia esculenta (L.) Schott

Plant Symbol = COES

Contributed by: USDA NRCS National Plant Data Center and Pacific Islands West Area Office

Forest & Kim Starr (USGS)
@ Plants of Hawaii (HEAR)

Alternate Names
Coco yam, dasheen, elephant's ear, gabi, binata, callaloo, eddo, eddy root, swamp taro
Chamorro: suni,
Chuukese: woot,
Hawaiian: kalo,
Marshallese: jibabwãi,
Palauan: bisupsal,
Pohnpeian: sawa
Samoan: talo,
Ulithian: ioth
Yapese: mal

Caution: If taro is not prepared and cooked well, the acridity will cause itchiness in the mouth and throat. All parts of taro can cause stomach aches, if ingested without cooking. Contact with the sap can irritate sensitive skin.

Uses
Please consult the links on the PLANTS Plant Profile for this species for extensive information not contained within this plant guide.

*Ethnobotanical***:** Taro was the most important food throughout the Hawaiian Islands. The mature root is boiled as a starchy vegetable. It was the staple of the Hawaiian diet and the plant used to make poi.

The leaves are high in minerals and vitamins A, B, and C. These large leaves are cooked like mustard or turnip greens and the resulting product is called callaloo in the Caribbean.

The young leaves are cooked and used for human consumption as a very nutritious vegetable and the corms are used as staple in place of rice or potato (Plucknett and White 1979). These young leaves are boiled or covered with coconut cream, wrapped in banana or breadfruit leaves and cooked on hot stones (Kubo 1970).

The corms are generally cooked by baking, boiling or baking in the traditional ovens.

The starch contained in the large corms of taro is highly digestible, therefore making it a good source for carbohydrate and to a lesser degree a source of potassium and protein.

Taro corms have been used in the production of taro chips, dehydrated stable commodities, starch, flour, and in non-food application of taro starch in the manufacture of biodegradable plastics.

Taro is good for people allergic to milk or cereals and can be consumed by children who are sensitive to milk (Roth and et.al., 1967).

The digestibility of taro starch has been estimated to be 98.8 percent. Therefore taro flour and other products have been used for infant formulae in the United States and have formed an important constituent of proprietary canned baby foods.

Medicinal: The Pinatubo Negritos of the Philippines used taro as medicine. The leaves and corms were

boiled and eaten by women experiencing a difficult childbirth. Many tribes believed the early morning dew that collected in the leaf was excellent medicinal eyewash. Women with dysmenorrheal were made to sit on taro leaves. Juice of the petioles is styptic and was used to arrest arterial hemorrhage. Taro was used in earache and as an external stimulant and rubefacient. Taro was used as a laxative in cases of hemorrhoids. Some tribes use taro as an antidote to the stings of wasps and other biting or stinging insects. Heated tubers were applied to painful parts in rheumatism. Honey mixed with tuber ash was used as a cure for apthae in the mouth.

In Hawaii, the raw juice mixed with sugar was taken orally to reduce fever. Taro was used by Hawaiians to treat illness ranging from constipation to tuberculosis.

In Malaysia, warmed leaves were used to compress a child's head to size if too long.

Horticultural/Landscape: Taro may be incorporated into the general landscape or planted in the traditional style in wet and dry paddies. Taro can be planted in dry culture or non-flooded fields, but not all taros genetic lines can be planted in wet culture or flooded fields.

Livestock: Taro leaf blades and petioles have been used in animal feed.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description

Arum Family (Araceae). Taro is an ancient crop grown throughout the tropic and subtropics. Taro is believed to have originated in South East Asia including India and Malaysia. Spencer (1966) stated that taro and other edible arioida were distributed from east India to Formosa and the Solomon Islands. Taro seeds were dispersed by birds, and palm civets .(Panoff, 1972, Hambali, 1979).

Taro, sometimes called the "potato of the tropics," or "elephant ears" is a wetland herbaceous perennial with huge "elephant ear" like leaves. It produces heart shaped leaves 2-3' long and 1-2' across on 3' long petioles that all emanate from an upright tuberous rootstock, called a corm. The petioles are thick, succulent, and often purplish. The leaf petiole attaches near the center of the leaf. The corm is shaped like a top with rough ridges, lumps and spindly roots, and usually weighs around 1-2 pounds, but can weigh eight pounds. The skin is brown with white or pink flesh. Taros can produce smaller tubers or "cormels" which grow off the sides of the main corm. Under ideal growing conditions, a single taro plant can get 8' tall with an 8'canopy spread.

There are more than 200 cultivars of taro, selected for their edible corms or cormels, or their tropical looking ornamental foliage. These cultivars fall into two main groups: wetland taros, the source of the Polynesian food *poi*, which is made from the main corm; and upland taros, which produce numerous eddos that are used much like potatoes for cooking and in processing.

Taro, although grown commercially in many areas of the Pacific Basin, for the most part, is a backyard crop planted usually in small plots near the house. Because taro has a high water requirement and a long growing season it can only grow where water is available most of the year. Its ability to grow in waterlogged conditions allows for the utilization of hydromorphic soils which are unsuitable for other crops (Onwueme, I.C. 1985)

Taro and other aroid food crops have traditionally been a source of food energy for Pacific Islanders. Taro is a plant that must be tilled and watered if it is to grow and perform. The roots and suckers of many varieties of taro were carried along the trade routes of the world. The taro plant has a triple value in that the stem may be used as salads, the tubers provide easily digested starch, with the leaves are used as a green vegetable. The leaves are also used as wrapping for food, as plates, and as an umbrella in a rainstorm. *Cyrtosperma* (giant taro) provides for a reserve food crop, which grows well in low-lying areas and saline swamps.

Distribution: For current U.S. distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment

Adaptation; Taro can grow in a wide range of soil from upland or dry land soils that are well drained, non-flooded soils to soils that are in high rainfall areas or saturated for prolonged periods of time. Taro can grow in areas that only it and rice can grow because of standing water during the growing season. The upland taro is usually grown on hillsides in soil that is marginal in fertility and productivity. Soils in these areas are usually well drained and friable. While lowland or wetland taro is usually planted in

low-lying areas where there is an abundant supply of water. The soils in these areas are normally alluvial and of high native fertility and production.

Taro can grow in areas ranging from sea level to 1,800 m in elevation under daily average temperature of 21-27°C and rainfall of 250 cm annually. Taro is usually planted at wide spacing of 1m x 1m at a density of 10,000 plants/ha in dry areas and at spacing as close as 45cm x 45cm or approximately 49,000 plants/ha in wetland areas.

Planting material

Taro is usually the first crop planted after the clearance of a forest fallow because the soil if very fertile. However after repeated use the soil becomes less productive and will require organic or inorganic fertilizer to maintain high yields. If commercial fertilizer is used be sure not to place the fertilizer in the bottom of the hole with the sucker because the fertilizer will destroy the young sucker.

In the South Pacific, "tiapuli" or setts are prepared from the suckers or main plant. The tiapuli consist of the cormels with the petioles and are the main material used of propagating taro. Small tiapuli used for planting can have a considerable effect on yield if weeding is delayed during early establishment. Large size planting material grows more vigorously, giving full ground cover earlier and hence providing better weed control. Planting depth should be in a furrow or hole about 30 cm deep. Planting should be timed to rainfall with lower rainfall areas planted during the early part of the rainy season for best survival and production. In areas with well-distributed rainfall or if one is using irrigation the effect of planting dates is less important because planting can occur throughout the year. Most of the planting and production operation is manual in small communities except for occasional chemical weed control.

In Hawaii, the planting material is called huli. Huli are the cormels ('oha or keiki) that have been trimmed. When the kalo plant is harvested, the keiki are cut off from the harvested makua plant and their leaves and corms are cut off, leaving only about a quarter of an inch attached to the stem. These huli are then left in a cool, dry place for a day or two to allow the cut to heal before they are planted again. The huli should be kept moist so that they don't dry out but should not be left in standing water otherwise they will rot. After a day or so, the huli will be ready for planting.

Wet kalo is grown in the lowlands and on valley floors in man made terraces (Lo'i) that are irrigated by diverted mountain streams. The huli may be planted in rows or in mounds in the lo'i. They will grow to maturity in 9-14 months, depending on the variety. Wet kalo must have cold water running through it's lo'i because warm, standing water will cause the kalo to rot.

Management

Weeding must be preformed during the first six months after planting. If weeding is not done on a regular basis during the first six months, taro production can be reduced by as much as 50 to 85 percent. Weeding after six months is usually not important because the taro crop forms full ground cover therefore preventing young weeds from growing. Unwanted vegetation can be controlled using mechanical means or through the use of approved herbicides.

The taro must be weeded and mulched several times during the crop's growth. Commercial fertilizers are also used to produce larger plants.

When the crop is ready to be harvested, the taro are pulled out of the ground and the corms cut off. The new planting material will also be prepared at this time. If the taro is being grown for the leaves, the leaves should be picked about two months after planting when the leaves are large but still young. If the taro is being grown for the corms, then they should be harvested when the corms reach maturity. Taro that is being grown for the corms should not be used for leaves because picking the leaves while the corm is developing will damage the corm.

Harvesting

Harvesting of taro depends on the location of the crop and the variety planted. However, most lowland plantings can be harvested in 12 to 15 months after planting if weeds are controlled. Taro growing on the warmer upland sites with good solar radiation will mature in about 12 months. Most of the taro grown in the lowlands or wetland areas is harvested by hand. The main corm and suckers are broken up and loosened from the soil and rotated in a circular fashion to cut and sever the roots. Mature taro leaves turn yellowish in color.

Pests and Potential Problems

Pests are major problems facing taro growers throughout its growing range. Each of the following pests can occasionally become major pest and require control measures. The largest number of pests usually attack the leaves of the plant. The most common invertebrate pests are: Grasshoppers, crickets, thrips, aphids, leafhoppers, mealy bugs,

plant hoppers, scales, whiteflies, several moths and butterflies, beetles, termites, nematodes, snails and slugs, ants, and mites. Vertebrate pests of taro include porcupines, rats and mice, bush pigs and rails. Taro diseases caused by biotic agents include four main groups of fungi: Ascomycetes, basidiomycetes, phycomycetes, and fungi imperfecti. These biotic agents cause leaf blight, leaf spot, soft rot, spongy black rot, and pocket rot of the corm.

Cultivars, Improved, and Selected Materials (and area of origin)

Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

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