Elaeis guineensis

Jacq.

Arecaceae

wild oil palm, oil palm, African oil palm

LOCAL NAMES
Burmese (si-htan,si-ohn); Creole (crocro guinee,crocro); Dutch (oliepalm); English (wild oil palm,African oil palm,guinea oil palm,oil palm); French (crocro,corossier,corojo de Guinea,crocro guinée,palmier a huile); German (Steinfrüchte,Ölpalme); Italian (palma da olio); Luganda (munazi,mubira); Malay (kelapa sawit); Mandinka (tango,tengo,tego,tee); Spanish (palma africana,corozo,corojo de Guinea,coroco); Swahili (mchikichi,mjenga,miwesi); Thai (pan namman); Trade name (oil palm,wild oil palm,African oil palm); Vietnamese (dua dâu,co dâu)

BOTANIC DESCRIPTION
Elaeis guineensis is a handsome tree reaching a height of 20 m or more at maturity. The trunk is characterized by persistent, spirally arranged leaf bases and bears a crown of 20-40 massive leaves. The root system consists of primaries and secondaries in the top 140 cm of soil.

Leaves numerous, erect, spreading to drooping, long, reaching 3-5 m in adult trees; leaf stalks short with a broad base. Spiny, fibrous projections exist along the leaf margins from the leaf sheath, wearing away on old leaves to jagged spines. Leaf blades have numerous (100-160 pairs), of long leaflets with prominent midribs, tapered to a point; arranged in groups or singly along the midrib, arising sometimes in different planes.

Male and female inflorescences occur on 1 plant; sometimes a single inforescence contains both male and female flowers. Inflorescences arise among the leaf bases in large, very dense clusters, with innumerable small flowers, enclosed in the bud stage in 2 large fibrous bracts, which finally become deciduous. Male flowers single or in pairs in recesses on the branchlets, each with 3 sepals, 3 petals with edges touching in bud, 6 stamens, and a small, sterile pistil. Female flowers subtended by 2-3 small bracts, with 3 sepals, 3 petals overlapping in bud in a ring of small, sterile stamens, and a 3-celled ovary with 3 spreading stigmas.

Fruits borne in bunches. The average weight of each bunch is 23 kg, but a bunch may weigh up to 82 kg. A bunch contains between 200 and 2000 sessile ovoid drupes, 4 cm long and 2 cm broad, with pointed apex. The fruit coat colour varies from yellow to orange or nearly black. Four oil palm varieties have been distinguished on the basis of the fruit structure, especially the thickness of the endocarp: E. g. var. macrocarpa with 40-60% shell, E. guineensis var. dura with 20-40% shell, E. g. var. tenera with 5-20% shell and E. guineensis var. pisifera, a shelless form.

The generic name comes from the Greek word ‘elaion’ (oil), referring to the oil extracted from the palm.

BIOLOGY
Male and female flowers are borne on the same plant but open at different times, so that cross-pollination is necessary. A male inflorescence contains 700-1200 flowers and may yield 80 g of pollen over a 5-day period. The female flower is larger and receptive to pollen for 36-48 hours. Honeybees are attracted by the pollen scented like anise seed, which they collect as they gather nectar. It has not been established whether the bees contribute to pollination. However, The weevil Elaeidobius kamerunicus has been found to be a successful pollinator. Fruit development commences immediately after fertilization. Black vultures (Coragypt atratus) feed avidly on E. guineensis and are involved in its dispersal.

Processed fruit bunches for industrial use in distillation of ylang flowers. Sikense, Ivory Coast. (Griffee P.)

Friendly Farm - fruits 6 weeks from maturity; Luapula province. (Griffee P.)

Tenera hybrid fruits. Note the thin shell, lauric
acid type kernal and large oleic oil-bearing mesocarp (arrows). (Griffee P.)

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ECOLOGY
It is difficult to determine the natural habitat of the oil palm because, while it does not grow in primeval forest, it flourishes in habitats where forests have been cleared. It requires a relatively open area to grow and reproduce itself and thrives best when soil moisture is maintained. Normally, E. guineensis occurs in disturbed forests and along rivers and streams, both in its native range in West Africa and in some introduced areas. It is a succession species favoured by slash and burn, and its gene pool has expanded as farmers clear land and create more open habitat for the germination of its seeds.

BIOPHYSICAL LIMITS
Altitude: Up to 900 m, Mean annual temperature: 27-35 deg. C, Mean annual rainfall: 2000-3000 mm

Soil type: It has a fibrous root system and benefits from deep soils that are fertile, free from iron concretions and well drained. It also tolerates a fair range of soil pH (4-6), although neutral soils are favourable.

DOCUMENTED SPECIES DISTRIBUTION

Native: Cameroon, Cote d'Ivoire, Democratic Republic of Congo, Ghana, Guinea, Sierra Leone, Uganda

Exotic: China, Colombia, Congo, Costa Rica, Ecuador, Honduras, India, Indonesia, Kenya, Madagascar, Malaysia, Nigeria, Papua New Guinea, Philippines, Singapore, Solomon Islands, Sri Lanka, Tanzania, Togo, Venezuela, Zanzibar

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

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PRODUCTS
Food: Palm oil is popular in West Africa and Malaysia for cooking. It is now imported by India to meet local shortages in edible oil, being cheaper than many other vegetable oils. In West Africa, palm oil is often added directly to bring richness to soups and sauces. Addition of oil to cereal preparations greatly increases their calorific density, which is particularly advantageous for young children. Palm oil is also used as frying oil in the preparation of snacks such as bean cakes and fried plantain. Its 10% linoleic acid content makes it an excellent source of carotene. This is important in reducing incidence of vitamin A deficiency and the occurrence of nutritional blindness. Oil palm also provides heart-of-palm.

Fodder: Pressed cake is used as cattle feed.

Apiculture: The juice from fermenting fruit is collected by bees. The honey is dark amber with an astringent flavour.

Fuel: It is technically possible to produce from palm oil either carbohydrates for conversion to alcohol or a methanolizable oil as a diesel substitute. In Togo, the pressed fruits are dried and fashioned into cakes for cooking fuel.

Lipids: Palm kernel oil contains about 50% oil. This oil is used in hard water soaps, the manufacture of glycerin, shampoos and candles. The better grades are used in manufacturing margarine.

Alcohol: Palm wine is the delicious wine obtained by tapping the base of the immature inflorescence of the oil palm. Freshly tapped, undiluted and chilled, palm wine is pleasant to drink and is very high in yeast content. The sale of palm wine is considered more profitable than the sale of the fruits and oil.

SERVICES
Reclamation: Oil palm is a good crop for rehabilitating degraded areas. In Sumatra it has successfully been established on abandoned farmlands taken over by Imperata cylindrica.

Shade or shelter: E. guineensis shade is lighter than that of other plantation crops such as rubber or cocoa and is suitable for substantial quantities of undergrowth, attracting livestock. Attention has been given to raising livestock in oil palm plantations as a subsidiary source of income. Palm fronds are useful for thatch.

Soil improver: The potash-rich residue from boilers is routinely recycled onto plantations to help enrich the soils for instance in Malaysia. Labour and transportation costs may discourage such recycling.

Ornamental: E. guineensis has been planted as an ornamental on tobacco estates around Deli and Medan in Sumatra.

Intercropping: Coffee and cocoa are small trees that can be planted among E. guineensis trees. Shading with E. guineensis presents certain difficulties, because while cocoa benefits from greater shade when it is young, the shade that the palm provides becomes increasingly undesirable as the cocoa plantation matures.

TREE MANAGEMENT
Initial spacing is normally 9 m in a triangular arrangement, giving 140 trees/ha. The individual trees are fenced with wire netting to protect them from attack by rodents and grass cutters that eat the heart of young palms during the 1st few years. Mulching to conserve moisture in the dry season is necessary. The lower senescent leaves should be removed and burnt.

GERMPLASM MANAGEMENT
Seed storage behaviour is intermediate. Storage temperatures of 5 deg. C are said to damage seed viability in moist storage. Kernels were safely dried to 4.4% mc when set to germinate in vitro. However, hermetic storage of intact kernels at -18 deg. C or -196 deg. C with moisture content between 20.9% and 4.4% resulted in a loss in viability by about 13%; no loss in viability after 8 months subsequent storage in liquid nitrogen; no loss in viability occurred after 4 months hermetic storage at either 10 deg. C or 30 deg. C with 19.4-5.2% mc; 50-70% of excised embryos survived desiccation to 10.4% mc by slow drying, and no loss in viability in subsequent cryostorage overnight; seeds tolerated desiccation to 10-6% mc; depending on seed lot, no loss in viability after 12 months of hermetic storage at 15 deg. C, but complete loss in viability occurred at 0 deg. C and -20 deg. C; there are about 230 seeds/kg.

PESTS AND DISEASES
E. guineensis is attacked by nematodes, slugs, snails, mites, insects, birds and mammals. Mammals include rats, wild pigs, monkeys and elephants, which damage seedlings and fruits. Birds include the long-tailed parakeet, the American black vulture, the house crow and the large-billed crow. The birds carry away fruit from the bunch and scatter it half-eaten. Only 1 nematode, Rhadinaphelenchus cocophilus, has been responsible for a serious diseased condition, red-ring disease. Damaging insects include the oil palm bunch moth and the West African oil palm leaf miner.

Diseases have become prevalent in areas where E. guineensis is cultivated on a plantation scale. Diseases of particular concern include fusarium wilt (caused by Fusarium oxysporum) and bacterial bud rot (in Democratic Republic of Congo), dry basal rot, caused by Ceratocystis paradoxa (in Nigeria), ganoderma trunk rot and crown disease in Asia; and spear rot in the American tropics. Spear rot has emerged as a major threat to E. guineensis production in Latin America.

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FURTHER READNG

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SUGGESTED CITATION

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