

TAXONOMIC, NOMENCLATURAL AND ETHNOBOTANIC NOTES ON

ELAEIS

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It [the oil] has three properties: the scent of violets, taste resembling that of our olive oil, and colour which looks like saffron, however, much more natural and perfect.

Cadamosto (1455-1456)

INTRODUCTION

E*laeis* is a very small genus of the Palmae. It is now generally considered to have two species: one African (*E. guineensis*) and one American (*E. oleifera*), although some botanists (Annet, 1921; Burkill, 1935; Wessels-Boer, 1965) believed that several additional species might be recognized; one was of the opinion that six or seven species should be accepted (Lemée 1930).

Elaeis guineensis is commercially the more important species: known as the 'African oil palm', it is the source of an important oil now produced mainly in plantations; the major producing country is Malaysia. It can now take its place as one of the world's major tropical crop species, and today it is the most rapidly expanding plantation crop in the tropics.

Elaeis oleifera is locally valued in Central America and northern South America for its excellent oil, but it is extremely important scientifically from the genetic point of view, as it hybridizes with *E. guineensis* and has a number of desirable characteristics that may be useful if introduced into *E. guineensis*.

In Africa, *Elaeis guineensis* has become so widespread that it is almost impossible to point out with certainty an area where it was originally native. Usually the putative centre of origin of economic plants is established primarily by studies of variability in wild populations or from the presence of related species in a given locality; but these

approaches do not exist for *E. guineensis*.

The palm is now found domesticated, semi-domesticated or spontaneously escaped; domestication and semi-domestication have extended the range of the species eastward as far as Madagascar. It is often impossible to ascertain whether a population has resulted from natural or from man-directed spread.

The palm will not tolerate heavily forested environments. Instead it takes over in open or disturbed areas. It is a heliophile. It very frequently populates locations where the influence of man has been operative (de Blank, 1952; Hartley, 1967; Zeven, 1967, 1972; Purseglove, 1972; Corley *et al.*, 1976). Palm groves—dense growths of the palm—owe their origin to human activities such as the opening up of areas of forest from camps or even abandoned settlements or villages. The groves represent 'secondary phenomena' produced, almost always subconsciously, by man's activity.

It has been suggested that Arab slave trading may have had a significant role in some of the eastward spread in Africa; the presence in Madagascar of a strain of *E. guineensis* (once considered to represent a distinct species, *E. madagascariensis*) is probably the result of an early introduction, as early as the 10th century, at the beginning of African influence in the island (Purseglove, 1972).

Chevalier (1934, 1943) has suggested the coastal belt between Liberia and Angola—a strip 125-190 miles wide—as the original home of *E. guineensis*; and this area has generally been accepted as the region from which the species has spread eastward across tropical Africa. This opinion, however, has been questioned. Since hardly any population of the palm in Africa has escaped some human intervention or has experienced natural selection in the field, gene frequencies have undoubtedly often been altered, making use of information from genetic studies sometimes difficult to interpret (Corley *et al.*, 1976).

In 1933, it was proposed that *Elaeis guineensis* had its origin in the northern part of South America (de Wildeman and Ledoux, 1933; Surre and Ziller, 1963). There has been a subsequent proposal that the home of this species was in the New World

(Cook, 1942). These suggestions, however, have not been seriously accepted: they are not supported by archaeoethnobotanical, historical or linguistic evidence. It is generally held that *E. guineensis* is of African origin.

It seems quite probable that the genus originated in the Tertiary, when Africa and South America are believed to have been joined by a land bridge and that the location of origin was on the African end of the bridge (Zeven, 1964b, 1965). Fossil pollen grains from the Miocene of the Niger Delta match those of modern *Elaeis guineensis* (Friedal, 1897); furthermore, they are found with increasing frequency in later deposits up to modern excavation sites (Zeven, 1964, 1965; Rees, 1965). It is possible that the American and African species had a remote common ancestor now extinct.

There have been arguments against the continental drift theory on the basis that the ranges of other genera of the Palmae do not show similar distributions (Comer, 1966). The discovery of such ancient and abundant pollen grains, however, tends to support the land bridge or continental drift explanation of the origin of *Elaeis*.

If phylogenetic relationships are meaningful, the genus arose probably in the Americas, not in Africa. The chromosome number is $2n = 2x = 32$ in *Elaeis*, and the basic number $x = 16$ is the same in closely related genera (Hardon, 1976). *Elaeis guineensis* and *E. oleifera* hybridize easily and produce fertile offspring (Hardon and Tan, 1969). In these hybrids, characters of *E. oleifera* are dominant over those of *E. guineensis*, suggesting that *E. oleifera* is the more primitive species, a strong argument for the American origin of the genus (Hardon, 1969).

TAXONOMY AND NOMENCLATURE

Agronomical or Horticultural Aggregations of *Elaeis guineensis*

In the years of the 20th century, specialists in oil palm began to pay attention to what they termed 'varieties' and other subspecific categories.

They are sometimes referred to as cultivars, but they are not true cultivars (Purseglove, 1972), as

many of these strains occur in wild populations which have experienced no human intervention. The palm is monoecious and cross-pollinated and cannot be vegetatively propagated in clones, although experiments with tissue culture are promising (Hardon, 1976).

Their agronomical or horticultural classification into large aggregations of strains or races is based on trivial and variable characters, primarily on structure and colouration of the fruits. The sundry members of these aggregations are classified on the colour of the ripe or unripe exocarp or 'skin' or on the thickness or presence or absence of the endocarp or 'shell' or pulp. Other morphologic characteristics of the aggregations had not been fully investigated when the classifications were first proposed (Chevalier, 1910; Beccari, 1914; Jumelle, 1917, 1918; Yampolsky, 1922; Bunting *et al.*, 1934).

These strains are usually called 'subspecies' or 'varieties' which is unfortunate, in as much as the two terms have very definite meanings in taxonomic botany—referring to genetically stable entities.

In 1910, Chevalier published his own observations, listing and giving taxonomic consideration and Latin names to two 'subspecies' and 14 'varieties' and 'forms' (Chevalier, 1910). Four years later, Beccari published a monograph with his classification based almost completely on that of Chevalier; he enumerated 13 'varieties' and six 'forms' of *Elaeis guineensis* (Beccari, 1914). Beccari considered the 'varieties' earlier described by Welwitsch as *E. guineensis* var. *communis* to represent what he described as forma *dura* and forma *tenera*.

In 1917, Jumelle enumerated 19 'varieties' based mainly on the classifications of Chevalier and Beccari (Jumelle, 1917).

Elaeis poisonii, a palm with 'a more or less fixed' abnormality ... with six accessory sterile carpels surrounding the fruit, holding oil equally with the pericarp (Burkill, 1935), was described by Annet. This abnormal palm had the local name of 'diwakkawakka' (Annet, 1918).

A year later, Bücher and Fickendey, who recognized two species and 22 varieties, subvarieties and

forms, proposed a classification still based primarily on that of Chevalier but adding several 'subspecies'. They added little to the earlier classifications; in reality, they further complicated two already complicated classifications by publishing, without adequate descriptions, several 'varieties' of *E. guineensis* with subspecific Latin names and no indication of their presumed taxonomic categories. They described the 'diwakkawakka' type of oil palm as a distinct variety: *E. guineensis* var. *diwakkawakka* (Bücher and Fickendey, 1919).

In 1921, Annet attempted to reduce the number of subspecific categories recognized (Annet, 1921). These classifications were based on leaf and fruit differences and other unstable morphological characteristics. Had they been seriously and permanently adopted as representing genetically stable taxonomic units, it would undoubtedly have led to widespread confusion. Nowadays, terms are applied to the aggregations of the strains or races as outlined below without attempting to put the individual members of the aggregations into taxonomic categories.

In 1934, the view was expressed that '... it is impossible to make any definite classification of the different forms described in the literature ... until further breeding experiments have been conducted to show the extent of the hereditary characteristics, also those forms which are merely hybrids of the original varieties' (Bunting *et al.*, 1934).

Burkill has written that research indicates that '... earlier specialists had over-estimated the value of easily observable characters and had issued names for groups of specimens not satisfactorily circumscribed by their definitions; consequently, as the vernacular names for the races serve better, there is a tendency to use them instead' (Burkill, 1935). These races or strains often grow together; they have the same chromosome number, as far as cytological studies have progressed ($2n = 2x = 32$) (Hartley 1967); they hybridize easily; and when they cross, there are many intermediates.

Hartley concurs, stating: 'The distinguishing of varieties of the oil palm has been attempted by many workers. These attempts have, in most cases, been unsatisfactory, since in the wild, each palm is a hybrid in respect of certain of its characters. Most

of the early attempts at classification are unworthy of mention, since they were based on a very small acquaintance with the palm and no knowledge of the inheritance of the characters described' (Hartley, 1967).

The earliest attempt to use genetic characters to classify entities of *Elaeis* was made by Vanderweyen who distinguished four 'varieties': *macrocaraya*, *dura*, *tenera* and *pisifera* (Vanderweyen, 1952; Surre and Ziller, 1963).

The first simple classifications were offered, however, by Janssens (1927) and Smith (1935). Janssens recognized three aggregations of fruit types: *dura*, *tenera* and *pisifera*; he accepted the white-fruited type *albescens* as a subsidiary of *dura*, calling it *dura-albescens* (Janssens, 1927). Vanderweyen referred to Janssens' classification method as the most complete and logical (Beirnaert and Vanderweyen, 1941).

A modern agronomical classification recognizes these groups or aggregations of types as follows (Purseglove, 1972; Hartley, 1967, t. I):

- 1) *Albescens*. Fruit ripening deep yellow with an apical green or black 'cap' over more than half the length of the fruit.
- 2) *Dura*. Endocarp thick, 2-8 mm., making up 25-55% of the weight of the fruit, sometimes more. The mesocarp is usually 35-55% of the weight. The kernels generally are large and make up 7-20% of the weight.
- 3) *Pisifera*. Fruit without an endocarp and mainly sterile or with very small kernels in fertile fruits.
- 4) *Nigrescens*. Fruit when immature apically purplish or black, the 'cap' cream- or ivory-coloured. There are two types: *rubro-nigrescens* with the unripened fruit deep orange-red but with a brown 'cap'; *rutilo-nigrescens* with the ripened fruit pale orange with a black 'cap' on the upper half.
- 5) *Tenera*. Fruit with a thin endocarp, 0.5-3 mm., making up 1-32% of the weight of the fruit; the kernels make up 3-15% of the weight.
- 6) *Virescens*. Unripe fruit green with a yellowish 'cap'; ripening to a red-orange but retaining an exceedingly small area of green at the apex.

The Genus *Elaeis* and its Synonyms

The genus *Elaeis* was described and the fruit illustrated apparently for the first time by Lobelius (Lobelius 1570, 1576, 1581) who called the fruit *Nucula indica* ('little nut of India'). He stated that it came from Guinea. Clusius discussed the palm in many of his publications from 1567 to 1611; he is believed to be the author of the remarks on the oil palm that were published in Dodoens' herbal, *Cruydt-boeck*, of 1608: he contributed a description of the palm together with an illustration of the pistillate inflorescence, fruits and kernels and the statement that it came from Guinea (Dodonaeus, 1608). Sir Hans Sloane, M.D., a botanist who collected some 800 plants in the West Indies, described the oil palm from Jamaica in his *Catalogus Plantarum* (1696), reporting that it had been introduced from Guinea.

Elaeis did not appear in Linnaeus' *Species Plantarum* of 1753, the starting publication and date of modern botanical nomenclature. The first post-1753 description and illustration was published in 1763 by Nicolaus Joseph von Jacquin on the basis of his collection made on the island of Martinique. He adopted as the specific epithet, *guineensis*, the geographical name employed more than 150 years earlier by Clusius and Lobelius—an appropriate name, inasmuch as in some localities in Guinea this palm is dominant, often forming pure forests of the species.

- Elaeis* Jacquin, *Select. Stirp. Amer.* (1963) 280.
Corozo, Jacquin ex Giseke, *Linnaeus, Prae. Ord. Nat.* (1792) 42, 92.
Alfonsia Humboldt, Bonpland et Kunth, *Nov. Gen. et Sp.* 1 (1815) 306.
Barcella Drude in Martius, *F1. Brasi.* 3, pt. 2 (1882) 459.

The genus *Elaeis* was described on the basis of material imported from West Africa and cultivated in the West Indies. The description of *Corozo* is based on material from Central America and northern South America. The type specimen of *Alfonsia* comes from the Sinú in northern Colombia. The

material on which *Barcella* is based was collected in the Rio Negro of the Brazilian Amazonas.

Elaeis, related to *Cocos*, the genus of the coconut palm, is classified in the tribe or subfamily Coccoideae, sometimes spelled Cocoeae or Coccoineae. This classification is based on sound morphological reasoning (Tomlinson, 1960).

Elaeis guineensis and its Synonyms

As with sundry other commercially valuable plants, a plethora of names have been proposed for subspecific variants of the single species *Elaeis guineensis*. Strains or races, differing in trivial, variable or unstable characters, have been given Latinised epithets and treated as botanical subspecies and varieties; even subvarieties and forms have been proposed and treated as distinct taxonomic entities, even though they are not genetically stable and cannot be taxonomically classified.

It is obvious that these classifications must be viewed as agronomic or horticultural entities of value to specialists involved in the improvement of material for plantation use.

As a consequence, these binomials, trinomials or longer Latinised names must be ignored from the botanical point of view.

The validly published binomial *Elaeis guineensis* has 83 synonyms, as indicated in the following list.

Elaeis guineensis Jacquin, Select. Stirp. Am. Hist. 1 (1763) 280. t. 172.

E. melanococcus Gaertner, Fruct. et. Sem. Pl. 1 (1788) 18, t.6, fig. 2.

E. occidentalis Swartz, Fl. Ind. Occ. I (1797) 619 = *Caliptrogyne occidentalis*.

E. guianensis Jacquin *guianensis* Steudel, Nom. Ed. 2, pt. 2 (1821) 249, *nomen sphalm*.

E. pernambucana Loddiges ex G. Don, Loud. Hort. Brit. (1830) 399, *nomen nudum*.

E. spectabilis Roxburgh in Sweet, Hort. Brit., Ed. 3 (1840) 716.

E. montana Page ex Steudel, Nom., Ed. 2, pt. 1 (1840 -41) 555, *nomen hort. nudum*.

E. guianensis Jacquin var. *macrocarpa* Welwitsch, Apontamentos (1859) 584.

E. guianensis Jacquin var. *microcarpa* Welwitsch, Apontamentos (1859) 584.

E. dybowskii Hua, Bull. Museum 1 (1895) 315.

E. thompsonii Chevalier, Govern. Gazette S. Nigeria, Suppl. (July 1909) 25, *nomen nudum*.

E. guineensis Jacquin subsp. *nigrescens* Chevalier, Veg. Utiles Afrique Trop. Franç. (1910) 46.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *communis* Chevalier, loc. cit. 47.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *vulgaris* Chevalier, loc. cit. 50.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *vulgaris* Chevalier fma. *androgyna* Chevalier, loc. cit. 51.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *vulgaris* Chevalier fma. *dioica* Chevalier, loc. cit. 52.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *vulgaris* Chevalier fma. *ramosa* Chevalier, loc. cit. 52.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *sempernigra* Chevalier, loc. cit. 53.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *macrocarpa* Chevalier, loc. cit. 54.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *pisifera* Chevalier, loc. cit. 55.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *ceredia* Chevalier, loc. cit. 56.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *idolatrix* Chevalier, loc. cit. 57.

E. guineensis Jacquin subsp. *nigrescens* Chevalier var. *macrophylla* Chevalier, loc. cit. 59.

- E. guineensis* Jacquin subsp. *virescens* Chevalier var. *repanda* Chevalier, loc. cit. 61.
- E. guineensis* Jacquin subsp. *virescens* Chevalier var. *intermedia* Chevalier loc. cit. 63.
- E. guineensis* Jacquin subsp. *virescens* Chevalier var. *gracilinux* Chevalier, loc. cit. 64.
- E. guineensis* Jacquin subsp. *virescens* Chevalier var. *spectabilis* (Roxb.) Chevalier, loc. cit. 64.
- E. ubanghensis* Chevalier, Etudes Fl. Afr. Centr. 1 (1913) 333, *nomen nudum*.
- E. guianensis* Jacquin var. *madagascariensis* Jumelle et Perrier de la Bathie, Journ. Matières Grasses (1911) 6.
- E. guineensis* Jacquin subsp. *virescens* Chevalier var. *communis* Chevalier fma. *dura* Beccari, Contrib. Conoscenza Palma Olio (1914) 37.
- E. guineensis* Jacquin var. *communis* Chevalier fma. *dura* Beccari, loc. cit. 37.
- E. guineensis* Jacquin subsp. *nigrescens* Chevalier var. *communis* Chevalier fma. *tenera* Beccari, loc. cit. 38.
- E. guineensis* Jacquin subsp. *nigrescens* Chevalier var. *leucocarpa* Beccari, loc. cit. 40.
- E. guineensis* Jacquin var. *sempernigra* (Chev.) Beccari loc. cit. 40.
- E. guineensis* Jacquin var. *macrocarpa* (Chev.) Beccari, loc. cit. 41.
- E. guineensis* Jacquin var. *pisifera* (Chev.) Beccari, loc. cit. 41.
- E. guineensis* Jacquin Var. *ceredia* (Chev.) Beccari, loc. cit. 42.
- E. guineensis* Jacquin var. *idolatrix* (Chev.) Beccari, loc. cit. 43.
- E. guineensis* Jacquin var. *angulosa* Beccari, loc. cit. 48.
- E. guineensis* Jacquin var. *rostrata* Beccari, loc. cit. 50.
- E. guineensis* Jacquin var. *communis* Chevalier fma. *fatua* Beccari, loc. cit. 54.
- E. guineensis* Jacquin var. *communis* Chevalier fma. *semidura* Beccari, loc. cit. 56.
- E. guineensis* Jacquin var. *communis* Chevalier fma. *tenera* Beccari, loc. cit. 58.
- E. guineensis* Jacquin var. *albescens* Beccari, loc. cit. 62.
- E. guineensis* Jacquin var. *ceredia* (Chev.) Beccari fma. *caryolitica* Beccari, loc. cit. 65.
- E. guineensis* Jacquin var. *virescens* Chevalier fma. *repanda* (Chev.) Beccari, loc. cit. 66.
- E. guineensis* Jacquin var. *compressa* Beccari, loc. cit. 71.
- E. guineensis* subsp. *macrocarpa* Beccari, loc. cit. 71.
- E. madagascariensis* (Jumelle et Perrier de la Bathie) Beccari, loc. cit. 72.
- E. poissonii* Annet, Congr. Agricult. Colon 1918. 2 (1919) 383.
- E. guineensis* Jacquin var. *diwakkawakka* Bücher et Fickendey, Die Ölpalme (1919) 16.
- E. guineensis* Jacquin var. *dura* (Becc.) Bücher et Fickendey subvar. *nigrescens* (Chev.) fma. *breviformis* Bücher et Fickendey, loc. cit. 18.
- E. guineensis* Jacquin var. *macrocarpa* (Welwitsch) Bücher et Fickendey, loc. cit. 20.
- E. guineensis* Jacquin var. *macrocarya* (Becc.) Bücher et Fickendey, loc. cit. 21.
- E. guineensis* Jacquin var. *angulosa* (Becc.) Bücher et Fickendey, loc. cit. 21.
- E. guineensis* Jacquin var. *dura* (Becc.) Bücher et Fickendey loc. cit. 20.
- E. guineensis* Jacquin var. *macrocarya* (Becc.) Bücher et Fickendey, loc. cit. 21.
- E. guineensis* Jacquin var. *angulosa* (Becc.) Bücher et Fickendey, loc. cit. 21.
- E. guineensis* Jacquin var. *compressa* (Becc.) Bücher et Fickendey, loc. cit. 21.
- E. guineensis* Jacquin var. *sempernigra* (Chev.) Bücher et Fickendey, loc. cit. 21.
- E. guineensis* Jacquin var. *leucocarpa* (Becc.) Bücher et Fickendey, loc. cit. 21.
- E. guineensis* Jacquin var. *macrophylla* (Chev.) Bücher et Fickendey, loc. cit. 21.

E. guineensis Jacquin var. *macrophylla* (Chev.)
Bücher et Fickendey, loc. cit. 21.

E. guineensis Jacquin subvar. *fatua* (Becc.) Bücher
et Fickendey, loc. cit. 22.

E. guineensis Jacquin var. *dura* Beccari subvar.
nigrescens Chevalier fma. *rostrata* (Becc.) Bücher
et Fickendey, loc. cit. 22.

E. guineensis Jacquin var. *dura* Becc. subvar. *vi-
rescens* Chevalier fma. *breviformis* (Becc.) Bücher et
Fickendey, loc. cit. 22.

E. guineensis Jacquin var. *dura* Beccari,
subvar. *virescens* Chevalier fma. *longiformis* Bücher
et Fickendey, loc. cit. 23.

E. guineensis Jacquin var. *dura* Beccari, subvar.
virescens Chevalier *nigrescens* Chevalier, fma.
breviformis Bücher et Fickendey, loc. cit. 23.

E. guineensis Jacquin var. *tenera* Beccari subvar.
nigrescens Chevalier fma. *longiformis* Bücher et
Fickendey, loc. cit. 23.

E. guineensis Jacquin var. *tenera* Beccari subvar.
nigrescens Chevalier fma. *breviformis* Bücher et
Fickendey, loc. cit. 24.

E. guineensis Jacquin var. *pisifera* Chevalier subvar.
virescens Chevalier fma. *longiformis* Bücher et
Fickendey, loc. cit. 24.

E. guianensis Jacquin var. *tenera* Beccari subvar.
virescens Chevalier fma. *breviformis* Bücher et
Fickendey, loc. cit. 24.

E. guineensis Jacquin var. *pisifera* Chevalier subvar.
nigrescens fma. *longiformis* Bücher et Fickendey,
loc. cit. 24.

E. guineensis Jacquin var. *ceredia* subvar. *ingres-
cens* fma. *longiformis* Bücher et Fickendey 24.

E. guineensis Jacquin var. *dura* Beccari, subvar.
albescens Beccari fma. *longiformis* Bücher et
Fickendey, loc. cit. 25.

E. guineensis Jacquin var. *diwakkawakka* Bucher
et Fickendey subvar. *dura* Beccari fma. *nigrescens*
breviformis Bucher et Fickendey, loc. cit. 26.

E. guineensis Jacquin var. *diwakkawakka* Bucher
et Fickendey subvar. *tenera* Beccari fma. *nigres-*

cens breviformis Bucher et Fickendey, loc. cit. 27.

E. guineensis Jacquin var. *diwakkawakka* subvar.
dura Beccari, fma. *virescens breviformis* Bücher et
Fickendey, loc. cit. 27.

E. guineensis Jacquin var. *idolatria* subvar. *dura*,
fma. *nigrescens breviformis* Bucher et Fickendey,
loc. cit. 27.

E. guineensis Jacquin var. *idolatrix* Chevalier
subvar. *virescens* fma. *breviformis* Bucher et Fick-
endey, loc. cit. 28.

E. macrophylla Chevalier, Expt. Bot. Afr. occ.
Franc. 1 (1920) 676, *nomen nudum*.

E. guineensis Jacquin var. *spectabilis* Chevalier,
Rev. Bot. Appl. Agric. Trop. 14 (1934) 190.

E. guineensis Jacquin var. *idolatria* Chevalier, loc.
cit. 190.

E. guineensis Jacquin var. *dumpy* T. C. Whitmore,
Palms of Malaya (1973) 15 *nom. nud.*

***Elaeis oleifera* and its Synonyms**

Elaeis oleifera is the American species, grow-
ing in Central America and northern South Amer-
ica, from Costa Rica eastward through Colombia
and Venezuela to the Guianas. It differs from *E.
guineensis* in a number of characters, the principal
difference being the procumbent trunk which, after
10 or 12 years, it usually assumes. There are other
differences: the leaves lie in one plane and do not
have swellings at the base; there is a spiny bract
under each flower and a spathe that remains after
rupture by the developing fruit bunch so that the
bunch is surrounded by the fibres of the spathe. The
mesocarp is thin and the exocarp ripens pale yellow
or bright orange.

The populations of *Elaeis oleifera* exhibit greater
uniformity than those of *E. guineensis*. Unlike *E.
guineensis*, it has little variation in fruit,
inflorescences or leaf formation (Hartley, 1967).

The binomial *Elaeis melanococcus* was earlier
widely accepted for the species, based upon de-
scription of the fruit and seeds of *E. guineensis* and
another species described by Gaertner who may
have had at hand a mix of material of two species.

It has been suggested that the American species be called *Elaeis melanococca* because of its very common acceptance and use by agronomists and others (Corley *et al.*, 1976). This suggestion, however, is not taxonomically acceptable according to the International Rules of Botanical Nomenclature and would lead only to confusion.

Mention of this American species was made and the fruit with calyx was illustrated by Jacquin under *Corozo* in 1763. The term *corozo* is the name in Spanish applied to many different palms in Central and South America. Giseke, on the basis of Jacquin's figure, adopted *Corozo* as a generic name in editing Linnaeus' *Praelectiones in Ordines Naturales* of 1792.

Alfonsia oleifera, described in 1816, is apparently the earliest binomial using the specific epithet *oleifera*. The generic term *Alfonsia* is often considered to be a synonym of *Corozo* (Dahlgren, 1936; Moore, 1963; Glassman, 1972). Consequently, Cook, accepting *Corozo* as a valid genus, made the combination *C. oleifera* (Cook, 1910). *Corozo* is now generally believed to be a synonym of *Elaeis* (Wessels-Boer, 1965), requiring the creation of the binomial *E. oleifera*.

The generic name *Barcella*, published in 1882, is frequently treated as representing a subgenus of *Elaeis* (Dahlgren, 1936; Glassman, 1972). *Barcella odora* differs in minor characters of the inflorescence but the same type of inflorescence is occasionally seen as an abnormality in *E. guineensis* and *E. oleifera*. It is obviously not a character that warrants the creation of a separate genus (Wessels-Boer, 1965).

Elaeis oleifera (HBK) Cortes, Flora Colomb. 1 (1897) 203.

? *Cocos butyracea* Linnaeus fil., Suppl. (1781) 454.

? *Elaeis butyracea* (L. fil.) Kunth ex Duchesne Rept. (1836) 26.

Elaeis melanococcus auct., non Gaertner 1 (1788) 18, t. 6, fig. 2, *pro parte*.

Alfonsia oleifera Humboldt, Bonpland et Kunth, Nov. Gen. et Sp. 1 (1816) 307.

Elaeis melanococcus auct., non Gaertner var. *semicircularis* Oersted, Vidensk. Meddel. Kjoeb. 1858 (1859) 21.

Elaeis odora Trail, Journ. Bot. 15 (1877) 81.

Barcella odora (Trail) Drude in Martius, Fl. Bras. 3, pt. 2 (1882) 459, t. 106.

Barcella odorata Glassman, A. Revision of B.E.

Dahlgren's Index of American Palms (1972) 55, *nom. sphalm.*

Elaeis odorata Glassman, loc. cit. 55, *nom. sphalm*

ETHNOBOTANICAL NOTES

E *laeis guineensis* is valued today as an important dietary adjunct amongst the negroes in many parts of tropical Africa, although it is believed that in a few localities palm wine was a more favoured product of the oil palm. The wine, however, formed part of the diet wherever it was produced. Undoubtedly the palm has had a long history of indigenous utilization, especially for its oil, which must have been employed in the diet by numerous negro tribes as it is today, particularly in the forested regions (Burkill, 1935). Since it is now known that the wide distribution of *E. guineensis* in Africa is due in great part to human activity, it is obvious that the plant was valued for several economic uses by the natives for a long period.

Ethnobotanical information on the inhabitants of tropical Africa is extremely scarce, and our understanding of the uses of the oil palm by the local negroes must, in great part, be deduced from the few scattered records and tangential reasoning.

One reason for believing that the oil was used locally in cooking in Africa from remote times lies in the discovery of *Elaeis* fat in an Egyptian tomb dated 5000 years ago; the oil had to be imported into Egypt from tropical regions far to the south and west (Friedel, 1897; Hartley, 1967; Zeven, 1972). Another reason to believe that palm oil was an appreciable part of the native diet is the report by Clusius in 1605 that the Portuguese fed the fruits to slaves being transported to the Americas

(Purseglove, 1972). In fact, the early Portuguese and later Dutch navigators encountered *Elaeis guineensis* in various parts of western Africa and reported that the oil was a part of the aboriginal diet and that the several products of the oil palm were well known to the natives. The Portuguese navigators mentioned the palm as early as 1434, stating that it was a 'small species of tree bearing red nuts with black eyes in great quantities, but they are small . . . It (the oil) has three properties: the scent of violets, taste resembling that of our olive oil and colour which looks like saffron, however, much more natural and perfect' (Crone, 1937; Hartley, 1967; Purseglove, 1972). These early Europeans reported the nutritional use of the palm amongst the negroes of West Africa's palm belt, especially along the coast of Liberia and the area where such dense groves of *E. guineensis* were found that the Portuguese named the region Cabo Palmas (Zeven, 1972, Purseglove, 1972). Linguistic evidence indicates that the palm oil had long been an important part of local industry (Zeven, 1967, 1972; Hardon, 1976).

Even today amongst the natives, a crude manufacture is employed to produce a poor quality oil known as 'black oil'. Undoubtedly, it is a kind of oil that has been produced for centuries, as the natives are still extremely fond of it. The bunches of fruit are left in the open air for a week or more. The nuts are then put into a hole in the ground about four feet deep, and left for from three weeks to three months to decompose and soften the pericarp (*i.e.*, the exocarp and the mesocarp). Then they are put into another hole with rocks and pounded to separate the pulp which is then collected in cloth bags and put under pressure to squeeze out the oil. The remaining shells are used as fuel (Burkill, 1935).

Palm oil is rich in carotene, particularly beta-carotene, which is an excellent precursor of vitamin A (Hartley, 1967; Purseglove, 1972). Today, the oil is still an important dietary element, especially in many regions near rain forests where it sometimes becomes a staple food. The palms are usually extremely abundant in recently cleared plots (Irving, 1948).

Probably the use of second importance—if not

the first—in many of the negro tribes is the manufacture of wine. There is no reason to doubt that this nutritional adjunct was known to the negro populations in most, if not all, regions where the oil palm was abundant. At the present time, production of oil palm wine from the sap of *Elaeis guineensis* is extensive. It is a good source of the vitamin B complex, important in the carbohydrate-rich diet of many parts of Africa, and of carotene, especially β -carotene, precursor of vitamin A (Purseglove, 1972). The crown of the tree is lightly tapped or the male inflorescence is removed and slices are cut once or twice a day. The sap drips through a funnel made from leaves into a receptacle. Fermentation of the sugar-rich sap is rapid. Unfortunately, in some areas, trees are felled for the production of wine, a practice that local governments are attempting to control (Shepstone, 1951).

There are numerous minor uses of *Elaeis guineensis* in sundry parts of tropical Africa. The central shoot or 'cabbage' of the palm is edible. The leaves are commonly employed as thatching in West Africa, and the petioles and rachises make excellent fences and are valuable as protection for the tops of mud walls. The 'wood' is utilized in local industry. The leaves furnish a strong and resistant yellow textile fibre resembling hemp and linen; it is produced by the natives who still bundle the leaves, retting them to get a superior fibre, which is employed in making fishing lines and cordage (Dike, 1956). The oil is presumably medicinal for intestinal problems and ailments of the ears; it is reputedly a mild laxative for recently delivered women and is given for newborn babies to treat colic (Gisard and Vanden-Berghe, 1889). In some parts of Central Africa, the palm was valued as the source of a holy chrismal oil for religious uses and, until the end of the 19th century, in the manufacture of brooms from old, dried inflorescences (Tisserant, 1953; Stuhlmann, 1894).

Elaeis guineensis was introduced into the Americas by the early slave trade. It became very well and widely established in Brazil and the West Indies (Purseglove, 1972). Although *Elaeis guineensis* has spread widely in spontaneous growth in Brazil, it was probably introduced earlier to the

West Indian islands. The medicinal uses of the oil went from Africa to the New World with the slaves. Examples are the utilization in São Thome of the oil as an embrocation and the numerous therapeutic uses in Brazil, where the plant has become abundant as a spontaneous element of the flora (Purseglove, 1972; Penna, 1946; Correa, 1931). The oil was even known and prescribed medicinally in the 17th Century in Europe (Purseglove, 1972).

International commerce in palm oil began in the early years of the 19th century. The abolition of slave trading led to the substitution of palm oil by the shippers who wished to keep their African connection.

Much less is known concerning the use of *Elaeis oleifera* by the Indians of Central America and northern most South America. It is probable that the oil has found limited use, but with the extraordinarily rich neotropical flora, the inhabitants undoubtedly preferred to continue using oil from the numerous native species of plants that occur in great abundance in the forests and which are better known to them. In Colombia, some oil is locally produced and finds commercial use in the manufacture of soap; it was formerly employed domestically, undoubtedly on a limited scale, in cooking and as an oil for lamps (Hartley, 1967).

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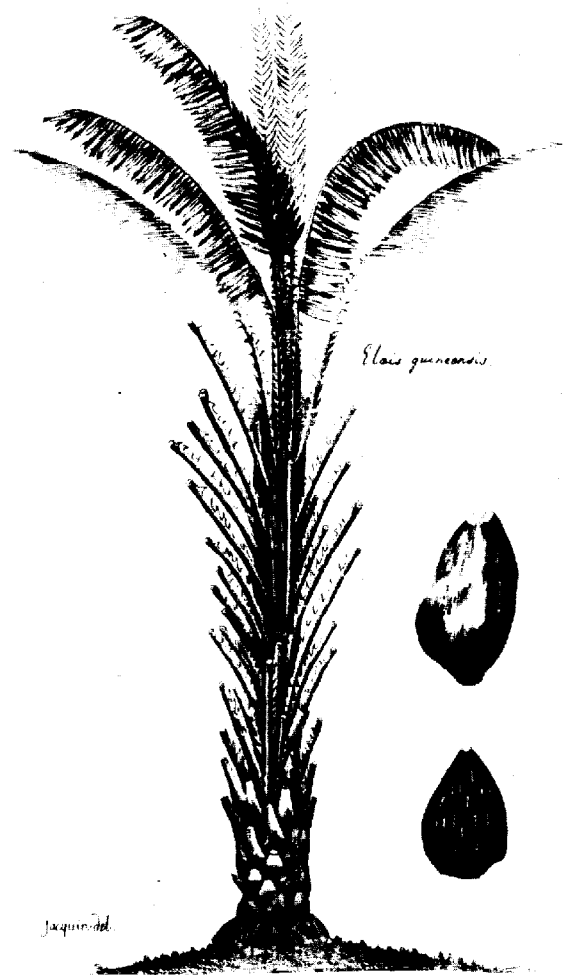
Catalogus Plantarum

- 15^a. seu arbor exotica fructu dactylis simili. C. B. pin. p. 508. Arbor tinctoria Theveti. Jonst. Dendr. p. 145. Palma Guineæ Penini. Cluf. Nott. in Garc. p. 194. quoad descr. J. B. tom. 1. lib. 3. p. 369. Palma Ady insulæ S. Thomæ & fructus Abanga & Caryoces. Ejusd. ib. p. 386.
720. p. 28. ^{nic. o} Palma major dactylifera & vinifera Guineensis. Jonst. Dendr. p. 139. Palma nucifera Guineensis incolis palma Adyl Ejusd. p. 149. Nucula Indica altera. Park p. 1598.
- ^{nic. o} quoad descr. An alia palma regni Congo Indicis persimilis. Nieremb. p. 333? An arbore della forma di quello che fa dattoli che da liquori che chiamamo Mignol. Aluise di Cadamosto. Ramnus. p. 112? lat. p. 28? palmes desquels les Noirs tirent certain suc appelle mignol pour leur de-pence & boisson ordinaire de Thevet. sing. p. 20? Palma vinifera Lugl. p. 1834? ^{nic. o} Palma vinifera Theveti. J. B. tom. 1. lib. 3. p. 369? C. B. pin. p. 507? *The Palm Oyl-tree.* Hanc palmam Junio-rem è Guinea Jamaica allatam, in agris Dom Colbeck plantatam, luxuriare observavi.

The description of Palma nucifera Guineensis o Nucula Indica in Sir Hans Sloane (1696) Catalogus Plantarum.



Elaeis guineensis (c) growing two plants of *Musa paradisiaca* subsp. *sapientum* (banana) (A, D.) and a species of *Raphia* (B) being tapped for wine. From P. de Marees *Beschryvinghe Ende Historische Verhael van het Gout Koninckryck van Guinea, andersde Gout-Custe de Mina Genaemt, Liggend in het Deel van Africa* (1602).

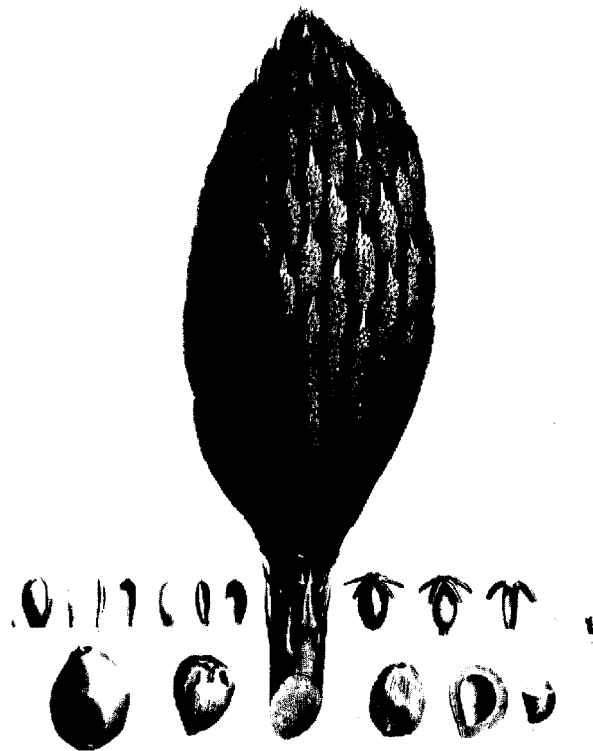


Elaeis guineensis. From N.J. Jacquin, *Selectarum Stirpium Americanarum Historia* (1763).



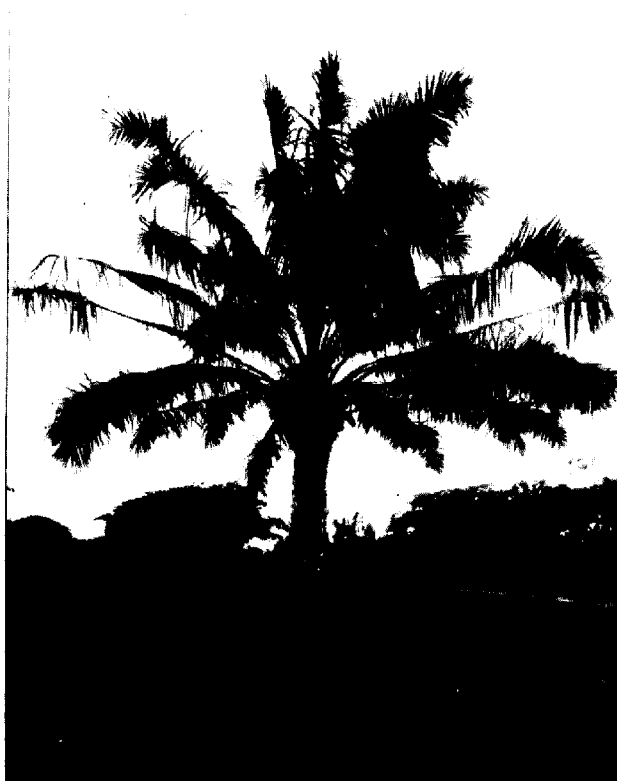
ELAEIS guineensis *ACROCOMIA sclerocarpa*

Elaeis guineensis (left) From von Martius, *Historia Naturalis Palmarum 2* (1824), t. 54.



ELAEIS guineensis

Elaeis guineensis. *Staminate inflorescence*. From von Martius, *Historia Naturalis palmarum* 2 (1824) 56.



Elaeis oleifera. From Correa, M.P. *Diccionario das Plantas Uteis do Bresil* 2 (1931) t. opposite page 521.



ELAEIS melanococca

Elaeis oleifera, staminate (left) and pistillate (right) inflorescences. From von Martius, *Historia Naturalis Palmarum* 2 (1824) t. 55.