

Plants Africa gave to the World

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ABSTRACT

Although the flora of Africa is rather poor in plant species when compared to the floras of Tropical America or South-east Asia, this vast continent is the home of a wide range of plants useful to Man. Many of these have become famous in cultivation around the world. Coffee now provides an important source of income for certain countries, and the Yams yield one of the world's staple foods. The Oil Palm and Cola trees are widely cultivated in Africa itself and elsewhere. African Mahoganies and Ironwoods are much sought after timber trees of excellent quality. Numerous grasses and pulses are well-known for their food value, and some of the native Cucurbitaceae are appreciated additions to our vegetable diet.

African plants have also made their contribution to horticulture, ranging from world-famous trees such as the African or Gabon Tulip tree and many of the South African species of Proteaceae to the multitude of East and South African succulents.

The present paper provides a survey of the most important of these useful plants and will emphasize the need of further research for forestry and agricultural as well as horticultural purposes, especially as far as some still little-known but potentially important plants species are concerned.

RÉSUMÉ

LES PLANTES QUE L'AFRIQUE A DONNÉES AU MONDE

Bien que la flore d'Afrique soit plutôt pauvre en espèces végétales quand on la compare aux flores de l'Amérique tropicale ou du Sud-Est asiatique, ce vaste continent est le berceau d'une large gamme de plantes utiles à l'homme. Beaucoup de ces plantes sont devenues renommées dans les cultures pratiquées partout dans le monde. Le café procure maintenant une importante source de revenus pour certains pays et les ignames sont une des principales sources d'alimentation du monde. Le palmier à huile et les colatiers sont largement cultivés en Afrique aussi bien qu'ailleurs. Les acajous et bois de fer africains sont très recherchés pour leur bois d'excellente qualité. De nombreuses graminées et légumineuses sont bien connues pour leur valeur alimentaire et certaines cucurbitacées sont des suppléments appréciés de notre alimentation en légumes.

Les plantes africaines ont aussi apporté leur contribution à l'horticulture, allant des arbres mondialement renommé tel que le tulipier africain ou du Gabon et beaucoup d'espèces sud-africaines de Protéacées jusqu'à la multitude des plantes succulentes de l'Afrique l'Est et du Sud.

Le présent document fournit un relevé des plus importantes de ces plantes utiles et souligne le besoin de recherches plus poussées dans les domaines forestiers, agricoles et horticulturaux, spécialement pour les espèces végétales encore peu connues mais potentiellement importantes.

INTRODUCTION

As some investigators see it, and as we may well accept: Africa is a mother. Islands and continents have separated from her, have floated or broken away, thereafter to become independent in every sense and free to develop their own nature, usually more richly and with more diversity than before. And, whereas nature and her components in these segregated parts of the world have become adventurous in number, form, colour and expression, the world of Africa — 'mother's world' — has remained almost stagnant, static, and willing to give up her last secrets. We cannot really blame 'Mother Africa' for being poor both in number and diversity: especially, as the continuous deterioration of climatic conditions on the one hand and the influence of man's greed and ignorance as colonizer and user of the land on the other have left the all too familiar exploited landscapes so difficult to convert again into useful or restful countrysides. In other words, we have done almost everything possible to exploit this old continent leaving behind an exhausted land-mass and its biota which, ironically enough for the survivors, is now troubled by all and everything that Man could possibly think of.

However, mother-continent Africa has done more than to give birth to other land-masses, and more than to produce lions, elephants and giraffes. Africa is the home of some of the finest ornamental plants the world knows, and has given (and is still giving) her exploiters timber, shelter, and food. And, although this generosity, in general view, is scarcely appreciated, many of the species which farmers and gardeners have taken into cultivation are now favourites in extra-African gardens, or are important food-crops for many millions of people in tropical Asia and in America.

But Africa is a large continent and, although rather well explored, certain territories and certain taxonomic groups of plants (all critical enough) require our attention: the first to be better known and mapped and the latter to be cleared-up. Some of these aspects were mentioned at the last AETFAT-Meeting, in Las Palmas 1978 (Kunkel, 1979) but, more urgent still, much work remains to be done in the form of exhaustive studies on the uses of all indigenous plant species, the knowledge gained to be preserved for future needs before supermarkets and imported prejudice result in the loss of this valuable knowledge. I believe that our present level of knowledge concerning the use and application of African wild plants (which should not restrict itself to phanerogams, only) is still scratching at the

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surface and has a long way to go before reaching the roots. Let us hope that we shall have the time and opportunity to do so.

The present paper should not be mistaken for an 'inventory' of all available material. It is offered as a contribution, and as a call for action. It is hoped that it will draw attention to facts already known, as well as to the potential of some lesser known plants and to others as yet quite unknown; here I prefer not to use the expression 'potential of underexploited material', an ugly term to be avoided.

SOME AFRICAN FOOD PLANTS

Beginning with what I consider to be Africa's economically most important plant species, *Elaeis guineensis*, I need hardly discuss it further. This is the West African Oil Palm, so essential for use by humans in nutrition and industry, but also providing palm-wine and so-called palm-cabbage, although the gathering of a 'cabbage' usually means the end of a particular specimen. *Elaeis* is now widely cultivated in South-east Asia and in tropical America (some authors even suggest that this species is of American origin!). Many new and improved cultivars and infraspecific hybrids have been developed outside the original range of the species, and probably a good many of them have not yet reached their ancestral homeland. Of other palms, the widely occurring Coconut Palm (*Cocos nucifera*) and the Date Palm (*Phoenix dactylifera*) are not considered as natives of Africa. However, certain species of *Raphia* are, and these have gained international repute as the source of the famous Raffia used in many forms of wicker-work, for weaving and in other handicraft. And there are species of *Hyphaene* and *Borassus*, both highly ornamental, and providing edible fruits and palm-cabbage; it is interesting to note that *Borassus* is also a source of sugar for local use.

Most food plants now grown in Africa are of extra-African origin: I refer here of course to the most important species, namely rice and mandioca (or cassava). There are, however, native millets (i.e. species of *Echinochloa*, *Eragrostis*, and a complex of *Pennisetum* with many synonyms), and sorghums (especially *Sorghum bicolor*), some of which have been taken into cultivation in other tropical countries.

Important providers of starch and food in general belong to the widespread and much cultivated genus *Dioscorea*, the yams or potatoyams, with several species native to Africa where they provide the basis of daily staple food; some of these species are also cultivated outside the continent of Africa.

Other important food plants from Africa such as the Abyssinian Pea (*Pisum* sp.), the Pigeon Pea (*Cajanus cajan*), the Bambarra Pea (*Voandzeia subterranea*), and other legumes like *Canavalia virosa*, *Psophocarpus* and *Vigna* spp. are cultivated here as well as in other regions of the world. Also of special interest are the African members of Cucurbitaceae of which some species (*Telfairia*) have seeds used for their oil-content, others (i.e.

Acanthosicyos, *Momordica* and *Cucumis*) are used as vegetables. *Citrullus lanatus* (or *C. vulgaris*?) has become famous throughout the world, relished and known as the Watermelon. Some Cucurbitaceae still remain in need of investigation for their potential value (Jeffrey, 1979).

Together with the above-cited Oil Palm two other native oil-producing species of trees should be mentioned: *Butyrospermum parkii*, the Shee-butter Tree of the savanna countries north of the Equator, and (is it still called by this name?) *Tieghemella heckelii*, the Makoré or Edinam (or just the Butter Tree), a very tall species of the rainforest. Both genera belong to the Sapotaceae, and both provide oil and fat for cooking and for the manufacture of margarine, soap and candles. Unfortunately both species have apparently encountered difficulties with their cultivation in other continents; nevertheless, the export of Shee-butter products from Africa amounts to over 30 000 tons, annually. Some oil is also produced by native species of *Olea*, mainly in southern Africa, and from North-east Africa is the Nug (*Guizotia abyssinica*), also known as Niger Seed and cultivated in Africa and in parts of South America. And, even if *Sesamum indicum* is really of Asiatic origin, there are more than 20 African species in the genus, and several of them are harvested for their oily seeds (Brücher, 1977). Connected with oil-products and not to be forgotten is *Ricinus communis*, used for mechanical and medicinal purposes (as we well remember); the oil can also be used for cooking, and the plant itself (although it may become weedy) is frequently cultivated as an ornamental.

Food is also provided by *Plectranthus* (Labiatae), the Kaffir Potato, and by species of the Musaceae some of which are considered as natives of Africa. One thinks first of the genus *Musa* itself, and then of the Ensai (*Ensete ventricosum*), a widely cultivated species with an edible corm; this same Ensai is often found as an ornamental. The so-called African Breadfruit is a name somewhat confusingly applied to such extremely different plants as *Encephalartos* (an ornamental gymnosperm) and *Treculia*, which belongs to the Moraceae.

Besides starch and oil-producing plants, there is the group (mainly of trees) renowned for their fruits. But, whereas introduced plants such as *Citrus*, *Mangifera*, *Carica*, some *Musa* etc. are usually grown in larger plantations, the native fruit trees are mostly kept where they occur naturally, that is to say, they are treated as 'wild orchards'. One may mention here species of *Ficus* (Moraceae), and the refreshing fruits of *Maesobotrya barberi* (Euphorbiaceae); the nuts of *Ricinodendron rautanenii* (also Euphorbiaceae) are a local staple food, as are the fruits and seeds of many other trees and shrubs, especially of the family Leguminosae. The fruits of *Mammea africana* are eaten but have never reached the fame and wide distribution of those of its American counterpart, *Mammea americana*. On the other hand, *Blighia sapida* (known as the Akee) became properly Americanized as a result of the slave trade.

Harpephyllum caffrum (Anacardiaceae), the Kaffir Plum, has entered cultivation. And there is the typical fruit-family, the Chrysobalanaceae. All African species of *Chrysobalanus* known as wild fruit trees have been united with *C. icaco*, by White (1976) and, if accepted, all these different forms should be called Icacó Plum, or Coco Plum. On the other hand, the genus *Parinari* of the same family and also appreciated for its fruits, has been segregated (again: if accepted) into three different genera. The classical Icacó Plum, however, is regarded as a true American species!

Other useful genera belong to the Malvaceae, and here we have species of *Abelmoschus*, *Gossypium* and *Hibiscus* all of which are grown as ornamentals, for their fibre, and as food-providers. Even some *Acacia* species count as food plants, as the gum of some of them is edible (Vassal, 1979). And there must be hundreds of other food-providers known to local people, but only very few of these plants are as yet known or used outside their home territory.

SPICES AND DRUGS OF AFRICAN ORIGIN

Africa has given the world several species of great economic importance as drugs, e.g. *Coffea*. This stimulant (main species cultivated: *Coffea arabica*, probably native in the Ethiopian region) has created wealth and employment in large areas of tropical America, and even South-east Asia has its own coffee-producing centres (Friis, 1979). Another stimulant of worldwide fame, as pointed out by Brenan (1979), has made its contribution in the form of species of the genus *Cola* (Sterculiaceae), especially *C. acuminata* and *C. nitida*. But there are at least five known species of the same genus (Brenan *l.c.*) of which the leaves are eaten as a vegetable.

Referring to spices, most peppers are of extra-African origin. However, two genera of two different plant families are native, being used locally (or misused as adulterants): species of the genus *Xylopia* (Annonaceae), an alternative for pepper, and a great number of species of *Aframomum* (Zingiberaceae), a substitute of the true Ginger. Several other genera provide substitutes for coffee or tea (i.e. *Catha edulis*), or are chewed as stimulants; most of these species (*Boscia*, *Cassia*, *Parkia* etc.) are of local importance, only, and none seems to be cultivated.

AFRICAN TIMBER TREES

Timber trees of Africa are legion. As everywhere in the tropics, there are soft- and hardwoods, white- and redwoods, yellow- and firewoods, ironwoods and other kinds of timber. Much of the world-famous Mahogany, supposed to originate in tropical America, for example, is supplied by African countries, needless to say being timber of somewhat different genera. However, the African substitutes for Mahogany are equally beautiful, and first-class timbers besides, and here one immediately thinks of the genera of the Meliaceae such as *Entandrophrag-*

ma, *Guarea*, *Khaya*, *Lovoa* and *Turraeanthus*, all of which yield an excellent 'mahogany'.

Other much sought-after timbers belong to different plant families, i.e. *Chlorophora* and *Antiaris* (Moraceae), *Lophira* (Ochnaceae), *Terminalia* (Combretaceae), *Heritiera* and *Triplochiton* (Sterculiaceae), *Mitragyna* and *Nauclea* (Rubiaceae), *Diospyros* (Ebenaceae), *Aucoumea*, *Canarium* and *Dacryodes* (Burseraceae), *Dalbergia* (Fabaceae), *Aningueria*, *Gambeya* and *Tieghemella* (Sapotaceae), and the large family of the Caesalpinaceae, with genera such as *Azelia*, *Berlinia*, *Distemonanthus*, *Gossweilerodendron*, *Guibourtia* and many others.

North Africa gave gardeners the famous Atlas Cedar (*Cedrus atlantica*), with its several cultivars; the South and East African Yellow-woods (*Podocarpus*) are much appreciated in carpentry, and *Widdringtonia* and *Tetraclinis* are other native Gymnosperms valued as timber and for reforestation. East African species of *Juniperus* are called 'Pencil Cedar', and are used for this very purpose. A recent publication on African export timbers was presented by Dahms in 1979.

PLANTS WITH OTHER USES

Except for medicinal purposes, African trees with other uses are limited: since the cultivation of the American *Hevea brasiliensis* in Africa, the use of *Alstonia* and *Funtumia* (both of the Apocynaceae) and some lianas has vanished. *Ceiba pentandra* (an African species?) and several species of the related genus *Bombax* (and 'derivates') are still used locally for Kapok. But there are medicinal and rather important poisonous plants of international fame and reputation: genera like *Rauvolfia*, *Strophanthus* and *Strychnos* being the best known.

A tree with the most multiple uses (Wickens, 1979) seems to be *Adansonia digitata*, the Baobab; it provides timber and shelter, shade and fruits, water and medicine, fibre, food, tannin and various curious etceteras which includes the setting up of a prison in the great trunk of a Baobab.

AFRICAN ORNAMENTALS

If the section dealing with timbers is considered voluminous, this chapter on ornamental plants of African origin requires even more attention, because many famous plants of gardens and greenhouses, widely accepted and established all over the world, form a proud African 'family'.

It is difficult to give priority to any single species because most species have outstanding features, but as one usually thinks of trees first as 'superior beings', one may well open these remarks with trees; some ornamental palms and conifers have already been cited. Favourites of parks and larger gardens in the tropics and subtropics in general are the African Tulip Tree (*Spathodea campanulata*), the Sausage Tree (*Kigelia africana*), some Fig species (especially

Ficus afzelii and *F.lyrata*), species of *Erythrina* (*E.caffra*, *E.senegalensis*), of *Bauhinia* (i.e. *B.galpinii*), of *Dombeya*, of *Schotia* and others. *Carissa* and the related genus *Acokanthera*, from South Africa, are for example, frequent in most Canary Island gardens, and *Hibiscus schizopetalus* is not absent from any subtropical garden of distinction. Some species of *Acacia* are grown as shade trees and are very decorative in semi-arid landscapes; at least one of these, *Acacia karroo*, has become naturalized in some Mediterranean countries. *Cussonia*, *Millettia* and *Sparmannia* are greenhouse plants and of the kind prized by collectors.

World fame has been established for South Africa's Proteaceae, where genera like *Protea*, *Leucadendron* and *Leucospermum* have, together, some 250 species all of which are extremely 'garden-worthy'; cut flowers of *Leucadendron argenteum* (the Silver Tree) and *Protea cynaroides* (the King Protea) are first-class export articles to Europe and North America, although some of the material is now coming from horticultural establishments in Madeira. On the other hand, the equally numerous genus *Erica*, mainly of southern Africa, is relatively little known outside its natural habitats (Van der Spuy, 1971).

Widespread and popular garden plants of African origin are *Plumbago capensis* (now less aptly named *P. auriculata*), *Jasminum floribundum* (said to be native in the Nile region?), the 'Busy Lizzies' (*Impatiens oliveri* and *I.sultanii*, with their many cultivars), *Asparagus* species like *A.setaceus* (syn.: *A. plumosus*) and *A. sprengeri*, the Gazanias, the Gerberas, the Thunbergias, some beautiful Gardenias, and the highly varied and much cultivated complexes of *Streptocarpus* and the Saintpaulias or African Violets. *Tecomaria capensis* is well-known elsewhere, and so are some Labiatae like *Plectranthus*, *Pycnostachys* and, especially, the Lion's Ear or *Leonotis leonorus*. Much cultivated, but often running wild, is the Calla-lily (*Zantedeschia aethiopica*), and a truly weedy invader is the yellow-flowering *Oxalis pes-caprae*, Africa's only serious contribution to the list of world-infamous weeds.

Missing in this list, still, are *Ochna serrulata* (Ochnaceae), the mention of some Rubiaceae, especially the genera *Mussaenda*, *Randia* and *Pavetta*, the genus *Monodora* (Annonaceae), species of *Dorstenia* (Moraceae), the Breath-of-Heaven (*Diosma*; Rutaceae), the Cape Marigold (*Dimorphotheca*, a Compositae), the Evergreen Grapevine (*Rhoicissus capensis*), the 'Burning bush' (*Combretum microphyllum*) and many others. But special mention goes to that astonishing group of Pelargoniums so very much cultivated all over the world. This varied complex of beloved climbing or hanging, bushy or potted and always flowering 'geraniums' with their uncountable races, hybrids and cultivars, is probably Africa's most important contribution to horticulture.

In the Monocotyledones, the genera *Cyanotis* and *Palisota* (Commelinaceae) have become appreciated greenhouse plants; *Cyperus papyrus* seems to be of African origin; some ornamental *Dracaena* species

are African, and so are, probably, most species of *Sansevieria*. Who will forget the 'Bird-of-Paradise' flowers of *Strelitzia*, and who does not appreciate Liliflorae of genera such as *Agapanthus*, *Babiana*, *Bulbine*, *Clivia*, *Chlorophytum*, *Crinum*, *Dierama*, *Drimiopsis*, *Freesia*, *Galtonia*, *Gladiolus*, *Gloriosa*, *Haemanthus*, *Hypoxis*, *Ixia*, *Kniphofia*, *Nerine*, *Watsonia* and others, so well-known in our gardens?

But, also related to the lilies, are various genera of succulents such as *Aloe*, *Gasteria* and *Haworthia*, and with this we approach African succulents in general. The Elephant Bush or Spekboom (*Portulacaria afra*) is often grown as a hedge; *Cissus quadrangularis* is present in most succulent collections, and not absent are species of Asclepiadaceae, especially of *Caralluma*, *Ceropegia*, *Huernia* and *Stapelia*, all of these with remarkable flowers which are large, colourful, and rather smelly.

To the family of Crassulaceae belong widely cultivated and much admired species of *Cotyledon* and *Crassula*, *Kalanchoe* and *Bryophyllum* (which I would prefer to keep separate), the remarkable *Rochea*, the numerous *Adromischus* and others. Succulent *Kleinia* are related to *Othonna euphorbioides* and to *Senecio johnstonii*, the 'giant' of the Kilimanjaro. And succulents too, in the wider sense of the term, are the Mesembryanthemaceae, with most of the roughly thousand or so of its species native in southern Africa. I prefer not to cite the 125 genera of Herre's (1973) book, except for the more common *Carpobrotus*, *Lampranthus* and *Drosanthemum* familiar in so many gardens, and the often weedy appearance of some species of *Mesembryanthemum* as well as *Aptenia cordifolia*. As for the many species of *Lithops* and related genera, the so-called 'living stones', which I cannot help but admire, I wish I had a living collection of these glorious little plants hardly noticeable in the wild and much sought-after in cultivation.

Little remains to be said here on succulents because so many and important books have already been written covering the theme. As curiosities in collections, one finds the swollen 'trunks' of species of *Adenia* (Passifloraceae) and of *Adenium*, the latter being an Apocynaceae. And we have this surprising multitude of succulent Euphorbias, the mainly Arabic-African counterparts of the American cacti, with all imaginable and unimaginable forms and expressions, apparently with the exception that none has yet become an epiphyte. Many species of this complex have been taken into cultivation, including tree-shaped ones such as *Euphorbia excelsa*, *E. candelabrum*, *E. tetragona*, *E. triangularis* and *E. grandidens*, all of which may reach 12–15 metres in height (Palmer & Pitman, 1972).

A last and famous and highly specialized African plant to be mentioned is not a succulent nor a tree nor a proper shrub: growing in South West Africa (Namibia), the *Welwitschia mirabilis* (or *W. bainesii*, as this very odd-looking gymnosperm is now called) must try amazingly hard to keep alive for about a hundred years, because it hardly ever rains in that region.

CONCLUDING REMARKS

As it appears both difficult and superfluous to make concluding remarks by summarizing a summarized report, I prefer to conclude with that which evidently remains to be done:

Africa is a palaeo-continent with limited resources, but with a great number of extremely interesting plants, plant-formations and entire landscapes each of which deserves more protection and planning than is given at the moment. Nature in Africa is also in need of thorough and supraregional investigations into the actual and the potential use and application of the known and the suspected 'useful' elements of its flora, for their nutritional, medicinal, industrial, ornamental and other properties, in order that we shall know them as such.

It is herewith suggested than an 'Ethnobotanical Commission' be set up to study the matter and — hopefully within the framework of AETFAT — will report on achievements or any results obtained, to encourage more and future investigations in what we may name a Regional Natural Heritage.

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REFERENCES

- BRENAN, J. P. M., 1979. The genus *Cola*. Its taxonomic-economic relationships. In G. Kunkel, *Taxonomic aspects of African economic botany* 49–52. Las Palmas: Ayuntamiento.
- BRÜCHER, H., 1977. *Tropische Nutzpflanzen. Ursprung, Evolution und Domestikation*. Berlin-Heidelberg-New York: Springer Verlag.
- DAHMS, K. G., 1979. *Afrikanische Exporthölzer*. Stuttgart: DRW-Verlag.
- FRIIS, I., 1979. The wild populations of *Coffea arabica* L. and cultivated coffee. In G. Kunkel, *Taxonomic aspects of African economic botany* 63–68. Las Palmas: Ayuntamiento.
- HERRE, H., 1973. *The genera of the Mesembryanthemaceae*. Rotterdam: Balkema.
- JEFFREY, C., 1979. The economic potential of some Cucurbitaceae and Compositae. In G. Kunkel, *Taxonomic aspects of African economic botany* 35–38. Las Palmas: Ayuntamiento.
- KUNKEL, G. (Ed.), 1979. *Taxonomic aspects of African economic botany*. Las Palmas: Ayuntamiento.
- PALMER, E. & PITMAN, N., 1972. *Trees of southern Africa*. 3 vols. Cape Town: Balkema.
- QUIGLEY, F. & HALL, J. B., 1979. The relation to cultigens of wild edible yams (*Dioscorea* sect. *Enantiophyllum*) in Ghana. In G. Kunkel, *Taxonomic aspects of African economic botany* 75–79. Las Palmas: Ayuntamiento.
- UPHOF, J. C. T., 1968. *Dictionary of economic plants*. Lehre: Cramer.
- VAN DER SPUY, U., 1971. *South African shrubs and trees for the garden*. Johannesburg: Keartland.
- VASSAL, J., 1979. Acacias gommiers au Sahel. In G. Kunkel, *Taxonomic aspects of African economic botany* 39–41. Las Palmas: Ayuntamiento.
- WESTPHAL, E., 1974. Pulses in Ethiopia, their taxonomy and agricultural significance. *Belmontia* n.s., 3: 1–261.
- WHITE, F., 1976. The taxonomy, ecology, and chorology of African Chrysobalanaceae (excluding *Acioa*). *Bull. Jard. bot. nat. Belg.* 46: 265–350.
- WICKENS, G. E., 1979. The uses of the Baobab (*Adansonia digitata* L.) in Africa. In G. Kunkel, *Taxonomic aspects of African economic botany* 27–34. Las Palmas: Ayuntamiento.