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## The Coconut Palm in East Africa. 1. East African Tall

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### Origin and Diversity

The general consensus has been that the coconut originated in the southwest Pacific and reached Africa later (Purseglove 1972, Child 1974, Ohler 1984). Purseglove speculated that Malaysian searovers introduced the coconut to Madagascar in the first centuries A.D. and that from there it could have reached the coast of mainland East Africa. Merrill (1937) mentioned that the words for coconut used in Madagascar also occur in the Far East and the Pacific. However, Sauer (1967) thought that the early presence of coconuts on uninhabited islands like the Seychelles and Mauritius strongly suggested natural dispersal. It follows from this that coconuts could have floated to East Africa (Harries 1978). Subsequently, Harries (1981) showed that the common tall varieties in East Africa are late germinating, with wild type characteristics similar to the coconuts on the Indian subcontinent, while the common tall varieties in peninsular Malaysia are early germinating, domesticated types. Thus the natural dissemination favored by Sauer and the human-aided introduction suggested by Purseglove can be considered as consecutive events rather than competing theories.

It has recently been suggested that the coconut was domesticated in the region between southeast Asia and Australasia (known as Malesia), but that the ancestral coconut may have originated in western Gondwanaland at the time it split up into the present continents (Harries 1990). This raises the possibility that the wild type coconut may have existed on the fringes of the Pacific and Indian oceans since the earliest time. In that case the coconut palm could be considered indigenous over a very large area, including the coast and islands of East Africa (Harries, in press). Indeed, the two closest botanical relatives to the coconut are found respectively in southern Africa, *Jubaeopsis caffra* (Uhl and Dransfield 1987) and Madagascar,

*Voanioala gerardii* (Dransfield 1989). The presence of coconuts with wild-type characteristics does not prevent the introduction of others with domestic-type characteristics nor the subsequent introgression between the two, with the former characteristics predominating. There is the possibility that when the Polynesians settled in the Pacific, related peoples sailed to Madagascar. They would have been carrying the domestic type of coconut from Southeast Asia and they may have reached the African coastline.

The first written reference to the coconut palm in East Africa is thought to be in the "Periplus of the Erythraean Sea," written about A.D. 60. The Periplus mentioned that the town of Rhapta, believed to have been located somewhere on the coast of present day Tanzania, traded in coconuts (Schoff 1912). It is thought that this town derives its name from the Greek or Arab verb "to sew" (Ravenstein 1898, Schoff 1912), because the local boats were sewn together with fibers. When the Portuguese first sailed to East Africa and India they found Arab boats sewn with coconut fiber (coir) and carrying coconuts as cargo. Although the reference to coconuts in the Periplus has been taken as evidence of the introduction of the coconut to East Africa by Hindu merchant-seafarers sometime in the 7th to 1st century B.C. (Schoff 1912, Hichens 1938, Hourani 1951), it can equally well be explained simply as the opening up of trade between the two regions where coconuts already existed. It is certain that the town Rhapta had an established place in the mercantile system of the Indian Ocean. The Periplus strongly indicates a vigorous commerce between India and East Africa. It is one author's conjecture (HCH) that coastal towns like Rhapta developed where they did because coconuts were already present. Two thousand years ago or more, the coconut palm not only served to identify seashore locations with fresh ground water, but in those places it literally acted as a natural desalination plant. The

sweet, uncontaminated drinking water from the immature nut was then, and is still now, an important use of this plant to the local community. This applies to offshore islands and to favorable parts of the African and Indian coast. It is not suggested that the early coconuts were present in large numbers or spread over extensive lengths of coastline and were certainly not found naturally anywhere in the hinterland.

While the earliest history of the coconut in east Africa remains uncertain, there is no doubt that its establishment was not a single event but a continuous affair extending over many centuries. Though the Indian influence appears to have waned somewhat after the times of the *Periplus*, trade relations between India and East Africa continued to exist until well after the arrival of the Portuguese. Several Arab geographers like Buzurg ibn Shahriyar, Al-Mas'udi, and Al-Biruni attest to such connections in the early Middle Ages (Ingrams 1967, Kirkman 1968, Spencer Trimmingham 1975). Marco Polo wrote of ships of the Malabar coast which sailed to the islands Madeigascar and Zanghibar in the late 13th century (Wright 1892). Vasco da Gama met Hindu merchants at the larger ports of East Africa (Ravenstein 1898). Duarte Barbosa observed in the early 16th century that ships from the kingdom of Cambay, the great seaport of Gujarat, were often to be found in the harbors of Mombasa, Malindi and Mogadishu (Stanley 1866).

### Early Arab History

The Arab and Persian colonization of East Africa is of even greater importance. It was a long and gradual process which began in remote antiquity and continued more or less steadily for many centuries with at certain times more massive waves of immigration due to political or religious persecution at home (Coupland 1938, Chittick 1975). There is little doubt that many of these traders and settlers brought coconuts independently. In the *Khabar al-Lamu*, a chronicle of Lamu, the introduction of the coconut palm on the Lamu archipelago (present day Kenya) is attributed to Arab settlers, who came by way of India in the 7th century A.D. (Hichens 1938). They brought coconut seedlings and are referred to in the chronicle as *Kina Mti* (kinsmen of the trees). In persistent traditions on the coast of mainland Tanzania, Zanzibar and Mafia, the arrival of the coconut is attributed to the *Debuli*, whose ships

reputedly had sails of palm matting (Piggot 1941; Gray 1954, 1962; Chittick 1965; Baumann 1896). It is now believed that the *Debuli* arrived before the *Shirazi* and that their name derives from the town of *Debul*, known to the Arabs who conquered it in A.D. 711–712 as *Daybul*, a port situated near the mouth of the *Indus*. It is now identified with the excavations at *Bhambor*, 40 miles east of *Karachi* (Chittick 1965). *Pemba* tradition credits the introduction of the coconut palm to the *Wadiba*, who according to Gray (1954, 1962) hailed from the *Maldivé Islands*, which were known to 14th century Arab geographers as the *Diba Islands*.

According to the Arab traveller *Ibn Battuta* (Gibb 1962), great quantities of cowries and coconut products were exported from these islands. Both the *Maldives* and the *Laccadives* were the scene of remarkable shipbuilding activity. The ships, including hulls, masts, ropes, stitches and even sails, were built entirely of the various products of the coconut. The Arabs and Persians from the *Gulf* used to import coconut products from these islands or go there to have their ships built on the spot. There is evidence that the *Maldives* were first settled by *Singhalese Buddhists* who planted coconuts and dug wells (Hourani 1951, Sauer 1967).

The *Shirazi*, who derive their name from the town of *Shiraz* on the *Persian Gulf*, settled in East Africa from the 9th century A.D. onwards. Wild type coconuts may have grown spontaneously around their earliest settlements, but there is no doubt that they have imported coconuts as well. Though the area around the *Persian Gulf* appears to be unsuitable for coconut cultivation, coconuts did and do grow there. The traveller *Nasir-i-Khusraw* observed them in *Oman* in the 11th century A.D.; *Ibn-Battuta* found them in the 14th century at *Zafari*, a port of the *Hadramut*, in the sultan's garden in the city of *Zabid* on the *Red Sea* and in *Oman* (Gibb 1962). The Arabs and Persians around the *Gulf* had further easy access to coconut products from *India*, the *Laccadives* and the *Maldives*. The *Shirazi* have most certainly played an important part in the distribution of the crop in East Africa. They first settled on the *Benadir coast* (present day *Somalia* and *Kenya*), and from the 11th century onwards they remigrated southwards and settled in many towns along the coast as far south as *Sofala* in present day *Moçambique*. Such migrations took place as late as the 17th century, witness the settlement of *Khatimi-Barawi* at *Kun-*

duchi near the present Dar es Salaam (Chittick 1975).

Two Arab geographers during the early Middle Ages have referred to the cultivation of the coconut in East Africa. Al-Mas'udi made several visits to the island of Kanbalu, the last one in 916. The island had a population of Muslims and pagan Zanj. The staple foods of the Zanj were bananas, sorghum-millet, taro and coco-yam, and they extensively cultivated the coconut palm on their islands. Kanbalu is generally considered to be the present day Pemba or Zanzibar (Ingrams 1967, Kirkman 1968, Chittick 1975). Kirkman speculates that Kanbalu could be the ruined town at Mkumbuu on Pemba and that the name Kanbalu is probably derived from a town about 40 miles northwest of Debul in northwest India. However, according to Freeman-Grenville (1962*b*), Al-Mas'udi placed the island near Sofala and he considers it therefore to be Madagascar. Ibn Sa'id reported in the 13th century that the Mand islands near Mombasa were celebrated for their coconuts. Among these islands he described Kilwa as the most important and further Zanzibar. However, the highly inaccurate description of these islands makes it unlikely that he visited the area himself. He may have referred as well to Manda, an island of the Lamu archipelago near Mombasa (Freeman-Grenville 1962*b*).

If Harries (1990) is right, the first coconuts in East Africa originate principally from the same source as those on the Indian subcontinent and adjacent islands, namely, the wild type populations that pre-date human maritime activity. Even so, the foregoing information, though partially based on local legends and conjecture, suggests that coconuts were continuously imported from the same areas later on. Emigration of people from India and the Persian Gulf to East Africa, trade relations between the Gulf and India and between both areas and East Africa, all point in that direction. As to the flourishing trade relations between India, the Persian Gulf and East Africa, these were made easy by the prevailing and predictable monsoons. Since times immemorial, traders from India, the Persian Gulf and the Hadramut arrive with the northeast monsoon, which blows from December to March, and return with the southwest monsoon, blowing from June to October. In India the coconut palm has been known for at least 3,000 years. Medieval writers such as Marco Polo refer to it as *nux indica*, the Indian (or Indies) nut (Wright 1892). Even so, Indian scholars do

not regard it as indigenous (Mayuranathan 1938, Menon and Pandalai 1960).

### Early European History

By the time Vasco da Gama reached East Africa in 1498, a series of independent and often competing towns and settlements ruled by Muslim Afro-Arab/Shirazi (or Swahili) dynasties were scattered along the East African coast, more sparsely south of Cape Delgado (the present border between Tanzania and Moçambique) but in increasing density to the north. The most important settlements were Mogadishu, Barawa, Siju, Pate, Lamu, Malindi, Mombasa, Pemba, Zanzibar, Kilwa, Moçambique Island and Sofala. To the Portuguese the most striking natural object around these settlements was the coconut, which was a great novelty to them. It features in many of their chronicles. In the journal of the first voyage of Vasco da Gama from 1497 to 1499 (Ravenstein 1898) the coconut palm was described from the islands of S. Jorge and Moçambique and from Malindi:

The palms of this country yield a fruit as large as a melon of which the kernel is eaten. It has a nutty flavour.

The Portuguese also observed the sewn boats, already in use during the time of the Periplus in the first century A.D.:

The vessels of this country are of a good size and decked. There are no nails and the planks are held together by cords. The sails are made of palm matting.

Duarte Barbosa observed the same boats on the islands of Zanzibar, Pemba and Mafia in 1517 (Stanley 1866) and Monclaro at Mombasa in 1569 (Freeman-Grenville 1962*b*). De Barros, describing Kilwa in 1505, before it was sacked by d'Almeida, wrote:

From our ships we saw the fine houses, terraces and minarets with palm and fruit trees in the orchards, which made the city so beautiful that our men were eager to land (Dorman 1938).

An anonymous witness of the same attack on Kilwa described the pursuit of the sultan as:

A trail of things dropped in the hasty flight of the occupants led to a palm grove, the trees of which were so dense that d'Almeida prevented his men from continuing the pursuit (Gray 1962).

The same author mentioned the use of the coconut at Kilwa as drinking nut and for making wine and vinegar (Axelson 1940, Freeman-Grenville 1962*a*). In 1522 the Portuguese invaded the Ker-

imba Islands (a small island group located near Cape Delgado) and destroyed the main town and extensive palm groves (Axelson 1940). In 1569 the Portuguese missionary Monclaro, on his way from Kilwa to Pate, stopped at Mafia (Monfia). He reported that the island had numerous palm groves and traded in tar (probably copal) and coconut fiber (Freeman-Grenville 1962*a*). In 1587 the town Faza on Pate Island was sacked by the Portuguese for giving support to invading Turks. After killing all inhabitants, they cut down ten thousand coconut palms, the main source of subsistence of the population. Afterwards they did the same in Mombasa (Strandes 1968). In 1589, after the second Turkish incursion, they took similar revenge on the town of Manda and destroyed 2,000 coconut palms (Axelson 1960). The destruction of coconut palms by the Portuguese was not merely to deprive the local people of subsistence and trade but was a deliberate act of war to prevent ships being built that could be used against them. In Rezende's description of East Africa in 1634, the kingdoms Pate, Ampaza and Siu on Pate Island, Lamu, Mombasa, Zanzibar and Pemba are mentioned to be abundant in coconuts (Strandes 1968).

### Later Arab History

All these reports indicate that the coconut palm was well established in coastal settlements of East Africa at the onset of Portuguese influence, but predominantly in the present Kenya and the adjacent islands of Pemba, Zanzibar, Mafia and Moçambique. Kilwa was the only important city-state on the mainland of present Tanzania, though smaller settlements existed. In the 17th century the number of settlements of Shirazi origin along the coast of mainland Tanzania strongly increased. Freeman-Grenville (1962*b*) lists no fewer than 62 archaeological sites, many of which are still inhabited. There is no doubt that coconuts grew in these settlements from their earliest existence. To understand the distribution of the crop over the country in later years, it is important to note that the great majority of these settlements on the Tanganyika coast existed between the border of present Kenya and Ras Kimbiji, near Dar es Salaam. In the southern part of present day Tanzania there were, except for Kilwa, only two settlements, Lindi and Mikindani. Through all the centuries, the Arab and Persian settlers and their Swahili descendants exploited the agricultural resources of the land only to a certain extent.

They introduced fruits like the orange and cultivated coconut palms along the rivers near their towns or irrigated by wells (Strandes 1968). These crops were mainly for local consumption; the main activity was trade in commodities like ivory, gold and sometimes slaves, but not agriculture (Coup-land 1938). Therefore, with the possible exception of Zanzibar, Pemba and the Lamu archipelago, the coconut palm was restricted to limited areas around the settlements and was not grown widely along the coast as today. Hostilities between the various towns or settlements and with the African tribes of the interior must have further contributed to this fact. This situation did not change much until the most recent immigration of Oman Arabs from the 1820's onwards.

From the 1820's, Seyyid Said, Sultan of Oman from 1806 to 1856, encouraged the settlement of Omanis on Zanzibar, Pemba and the coast of the mainland. On the mainland this did not happen much before 1837, when the Mazrui family, hereditary rulers of Mombasa since 1740, were finally defeated by this sultan and most of the coastal areas of present Kenya and Tanzania came effectively under his control. These immigrants together with the local Swahili began to grow grains and coconuts on plantation scale. The Omanis took an interest in coconut production at a critical period when the earlier interest in fiber for maritime purposes was replaced by the demand for copra and oil for industrial process. Cooper (1977) described these developments on the coast of Kenya. Not only did the scale of agricultural production increase vastly from the 1820's but in parts of the coast, most strikingly in Malindi, new ways of organizing production were also developed. The typical coastal farming unit, a family supplemented perhaps by a few slaves, gave way to large-scale plantations based on closely supervised labor. Millet was much in demand in Arabia and Zanzibar, while coconuts and sesame went to Arabia and to French traders in Zanzibar. Mainland farmers found the means to meet these demands through the slave-trading infrastructure that developed in the late 18th century. According to Cooper, Mombasa started extending into the hinterland as early as 1840. In the 1860's there were thriving plantations with grain, coconuts, and fruit trees. Malindi became the granary of East Africa with a slave labor-force of 5,000-10,000. Coconuts at Malindi were planted somewhat later, in the 1880's. By 1890 there were "forests" of coconuts there. After the abolition of slavery, labor

*Table 1. The number of coconut palms estimated to have grown in the various districts of German East Africa in 1890.*

District	Number of Coconut Palms in the District in 1890
Tanga	450,000
Pangani	200,000
Mafia island	100,000
Bagamoyo	100,000
Saadani	20,000
DaresSalaam	50,000
Kilwa	20,000
Lindi/Mikindani	15,000
Total	955,000

became scarce and the coconut became even more favored. The same developments took place in present Tanzania, mainly in the northern Muheza and Tanga districts, on Mafia Island and later in the Pangani district. Krapf (1860) reported an abundance of coconuts around Tanga already in 1840. Baumann (1891) described in detail the extensive coconut plantations in the Tanga district, in particular the Arab-owned groves around Tanga. When Burton and Speke (1858) visited Pangani in 1857, they found few Arabs there. Coconut palms were restricted to a narrow strip around the Pangani Bay while the Pangani settlements were surrounded by a thick, thorny jungle where the people fled when pursued.

Baumann (1891) found the land north of the Pangani River covered with extensive sugarcane plantations and dense coconut groves. Many Arab settlers had remigrated from Tanga to Pangani because the harbor of the latter was inaccessible to British warships and thus favored the slave trade, by then illegal. Further, the Pangani area was more suitable for the cultivation of sugarcane. According to Werth (1915) the heyday of Pangani did not come before the rule of sultan Seyyid Barghash (1870–1888). When labor became scarce at the end of the century, the sugarcane industry declined and coconuts became even more favored. The densely planted coconut groves far inland along the Pangani River date from this period (Paasche 1906). Coconut groves were greatly extended on the island of Mafia as well, stimulated by the sultan's liwali on the island, Salim bin Said, who had a large estate himself near Terreni. This was mainly during the rule of Seyyid Barghash. Oman Arabs settled at Bagamoyo and Dar es Salaam as well, but their coconut

plantations did not reach the proportions as in northern Tanzania. In the area around Bagamoyo, the activities of the Catholic Mission were important during the same period. From 1870 the Holy Ghost missionaries planted extensive coconut plantations and further strongly encouraged coconut planting by smallholders. In the southern Kisarawe, Rufiji, Kilwa, Lindi and Mtwara districts of present Tanzania, plantation-scale planting by Oman Arabs was of minimal importance. Isolated plantations of modest size, mainly planted during the rule of sultan Seyyid Barghash, existed at Mtoni, Mayungi-yungi, Kilwa Singino, Mchinga, Lindi and Mikindani only. The southern districts of present Tanzania were therefore virtually bare of coconuts.

### Later European History

The initial predominance of coconut groves in Kenya and northern Tanzania compared with southern Tanzania, later greatly enlarged by the plantation agriculture of the Oman settlers, and to a certain extent the Catholic mission at Bagamoyo is best demonstrated by a coconut inventory carried out by district authorities at the beginning of German rule of present mainland Tanzania (Anonymous 1891). The number of palms estimated in the various districts of German East Africa are presented in Table 1. It is important to note that at the onset of the German colonial administration (1888–1916), only 4% of the coconut palms of mainland Tanzania grew in the southern Kilwa and Lindi districts, while 75% grew in the Tanga and Pangani districts.

During the German administration, the government, strongly stimulated coconut growing. Extensive village inquiries revealed that seednuts and seedlings were distributed by their Swahili or Arab agents (Maakida), free of charge, to smallholder farmers via the village chiefs. This happened from about 1892 until shortly after the Maji-Maji war (1905–07) along the whole coast of mainland Tanzania, except for the Bagamoyo and Mikindani districts and less so in the Tanga district. Surprisingly few references regarding these activities could be found in the otherwise abundant publications during German colonial rule. Only Stuhlmann (1909), when describing the fourfold increase in exports of copra between 1900 and 1903, mentioned that this increase was mainly due to the efforts of the government, which since about 1892 encouraged the native population at every opportunity to plant coconuts and distrib-



uted seednuts and young palms in large quantities. Between 1898 and 1903 the copra exported from German East Africa increased from about 700 tons to almost 4,000 tons (Stuhlmann 1909). Assuming that an East African Tall palm on the mainland produces about 4 kg copra per year, this means that at least 800,000 additional palms came into bearing during these years. This is a conservative estimate because the coconut is not only used for copra production but for drinking nuts, fresh nuts, and palm wine as well, though the latter use of the palm, according to Stuhlmann, was officially discouraged. It is therefore estimated that during the early years of German rule not less than 2 million seednuts or seedlings were distributed under the government scheme. A very important aspect of this distribution scheme was that the Germans got virtually all their seednuts from or via Mafia. All the senior farmers interviewed during our inquiries stated this without hesitation, even where geographical distances seem to forbid this. This is not surprising because the government had their own nurseries on Mafia, had complete control over all exports of coconuts and copra via their customs-office at Chole Island, and further spectacularly increased the number of coconut palms in Mafia during their rule by distributing seednuts there as well. There was a general consensus on Mafia that not all the seednuts used for this distribution were collected from the local palms, though there were at least 100,000 bearing palms on the island at the onset of German rule (Anonymously 1891) and therefore enough seednuts locally available. Particularly in the early years of the coconut promotion scheme, when according to Baumann there was still very little government activity on Mafia, Chole Island was only used as a distribution center for seednuts, imported into Mafia by large, motorized, Indian dhows. As origin of the seednuts, the Comores were mentioned. This seems plausible because the Deutsch-Ostafrikanische Gesellschaft (DOAG), the predecessor of official German rule in Tanganyika, obtained 1,000 acres of land on the Comores in 1886 (Prager and Frömsdorf 1986). It is possible that the Germans also imported seednuts from the Pacific, where they were planting coconuts in the Bismarck Archipelago and the Caroline Islands. At the same time, they may even have taken coconuts such as the Pemba Dwarf, from East Africa to the Pacific, as well as to territories in West Africa (Krain et al. in press).

The distribution of seednuts on the mainland

during German rule had by far the greatest impact in the south, in particular in the present day Kisarawe, Rufiji and Kilwa districts, because only 4% of all the coconuts in the country at that time grew there. The coconut was virtually a new crop, which was often forced upon the people. Almost all the present palms in the three districts are therefore of comparatively recent Mafia origin with a possibility that many of the original seednuts were imports from the Comores or the Pacific. It was different in the northern districts of the country, in particular the Tanga and Pangani districts. There the coconut was a long established crop; more than 75% of all coconuts in the country grew there. There is no doubt that the limited distribution of seednuts by Germans in the north had much less influence on the coconut population there.

Plantation companies and private European farmers played a modest role in the coconut growing of German East Africa, except on Mafia Island. In 1910 Europeans owned nearly 6,000 ha (or 600,000) coconut palms on the mainland (Stuhlmann 1910). However, about half of these palms were planted in unsuitable soils and later abandoned or replaced by sisal (Anonymous 1899–1912). Interest of private farmers on Mafia Island started as late as 1910 but they planted at great speed (King 1917). King considered that by 1917 most of the soils suitable for coconut on Mafia were already occupied by the crop. It is estimated that at the end of German rule there were about a million coconut palms on Mafia and between two and three million on the mainland.

From 1916 to date the coconut industry was gradually expanded, mainly by smallholder farmers. The increase was not spectacular. According to Swynnerton (1946) the copra production between 1913 and 1939 scarcely doubled while the rival cotton and sisal industries increased five-fold and coffee sixteen-fold. In the 1930's the coconut industry received a boost from German settlers, who planted or extended about 4,000 ha on the mainland and 6,000 ha on Mafia. From 1945 (copra bill) until the late 1950's the British colonial administration stimulated coconut growing by subsidies and distribution of seedlings, mainly in the Tanga and Pangani districts.

In the last decades coconut production has been in decline because of inadequate replanting, pests and a destructive disease. From 1979 the National Coconut Development Programme (NCDP), a joint project of the Tanzanian government, the German

Agency for Technical Cooperation (GTZ) and the International Development Agency (IDA), is in operation to promote the coconut industry in Tanzania.

### The Lethal Disease

The lethal disease of coconut palm (LD) has caused severe losses in the coastal coconut belt of mainland Tanzania. The first reliable report of the disease was from Bagamoyo in 1902 (Stein 1905), but there is no reason to believe that it did not occur much earlier. Symptoms of LD are very similar to those of lethal yellowing-type diseases in the Caribbean area and West Africa (Schuiling et al. 1981). Mycoplasma-like organisms were associated with LD (Nienhaus et al. 1982). However, as distinct from lethal yellowing, no imported coconut variety with satisfactory resistance to LD could be found to date (Schuiling and Mpunani 1990). Another characteristic of LD, as opposed to lethal yellowing, is the great diversity in losses observed in the various affected areas. In the southern half of the Tanzanian mainland, in particular the Kisarawe, Rufiji and Kilwa districts, the disease has caused heavy losses, while in the northern half, particularly the Tanga and Pangani districts, LD has made far less impact. This may be related to the history of coconut groves in both areas. In northern Tanzania, where coconuts have grown for many centuries, a measure of equilibrium between disease and host palm may have come to exist while this did not happen in the south, where the coconut palm is a comparatively new crop, introduced from or via disease-free Mafia Island. This hypothesis leads to resistance trials with subpopulations of the local East African Tall. An extensive study on the history, epidemiology and economic impact of lethal disease in Kenya and Tanzania with reference to the history of the coconut industry has recently been completed (Schuiling 1991).

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## A CHANGE IN PRINCIPES

The size and format of *Principes* has been changed to this larger one to allow for improved photographs and the inclusion of increased horticultural materials. Martin Gibbons of the U.K. has been named as Horticultural Editor of *Principes*.