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# The Distribution, Abundance and Utilization of the Lala Palm, *Hyphaene natalensis*, in Tongaland, Natal

*by*

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## Abstract

The distribution of the Lala Palm, *Hyphaene natalensis*, in Tongaland and Northern Zululand, is mapped; the Palm occupies an area of about 156 000 ha. The total number of individuals is estimated at approximately 10 500 000 and the total yield in leaves per year is estimated at about 33 000 000. The exploitation of the leaves for fibre could be an economic proposition, but communications in the region are poor and the area is extremely large. Present utilization of the Lala Palm, by the Bantu is considered.

## Introduction

Recently it has been suggested that the leaves of the Lala Palm, *Hyphaene natalensis*†, in Tongaland, which yields an excellent fibre, should be reaped and processed for the fibre. However, before embarking on such a scheme it was considered desirable to study the distribution, abundance and present utilization of the Lala Palm with a view to assessing the feasibility of the scheme.

Tongaland has been defined as that part of Natal which lies east of the Lebombo Mountains, north of the Mkuzi River and St. Lucia, and south of Mozambique (Campbell, 1969). For the most part it is flat to gently undulating country about 14,7 to 44 m above sea level, until it rises sharply in the west to the Lebombo Mountains. A feature of Tongaland that is uncommon in Natal is the presence of numerous pans and lakes, namely the Pongola flood plain and environs (Coke & Pott, 1970), the Mosi Swamp running more or less north to south, and the series of coast lakes including the Kosi System and Lake Sibayi (see Fig. 1). In addition, there are numerous ephemeral, as well as a few permanent pans and swamps scattered through the country east of the Mosi Swamp to the sea.

The Tongaland or Mozambique Plain, as the flat coastal plain is called, is a recently uplifted area of marine sands. From the coast to the Lebombo the soils change from white to grey sands, to red sands across the Pongola, and to Cretaceous soils in the Lebombo foothills. The soils occupied by the Lala Palms are the grey ands white sands.

Few climatic data are available from the area. It is known, however, that the average summer rainfall along the coast is about 1 200 mm and that this falls off steadily as one moves inland to about 600 to 700 mm along the Pongola River. There is little, if any, rainfall in winter. It is fairly safe to assume, therefore, that the average annual rainfall between the Mosi Swamp and the sea, which is the main palm belt (see Fig. 1), is between 900 and 1 200 mm. No temperature data are available from the area, but it is known that in winter minimum temperatures are not sufficiently low to allow even light frost, and that maximum temperatures in summer are in the region of 45° C. The climate, according to Köppen's classification is "tropical with summer rainfall", and according to Thornthwaite's classification "sub-humid warm, with sufficient moisture in all seasons" (Schulze, 1947).

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† Formerly known as *Hyphaene crinita*, which is apparently a tropical West African species (Furtado, 1970).

## The Lala Palm Belt

The area covered by Lala Palms is shown in Fig. 1. This distribution has been plotted from aerial photographs, and ground checks in 1968 and 1969. South of St. Lucia the palm belt stops, though small isolated patches occur down the coast as far south as the Umtamvuna River.

The structure of the Lala Palm community varies quite considerably from east to west. Along the east coast the palms occur mainly as widely scattered individuals in grassland (Plate 1). The most important grass species, which form a moderately dense tussocked community up to 0,75 m tall, are *Aristida junciformis*, *Elyonurus argenteus*, *Tristachya hispida* and *Trachypogon spicatus*. The individuals of *Hyphaene natalensis* are often mixed with another palm, *Phoenix reclinata*, the Wild Date Palm, and both palms exhibit the same ability to produce several stems from a single rootstock or plant. Further inland the grassland is invaded by other woody plants and the density of *Hyphaene natalensis* increases (Plate 2), while that of the *Phoenix reclinata* decreases markedly. Some of the more common associated woody plants are *Dichrostachys cinerea*, *Acacia burkei*, *Maytenus heterophylla*, *M. senegalensis*, *Vangueria infausta*, *Sclerocarya caffra*, *Strychnos spinosa*, *S. madagascariensis*, *Combretum molle*, and *Syzygium cordatum*. In these areas bush clumps tend to form where there is some protection from fire, though woody plants are also found scattered through the grassland. These woody species vary greatly in density, height and occurrence, depending on local edaphic and biotic factors.

In those areas where the water table is near the soil surface for most of the year, herbaceous species only occur. So, although *Hyphaene natalensis* is capable of tolerating waterlogged soils, it is unable to withstand continuous waterlogging and only occurs in seasonally inundated areas.

In general then, the Palm Veld near the coast is fairly open, becoming more dense towards the Mosi Swamp where it is a mosaic of different types from open herbaceous communities to dense bush clumps.

For mapping purposes a density of at least 10 plants per acre (0,4 ha) was taken as constituting Lala Palm Veld, though nearer the coast *Phoenix reclinata* tended to confuse the air photo interpretation. Thus, Lala Palms do occur east and west of the area mapped as Lala Palm Veld, but in these areas individuals are widely scattered.

## Quantitative Methods and Results

In the field Lala Palms were counted at 36 sites, each site being 70 × 70 paces, or approximately one acre (0,4 ha) in size. The location of these sample sites was governed primarily by ease of access.

Sample sites 1 to 24 were in the vicinity of the Maputa–Ingwavuma road. The first site was on the north side of the road 1,6 km from Maputa Post Office, thereafter sample sites were taken at intervals of 1,6 km on alternate sides of the road. Sample sites 25 to 29 were located on a track joining the Maputa–Ingwavuma road to the Maputa–Nseleni road, and were spaced in the same way as above. Sample sites 30 to 33 were placed 16 km from Maputa on the Maputa–Nseleni Road in the same way as above. Sample sites 34 and 35 were located on the Mbazwana–Lower Mkuzi road, and site 36 on the main road south of Hluhluwe (see Fig. 1).

At each sample site the number of individual plants of *Hyphaene natalensis* was counted and the number of stems per plant recorded. The number of leaves per stem was also counted. These data are summarized in Table 1.

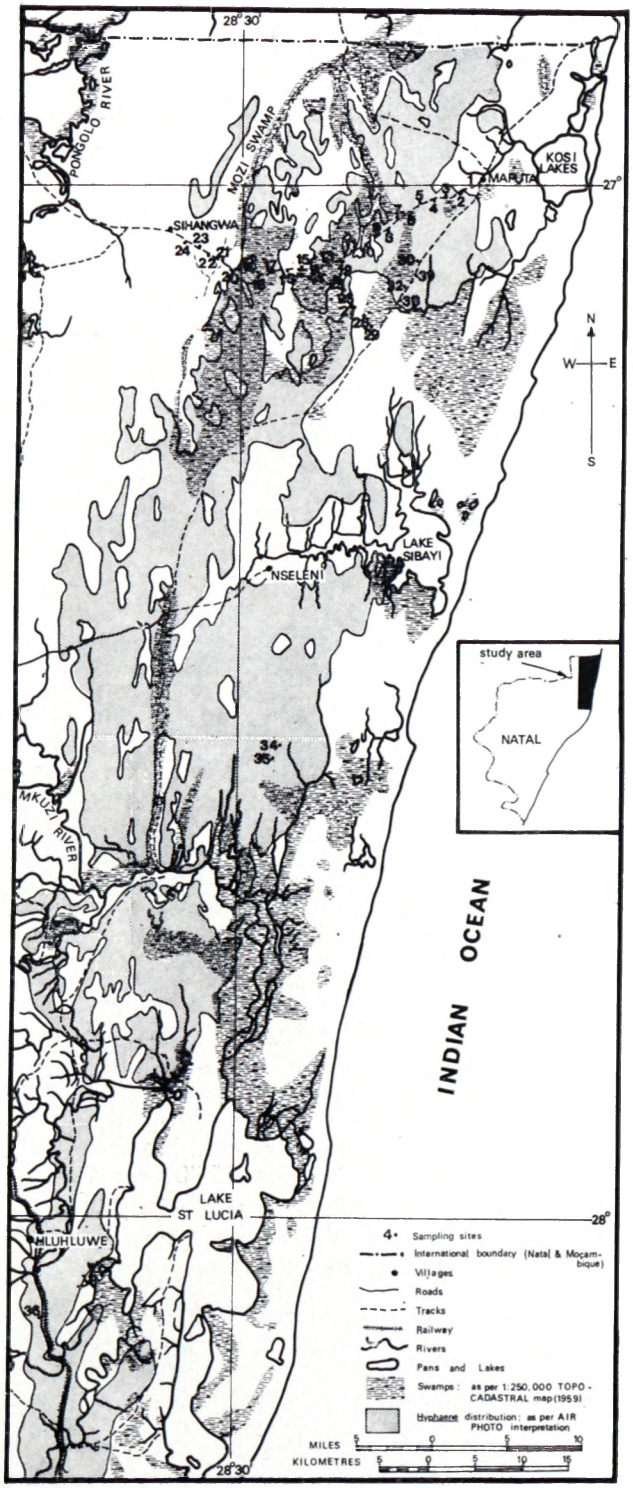


FIG. 1.—Map of eastern Tongaland showing the distribution of **Hyphaene natalensis,** swampy ground, and coastal lakes in the study area.

TABLE 1.—Summarized field data of the number of plants, stems and leaves of *Hyphaene natalensis* counted in 36 one-acre (70 × 70 paces) (0,4 ha) sample sites.

| Sample sites | Total No. of plants per acre (0,4 ha) | Total No. of stems per acre (0,4 ha) | Average No. of stems per plant | Total No. of leaves per acre (0,4 ha) | Average No. of leaves per plant | Average No. of leaves per stem |
|---|---|---|---|---|---|---|
| 1* | 1 | 1 | 1,00 | 1 | 1,00 | 1,00 |
| 2 | 7 | 12 | 1,71 | 45 | 5,00 | 3,75 |
| 3 | 10 | 50 | 5,00 | 185 | 18,50 | 3,70 |
| 4 | 17 | 17 | 1,00 | 63 | 3,71 | 3,71 |
| 5 | 11 | 16 | 1,45 | 35 | 3,18 | 2,19 |
| 6 | 11 | 18 | 1,64 | 39 | 3,55 | 2,06 |
| 7 | 34 | 115 | 3,38 | 426 | 12,35 | 3,70 |
| 8 | 15 | 37 | 2,47 | 76 | 5,07 | 2,06 |
| 9 | 13 | 21 | 1,62 | 41 | 3,15 | 1,95 |
| 10 | 11 | 18 | 1,62 | 29 | 2,62 | 1,61 |
| 11 | 69 | 168 | 2,44 | 711 | 10,30 | 4,24 |
| 12 | 33 | 91 | 1,32 | 398 | 12,07 | 4,35 |
| 13 | 64 | 454 | 7,10 | 891 | 14,02 | 1,97 |
| 14 | 71 | 246 | 3,47 | 687 | 9,68 | 2,39 |
| 15* | 7 | 25 | 3,57 | 157 | 22,43 | 6,28 |
| 16* | 9 | 19 | 2,11 | 96 | 10,68 | 5,05 |
| 17 | 109 | 1 289 | 11,74 | 1 904 | 17,47 | 1,48 |
| 18 | 179 | 1 789 | 9,99 | 2 674 | 14,94 | 4,50 |
| 19 | 17 | 43 | 2,52 | 131 | 7,71 | 3,05 |
| 20* | 2 | 3 | 1,50 | 12 | 6,00 | 4,00 |
| 21* | 1 | 1 | 1,00 | 4 | 4,00 | 4,00 |
| 22* | 3 | 7 | 2,33 | 26 | 8,67 | 3,71 |
| 23* | 1 | 1 | 1,00 | 5 | 5,00 | 5,00 |
| 24* | 1 | 2 | 2,00 | 6 | 6,00 | 3,00 |
| 25 | 33 | 103 | 3,43 | 317 | 9,60 | 3,08 |
| 26 | 5 | 9 | 1,80 | 24 | 4,80 | 2,64 |
| 27 | 11 | 21 | 1,18 | 58 | 5,27 | 2,76 |
| 28* | 1 | 1 | 1,00 | 3 | 3,00 | 3,00 |
| 29* | 1 | 1 | 1,00 | 3 | 3,00 | 3,00 |
| 30 | 15 | 23 | 1,53 | 65 | 4,33 | 2,83 |
| 31 | 17 | 31 | 1,82 | 74 | 4,35 | 2,39 |
| 32 | 14 | 25 | 1,64 | 65 | 4,64 | 2,60 |
| 33 | 12 | 21 | 1,75 | 37 | 3,08 | 1,76 |
| 34 | 83 | 182 | 2,19 | 772 | 9,30 | 4,24 |
| 35 | 71 | 147 | 2,04 | 689 | 9,70 | 4,69 |
| 36 | 30 | 144 | 4,80 | 668 | 22,27 | 4,64 |

* Sample sites outside the area mapped as *Hyphaene* Palm Veld.

The area of Lala Palm Veld in Tongaland and Northern Zululand is approximately 156 000 ha (600 square miles, about 375 000 acres). From the field data obtained from sites within the area mapped as *Hyphaene* Palm Veld, excluding data from the 10 sample sites outside the mapped area, we find the following:

Average number of plants per acre (0,4 ha) = 37,00

Average number of stems per acre (0,4 ha) = 195,77

Average number of stems per plant = 5,28

Average number of leaves per acre (0,4 ha) = 427,08

Average number of leaves per plant = 11,25

Average number of leaves per stem = 2,18

The total number of individual *Hyphaene* Palms may be estimated as 14 000 000 individuals, comprising approximately 73 500 000 stems and bearing a total number of about 160 000 000 leaves. However, from the data in Table 1 it is apparent that the figures have been affected by the two sample sites, 17 and 18. From field experience and from a close study of the air photographs, it is clear that areas where *Hyphaene natalensis* is dense are extremely limited, and have been estimated at less than 5%. A more realistic estimate of the total number of individual Lala Palms is, therefore, about 10 500 000 individuals comprising approximately 31 000 000 stems and bearing a total number of about 100 000 000 leaves. It should be noted that owing to utilization by the local Bantu (see later) the average number of leaves per plant is probably considerably lower than normal (compare Plate 4).

## Proposed Utilization of Lala Palm

As already stated, it has been suggested that the Lala Palm be commercially exploited for its fibre. With the statistics obtained, the economics of the scheme can be more readily assessed.

Each leaf of *H. natalensis* has a life span of two to three years. From the data presented above it is apparent that on average each stem produces only one new leaf a year. This means that at most one stem will yield, on a sustained yield basis so as not to decimate the population, one leaf in three years. Therefore, the annual yield of leaves from the entire area could be in the region of 33 000 000 leaves. This may, on superficial examination, appear an economic proposition. However, it must be remembered that communications in this region are extremely poor and that the area involved is relatively large, being about 160 km long and 32 km wide.

In addition to these factors, ownership of the land and of the Lala Palms themselves poses a problem. Some of the land is Bantu Area, some of it is White farmland, but most of it is State owned and occupied by Bantu. Also, it is not clear at this stage how well the plants, which grow extremely slowly at a rate of about 0,5 m in 10 years, will tolerate defoliation, as the leaves required for fibre production are the young leaves, not the old leaves.

On the credit side, it must be said that it is the practice of the Bantu to top selected stems and collect the sap (Plate 3). This topping seems to have little effect on the plant which merely produces another stem from the rootstock, the stem which is topped dying off. This practice, coupled with frequent burning of the grassland, has stunted the growth of the Lala Palm in Tongaland which, if protected, is capable of growing into an attractive tree five to eight metres high (Plate 4).

## Current Utilization of Lala Palm

Lala Palms have two major uses for the local Bantu in Tongaland.

1. The leaves are used in all forms of basket work.

2. The sap of the palm is tapped, and the sap is collected and allowed to ferment into a potent brew, locally called *ubuSulu*. This *ubuSulu* is an essential ingredient of their diet as it produces yeast cells and also the essential vitamin B, riboflavine and nicotinic acid (Campbell, 1969). In addition, quantities of this *ubuSulu* are "exported" to the surrounding regions where it is sold (Moll, 1968). This traditional practice injects money into an otherwise extremely poor economy and one week's work earns one man sufficient money for one month's existence. Over the years, ownership of the palms has been established and these rights are jealously protected. Poachers are harshly dealt with and are lucky to escape with their lives.

The decision to allow or prohibit exploitation of the Lala Palm for fibre is one which cannot be taken easily. All facts and traditional customs must be considered before the final step is taken.

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PLATE 1.—A general view of the typical coastal phase of the Palm Veld between Maputa and Lake Sibayi: **Hyphaene natalensis** in the foreground, a group of **Phoenix reclinata** in the left middle distance, and scattered **Syzygium cordatum** trees.

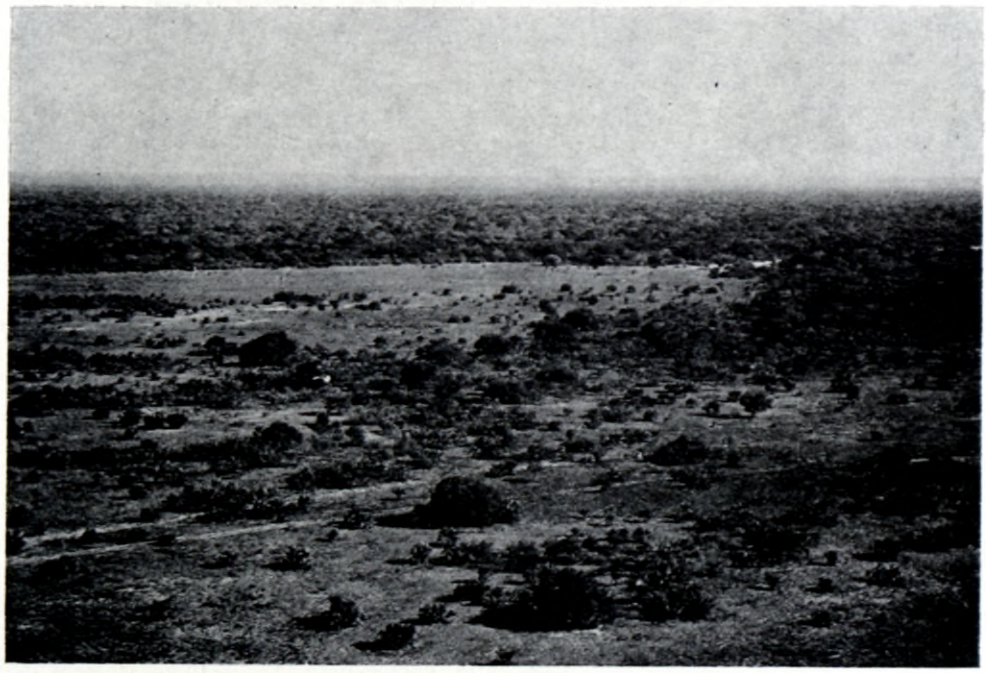

PLATE 2.—A general view of the typical inland phase of the Palm Veld about 80 km north of Nseleni, with fairly dense clumps of **Hyphaene natalensis** and scattered trees and bushes, an open wet grassland patch, and dense woodland.

PLATE 3.—A typical tapped **Hyphaene natalensis** showing the protective "hat" woven from a single leaf, the sliced stem and clay collecting vessel.

PLATE 4.—An example of **Hyphaene natalensis** in the grounds of the Natal Herbarium, Durban This 3-stemmed individual was planted in the early 1900's.