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The Distribution and Ecology of Nigerian Rattan Palms (Calamoideae)

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ABSTRACT

Collections of 14 species of rattans were made in forest habitats along the coastal areas and major forest zones in Nigeria. Taxa such as Calamus deerratus Linn; C. piloselus Becc.; Laccosperma secundiflorum (P. Beauv) Kuntze, L. laeve Mann & Wendl and Eremospatha wendladiana Drammer & Becc. were found in a wide array of forest types, ranging from dry to wet and occupying all the strata of the habitat whereas others exhibited restricted distribution. Diversity of rattan palms is moisture dependent. Forest disturbance through selective logging activity encourages regeneration of rattan in the country particularly in inundated areas.

Key words: *Distribution, Ecology, Rattan palms, Nigeria.*

INTRODUCTION

Rattans are climbing palms belonging to the *Calamoideae*, a large subfamily of the palm family (Palmae or Arecaceae). According to Dransfield (1992a) and Sunderland (1999) all of the species within the *Calamoideae* are characterized by overlapping reflexed scales on the fruit and possess climbing habit (Dransfield, 1992). The range of rattans extends from sea level to more than 300m elevation, from equatorial rain forests to monsoon savannahs and the foothills of the Himalayas (Ewers and Chiu, 1990). Thus the large number of rattan species is matched by great ecological adaptation and diversity (Klotz, 1978). Most, admittedly crude, ecological preferences for rattan species have generally been identified during taxonomic inventory work (Sunderland, 1999), yet these broad ecological summaries are invaluable as a basis for establishing cultivation procedures. Throughout their natural range, rattan species are found in a wide variety of forest and soil types. Some species are common components of the forest understorey. Others rely on good light penetration for their growth; hence some species are found in gap vegetation and may respond well to canopy manipulation. Some species grow in swamps and seasonally inundated forest, while others are more common on dry ridge tops.

Rattans growth habit may be solitary (single-stemmed) or clustering (i.e. they produce numerous stems from one individual through rhizome). Most of the rattan species occurring in Africa are clustering. The suckers that develop to form a cluster are produced from the lowermost nodes of the original stem, specifically in the axils of the basal – most leaves. They in-turn produce further suckers that develop into stems and a large clump then develop (Dransfield, 1992a). In terms of

utilization Caldecott (1988) stated that the largest demand for canes is for making furniture, for which they provide both frames and decorative trimmings and facings. Appanah *et al*. (1998) noted that the unsplit canes are utilized as broom handles, sewer rods, walking sticks, ski sticks, snow brooms, *et cetera* while split canes are used for chair seats and in basketry works. Caldecott (1988) listed the uses of canes to include mats, handicrafts and souvenirs. This paper discusses the distribution and ecology of this group in Nigeria

MATERIALS AND METHODS

Seasonal field trips were made between 2003 and 2006 for specimen collections along planned routes in some Nigerian forest reserves based on previously identified locations of rattan species in the country by Morakinyo (1994). Collections covered different vegetation zones such as the mangrove and fresh water swamp forest, the rain forests, derived savanna and Guinea savanna. The collection sites are distributed in 16 states in southern Nigeria where rattans grow naturally. These include Abia, Akwa-Ibom, Anambra, Bayelsa, Cross River, Delta, Edo, Ekiti, Lagos, Ogun, Ondo, Osun, Oyo and Rivers. Figure 1 shows the map of Nigeria indicating the known distribution of rattans in Nigeria.

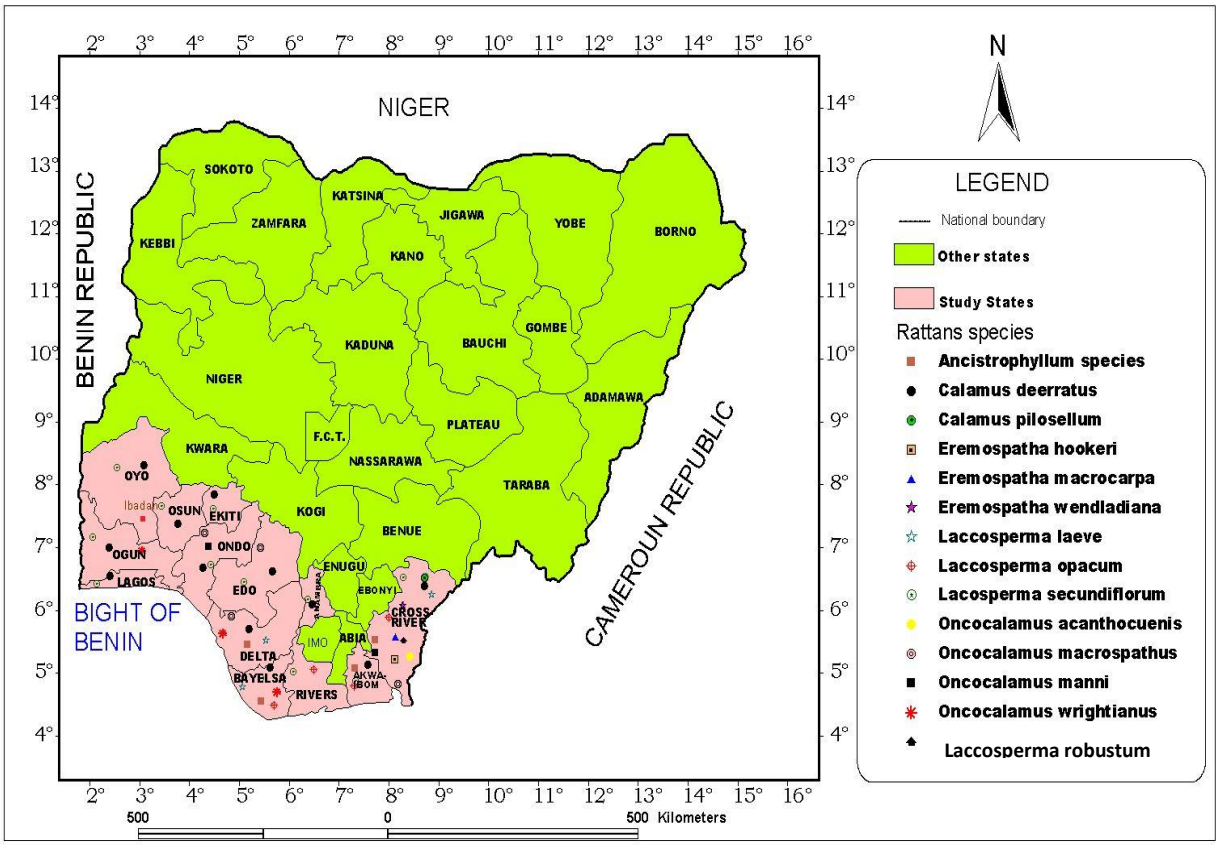

Fig 1: Geographical Distribution of Rattan Species in Nigeria

RESULTS

In terms of diversity, the highest density of rattan species is found in Cross-river state with 2500-3500 annual rainfall where almost every species in the country is represented. Fourteen of the twenty known African rattan species occur in Nigeria belonging to *Eremospatha, Calamus, Laccosperma* and *Oncocalamus* species are found along the coastal areas and some undisturbed forests (Fig.1). The present study reports for the first time the occurrence of *Calamus piloselus* Becc. in the country. Diversity of rattan species increases with moisture content and this suggests that the prevalence of rattans in the forest is related to moisture availability. All rattans species require appreciable amount of moisture and light to grow.

Some species of *Oncocalamus* Drude, because they demand so much light, are often the earliest colonizers of heavily disturbed areas. Other species of rattan, notably *Calamus deerratus*, grow in permanently or seasonal inundated forests or swamps while yet other species, such as *Lacccosperma opacum* (G. Mann) H. Wendl and *L. laeve* Mann and H. Wendl are relatively shade tolerant and prefer to grow under the forest canopy. Like other lianas of tropical rainforests, the leafy crown of a rattan is eventually exposed to full sun conditions when it reaches the top of the forest canopy. *Laccosperma leave, Calamus piloseus, C. deeratus, Eremospatha wendladiana, E. hookeri and Oncocalamus acanthocuenis* exhibited erect growth habit while others exhibited straggling growth habit (Table 2).

Table 1: List of representative specimens studied

	Taxa	Locality	Herbarium Number
1	*Oncocalamus macrospathus* Burr	Oban F.R. Ogbese F.R.;Ughuori, Edo state	FHI 92561
2	*Laccoperma secundiflorum* (P. Beauv.) Kuntze	Edun F. R. Ilaro; Oban F.R. C.R.S. Ediene, Akwa-Ibom Apiapum F.R,Obubra, J4 F.R. Ogun State; Aifesoba, Edo State, Badagry, Lagos State, Ekiti State	FHI 50908
3	*Oncocalamus wrightianus* Hutch	Edun F.R. Ilaro; Edjeba, Warri Ughelli, Delta state, Ahoada, Bayelsa State.	FHI 17419
4	*Ancistrophyllum novum* Burret	Ughelli, Edjeba, Warri; Akampa, C.R.S. Edondon, C.R.S	FHI 32931
5	*Eremospatha macrocarpa* (G. Mann & H. WendI) H. WendI	Obubra, Awi, C.R.S.	FHI 3851
6	*Laccosperma robustum* Kuntze	Edondon F.R., Abia Oyigbo, Obuaku, River State	FHI 11120
7	*Laccosperma opacum* G. Mann and H. Wendl	Ediene, Akwa Ibom, Edondon, C.R.S. Elele, Rumuji, Bayelsa State	
8	*Oncocalamus manni* H. Wendl	Obubra, Ovonum, Awi, C.R.S. Odigbo, Ondo State	UIH 1002
9.	*Laccosperma leave* (G.Mann & H.WendI) H. Wendl	Akampa Edondon, Oban River Obubra	UIH 1002
10	*Calamus pilosellus* Becc.	Ikot-Okpora, Akwa Ibom; Sapoba, Edo State, Onitsha,Anambra State;Edun, F.R.,Ogbese F.R.	FHI 3862
11.	*Calamus deerratus* Linn.	Iwopin, J4 F.R. Ogun State; Badagry, Epe, Lagos State, Ife -Odan, Oyo State.	FHI 34638
12	*Eremospatha wendladiana* Drammer & Becc.	Oban, F.R. Obula C.R.S. Apiapum C.R.S.	UIH 3443
13	*Eremospatha hookeri* Mann	Oban, F.R. Obubra F.R.; Edondon, F.R	FHI 3852
14.	*Oncocalamus acanthocuenis* Drude	River Obubra Lekki, Lagos State Ediene, Akwa-Ibom	FHI 5752

F.R. = Forest Reserve, C.R.S. = Cross River State

Table 2: Growth Characteristics of the rattans

Accession No.	Species Name	Growth Habit
FHI 92561	*Oncocalamus macrospathus* Burr	Solitary/ Straggling
FHI 50908	*Laccosperma secundiflorum* (P. Beauv) K Kuntze	Solitary/ Straggling
FHI 17419	*Oncocalamus wrightianus* Hutch	Solitary/ Straggling
FHI 32931	*Ancistrophyllum novum* Burret	Solitary/ Straggling
FHI 3851	*Eremospatha macrocarpa* (G. Mann & H Wendl) H. Wendl	Solitary/ Straggling
FHI 17421	*Laccosperma robustum* Kuntze	Solitary/ Straggling
FHI11120	*Laccosperma opacum* G. Mann and H. Wendl	Solitary/ Straggling
UIH1002	*Oncocalamus manni* H. Wendl	Solitary/ Straggling
UIH 1006	*Laccosperma laeve* Mann and Wendl	Solitary/ Erect
FHI 3862	*Calamus pilosellus* Becc.	Cluster/ Erect
FHI 34638	*Calamus deerratus* Linn.	Cluster/ Erect
UIH 3443	*Eremospatha wendladiana* Drammer & Becc	Cluster/ Erect
FHI 3852	*Eremospatha hookeri* Mann	Cluster/ Erect
FHI 5752	*Oncocalamus acanthocuenis* Drude	Cluster/ Erect

DISCUSSION

The structure of the rattan palms provides insight into their ecology. For instance, mechanical tissue is well developed, varying only in distribution pattern and density among the species. Therefore there is a suggestion of xeromorphism in the habitat of the rattans brought about by the great heights/length of the plants which puts a barrier to water transportation. Some of the species such as *Calamus pilosellus* Becc. and *Laccosperma robustum* Kuntze of the tribe Calamoideae in Nigeria have a narrow distributional range within Cross-River State with 2500-3500mm annual rainfall. The demand so placed on rattan species by the limiting nutrient supply imposed on them by environmental stress has made species of rattan to develop morphological and anatomical adaptations that could act as coping strategy to combat such nutrient imbalance. It is not surprising therefore to find such preponderance of mechanical tissues in rattan. Forest disturbance, for example through selective logging activity, encourages the regeneration of rattans, and these palms are often a common feature along logging roads and skid trails (Sunderland, 2001). In functional terms, rattans lack tuberous roots and their narrow stems have a small proportion of parenchyma that could function in water storage. However, their long stem with a relatively large volume of water in wide vessels represent a significant water reservoir that would be available if cavitation of vessels occurred during periods of extreme water stress. Holbrook (1995) and Sperry *et al.* (1987) opined that other lianas have root pressure that is sufficient to refill air-filled xylem. During periods of limited rainfalls, rattans can experience severe water stress; at such times both stomatal closure and stem water storage would aid survival. The adaxial surfaces (upper surfaces) of most of the rattans species leaves are characterized by thick cuticle, an adaptation for water conservation especially in *Laccosperma secundiflorum, L. opacum* and *Calamus deeratus* that are found in dry forests. According to Holbrook & Sinclair (1992), the volume of water stored in wide and long vessels of rattans may have a similar function with tuberous root of some dicotyledonous plants. In addition to efficient water transport as suggested in other lianas (Ewers & Chiu, 1990) also opined that wide vessels serve as water reservoir for rattans during water stress.

REFERENCES

Appanah, S., Abd, L.M. and Raja, B. (1998). The Malaysian rattan business needs better support, more light and special niche markets. In: R. Bacilieri and S. Appanah (eds.).

Caldecott, J.O. (1988). Climbing towards extinction: a crisis for climbing palms. *New Scientists* **16**: 62-65.

Dransfield, J. (1992a). *The rattans of Sarawak*. Royal Botanic Gardens and Sarawak Forest Department, UK.

Dransfield, J. (1992b). The taxonomy of rattans. In: W.M. Razali, J. Dransfield and N. Manokaran (eds). *A guide to the cultivation of rattan.* Forest Record No. 35. Kuala Lumpur, Malaysia, Forest Research Institute Malaysia.

Ewers, F.W. and Chiu, S.T. (1990). A survey of vessel dimensions in stems of tropical lianas and other growth forms. *Oecologia.* **84**: 544-552.

Holbrook, N.M. and Sinclair, T.R. (1992a). Water balance in the arborescent palm, *Sabal palmetto*, Stem structure, tissue water release properties and leaf epidermal conductance. *Plant, Cell and Environment* **15**: 393-399

Holbrook, N.M. (1995). Stem water storage. In: Gartner, B.L. (ed). Plant Stems: physiology and functional morphology. Academic Press, San Diego, California, USA. Pp.115-117.

Klotz, L.H. (1978). Observation on diameter of vessels in stems of palms. *Principes.* **22**: 99-106.

Morakinyo, A.B. (1994). The ecology and silviculture of rattans in Africa: a management strategy for Cross-River State and Edo State, Nigeria. M.Sc. Dissertation. University College of North Wales, Bangor.

Sperry, J.S., Holbrook, N.M., Zimmerman, M.H. and Tyree, M.T. (1987). Spring filling of xylem vessels in wild grape. *Plant Physiology*. **83**: 414-417.

Sunderland, T.C.H. (1999). The Rattans of Africa. In: R. Bacilieri and S. Appanah (eds). Rattan cultivation: achievements, problems and prospects. CIRAD-Foret and FRIM, Malaysia. pp. 236-237.

Sunderland, T.C.H. (2001). Indigenous nomenclature, classification and utilization of African rattans. In: L. Maffi, T. Carlson and E. Lopez-zent (eds).