

## Distribution of mosses in Ekiti State, Nigeria

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**Abstract:** A field work was conducted to provide an updated distribution of mosses in Ekiti State, Nigeria. Mosses were collected from different substrates in three towns in the state. The towns include Ado Ekiti, Ikere Ekiti and Ifaki Ekiti. Each moss species was critically observed and identified based on their growth forms and morphological characters. Out of 69 samples collected, 8 species were obtained. They include *Calymperes erosum* C. Mull, *Bryum coronatum* SCHWAEGR, *Barbula lambaranensis* C.Mull, *Thuidium gratum* (P. Beauv) Jaeg., *Neckoropsis foveolata* MITT. Broth & Par., *Hyophila excurrentinervis* Par. & Broth, *Philonotis hastata* (Duby) Wisk and Marg. and *Racopilum africanum* MITT. The species were distributed among 4 different substrates namely: barks of palm trees, forest floors (loamy soils) fallen / decaying logs of wood and sandcrete materials. *Calymperes erosum* and *Racopilum africanum* were found growing on barks of palm trees only, *Barbula lambaranensis* and *Hyophila excurrentinervis* were found growing on sandcrete materials only while *Philonotis hastata* was found growing on loamy soils in forest floors only. Other species were distributed between a maximum of two substrates. This indicates that mosses require specific substrates for occurrence or growth.

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### Introduction

Bryophytes are small non – woody plants which occupy a phylogenetic place between the higher algae and the lower *pteridophytes*. Although, Anderson (1974) believed that bryophytes arose from *pteridophytes*, there is a general belief that bryophytes arose from the green algae (Strain, 1948; Steward and Maltox, 1975). It is estimated that there are about 25,000 bryophyte species known in the world which falls into three classes. These classes include Hepaticae (liverwort), Musci (mosses) and Anthocerotae (hornworts). Watson (1971) reported that mosses represent 14,000 species out of all the 25,000 known bryophyte species. Bryophytes, especially mosses are found in almost every habitat that supports life and their ecological roles is significant (Saxena and Harrinder, 2004). Some are normally submerged in lakes e.g. *Fontinalis antipyretica* Hewd. They also occur in a range of xeric habitats such as hot springs e.g. *Archidium alternifolium* (Dicks & Hewd) Schrimp, on sand e.g. *Bryum argenteum* Hewd, *Pleurozium Schreberi* Brid Mitt, in hot desert e.g. *Tortula intermedia* Berk

(Richardson, 1981). They also occur on calcareous walls e.g. *Barbula revoluta* and *Grimmia pulvinata* (Hewd) (Miles *et al*, 1989) and on leaves e.g. *Radula flaccida* (Lindenb and Gottsche) (Olarinmoye, 1974).

The present study was undertaken to identify mosses that grow in Ekiti State, Nigeria and investigate their distribution on different substrates.

### Materials and Methods

#### Collection of samples

Mosses were collected from three towns in Ekiti State, Nigeria. The towns include Ado Ekiti, Ikere Ekiti and Ifaki Ekiti. Collection was done from different substrates ranging from sandcrete materials (cement blocks, unplastered buildings, and concreted floors), barks of palm trees, forest floors (loamy soils) and fallen/decaying logs of wood. Each sample was kept in an envelope, labeled and brought to the laboratory for observations and identification. The moss species were identified using their growth forms and morphological characters. The key of Wijk *et al* (1959-1969) aided the identification.

#### Determination of parameters

% occurrence of mosses species on all the substrates  

$$= \frac{\text{total number of each moss species found on each substrate}}{\text{total number of moss species found on all substrates}} \times 100$$
 % occurrence of mosses species on each substrate  

$$= \frac{\text{total number of each moss species found on each substrate}}{\text{total number of moss samples collected from each substrate}} \times 100$$

**Results**

Out of 69 samples collected, 8 species were obtained. These are *Calymperes erosum* C. Mull, *Bryum coronatum* SCHWAEGR, *Barbula lambaranensis* C.Mull, *Thudium gratum* (P. Beauv) Jaeg., *Neckoropsis foveolata* MITT. Broth & Par. *Hyophila excurrentinervis* Par. & Broth, *Philonotis hastata* (Duby) Wisk and Marg. and *Racopilum africanum* MITT. The moss species were distributed among 4 different substrates namely barks of palm trees, forest floors (loamy soils), sandcrete materials and fallen / decaying logs of wood (Table 1).

Results show that the mosses require specific substrates for their growth. For instance, *Calymperes erosum* and *Racopilum africanum* were found growing only on barks of palm trees (100% occurrence each), *Barbula lambaranensis* and *Hyophila excurrentinervis* were found growing only

on sandcrete materials (100% occurrence each), while *Philonotis hastata* was found growing only on loamy soils in forest floors (100% occurrence). Other species were distributed between a maximum of two substrates (Table 2).

Table 3 shows the % occurrence of moss species on each substrate. The results revealed that *Barbula lambaranensis*, *Hyophila excurrentinervis* and *Bryum coronatum* can be found on sandcrete materials; *Calymperes erosum*, *Thudium gratum*, *Racopilum africanum* and *Bryum coronatum* can be found on barks of palm trees; *Thudium gratum* and *Neckoropsis foveolata* can be found on fallen/decaying logs of wood while *Neckoropsis foveolata* and *Philonotis hastata* can be found on loamy soils in forest floors.

Table1. Occurrence of moss species on different substrates.

Moss species	Substrate			
	Bark of palm trees	Forest floor (loamy soil)	Fallen/decaying logs of wood	Sandcrete materials
<i>Calymperes erosum</i>	6	0	0	0
<i>Bryum coronatum</i>	4	0	0	8
<i>Barbula lambaranensis</i>	0	0	0	14
<i>Thudium gratum</i>	4	0	3	7
<i>Neckoropsis foveolata</i>	0	5	2	0
<i>Hyophila excurrentinervis</i>	0	0	0	10
<i>Philonotis hastata</i>	0	4	0	0
<i>Racopilum africanum</i>	9	0	0	0

Table 2: Percentage occurrence of moss species on all the substrates. (C.e - *Calymperes erosum* , B. c - *Bryum coronatum*, B.l - *Barbula lambaranensis*, T.g - *Thudium gratum*, N.f - *Neckoropsis foveolata* , H.e - *Hyophila excurrentinervis*, P.h - *Philonotis hastata*, R.a - *Racopilum africanum* )

Substrate	Moss species % occurrence							
	C.e	B.c	B.l	T.g	N.f	H.e	P.h	R.a
Bark of palm trees	100	33.33	0	57.14	0	0	0	100
Forest floors	0	0	0	0	71.43	0	100	0
Fallen/decaying logs of wood	0	0	0	42.86	28.57	0	0	0
Sandcrete materials	0	66.67	100	0	0	100	0	0

Table 3: Percentage occurrence of moss species on each substrate.

Moss species	Substrate			
	Bark of palm trees	Forest floor (loamy soil)	Fallen/decaying logs of wood	Sandcrete materials
<i>Calymperes erosum</i>	26.09	0	0	0
<i>Bryum coronatum</i>	17.39	0	0	25.00
<i>Barbula lambaranensis</i>	0	0	0	43.75
<i>Thudium gratum</i>	17.39	0	60.00	0
<i>Neckoropsis foveolata</i>	0	55.55	40.00	0
<i>Hyophila excurrentinervis</i>	0	0	0	31.25
<i>Philonotis hastata</i>	0	45.55	0	0
<i>Racopilum africanum</i>	39.13	0	0	0

## Discussion

Several studies have reported the occurrence and distribution of moss species in different parts of the world (Foreau, 1961; Scott and Stone, 1976; Srinivasan, 1961; Subramanian, 2006). The present study reveals the occurrence of 8 different moss species in Ekiti State, Nigeria which are distributed among 4 different substrates (Table 1). High demands for wood (personal observation) and difficulties in accessing forests in the study areas limited the number of these substrates (fallen/decaying logs of wood and forest floors respectively) in the study (Table 1). Perhaps, more species can be obtained in future studies.

Though, bryophytes occupy a wide range of habitats/substrates with respect to availability of moisture (Busby *et al.*, 1978), their occurrence on these habitats/substrates could be attributed to suitable pH (Fatoba, 1983) and availability of propagules at the time of exposure to bare soil or substrate (Banfield, 1976). The present study emphasizes the significance of specific substrates vis-à-vis growth or occurrence of mosses. The results tend to agree with the work of Fatoba (2000) who collected 200 moss samples from sandcrete materials and was able to reveal the presence of *Hyophila excurrentinervis*, *Bryum coronatum* and *Barbula lambaranensis* only.

The antibacterial activities of some of the identified moss species are in progress.

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