Diversity of vascular plants on Ssese islands in Lake Victoria, central Uganda

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Abstract

Diversity and distribution of trees [≥5 cm diameter at breast height (dbh)], shrubs and herbs was assessed in thirty 0.05-ha (10 × 50 m) plots of a tropical high forest in the Ssese islands of Lake Victoria, central Uganda. The aim was to determine the floristic richness and composition of the forests. We recorded 179 species belonging to 70 families and 146 genera. Of these, nine families had five species or more. Rubiaceae was the richest with fourteen species followed by Euphorbiaceae (thirteen), Apocynaceae (ten) and Moraceae (nine). The majority of the families (35) were represented by one species each. Fifty-eight herbaceous species, 39 lianas, ten shrubs and 72 species of trees were recorded. The commonest species recorded in the forest included: *Uapaca guineensis* Mull. Arg., *Tabernaemontana pachysiphon* Stapf., and *Aframomum luteoalbum* (K Schum.) K. Schum. Among the rare species encountered were *Ficus densistipulata* De Willd., *Englerophytum oblanceolatum* (S. Moore) Pennington, and *Afromomum zambeziacum* (Bak.) K. Schum. The present study has shown that the Ssese islands are floristically rich in species and compare well with other mainland forests. Species richness, rarity and uniqueness of habitats can be considered as approaches in the prioritization of conservation sites within the fragmented forests of Ssese islands.

Key words: conservation, floristic richness, Ssese islands

Résumé

La diversité et la distribution d'arbres (≥5 cm dbh), arbustes et herbes furent enquêtés dans 30 zones de 0.05 ha (10 × 50 m) dans une forêt tropicale élevé dans les îles de Ssese du lac Victoria, en Ouganda Central. Le but était de déterminer la richesse floristique et composition des forêts. Nous avons constaté 179 espèces appartenant à 70 familles et 146 gêneras. Parmi ceux-ci, 9 familles comprenaient au moins 5 espèces. Rubiaceae fut le plus riche avec 14 espèces, suivi par Euphorbiaceae (13), Apocynaceae (10) et Moraceae (9). La majorité des familles (35) furent représentée que par une espèce chacune. Cinquante huit espèces herbacées furent constatées; 39 lianes, 10 arbustes et 72 espèces d'arbres furent aussi constatés. Les espèces les plus répandues dans la forêt furent: *Uapaca guineensis* Mull. Arg., *Tabernaemontana pachysiphon* Stapf., et *Aframomum luteoalbum* (K Schum.) K. Schum. Parmi les espèces rares que nous avons rencontré furent: *Ficus densistipulata* De Willd., *Englerophytum oblanceolatum* (S. Moore) Pennington, and *Afromomum zambeziacum* (Bak.) K. Schum. Cette étude a montré que les îles de Ssese sont riches en espèces de flores et comparent favorablement avec d'autres forêts du continent. La richesse d'espèces, la rareté et singularité des habitats peuvent être considérées comme démarches dans la classement de priorités des zones de conservation à l'intérieur des forêts fragmentées des îles de Ssese.

Introduction

Understanding of forest structure and floristics is necessary to the study of forest ecosystems (Nadkarni, Matelson & Haber, 1995). Tropical forests are well known for being the most species-rich ecosystems on earth (Gentry, 1992). Information on the distribution and abundance of tree species is of primary importance in the planning and implementation of biodiversity conservation (Condit *et al.*, 1996; Eilu, Hafashimana & Kasenene, 2004b). The diversity of vascular plants is fundamental to total rainforest biodiversity, because they provide resources and habitat structure for almost all other rainforest species (Nadkarni *et al.*, 1995; Parthasarathy, 2001). Vascular plants,

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especially trees, are useful for analyses of species–area and species–individual relationships because they are easy to locate precisely and count (Kadavul & Parthasarathy, 1999).

The distribution of vascular plants in Uganda's forests is reasonably well documented by Eggeling & Dale (1952); Polhill (1952); Hamilton (1974, 1982) and Howard, Davenport & Matthews (1996). However, despite the presence of incomplete species lists, there are no detailed and reliable published reports on the floristic richness and composition of the Ssese island forests with the exception of the attempt by Thomas (1941) who gives a limited descriptive account of the vegetation types on the islands.

Information on tropical plant species is needed because of its potential usefulness in understanding the relative extent of plant biodiversity across the tropics and its implication for conservation and management (Eilu, Hafashimana & Kasenene, 2004a). The results of quantitative inventory have enormous significance for the conservation and management of tropical forests (Campbell, 1994). Quantitative inventories help in the identification of economically useful species as well as species of special conservation concern, i.e. rare, uncommon and vulnerable species, and consequently to quantify the conservation value of the candidate sites (Keel, Gentry & Spinzi, 1993). This study was undertaken to determine the diversity and distribution of vascular plants. It is hoped that these data will be useful in conservation planning and management of the Ssese island forests, which are facing increased population and development projects that affect their continued existence.

Study area

The study sites were located on Bugala island which is the biggest of the 84 islands that make up Ssese islands in Lake Victoria. It has a total area of 29,600 ha. Kalangala District is a composite of 84 islands commonly known as Ssese islands on Lake Victoria. The district is surrounded by Lake Victoria. The whole archipelago lies between longitudes 39° and 33°E, and latitudes 0° and 1°S.

In general, the topography of the islands carry a general characteristic gentle elevation of land from the water side culminating into an undulating flat formation top cover. The biggest island, Bugala, consists of a 'spine' of narrow flat-topped ridges at 1220–1260 m above sea level, flanked by lower-lying flat plains situated at a medium terrace level and a level only a few metres above the present level.

The mean annual rainfall for Kalangala district is generally above 2000 mm. This is amongst the highest in Uganda and has a relatively even distribution and reliability throughout the year. The heaviest rainfall occurs in periods March to May and November to December. The mean annual temperature at Kalangala is 18°C and the mean maximum temperature ranges between 27 and 30°C. Being close to the equator, there is relatively little seasonal variation. Temperatures are buffered by the presence of surrounding lake water.

Methods and materials

Vegetation sampling

Sites of intact forest were subjectively selected after reconnaissance although they were distant from each other and always representative of the vegetation. The selection criteria for the transects included:

1 Absence of obvious signs of recent disturbance and/or limited human impact in the immediate past.

2 Representativeness of the arboreal vegetation of the area, including the local variations in topography and elevation.

3 Physiognomic homogeneity.

Plot size adopted for this study was chosen to suit the aggregated growth habits of the trees, shrubs and herbs. Square or rectangular plots have been shown to yield more accurate results than circular plots (Greig-Smith, 1983). Data were collected using quadrats of 10 m × 50 m for trees in the forest ecosystem. These were located at intervals of 100 m alternately along the transect. Transects were placed to capture as many microhabitats types as possible. The length of the transects varied from 500 to 800 m depending on accessibility and degree of slope. Four transects were made and 30 quadrats surveyed in all. Trees of diameter at breast height (dbh) of 5 cm were recorded with their respective diameters and heights. The plots were temporarily marked with wooded pegs and biodegradable flagging tape. In each plot, demarcated on the ground, enumeration and identification of all trees with dbh of 5 cm was performed. For the shrubs, 10 × 10 m nested plots were used and 5 × 5 m nested plots for the herbaceous species. Voucher specimens were collected for specimens that could not be identified in the field. These were brought to the Makerere University Herbarium (MHU) for identification. Every specimen collected was tagged and given a field identification number which indicated the plot where it was collected. Identifications of all species were based on flora and keys

(e.g. Polhill, 1952 onwards; Eggeling & Dale, 1952; Hamilton, 1991; Beentje, 1994).

Data analysis

Diversity indices were used to measure the different aspects of variability in the forests studied. Species richness was the main category of diversity index used. Calculations of diversity indices and evenness were performed using the computer program EstimateS (Colwell, 1997). Diversity indices and species estimators were used to determine tree species diversity. The Shannon–Weiner and Simpson's indices were used. Shannon's diversity index (H') (Magurran, 1988) assumes that individuals are randomly sampled from an indefinitely large population (Pielou, 1975). Simpson's index (D) is a commonly used dominance measure; it is weighted towards the abundances of the commonest species rather than providing a measure of species richness (Magurran, 1988). The value of D varies as the total number of species increases, depending on the type of the species-abundance relationship used in the index (May, 1981).

Jack 1 and Jack 2 Jackknife estimators of species diversity (Heltshe & Forrester, 1983; Palmer, 1991) were used. The number of observed species will typically be smaller than the true number of species. These jackknife estimators produce more accurate and less biased estimates, at least when sampling a restricted area.

Species accumulation curve was drawn to ascertain whether the sampling effort was sufficient for the three forest sites covered. They are used to evaluate the adequacy of sample size in a community data set.

Results

Floristics

A total number of 179 species was recorded on transects. These belonged to 70 families and 146 genera. Of these, nine families had five species or more as shown in Table 1. Rubiaceae was the most speciose with fourteen species followed by Euphorbiaceae (thirteen), Apocynaceae (ten) and Moraceae (nine). Poaceae, Commelinaceae and Annonaceae had six species each. The majority of the families (35) were represented by one species each.

Fifty-eight (58) herbaceous species, 39 lianas, ten shrubs and 72 species of trees were recorded. The commonest species recorded in the forest included: *Uapaca guineensis* (tree), *Tabernaemontana pachysiphon* (tree), *Aframomum luteoalbum* (herb), *Myrianthus holstii* (tree), *Craterispermum laurinum* (tree), *Urera trinervis* (liana) and *Raphia farinifera* (tree). Others are *Marantochloa leucantha* (herb), *Pteris burtonii* (herb), *Palisota manii* (herb), *Geophila repens* (herb), *Funtumia elastica* (tree), *Macaranga capensis* (tree), *Piptadeniastrum africanum* (tree) and were recorded in at least 18 of the 30 plots sampled (Table 2).

Species accumulation curves

This shows the change in species richness with increasing numbers of plots sampled. The curves for the observed species (Sobs) and the estimators (Jack 1 and Jack 2) show that they were tending towards the asymptote as shown in Fig. 1.

Species richness estimations and diversity indices

The species richness estimations as per the Jack 1 and Jack 2 species richness estimations are 245 and 288 respectively. It is argued by Palmer (1991) that observed species richness does not give a true estimate of species richness. It always underestimates it because you cannot count all species in a given area. Hence the adoption of estimators like the ones mentioned above. The Shannon–Weiner and Simpson diversity indices gave values of 4.67 and 82.04 respectively.

Discussion

Floristics

The relative distribution of the species in the various families tends to agree with earlier studies by Eilu *et al.* (2004a,b). Euphorbiaceae was one of the most speciose families according to Eilu *et al.* (2004a). Many families were also represented by a single species as earlier reported by Eilu *et al.* (2004b). Many species in tropical forests tend be rare, represented by very few individuals in an area. However, the dominant species may have varying numbers of individuals in an area depending on the underlying ecological conditions and interspecific competition among the plants. This tends to influence the relative distribution of species in families.

Species richness

The species richness recorded in this study is indicative of the richness of the flora in the forests of Bugala island.

Table 1 Distribution of species among families

Family	Number of species	Family	Number of species
Rubiaceae	14	Amaryllidaceae	1
Euphorbiaceae	13	Anacardiaceae	1
Apocynaceae	10	Anthericaceae	1
Moraceae	9	Araceae	1
Annonaceae	6	Araliaceae	1
Commelinaceae	6	Aspidiaceae	1
Poaceae	6	Balsaminaceae	1
Aspleniaceae	5	Begoniaceae	1
Zingiberaceae	5	Burseraceae	1
Marantaceae	4	Cactaceae	1
Meliaceae	4	Cannaraceae	1
Sapindaceae	4	Caryophyllaceae	1
Sapotaceae	4	Clusiaceae	1
Amaranthaceae	3	Connaraceae	1
Asteraceae	3	Cyatheaceae	1
Cyperaceae	3	Dracaenaceae	1
Dennstaedtiaceae	3	Dryopteridacaeae	1
Icacinaceae	3	Flacourtiaceae	1
Mimosaceae	3	Hypericaceae	1
Ochnaceae	3	Lamiaceae	1
Orchidaceae	3	Lauraceae	1
Pteridaceae	3	Linaceae	1
Acanthaceae	2	Marattiaceae	1
Cucurbitaceae	2	Melianthaceae	1
Dioscoreaceae	2	Menispermaceae	1
Fabaceae	2	Myristicaceae	1
Hippocrateceae	2	Myrsinaceae	1
Lomariopsidaceae	2	Oxalidaceae	1
Melastomataceae	2	Palmae	1
Myrtaceae	2	Phytolaccaceae	1
Passifloraceae	2	Rutaceae	1
Piperaceae	2	Smilacaceae	1
Rhamnaceae	2	Thymelaeaceae	1
Urticaceae	2	Ulmaceae	1
Verbenaceae	2		
Vitaceae	2	*Total number of species*	179

The species richness are comparable with earlier studies by Eilu *et al.* (2004b) for Budongo forest. Tree species richness in tropical areas varies greatly from place to place mainly due to variation in biogeography, habitat and disturbance (Whitmore, 1998). Hill, Curran & Foody (1994) report that both the effects of the ecological processes alone and sampling alone increase species number with area but they also point out that only ecological processes could be expected to increase the number of species per unit area. A record of approximately 190 plant species in about 2 ha is a high species number in a tropical rain forest. The species accumulation curves tended towards the asymptote signifying that the sampling effort was fairly sufficient. Species richness was observed to increase with increasing area and this reflects the floral richness of the forests. Species richness was relatively high given the ecological status of the forests in the light of succession and previous disturbances.

A comparison of diversity measures is somewhat difficult because of the heterogeneity in criteria and methods used. The Shannon–Weiner diversity index has been used in studies by Eilu *et al.* (2004a,b). However, the Shannon–Weiner diversity was comparatively high while the Simpson index which gives more weight to the more abundant species was low. A value of 82.4 denotes high species diversity and a very low dominance of species. The Shannon index gave a diversity value of 4.67. This denotes a high species evenness and richness in relative terms. This indicates that the species diversity in these forests is, to some extent, due to rare species.

Species of conservation and economic significance

Maesopsis eminii Engl. (a fast-growing species) is one of the trees with good-quality timber though susceptible to fungal attack. In Uganda, it grows in low moist tropical and riverine forests, colonizing forest, forest edge and mixed forest. It can be used for firewood, poles and shade for tea and coffee and also ornamental as an avenue tree. Its fruit is eaten by hornbills and monkeys. *Uapaca guineensis* Mull. Arg. is common in swamp forests around Lake Victoria. It is used as a firewood, for timber, shade, and soil and water conservation (Katende, Tengnas & Birnie, 1995). It is commonly found in mixed evergreen forest and riverine forest. *U. guineensis* grows well as a pure stand in swamps and as a shade tree on drained land, so it can play a role as a regulator of floods and water flow (Katende *et al.*, 1995). Species recorded and found to be rare in the forested lands as per the quadrats surveyed included *Ficus denstipulata* De Willd., *Englerophytum oblanceolatum* (S. Moore) Pennington, *Acacia pentagona* (Shumach) Hook. f. and *Afromomum zambeziacum* (Bak.) K. Schum.

Conclusion

The Ssese islands present forests exceptionally rich in flora. They also present unique challenges to conservationists because of their being islands coupled with increasing human populations. Conservation efforts should be geared towards identification of forest patches that are relatively

Table 2 Species list of the species recorded in Ssese islands surveyed forests

Family	Species name	Habit	Family	Species name	Habit
Acanthaceae	*Mimulopsis solmsii* Schweinf.	SH	Marantaceae	*Marantochloa leucantha* (K. Schum.) Milne-Rendh.	H
Acanthaceae	*Whitfieldia elongata* (P. Beauv.) De Wild. & Th. Dur	SH	Marantaceae	*Marantochloa purpurea* (Ridley) Milne-Redh.	H
Amaranthaceae	*Achyranthes aspera* L.	H	Marantaceae	*Trachyphrynium braunianum* (K. Schum.) Bak.	H
Amaranthaceae	*Aerva lanata* (L.) Juss. ex Schultes	H	Marattiaceae	*Maratia fraxinea* J. F. Gmelin	H
Amaranthaceae	*Celosia globosa* Schinz	H	Melastomataceae	*Dissotis senegambiensis* (Guill. & Perr.) Triana	H
Amaryllidaceae	*Scadoxus cinnabarinus* (Decne.) Fries & Nordal	H	Melastomataceae	*Warneckea jasmimoides* (Gilg.) Jac-fél	T
Anacardiaceae	*Pseudospondias microcarpa* Engl.	T	Meliaceae	*Guarea cedrata* (A. Chev.) Pellegr.	T
Annonaceae	*Artabotrys likimensis* De Wild.	L	Meliaceae	*Lovoa trichilioides* Harms.	T
Annonaceae	*Monodora myristica* (Gaertn.) Dunal	T	Meliaceae	*Trichilia dregeana* Sond.	T
Annonaceae	*Polyalthia suaveolens* Engl. & Diels	T	Meliaceae	*Trichilia prieuriana* A. Juss.	T
Annonaceae	*Uvaria angolensis* Welw. ex Oliv.	L	Melianthaceae	*Bersama abyssinica* Fresen.	T
Annonaceae	*Uvaria welwitschii* (Hiern) Engl. & Diels	L	Menispermaceae	*Tiliacora funifera* (Miers.) Oliv.	L
Annonaceae	*Xylopia parviflora* (A. Rich.) Benth.	T	Mimosaceae	*Acacia pentagona* (Shumach.) Hook.f.	L
Anthericaceae	*Chlorophytum filipendulum* Bak.	H	Mimosaceae	*Newtonia buchananii* (Bak.f.) Gilbert & Boutique	T
Apocynaceae	*Alafia microstylis* K.Schum.	L	Mimosaceae	*Piptadeniastrum africanum* (Hook. f.) Brenan	T
Apocynaceae	*Alafia* sp.	L	Moraceae	*Antiaris toxicaria* Lesch.	T
Apocynaceae	*Funtumia elastica* (Preuss) Stapf	T	Moraceae	*Ficus barteri* Sprague	T
Apocynaceae	*Landolphia buchananii* (Hall. f.) Stapf	L	Moraceae	*Ficus cyathistipula* Warb.	T
Apocynaceae	*Landolphia landolphioides* (Hall. f.) A. Chiev.	L	Moraceae	*Ficus densistipulata* De Wild.	T
Apocynaceae	*Landolphia owariensis* P. Beauv.	L	Moraceae	*Ficus ottoniifolia* Warb.	T
Apocynaceae	*Oncinotis pontyi* Dub.	L	Moraceae	*Ficus polita* Bak.	T
Apocynaceae	*Saba comorensis* (Bojer.) Pichon.	L	Moraceae	*Ficus pseudomangifera* Hutch.	T
Apocynaceae	*Strophanthus sarmentosus* DC.	L	Moraceae	*Myrianthus holstii* Engl.	T
Apocynaceae	*Tabernaemontana pachysiphon* Stapf.	T	Moraceae	*Trilepisium madagascariense* DC.	T
Araceae	*Culcasia scandens* P. Beauv	L	Myristicaceae	*Pycnanthus angolensis* (Welw.) Exell	T
Araliaceae	*Schefflera barteri* (Seem.) Harms	SH	Myrsinaceae	*Ardisia staudtii* Gilg.	T
Aspidiaceae	*Tectaria gemmifera* (Fée) Alston	H	Myrtaceae	*Syzygium cordatum* Hochst. ex Sond.	T
Aspleniaceae	*Asplenium dregeanum* Kunze	H	Myrtaceae	*Syzygium guineense* (Willd.) DC.	T
Aspleniaceae	*Asplenium holstii* Hieron.	H	Ochnaceae	*Ochna bracteosa* Robyns & Lawalree	SH
Aspleniaceae	*Asplenium inaequilaterale* Willd.	H	Ochnaceae	*Ochna holstii* Engl.	T
Aspleniaceae	*Asplenium sandersonii* Hook.	H	Ochnaceae	*Rhabdophyllum affine* (Hook. f.) Van Tiegh	T
Aspleniaceae	*Asplenium* sp.	H	Orchidaceae	*Bulbophyllum* sp.	H
Asteraceae	*Bothriocline longipes* (Oliv. & Heirn) N. E. Br.	SH	Orchidaceae	*Cynorkis kassneriana* Kraenzl.	H
Asteraceae	*Crassocephalum* sp.	H	Orchidaceae	*Habenaria macrandra* Lindl.	H
Asteraceae	*Crassocephalum vitellinum* (Benth.) S. Moore	H	Oxalidaceae	*Biophytum petersianum* Welw.	H
Balsaminaceae	*Impatiens niamniamensis* Gilg	H	Palmae	*Raphia farinifera* (Gaertn.) Hyl.	T
Begoniaceae	*Begonia oxyloba* Welw. ex Hook. f.	H	Passifloraceae	*Adenia cissampeloides* (Planch. ex Hook.) Harms	L
Burseraceae	*Canarium schweinfurthii* Engl.	T	Passifloraceae	*Paropsia guineensis* Oliv.	T
Cactaceae	*Rhipsalis baccifera* (J. Mill.) W. T. Stearn	E	Phytolaccaceae	*Hilleria latifolia* (Lam.) H. Walt.	H

Cannaraceae	*Rourea thomsonii* (Bak.) Jongkind	L	Piperaceae	*Piper guineense* Schum. & Thonn.	L
Caryophyllaceae	*Drymaria cordata* (L.) Willd. ex Roem. Schult.	H	Piperaceae	*Pothomorphe umbellata* (L.) Miq.	H
Clusiaceae	*Symphonia globulifera* L. f.	T	Poaceae	*Brachiaria scalaris* Pilger	H
Commelinaceae	*Commelina benghalensis* L.	H	Poaceae	*Leptaspis zeylanica* Nees & Steud.	H
Commelinaceae	*Commelina capitata* Benth.	H	Poaceae	*Oplismenus hirtellus* (L.) P. Beauv.	H
Commelinaceae	*Floscopa glomerata* (Willd.ex J. A. & J. H. Schult.)	H	Poaceae	*Panicum hochstetteri* Steud.	H
Commelinaceae	*Palisota mannii* C. B. Cl.	H	Poaceae	*Paspalum conjugatum* Berg.	H
Commelinaceae	*Pollia condensata* C. B. Cl	H	Poaceae	*Setaria megaphylla* (Steud.) Th. Dur. & Schinz.	H
Commelinaceae	*Stanfieldiella imperforata* (C. B. Cl.) Brenan	H	Pteridaceae	*Pteris burtonii* Bak.	H
Connaraceae	*Agelaea pentagyna* (Lam.)Baill.	L	Pteridaceae	*Pteris dentata* Forsk.	H
Cucurbitaceae	*Momordica foetida* Schumach.	L	Pteridaceae	*Pteris preussii* Hier.	H
Cucurbitaceae	*Passiflora edulis* Sims	L	Rhamnaceae	*Maesopsis eminii* Engl.	T
Cyatheaceae	*Cyathea* sp.	T	Rhamnaceae	*Ventilago africana* Exell	L
Cyperaceae	*Cyperus renschii* Böck.	H	Rubiaceae	*Chassalia cristata* (Hiern.) Bremek	L
Cyperaceae	*Mariscus sumatrensis* (Retz.) Kayoma	H	Rubiaceae	*Coffea canephora* Froehn.	T
Cyperaceae	*Scleria boivinii* Steud.	H	Rubiaceae	*Craterispermum laurinum* (DC.) Benth.	T
Dennstaedtiaceae	*Blotiella natalensis* (Hook)A.F.Tryon	T	Rubiaceae	*Dictyandra arborescens* Welw. Ex Benth.	T
Dennstaedtiaceae	*Histiopteris incisa* (Thunb.)J.Sim.	H	Rubiaceae	*Geophila hirsuta* De Wild.	H
Dennstaedtiaceae	*Pteridium aquilinum* (L.)Kuhn	H	Rubiaceae	*Geophila repens* (L.) I. M. Johnston	H
Dioscoreaceae	*Dioscorea abyssinica* Pax	L	Rubiaceae	*Keetia gueinzii* (Sond.) Bridson	L
Dioscoreaceae	*Dioscorea* sp.	L	Rubiaceae	*Oxyanthus speciosus* DC.	T
Dracaenaceae	*Dracaena fragrans* (L.) Ker Gawl	SH	Rubiaceae	*Oxyanthus unilocularis* Hiern	T
Dryopteridacaeae	*Dryopteris manniana* (Hook.) C. Chr.	H	Rubiaceae	*Pauridiantha callicarpoides* (Hiern) Bremek.	T
Euphorbiaceae	*Alchornea cordifolia* (Schum.& Thonn.) Mull.Arg.	T	Rubiaceae	*Pauridiantha paucinervis* (Hiern) Bremek.	T
Euphorbiaceae	*Alchornea laxiflora* (Benth.)Pax & Hoffm.	SH	Rubiaceae	*Psychotria peduncularis* (Salisb.) Steyerm.	SH
Euphorbiaceae	*Antidesma venosum* Tul.	T	Rubiaceae	*Rothmannia longiflora* Salisb	T
Euphorbiaceae	*Bridelia micrantha* (Hochst.) Baill	T	Rubiaceae	*Rutidea orientalis* Bridson	L
Euphorbiaceae	*Elaeophorbia drupifera* (Thonn.) Stapf	T	Rutaceae	*Zanthoxylum leprieurii* Guill. & Perr.	T
Euphorbiaceae	*Erythrococca trichogyne* Prain	SH	Sapindaceae	*Blighia unijugata* Bak.	T
Euphorbiaceae	*Macaranga barteri* Müll. Arg.	T	Sapindaceae	*Blighia welwitschii* (Hiern) Radlk.	T
Euphorbiaceae	*Macaranga capensis* (Baill.) Sim	T	Sapindaceae	*Lychnodiscus cerospermus* Radlk.	T
Euphorbiaceae	*Macaranga monandra* Müll. Arg.	T	Sapindaceae	*Zanha golungensis* Hiern	T
Euphorbiaceae	*Macaranga schweinfurthii* Pax	T	Sapotaceae	*Chrysophyllum albidum* G. Don	T
Euphorbiaceae	*Margaritaria discoidea* (Baill.) Webster	T	Sapotaceae	*Englerophytum oblanceolatum* (S. Moore) Pennington	T
Euphorbiaceae	*Tetrorchidium didymostemon* (Baill.) Pax Hoffm.	T	Sapotaceae	*Manilkara obovata* (Sabine & G. Don) J. H. Hemsl.	T
Euphorbiaceae	*Uapaca guineensis* Müll. Arg.	T	Sapotaceae	*Synsepalum brevipes* (Baker) Pennington	T
Fabaceae	*Abrus precatorius* L.	L	Smilacaceae	*Smilax anceps* Willd.	L
Fabaceae	*Dalbergia lactea* Vatke	L	Thymelaeaceae	*Peddiea fischeri* Engl.	T
Flacourtiaceae	*Casearia engleri* Gilg	T	Ulmaceae	*Trema orientalis* (L.) Blume	T

Table 2 Continued

Family	Species name	Habit	Family	Species name	Habit
Hippocrateceae	*Pristimera plumbea* (Blakel & Wilczek) N. Haillé	L	Urticaceae	*Boehmeria macrophylla* Hornem.	T
Hippocrateceae	*Salacia elegans* Welw. ex Oliv.	L	Urticaceae	*Urera trinervis* (Hochst. ex Krauss) Friis & Immelman	L
Hypericaceae	*Harungana madagascariensis* Lam.ex Poir.	T	Verbenaceae	*Clerodendrum fuscum* Gürke	L
Icacinaceae	*Apodytes dimidiata* Arn.	T	Verbenaceae	*Clerodendrum johnstonii* Oliv.	L
Icacinaceae	*Iodes* sp.	L	Vitaceae	*Cissus palmatiffida* (Bak) Planch	L
Icacinaceae	*Leptaulus daphnoides* Benth.	T	Vitaceae	*Cyphostema bambuseti* (Gilg & Brandt) Descoings ex Wild & Drumm.	H
Lamiaceae	*Plectranthus luteus* Gürke	SH	Zingiberaceae	*Aframomum luteoalbum* (K.Schum.) K.Schum.	H
Lauraceae	*Beilschmiedia ugandensis* Rendel	T	Zingiberaceae	*Aframomum mala* (K.Schum.) K.Schum.	H
Linaceae	*Hugonia platysepala* Welw.ex Oliv.	L	Zingiberaceae	*Aframomum zambesiacum* (Bak.) K.Schum.	H
Lomariopsidaceae	*Bolbitis gemmifera* (Hiern) C. Chr.	H	Zingiberaceae	*Costus dubius* (Afzel.) K. Schum.	H
Lomariopsidaceae	*Lomariopsis warneckei* (Hieron) Alston	H	Zingiberaceae	*Renealmia congolana* De Wild & Th. Dur.	H
Marantaceae	*Marantochloa holostachya* (Bak.) Hutch.	L			

T, tree; SH, shrub; E, epiphyte; H, herb; L, liana.

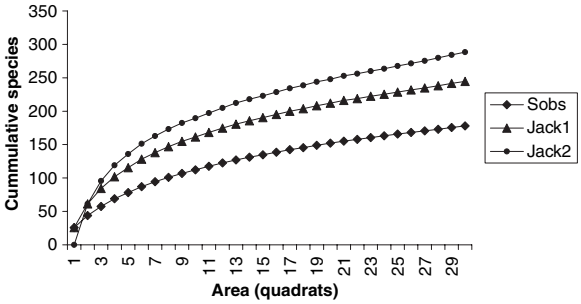

Fig 1 Species accumulation curve for the species found in the sampled forested area

richer or carry rare species or species of special conservation significance. These would be gazetted to conserve the rich flora, habitats and other biodiversity therein.

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