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Composition and Succession of the Woody Flora of South Nandi Forest, Kenya

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ABSTRACT
A floristic survey was carried out to determine the composition and succession of the woody flora of South Nandi Forest, Kenya. The classification of the forest is also discussed. Data was collected from 57 points in a forest block located in the central part of the forest and at various points of the forest using unstructured sampling. At each of the 57 points, enumerations were made of individuals in each of five size classes (≥50 cm ht-2 cm dbh; >2-8 cm dbh; >8-14 cm dbh; >14-20 cm dbh and >20 cm dbh). Eighty six species of erect woody plants constituting both shade tolerant (climax) and shade intolerant (pioneer) species were recorded in this survey. An additional ten species are documented to be also present in the forest. Many of the species present occur at low stocking. For trees >2 cm dbh, 12 species contribute 73.5 % of the total basal area and 72.2 % of the total stocking of the surveyed forest block. *Croton megalocarpus* currently the most dominant top canopy species is losing dominance to *Tabernaemontana stapfiana* and *Strombosia scheffleri*. The classification of South Nandi Forest as an Afromontane rain forest was found appropriate. The species composition and population status data generated in this study formed a useful starting point for developing a management plan for use under the joint forest management arrangement provided in the Kenya Forest Act of 2005. It also offered a reference point upon which to gauge the impacts of future management practices.

Key words: Composition, succession, classification, afromontane rain forest

INTRODUCTION
South Nandi Forest in Kenya is a unique Afromontane rain forest being a transitional between the midland-lowland Guineo-congolian forests and Afromontane forests (White, 1983). Afromontane forests are some of the most species rich ecosystems in Africa (Bussmann, 2004). These ecosystems experience pressure from human disturbance (FAO, 2009) as they share the same limited agricultural high potential areas with high human populations (Burgess *et al.*, 2007a; Cordeiro *et al.*, 2007; Fjeldsa and Burgess, 2008). This often results in significant destruction of the forests. Human or otherwise caused disturbance to forest ecosystems sets in motion successional changes. Such changes require documenting and understanding if the future management of the forests is to be in tune with the floristic realities. There are a number of publications (Burgess *et al.*, 2007b; Schmitt *et al.*, 2010; Bussmann, 2001; Aerts *et al.*, 2011), on the species composition of eastern African Afromontane forests. However, factors influencing tree distribution and how the species composition has changed over time are rarely give attention. Overall, many of the Afromontane forests especially the small sized ones, remain unstudied.

Many of the earlier floristic surveys in Kenyan high forests have been timber inventories aiming at rough estimation of available timber for sawmilling (Forest Department, 1967, 1976). These timber inventories gave little attention to population status of individual species. A few studies have been aimed at documentation of biodiversity (Beentje, 1990; KIFCon, 1994). Consequently these forests remain relatively unknown floristically.

Majority of these indigenous forests have faced heavy exploitation and destruction in the past (Forest Department, 1994). In 2005, the country acquired a new forest act. Under this Act the forests have been put under strict protection with the assumption that they will recover to their former state. The Act allows local communities to form Community Forest Associations (CFA) and acquire management rights which can include harvesting of both wood and non-wood products from the forests. This means the forests are likely to face some controlled exploitation in the near future. Before a CFA can get management rights it must prepare a management plan for the forest or section of the forest it intends to manage (Republic of Kenya, 2005). Under such a dispensation, it is important to compile some baseline information for these forests. There is need to document their remaining biodiversity, gauge their conservation and utilization values. This will provide a reference point upon which to assess the impacts of future management.

Since 1963 there have been three inventories carried out in South Nandi Forest: A reconnaissance inventory survey between 1963 and 1967 (Forest Department, 1967); a timber survey in 1976 (Forest Department, 1976) and a species composition survey (KIFCon, 1994). These studies did not give much attention to plants <5 cm in diameter. Without the coverage of the whole spectrum of tree sizes, species dynamics cannot be well understood and hence one cannot be sure of the species re-colonizing the forest. The current study has attempted to verify the findings of these previous inventories and to compile a checklist of erect, woody species found in the forest. Composition and relative abundance of tree species and succession are given attention. Classification of the forest is also discussed. The ultimate goal of the study was to generate baseline data on composition and succession trends as such data will be essential in guiding future management and evaluating impacts of management.

MATERIALS AND METHODS

Study area: South Nandi Forest, declared government forest in 1936, is situated in western Kenya near Kapsabet Township. The location is 0°.00'-0°.15'N, 34°.45'E-35°.07'E (Fig. 1) and it covers an area of about 20,000 ha of which 1400 hectares is plantations of exotic species. The rest is indigenous forest (KIFCon, 1994). Altitude ranges from 1700-2000 m. Mean annual rainfall is 1600-2000 mm and annual temperature is 19. (Republic of Kenya, 1982). Fifty seven and 82 species of woody plants excluding lianas were recorded to be growing in the forest in the 1967 and timber inventories, respectively (Forest Department, 1967; KIFCon, 1994). In White (1983) classification the Nandi forests (North and South Nandi) are placed under Afromontane rain forests. In White's map Nandi's location is the Afromontane center of Endemism at the border of the Lake Victoria regional mosaic.

Floristic survey: The floristic survey had two components: (1) a systematic sampling of a forest block measuring 9×5 km located more or less in the middle of the forest (Fig. 1). This was conducted between 1995 and 1996 (2) Unstructured survey covering the rest of the forest, conducted between 2005 and 2007). Multiple-nearest-tree sampling method developed by Hall (1991) was used. According to this method, the numbers of observations are kept constant for all

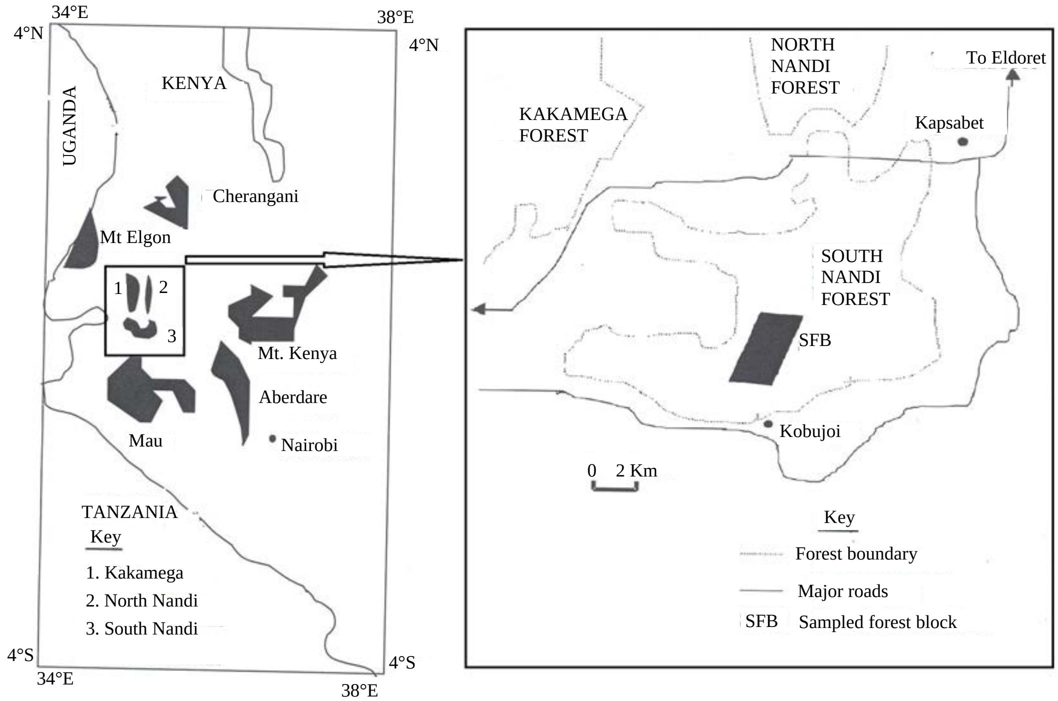

Fig. 1: Location of South Nandi Forest and the position of the surveyed forest block

Table 1: Size categorization of the plants assessed and number of observations made at each sampling point

Size category	Size class limits (cm dbh)	No. of observations per sample
Seedlings/Saplings	≥50 cm ht-2	40
Poles	>2-8	35
Small trees	>8-14	30
Medium trees	>14-20	25
Big trees	>20	20

samples. In this case the observations were the number of individual shrubs and trees assessed per size class. Assessment was limited to live, erect, woody plants of sizes shown in (Table 1). Sample points were arranged systematically in a forest block measuring 7.2 km. by 2.4 km laid out near Kobujoi Forest. The block was gridded (600 m×600 m). Sampling was done at the intersections of the grids. A total of 57 sample points were assessed. At each sampling point, the species and diameter at breast height (dbh) of each individual tree of the specified size (Table I) were recorded. For further documentation of species composition, erect woody plants encountered elsewhere in the forest rather than within the samples were also recorded by species. This was achieved through unstructured sampling, whereby walks were made along existing trails at various points of the forest and species of trees and shrubs along the trails recorded without determining their density.

Average stocking (individuals ha^{-1}) and basal area ($m^2\ ha^{-1}$) for trees >2 cm dbh (for 57 samples) were calculated for each species for all size classes combined. A list of all tree and shrub species encountered in the survey was compiled and compared with species lists of the previous surveys (Forest Department, 1967, 1976; KIFCon, 1994).

RESULTS AND DISCUSSION

Species composition and classification of South Nandi: A large number of species are present in South Nandi Forest but with few exceptions occur at low stocking. Stocking (individuals ha^{-1}) and basal area ($m^2 \, ha^{-1}$) of individual species are shown in (Table 2). A total of 49 species were recorded in the surveyed forest block. Of the 49 species, 45 had also been recorded by either the Forest Department (1967) survey or the KIFCon (1994) survey. Another 37 species (Table 3) were recorded outside the surveyed block, through the unstructured survey. Four species recorded in the current survey; *Allophylus ferrugigeus, Chionanthus mildbraedii, Deinbollia kilimandscharica* and *Psydrax parviflora* subsp. *rubrocostatum* had not been recorded in the previous surveys. Eight species (Table 3) were not recorded in the current survey but had been recorded by the Forest Department (1967) and KIFCon (1994) surveys. The general stocking in South Nandi, where a few species contribute a large proportion of the total stand stocking and majority of the species are only represented by a small number of trees is consistent with stocking in the East Usambara (Afromontane rain forests), Tanzania (Hamilton, 1989); lower attitude, Mt Elgon forest (Hitimana *et al*., 2004); Kakamega Forest (Odhiambo *et al*., 2004), afromontane forests at Bonga, Ethiopia (Schmitt *et al*., 2010), Taita Hills forests in Kenya (Aerts *et al*., 2011) and not unusual for tropical forests in general (UNESCO, 1978).

For individuals >2 cm dbh, twelve species (Table 4) are of particular interest, combined, they contribute 73.5 % of the total basal area and 72.2 % of the total stocking of the surveyed forest block. The six most abundant species are *Tabernaemontana stapfiana, Croton megalocarpus, Drypetes gerrardii, Strombosia scheffleri, Diospyros abyssinica and Casearia battiscombei*. These species were reported as the most abundant in the 1976 inventory (Forest Department, 1976) with the exception of *Drypetes gerrardii*, which was not even recorded then. In the 1976 inventory *Strychnos usambarensis* was reported as the fourth most abundant species. This species was not recorded in the present study and KIFCon (1994) recorded only one tree in its 3000 records. These inconsistencies suggest that in the 1976 inventory *Drypetes gerrardii* was misidentified as *Strychnos usambarensis* (the two species share a local name-Shekoye). Apart from this inconsistency there is no evidence for appreciable change in the relative abundance of species between 1976 and the present.

Comparing the species composition of South Nandi Forest with that of other Afromontane rain forests, the placement of the forest as an Afromontane rain forest (White, 1983) was found appropriate. Twenty four of the fifty five species mentioned by White (1983) as being typical of Afromontane forests are present in South Nandi Forest. The species composition of South Nandi matches well the composition of forests (southern Wellega, Illubabor and western Kefa forests) in neighbouring Ethiopia also considered as Afromontane rain forests. About 50% of the erect woody species reported for these forests (Friis, 1992) are present in South Nandi.

South Nandi differs from other Kenyan Afromontane rain forests in two particular ways. Firstly, *Croton megalocarpus* which occurs as one of the dominant species, although widespread in the highlands, rarely assumes dominance or co-dominance in other forests (Trapnell and Brunt, 1987). As a dominant, it occurs only in the Nandi forests, Kakamega and in one small forest near Nairobi and another small forest near Meru. Secondly, because of Nandi's location, at the interface of Afromontane archipelago-like regional center of endemism with the Lake Victoria regional mosaic (White, 1983), species of Guineo-Congolian origin (notably, *Antiaris toxicaria, Harungana madagascariensis, Trilepisium madagascariense* and *Zanthoxylum gilletii* not present or very rare in the other Kenyan Afromontane forests) are present in South Nandi. These differences, whether

Table 2: List of species recorded during the current study and % representation of each species in the surveyed forest block based on stocking (stems/ha) and basal area ($m^2 ha^{-1}$) for trees >2 cm dbh

Species	Family	Representation (%) in the surveyed forest block	
		Stocking (stems ha^{-1})	Basal area (m^2 ha^{-1})
Albizia gummifera (JF Gmel.) C.A. Sm.	Mimosaceae	(14) 1	0.39(1.2)
Allophylus abyssinica (Hochst.) Radlk.	Sapindaceae	(7) 0.5	0.31(1)
Allophylus ferrugineus Taub.	Sapindaceae	(1) 0	0.0 (0)
Aningeria adolf-friedericii (Engl.) Robyns and Gilb.	Sapotaceae	(4) 0.3	0.19 (0.6)
Bequaertiodendron oblanceolatum (S. Moore). Heine and J.H. Hemsl	Sapotaceae	(1) 0	0.001 (0)
Bersama abyssinica Fres..	Melianthaceae	(15) 1	0.41 (1.3)
Buddleia polystachya Fres	Loganiaceae	(0) 0	0.0 (0)
Casearia battiscombei R.E. Fries	Flacourtiaceae	(45) 3	1.3 (4.1)
Cassipourea malosana (Bak.) Alston	Rhizophoraceae	(0.5) 0	0.02 (0)
Cassipourea ruwensorensis (Engl.)	AlstonRhizophoraceae	(298) 21	1.4 (4.5)
Celtis africana Burm.f.	Ulmaceae	(11) 0.7	1.0 (3.2)
Celtis gomphophylla Engl	*Ulmaceae*	(10) 0.7	0.26 (0.8)
Chionathus mildbraedii (Gilg and Schellenb.)	StearnOleaceae	(13) 1	0.02 (0)
Coffea eugenioides S. Moore	Rubiaceae	(22) 1.5	0.03 (0)
Croton macrostachyus Del.	Euphorbiaceae	(7) 0.5	0.25 (0.8)
Croton megalocarpus Hutch	Euphorbiaceae	(36) 2.5	4.7 (15.1)
Deinbollia kilimandscharica Taub.	Sapindaceae	(35) 2.5	0.1 (0.3)
Diospyros abyssinica (Hiern) F. White	Ebanaceae	(40) 2.7	1.1 (3.6)
Dombeya torrida (J.F. Gmel.) P. Bamps	Sterculiaceae	(0) 0	0.0 (0)
Dovyalis macrocalyx (Oliv.) Warb.F	lacourtiaceae	(14) 1	0.2 (0.6)
Dracaena steudneri Engl.	Dracaenaceae	(22) 1.5	0.6 (2)
Drypetes gerrardii Hutch.	Euphorbiaceae	(22) 4	2.5 (7.8)
Ehretia cymosa Thonn.	Boraginaceae	(25) 2	0.5 (1.6)
Ekebergia capensis Sparmm	Meliaceae	(39) 3	0.1 (0.3)
Erythrococca bongensis Pax	Euphorbiaceae	(49) 3.5	0.1 (0.3)
Fagaropsis angolensis (Engl.) Dale	Rutaceae	(6) 0.4	0.06 (0)
Ficus sur Forssk.	Moraceae	(1) 0	0.4 (1.3)
Heinsenia diervilleoides K. Schum.	Rubiaceae	(275) 19	1.1 (3.5
Macaranga kilimandscharica Pax	Euphorbiaceae	(61) 4	1.0 (3.3)
Neoboutonia macrocalyx Pax	Euphorbiaceae	(42) 3	0.4 (1.3)
Olea capensis L.	Oleaceae	(5) 0..3	1.2 (3.8)
Oncoba routledgei Sprague	Flacourtiaceae	(3) 0.2	0.01 (0)
Polyscias fulva (Hiern) Harms	Araliaceae	(5) 0.4	0.8 (2.5)
Prunus africana (Hook.f.) Kalkm.	Rosaceae	(2) 4	1.6 (5)
Psydrax parviflora subsp rubrocostatum.(Robyns)Bridson	Rubiaceae	(14) 1	0.13 (0.4)
Psychotria mahonii C. Wright	Rubiaceae	(3.5) 0.2	0.05 (0)
Rawsonia lucida Harv.and Sond.	Flacourtiaceae	(6) 0.5	0.04 (0)
Ritchiea albersii Gilg	Capparaceae	(7) 0.5	0.12 (0.4)
Schefflera volkensii (Engl.) Harms	Araliaceae	(2) 0.1	1.0 (3.3)
Strombosia Scheffleri Engl.	Olacaceae	(104) 7	2.5 (8)
Syzygium guineense subsp afromontanum F. White	Myrtacaeae	(5) 0.4	0.5 (1.6)
Tabernaemontana stapfiana Britten	Apocynaceae	(64) 4	4.7 (14.9)
Teclea nobilis Del.	Rutaceae	(15) 1	0.01 (0)
Trema orientalis (L.) Bl.	Ulmaceae	(0) 0	0.0 (0)

Table 2: Continued

Species	Family	Representation (%) in the srveyed forest block	
		Stocking (stems ha^{-1})	Basal area ($m^2 ha^{-1}$)
Trilepisium madagascariense DC.	Moraceae	(7) 0.5	0.14 (0.4)
Vangueria infausta Burch.	Rubiaceae	(2.5) 0.2	0.01 (0)
Vangueria madagascariensis Gmel	Rubiaceae	(6) 0.5	0.03 (0)
Xymalos monospora (Harv.) Warb.	Monimiaceae	(37) 2.5	0.19 (0.6)
Zanthoxylum gillettii (De Wild.) Waterm.	Rutaceae	(9) 0.6	0.06 (0.2)

Forest block column: the value inside brackets stands for stems/ha or basal area and the value outside, representation (%)

Table 3: Species recorded (+) outside the surveyed block (current study) or documented to be present by the Forest Department (1967) or the KIFCon (1994) Inventory

Species	Family	Recorded in	
		Unstructured Survey (+)	Previous surveys K-KIFCon (1994), F-Forest Dept (1967)
Acacia abyssinica Benth.	Mimosaceae	+	KF
Alangium chinense (Lour.) Harms	Alangiaceae	+	KF
Albizia grandibracteata Taub.	Mimosaceae	+	K
Alchornea hirtella Benth.	Euphorbiaceae	+	K
Antiaris toxicaria (Pers.) Lesch.	Moraceae	+	KF
Blighia unijugata Bak.	Sapindaceae	+	F
Chaetacme aristata Planch.	Ulmaceae	+	KF
Chrysophyllum albidum G. Don	Sapotaceae		F
Cordia africana Lam.	Boraginaceae	+	KF
Craibia brownii Dunn	Papilionaceae	+	KF
Cyathea manniana Hook.	Cyathaceae	+	K
Dracaena afromontana Mildbr.	Dracaenaceae	+	K
Ensete edule (J.F. Gmel.) Horan	Musaceae	+	K
Erythrophleum spp	Caesalpiniaceae		K
Fagaropsis hildebrandii (Engl.) Milne-Redh.	Rutaceae		K
Ficus exasperata Vahl.	Moraceae	+	K
Ficus natalensis Hochst.	Moraceae	+	KF
Flacourtia indica (Burm.f.) Merill	Flacourtiaceae	+	K
Funtumia africana (Benth.) Stapf	Apocynacaeae	+	F
Harungana madagascariensis Proir.	Guttiferae	+	K
Ilex mitis (L.) Radlk.	Aquifoliaceae	+	F
Lepidotrichilia volkensii (Gürke) Leroy	Meliacaeae	+	K
Maesa lanceolarum Forssk.	Mysinaceae		F
Manikara butugi Chiov.S	Apotaceae	+	KF
Markhamia lutea (Benth.) K Schum.	Bignoniaceae	+	F
Maytenus senegalensis (Lam.) Exell	Celastraceae	+	K
Nuxia congesta Fres.	Loganiaceae	+	K
Obetia radula (Bak.) Jackson	Urticaceae	+	K
Ochna hostii Engl.	Ochnaceae	+	K
Oxyanthus speciosus DC.	Rubiaceae		KF
Podocarpus latifolius (Thunb.) Mirb.	Podocarpaceae	+	F
Polyscias kikuyuensis Summerrh.A	Raliaceae		KF

Table 3: Continued

Species	Family	Recorded in: Unstructured Survey (+)	Recorded in: Previous surveys K-KIFCon (1994), F-Forest Dept (1967)
Prema angolensis Gürke	Verbenaceae	+	K
Psydrax schimperiana (A. Rich.) Bridson	Rubiaceae		KF
Sapium ellipticum (Krauss) Pax	Euphorbiaceae	+	K
Schafflera abyssinica (A. Rich.) Harms	Araliaceae	+	K
Solanum mauritianum Scop.	Solanaceae	+	K
Solanum spp.	Olanaceae	+	K
Strychnos henningsii Gilg	Loganiaceae		K
Strychnos usambarensis Gilg	Loganiaceae	+	KF
Suregada procera (Prain) Croizat	Euphorbiaceae	+	F
Teclea simplifolia (Engl.) Verdoorn	Rutaceae	+	K
Trichilia dregeana Sond.	Meliaceae	+	F
Trichilia emetica Vahl.	Meliaceae	+	K
Vernonia auriculifera Hiern	Compositae	+	K
Vitex fischeri Gürke	Verbenaceae		F

Table 4: Contribution of twelve major species to the total basal area and total stocking of a forest block in South Nandi Forest, Kenya

Species	Contribution (%) to the total: Stocking	Contribution (%) to the total: Basal area
Casearia battiscombei	3	4.1
Cassipourea ruwensorensis	21	4.5
Heinsenia diervillioides	19	3.4
Celtis africana	0.7	3.2
Croton megalocarpus	2.5	15.1
Diospyros abyssinica	2.7	3.6
Drypetes gerrardii	4	7.8
Macaranga kilimandscharica	4	3.3
Olea capensis	0.3	3.8
Prunus africana	4	5.0
Strombosia scheffleri	7	8.0
Tabernaemontana stapfiana	4	14.9
Total	72.2	73.5

reflecting persisting floristic distinctness or a seral phase of *Croton* dominance, have management implications. A management objective could be maintenance of character if the present forest is shown to contain important germplasm. Alternative option could be to manipulate the forest to encourage change to a more commercially or biologically valuable forest.

Population status of top canopy tree species and succession: Stocking (individuals ha^{-1}) and basal area ($m^2\ ha^{-1}$) of trees >2 cm dbh for the top canopy species are shown in Table 5. *Casaeria battiscombei*, *Diospryos abyssinica*, *Drypetes gerrardii*, *Strombosia scheffleri* and *Tabernaemontana stapfiana* are fairly well represented in all size classes. *Croton megalocarpus* and *Celtis africana* have poor stocking in the smaller tree sizes (≤14 cm dbh), their high contributions to the total basal area are due to high stocking of big trees (>20 cm dbh) for *Celtis africana* and

Table 5: Stand table for South Nandi, Kenya based on 57 samples, showing stocking (individuals ha^{-1}) and total basal area (m^2 ha^{-1}) for individuals >2 cm dbh, for top canopy species

	Dbh class (cm)						
Species	≥50 cm height-2 cm dbh	>2-8	>8-14	>14-20	>20	Total	Basal area (m^2 ha^{-1})
Albizia gummifera.	138	9	2	0.3	2	152	0.39
Allophylus abyssinica.	127	2	0.9	0.6	3	134	0.31
Aningeria adolf-friedericii	7	3	0.2	0.3	0.7	5	10.19
Bersama abyssinica	59	7	2	3	3	73	0.41
Casearia battiscombei	82	17	9	7	12	127	1.3
Cassipourea malosana	3	0	0	0.2	0.3	3.5	0.02
Celtis africana	54	3	1	0.6	5	64	1
Celtis gomphophylla	37	5	0.9	1	2	46	0.26
Croton macrostachyus	17	3	1	0.8	2	24	0.25
Croton megalocarpus	27	7	5	3	22	64	4.7
Diospyros abyssinica	474	21	5	2	11	513	1.1
Drypetes gerrardii	58	17	8	8	22	113	2.5
Ehretia cymosa	6	13	4	3	4	30	0.5
Fagaropsis angolensis	40	4	0.5	0.5	0.5	46	0.06
Ficus sur	3	1	0	0.1	0.3	4.4	0.4
Olea capensis	51	2	0.2	0.3	2	56	1.2
Polyscias fulva	540	0.7	0.7	0.5	4	546	0.8
Prunus africana	418	2	0.1	0.1	242	2	1.6
Ritchiea albersii	8	4	0.7	0.8	1	14	0.12
Schefflera volkensii	3	0.2	0.1	0.1	2	5.4	1
Strombosia scheffleri	321	54	18	11	21	425	2.5
Syzygium guineense subsp afromontanum	15	2	0.48	0.1	3	20	0.5
Tabernaemontana stapfiana	75	16	8	7	3	3149	4.7
Trilepisium madagascariense	31	6	0.3	0.2	0.6	38	0.14
*Zanthoxylum gillettii*1	02	7	0.4	0.5	0.4	110	0.06

high stocking of trees >8 cm dbh for *Croton megalocarpus*. *Olea capensis* and *Prunus africana* have very low stocking for trees >2 cm dbh. Their high contribution to the total basal area is from a few large individuals.

A closer look at the population status of these top canopy species (Table 5), shows some evidence that *Croton megalocarpus* is losing dominance. The stocking of its small and medium sized trees (>8-20 cm dbh) is low compared with the stocking of its main competitors, *Drypetes gerrardii*, *Tabernaemontana stapfiana* and *Strombosia scheffleri*. The decline is partly explained by the high intolerance of *Croton megalocarpus* to shade, which restricts it germination to gaps. However, harvesting may be another cause of the decline. The population status of *Drypetes gerrardii*, *Tabernaemontana stapfiana* and *Strombosia scheffleri* suggests present trends will result in these as dominant species in the future (trees >20 cm dbh), partly due to their ability to regenerate under shade. Intensification of the dominance of *Tabernaemontana stapfiana* and *Strombosia scheffleri* will be at the expense of more valuable pioneer species such as *Croton megalocarpus*, *Prunus africana* and *Olea capensis*. To contain the extent of dominance of *Tabernaemontana stapfiana* and *Strombosia scheffleri*, research on better utilisation of timber from the two species needs to be done to make their harvesting attractive. High stocking and a balanced size-distribution in *Casearia battiscombei* suggest the species could be managed as the principal plywood source from the forest in future.

Of interest to management for timber are the furniture wood species *Aningeria adolfi-friedericii*, *Fagaropsis angolensis*, *Olea capensis*, *Prunus africana* and the plywood species *Trilepisium madagascariense* and *Zanthoxylum gilletii*. These species have very low stocking for trees >2 cm dbh and contribute very little to the total basal area of the forest. Occurrence is in moderate to high numbers as seedlings and poles (≥50 cm height-8 cm dbh) but at low concentrations in the larger size classes (>8 cm dbh) (Table 5). This may have been caused by a number of factors. Considering their high value for timber and plywood, over-exploitation could explain the low stocking of trees >20 cm dbh. There has been both legal and illegal harvesting of all six of these. Records at Kobujoi Forest Station show that legal harvesting has been in progress for more 30 years. However, over-exploitation would not explain the low stocking of individuals >8-20 cm dbh and it seems few seedlings and poles are recruited to larger size classes. Mortality and time-of-passage patterns and their possible implications for recruitment need to be investigated. Priority in the conservation of these species must be location and protection of the remaining seed sources.

CONCLUSION

The placement of South Nandi Forest in Afromontane rain forest was found to be appropriate as it composition is similar to that of other Afromontane forests. Top canopy species consist of both pioneer and shade tolerant species. This may be as a result of disturbance mainly logging that has taken place over the last 60 years or more. *Drypetes gerrardii*, *Tabernaemontana stapfiana* and *Strombosia scheffleri* are gaining dominance over previously the dominant species, *Croton megalocarpus*. Future management should consider utilization of these lesser known species. The better known timber and furniture wood species *Aningeria adolfi-friedericii*, *Fagaropsis angolensis*, *Olea capensis*, *Prunus africana* and the plywood species *Trilepisium madagascariense* and *Zanthoxylum gilletii* are having very low densities and may require special management to enhance their stocking.

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