

## Rarity and abundance in a diverse African forest

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**Abstract** We censused all trees  $\geq 1$  cm dbh in 50 ha of forest in Korup National Park, southwest Cameroon, in the central African coastal forest known for high diversity and endemism. The plot included 329,519 individuals and 493 species, but 128 of those taxa remain partially identified. Abundance varied over four orders of magnitude, from 1 individual per 50 ha (34 species) to *Phyllobotryon spathulatum*, with 26,741 trees; basal area varied over six orders of magnitude. Abundance patterns, both the percentage of rare species and the dominance of abundant species were similar to those from 50-ha plots censused the same way in Asia and Latin America. Rare species in the Korup plot were much less likely to be identified than common species: 42% of taxa with  $< 10$  individuals in the plot were identified to species, compared to 95% of the abundant taxa. Geographic ranges for all identified species were gleaned from the literature and online flora. Thirteen of the plot species are known only from Korup National Park (all discovered during the plot census), and 39 are restricted to the Nigeria–Cameroon coastal zone. Contrary to expectation, species with narrow geographic ranges were more abundant in the plot than average. The small number of narrow endemics (11% of the species), many locally abundant, mitigates short-term extinction risk, either from demographic stochasticity or habitat loss.

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## Introduction

Rarity is central to tropical forest conservation. Diverse communities inevitably include large numbers of species which are seldom recorded: the singletons in many inventories. In typical forest plots of a single hectare or less, 30% of the tree species may be singletons (Pitman et al. 1999). To exacerbate the difficulties with our understanding of tropical communities, species identification is often problematic. Even experts leave many specimens as ‘morphospecies’—recognizable within a site, but not matched to named collections in herbaria. For these reasons—rarity and difficult taxonomy—quantitative information on the abundances and distributions of tropical organisms, not just trees, remains problematic, and conservation planning is hindered by lack of basic knowledge about which species are most endangered. This is probably true in Africa more than any other region.

In addition, African forests can have unusual abundance patterns. One or a few species sometimes approach abundances observed in temperate forests (e.g. San-kovski and Pridnia 1995; Shaw et al. 2004), where a single dominant tree comprises more than half the forest (Makana 1998; Hart unpublished, 1990). This is known as monodominance, and although it is known in tropical forests elsewhere, it is most important in Africa (Marimon et al. 2001; Nascimento and Proctor 1997). Monodominance should go hand-in-hand with low diversity (Connell and Lowman 1989) and rarity, because the dominant trees force the scarce species to even lower abundance. Enhanced rarity exacerbates the problems of studying the forests. More exhaustive inventories are needed to document tree species abundances, and rarity might enhance extinction risk for many species.

The coastal forests of Western Africa, especially Cameroon, are increasingly recognized as important for the conservation of forest diversity. They are the richest in plant species across Africa and repeatedly appear as a center of endemism for plants and for animals (Lovett et al. 2000; Linder 2001; Küper et al. 2004; Rodrigues et al. 2004; Burgess et al. 2005). Because conservation of species and communities depends on more than just species counts, we sought more detailed information about the forests of coastal Cameroon. As part of a global network of large census plots within the tropics, coordinated by the Center for Tropical Forest Sciences (CTFS) of the Smithsonian Institution, we initiated a large-scale and precise forest inventory, aimed at documenting the abundances of all tree species and testing hypotheses about factors that regulate diversity and species composition. The plot covers 50 ha in the Korup National Park, and all individual trees have been mapped and identified (Thomas et al. 2003; Chuyong et al. 2004). Along with a companion plot in the Democratic Republic of the Congo (Makana et al. 2004), these are the largest forest plot inventories in Africa, and provide quantitative assessments of abundance and rarity.

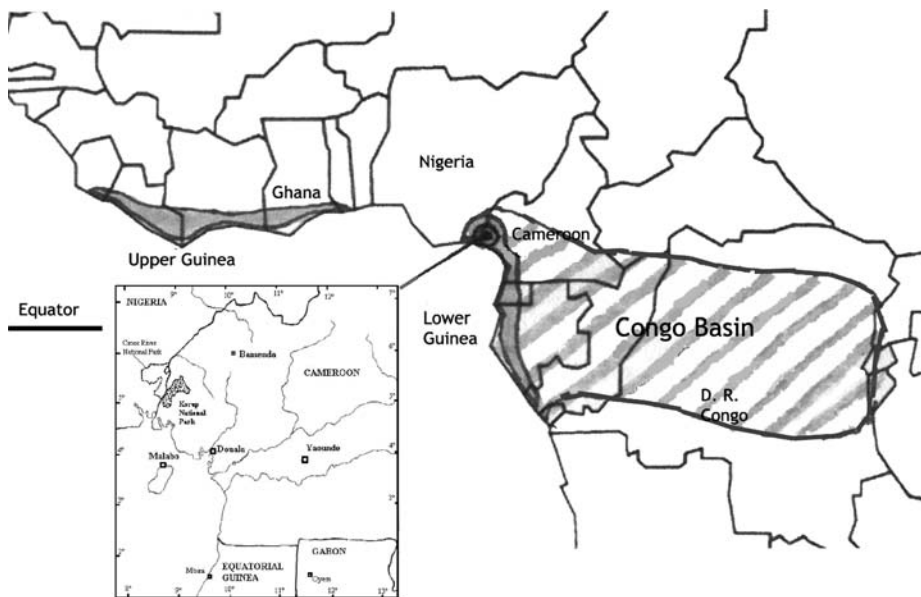
Here we describe the floristic composition, structure, and physiognomy of the Korup plot. We answer several basic questions about tree abundance: is the forest monodominant, and how abundant are the dominant canopy tree species? Is the understory also dominated by one or a few species? At the opposite extreme, how

many species are rare in 50 ha? We then consider whether the rare species at Korup have narrow geographic ranges, as predicted by macroecological theory (Brown 1995; Gaston 2003). Conservation planning often relies on the local abundance of species as well as their geographic ranges, and here we provide information for judging the conservation importance of southwest Cameroon (Rodrigues and Gaston 2000). Because a dozen other sites in the world now have comparable inventories (Condit et al. 2005), abundance patterns at Korup can be compared against the rest of the world, so that we can determine whether African forests differ fundamentally, as Richards (1973) once suggested.

## Materials and methods

### The park and forest

The Korup plot (NW corner 5°03.86' N, 8°51.17' E) is located in southern Korup National Park (4°54' to 5°28' N latitude and 8°42' to 9°16' E longitude), near the coast of Cameroon and the Nigerian border. It is within a belt of evergreen forest extending from southeast Nigeria to the mouth of the Congo River (Fig. 1) that is called the Lower Guinea forest, containing one or more Pleistocene refugia (White 1979; Maley 1987). The belt is characterized by wet forested lowlands, often backed by mountain ranges, and is generally reported to be rich in species (Linder 2001). Letouzey (1968, 1985) described the southern part of the Korup National Park as Biafran coastal forest, rich in gregarious Fabaceae-Caesalpinioideae.



**Fig. 1** Map of tropical Africa showing the three major forest blocks, from west to east: Upper Guinea, Lower Guinea, Congo (or Congolian). Inset in lower left is the detailed map of southeast Nigeria and southwest Cameroon, with Korup National Park indicated

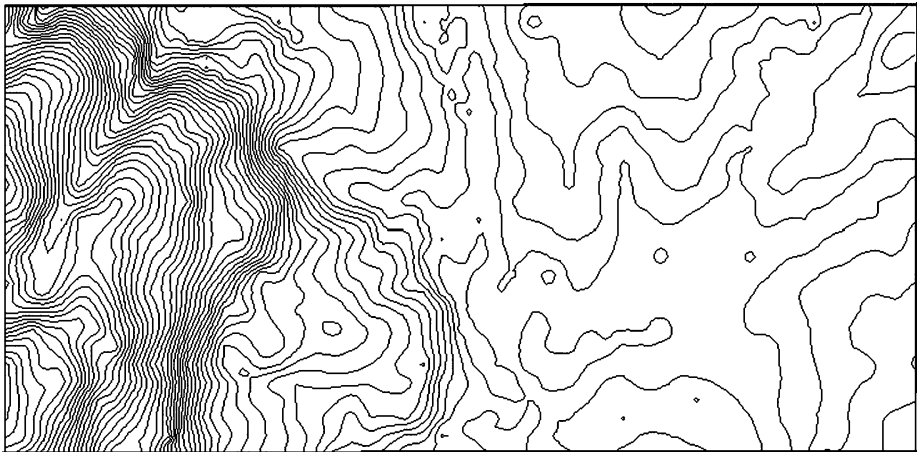
The plot measures 1,000×5,00 m<sup>2</sup> and is 150–240 m above sea level. The long axis of the plot crosses a permanent creek which is fed by a number of small, seasonal drainages (Fig. 2). One-third of the plot is a steep, rocky ridge, while the remaining two-thirds are flat terrain (Fig. 2). Soils of southern Korup are mostly non-hydric, skeletal, with a high sand content and low pH (Gartlan et al. 1986). Detailed soil mapping within the plot has been initiated but will be reported elsewhere.

### Census

We first surveyed the 50 ha, placing permanent stakes precisely every 20 m with minimal damage to the vegetation (Condit 1998). Subsequently, all individuals  $\geq 1$  cm diameter-breast-height (dbh) were tagged with numbered aluminum tags, mapped, measured, and identified to morphospecies. Stem diameter was measured 1.3 m above the ground, with swollen or buttressed trees measured at a spot where the trunk was more regular; in these cases, the measurement spot was painted so future measurements could match. Any stem fork or branch <1.3 m above the ground was treated as a secondary stem and also measured. To map stems, ropes were strung between adjacent stakes (including diagonals) and temporary stakes were placed at 5-m intervals, then the position of each stem was marked by eye on maps covering 10×10 m<sup>2</sup>. Additional details are given in Condit (1998).

### Taxonomy and collection

Most of the trees enumerated lacked flowers and fruits, so we had to rely on vegetative characters to segregate morphospecies: color, odor, and texture of bark slash; color of exudates from bark or leaves; leaf arrangement; petiole length; leaf shape; the number and form of secondary veins; and indumenta. Vouchers were collected from each morphospecies in the plot when first encountered. The first specimen was considered the “type” and was carefully described. Each morphospecies was subsequently collected at least five times (excepting those with <5 individuals) and compared side-by-side with the “type” until we were confident we could recognize



**Fig. 2** Topographic map of the Korup 50-ha plot, 1000 m × 500 m with 2 m contours. North and the highest point in the plot is to the left

it. Flowers or fruits were eventually collected from most taxa. Matching and recognizing morphospecies is a matter of judgment, and our opinions changed through time, but two of us (DK, DT) spent 700 days over 3 years in the plot, viewed nearly every one of 330,000 individuals, and checked all morphospecies against reference collections at herbaria in Cameroon, the U.K., and the U.S. (Herbaria YA, SCA, K, MO) and against regional floras (Aubréville et al. 1963–2001, 1961–1991; Hutchinson et al. 1954–1972). We are reasonably confident in our current classification of individuals into 493 morphospecies, but a few will change when fertile material is studied. A few trees could not be sorted, mostly because they lacked leaves but appeared to be alive. Our family classification follows the Angiosperm Phylogeny Group (2003).

### Abundance and diversity calculations

Because many inventories in tropical forest cover just 1 ha, we report abundance and basal area on a per hectare basis as well as for all 50 ha combined. The former is simply 0.02 times the latter, however, we can go further by estimating standard deviations by dividing the 1000×500 m<sup>2</sup> into 50 non-overlapping 100 × 100 m<sup>2</sup> and counting individuals (basal area) in each. Our counts of individuals do not include multiple stems per tree, but multiple stems are included in the basal area calculations. Unidentified trees were included in calculations of total plot basal area and density.

For species richness of trees ≥1 cm dbh, we report the tally for all 50 ha and the mean per hectare, obtained by averaging the totals from 50 100×100-m<sup>2</sup>. The trees not identified to morphospecies were not included in diversity estimates. All calculations were repeated for trees ≥10 cm dbh.

### Height categories of species

We classified all species into four growth-forms according to their estimated maximum height. Treelets and small trees include all species with adults generally less than 10 m tall; understory trees are those with adults 10–20 m tall; lower canopy species have heights 20–30 m; and upper canopy species are those often >30 m in height and emergent above the main canopy. Corresponding adult stem diameters were <10 cm, 10–30 cm, 30–60 cm, and >60 cm dbh, respectively. Information on the heights of the species came from field estimates in the plot supplemented with information from the literature, especially Aubréville et al. (1963–2001) and Hutchinson et al. (1954–72).

### Geographic range

Distribution patterns of the Korup tree species were tallied relative to the major African phytochoria (White 1979, 1983), which are based on the three main blocks of moist tropical forest in Africa (Fig. 1). White's large eastern block, or *Congolian* forest, falls largely in the two countries called Congo. His central block is the *Lower Guinean* forest, and covers the coastal belt from eastern Nigeria south through Gabon. The western block is *Upper Guinea*, mostly in Ivory Coast and Ghana. These three blocks are considered Pleistocene forest refugia (White 1983; Maley 1987), and Upper Guinea in the west is currently isolated from Lower Guinea by the Dahomey

Gap, a low rainfall area where savanna reaches the Atlantic coast; Lower Guinea and the Congolian forest are presently contiguous.

Tree distributions were obtained from the literature (Aubréville et al. 1963–2001, 1961–1991; Hutchinson et al. 1954–1972), supplemented by the TROPICOS database (<http://www.mobot.mobot.org/W3T/Search/vast.html>). Ideally, we would have considered ranges quantitatively, but species distribution data from tropical Africa is too sparse to allow this. Instead, we assigned each species to one of seven categories: (1) pan-African, including all moist forest and extending into dry and montane forests around it; (2) Guineo–Congolian, including all three moist forest blocks; (3) Lower Guineo–Congolian, meaning the central and eastern blocks; (4) Upper and Lower Guinea, or the central and western blocks; (5) Lower Guinea only; (6) coastal Nigeria–Cameroon only; and (7) Korup National Park only. The only species in the last category are those we discovered in the 50-ha plot.

We tested the hypothesis that geographic range was associated with abundance within the 50-ha plot, and this required estimates of statistical confidence. For all species in the same category of geographic range, we calculated the median abundance per 50 ha. Confidence limits in those medians were estimated by a spatial form of bootstrapping, because highly aggregated species distributions do not justify standard statistics (Valencia et al. 2004). The plot was divided into 50 individual hectares (non-overlapping  $100 \times 100 \text{ m}^2$ ), and these were resampled with replacement 1,000 times. For each sample, the median abundances were recalculated, and the 2.5th and 97.5th percentiles were used as confidence limits.

## Results

### Floristics and diversity

A total of 493 morphospecies were recorded within the 50-ha plot, including 365 (71%) identified to species, 96 (20%) identified to genus, 29 (6%) identified to family, plus three not yet known at even the family level (Table 1). In addition, 680 individual trees have not been assigned a morphospecies. There were 245 genera and 62 families among the 493 species (Appendices 1–3). Among trees  $\geq 10$  cm dbh, there were 306 species, 184 genera, and 53 families (Table 1).

So far, we have discovered 13 new species in the plot, and four of these have been described (Kenfack et al. 2004, 2006; Sonké et al. 2002; Gereau and Kenfack 2000). We anticipate more novel species among the 128 unnamed morphospecies and the 680 unassigned individuals.

The family Rubiaceae was the richest in the plot, with 86 species in 40 genera; Fabaceae was next with 39 species in 25 genera. The traditional Euphorbiaceae had 37 species and 25 genera, but APG II (2003) divided this into the Phyllanthaceae (9 genera), the Euphorbiaceae (14 genera), and the Putranjivaceae (2 genera). The Annonaceae and Malvaceae (including the traditional Sterculiaceae and Tiliaceae) also had more than 20 species each in the plot, and the Annonaceae had 11 genera (Appendix 3).

There were 233.1 species per ha among all individuals (Table 1), and 88.5 among trees  $\geq 10$  cm dbh. Fisher's alpha for the entire plot was 56.9, and 62.8 for trees  $\geq 10$  cm dbh, but was lower for individual hectares (Table 1).

**Table 1** Structure and diversity of the Korup 50-ha plot. *N* refers to the total number of, and *BA* the basal area. SD = standard deviation

|                                 | ≥1 cm  | ≥10 cm | ≥30 cm |
|---------------------------------|--------|--------|--------|
| Mean <i>N</i> ha <sup>-1</sup>  | 6586.4 | 491.8  | 83.9   |
| SD <i>N</i> ha <sup>-1</sup>    | 987.6  | 49.7   | 14.9   |
| Mean <i>BA</i> ha <sup>-1</sup> | 32.0   | 26.0   | 16.1   |
| SD <i>BA</i> ha <sup>-1</sup>   | 4.1    | 4.0    | 4.1    |
| Mean species ha <sup>-1</sup>   | 238    | 86.3   | 35.5   |
| SD species ha <sup>-1</sup>     | 17.5   | 12.0   | 8.2    |
| Species (50 ha) <sup>-1</sup>   | 493    | 306    | 192    |
| Mean Fisher's ha <sup>-1</sup>  | 48.3   | 30.5   | 24.2   |
| SD Fisher's ha <sup>-1</sup>    | 3.8    | 5.6    | 8.9    |
| Fisher's (50 ha) <sup>-1</sup>  | 56.9   | 49.3   | 41.5   |

## Abundance

We recorded 329,319 trees with dbh ≥1 cm within the 50-ha plot, of which 24,591, or 7.5%, were ≥10 cm dbh; this amounts to 6,586 individuals ha<sup>-1</sup>, with 492 ha<sup>-1</sup> above 10 cm dbh. The plot had 32.0 m<sup>2</sup> ha<sup>-1</sup> basal area, and 26.0 m<sup>2</sup> ha<sup>-1</sup> in trees ≥10 cm.

*Cola* in the Malvaceae was the most abundant genus (Appendix 2), followed by *Rinorea* (Violaceae), *Phyllobotryon* (Salicaceae, formerly Flacourtiaceae), and *Diospyros* (Ebenaceae). The Malvaceae was the most abundant family, followed by Violaceae, Salicaceae, and the Euphorbiaceae (Appendix 3). *Oubanguia* was the dominant genus in basal area, almost entirely in one species, *Oubanguia alata* (Lecythidaceae, formerly Scytopetalaceae). Lecythidaceae was the dominant family in basal area, due mostly to *Oubanguia alata*, followed by Fabaceae, Malvaceae and Euphorbiaceae (Table 2).

Several treelets were the most abundant species in the plot, with *Phyllobotryon spathulatum* first and three other *Cola* close behind (Table 2). Two canopy species, *Oubanguia alata* and *Dichostemma glaucescens* (Euphorbiaceae) were also among the top 10 species in abundance. *Oubanguia* and *Dichostemma* ranked first and third in total basal area, and *Cola laterita* ranked second, with low stem density but many large trees (Table 2). The largest diameters overall were mostly *Lecomtedoxa klaineana* (Sapotaceae), reaching 190 cm and including 13 of the 20 biggest trees; the single biggest tree was a 205-cm *Erythrophleum ivorense* (Fabaceae).

At the other extreme, 221 of 493 species (45%) had a mean density of ≤1 tree ha<sup>-1</sup>, and 34 species were singletons in 50 ha. Considering only trees ≥10 cm dbh, there were 38 singletons in the 50 ha, and 239 species had density <1 ha<sup>-1</sup> (78% of all species ≥10 cm).

Basal area had an even greater range: 12 rare species had 2×10<sup>-6</sup> m<sup>2</sup> ha<sup>-1</sup> (a single 1-cm sapling in 50 ha), while *Oubanguia* had 4.3 m<sup>2</sup> ha<sup>-1</sup>. The distribution of basal area and abundance per species approached log-normal, though deviating slightly with an excess of rarity (Fig. 3). These highly skewed abundance distributions produce extremes in the way that a few species dominate: the 10 most abundant species (2% of the total) accounted for 42% of the individuals, while the 10 rarest species accounted for <0.1%. In basal area, the 10 dominants accounted for 41% of the forest, while the 10 rarest accounted for 0.0001%.

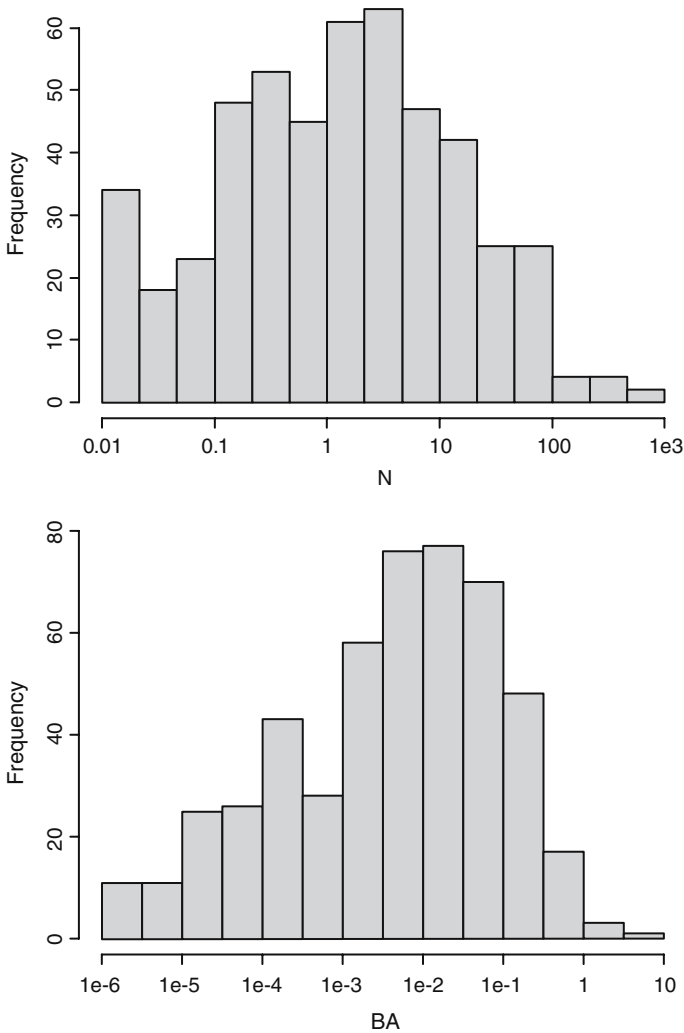
Species rare in the plot were considerably less likely to be fully identified than abundant species. Of the 100 rarest species (≤7 individuals), 47 were identified to species, in contrast to 89 fully identified out of the 100 most common species (>500

**Table 2** Dominant species in Korup 50-ha plot, in four diameter categories ( $\geq 10$ ,  $\geq 100$ , and  $\geq 300$  mm dbh), and in total basal area

| Species   | $N \geq 10$ (rank) | $N \geq 100$ (rank) | $N \geq 300$ (rank) | <i>BA</i> (rank) |
|---|--------------------|---------------------|---------------------|------------------|
| <i>Phyllobotryon spathulatum</i> (TL) (Lower Guinea)          | 534.6 (1)          | 0.1 (215)           | 0.0 (315)           | 0.2457 (32)      |
| <i>Cola semecarpophylla</i> (TL) (SE Nigeria and SW Cameroon) | 490.4 (2)          | 0.4 (121.5)         | 0.0 (315)           | 0.6660 (7)       |
| <i>Dichostemma glaucescens</i> (C) (Lower Guinea–Congolian)   | 345.0 (3)          | 45.5 (2)            | 1.9 (7)             | 1.5761 (3)       |
| <i>Cola praecata</i> (TL) (SE Nigeria and SW Cameroon)        | 309.4 (4)          | 9.1 (14)            | 0.0 (315)           | 0.6971 (5)       |
| <i>Oubanguita alata</i> (C) (Lower Guinea)                    | 298.4 (5)          | 82.1 (1)            | 18.1 (1)            | 4.3721 (1)       |
| <i>Cola</i> sp. nov.2 (TL) (Korup)                            | 247.3 (6)          | 0.0 (369)           | 0.0 (315)           | 0.1378 (53)      |
| <i>Cola</i> sp. nov.3 (TL) (Korup)                            | 164.7 (7)          | 0.2 (163.5)         | 0.0 (315)           | 0.1189 (62)      |
| <i>Diospyros preussii</i> (C) (Lower Guinea)                  | 147.1 (8)          | 0.0 (369)           | 0.0 (315)           | 0.0668 (86)      |
| <i>Angylocalyx oligophyllus</i> (TL) (Upper and Lower Guinea) | 115.9 (9)          | 0.0 (369)           | 0.0 (315)           | 0.0679 (85)      |
| <i>Rinorea lepidobotrys</i> (TL) (Upper and Lower Guinea)     | 109.8 (10)         | 1.9 (42)            | 0.0 (315)           | 0.1910 (40)      |
| <i>Diospyros turensis</i> (U) (Lower Guinea–Congolian)        | 95.9 (11)          | 10.2 (9)            | 0.0 (315)           | 0.2720 (27)      |
| <i>Strombosia pustulata</i> (C) (Guineo–Congolian)            | 82.4 (15)          | 15.7 (7)            | 2.4 (5.5)           | 0.6881 (6)       |
| <i>Drypetes staudtii</i> (U) (SE Nigeria and SW Cameroon)     | 82.0 (16)          | 21.7 (3)            | 0.1 (109.5)         | 0.5191 (11)      |
| <i>Hymenostegia afzelii</i> (C) (Upper and Lower Guinea)      | 80.5 (17)          | 13.8 (8)            | 1.6 (8.5)           | 0.5540 (9)       |
| <i>Diospyros gabunensis</i> (C) (Upper and Lower Guinea)      | 78.0 (18)          | 17.1 (6)            | 0.9 (17)            | 0.5522 (10)      |
| <i>Protomegabaria stapfiana</i> (C) (Upper and Lower Guinea)  | 67.3 (24)          | 18.7 (4)            | 7.0 (2)             | 1.4642 (4)       |
| <i>Cola rostrata</i> (U) (Lower Guinea)                       | 65.7 (25)          | 18.4 (5)            | 0.2 (72.5)          | 0.5078 (12)      |
| <i>Soyauxia gabonensis</i> (U) (Lower Guinea)                 | 63.6 (28)          | 10.0 (10)           | 0.4 (46.5)          | 0.3345 (18)      |
| <i>Klaineanthus gabonae</i> (C) (Lower Guinea)                | 40.6 (39)          | 9.7 (12)            | 2.8 (4)             | 0.6172 (8)       |
| <i>Strombosia tetrandra</i> (C) (Lower Guinea–Congolian)      | 35.3 (42.5)        | 6.3 (17)            | 2.4 (5.5)           | 0.4609 (15)      |
| <i>Lecomtedoxa klaineana</i> (E) (Lower Guinea)               | 6.1 (127)          | 4.2 (23)            | 2.9 (3)             | 1.9855 (2)       |
| <i>Hypodaphnis zenkeri</i> (C) (Lower Guinea)                 | 6.0 (129)          | 3.1 (31)            | 1.6 (8.5)           | 0.3205 (21)      |

*N* gives the total number of individuals per 50 ha  $\geq 10$  mm dbh, and *BA* the total basal area. Following each abundance category, the rank for that category is given in parentheses (rank 1 means the most abundant, 493 the least; in case of ties, all species involved were given the mean of the tied ranks, thus there are many ranks 344). A species is included if it was among the 10 most abundant species in any of the four categories. Examples: *Hypodaphnis zenkeri* is included because it ranked among the top 10 in abundance  $\geq 300$  mm dbh, although it ranked low in abundance  $\geq 10$  mm dbh. For each species, geographic range category and growth form (TL = treelet; U = understory; C = canopy; E = emergent) are listed





**Fig. 3** Abundance distributions for the 493 species in the Korup 50-ha plot. **(A)** Stem density  $\text{ha}^{-1}$ . **(B)** Basal area  $\text{ha}^{-1}$ . Abundance axis is logarithmic

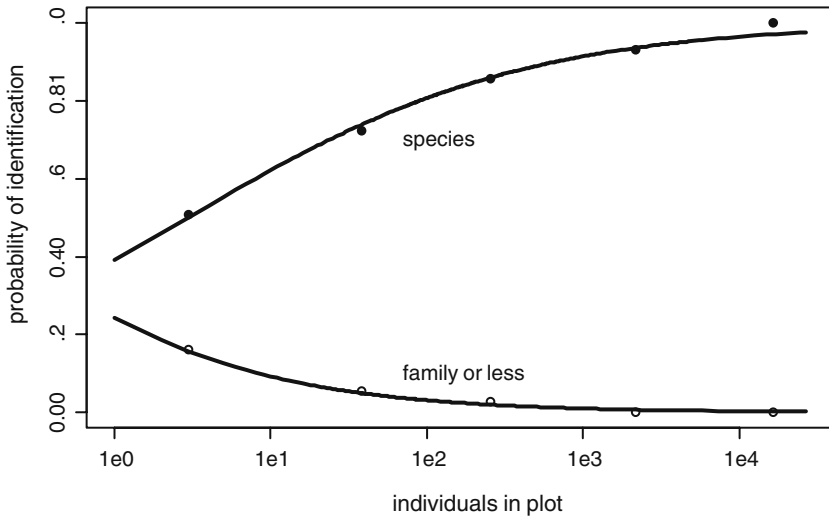
individuals). The estimated probability of identifying a species rose from 43% to 96% over the range of abundances in the plot (Fig. 4).

### Rarity in single hectares

Per single hectare, there were 51.4 singletons  $\geq 1$  cm dbh, and 38.4 singletons  $\geq 10$  cm dbh (means of 50 individual hectares). These represent 22% and 44% of the total species richness  $\text{ha}^{-1}$  in the two size classes, respectively.

### Geographic range and abundance

Of the species whose ranges were known, 123, or 33%, are known only from the Lower Guinean block of forest, from coastal Nigeria to Gabon (Table 3). Another



**Fig. 4** Probability species are identified as a function of their abundance in 50 ha. Points are observed fraction of species in log-10 bins (1–9 individuals per 50 ha, 10–99, etc.). Curves are fitted logistic regressions based on all individual species, with binomial error. Upper curve and points give probability that morphospecies are fully identified to species; lower curve is the converse probability, not being identified to species

39 species have even narrower ranges, found only in the small area near the Cameroon–Nigeria border; this includes the 13 species discovered during the plot census, which are (for now) known only from Korup National Park. Thus, 162 species have ranges <300,000 km<sup>2</sup>, of which 39 species span <80,000 km<sup>2</sup>. The other 202 species have wider ranges, including 82 found in all three tropical African forests blocks.

The species with narrow geographic ranges tended to be more common in the plot than widespread species. Only the 13 new species from Korup deviated from this trend; otherwise, the species in narrower range categories had median abundances well above the plot's overall median (Table 3). Conversely, species abundant in the

**Table 3** Geographic range and abundance of species found in the Korup 50-ha plot. *N* is the number of individuals  $\geq 10$  mm dbh; CI gives the bootstrap 95% confidence limits on median abundance

| Range                            | Land area (10 <sup>3</sup> km <sup>2</sup> ) | No. species | Abundance (CI) median <i>N</i> ha <sup>-1</sup> |
|----------------------------------|--|-------------|---|
| Widespread in Africa             | 1,800  | 22          | 1.16 (0.93–1.38)                                |
| Guineo–Congolian Lower           | 1,750  | 60          | 0.93 (0.77–1.16)                                |
| Guinea–Congolian Upper and Lower | 1,600  | 44          | 1.67 (1.37–1.91)                                |
| Guinea                           | 300  | 76          | 1.74 (1.55–2.20)                                |
| Lower Guinea endemic             | 150  | 123         | 3.34 (2.90–3.96)                                |
| SE Nigeria and SW Cameroon       | 23   | 26          | 8.19 (5.78–9.57)                                |
| Korup                            | 1.29   | 13          | 1.02 (0.70–1.66)                                |
| Unknown                          |  | 129         | 0.28 (0.20–0.34)                                |
| All species                      |  | 493         | 1.42 (1.20–1.50)                                |

plot had narrow ranges. For example, of the 10 most abundant species, 4 are narrow endemics, all treelets in the genus *Cola*, and 3 others are known only from Lower Guinea (Table 2). The comparison of medians, though, conceals wide variation in abundance: all geographic range categories included species from rare to common (Fig. 5).

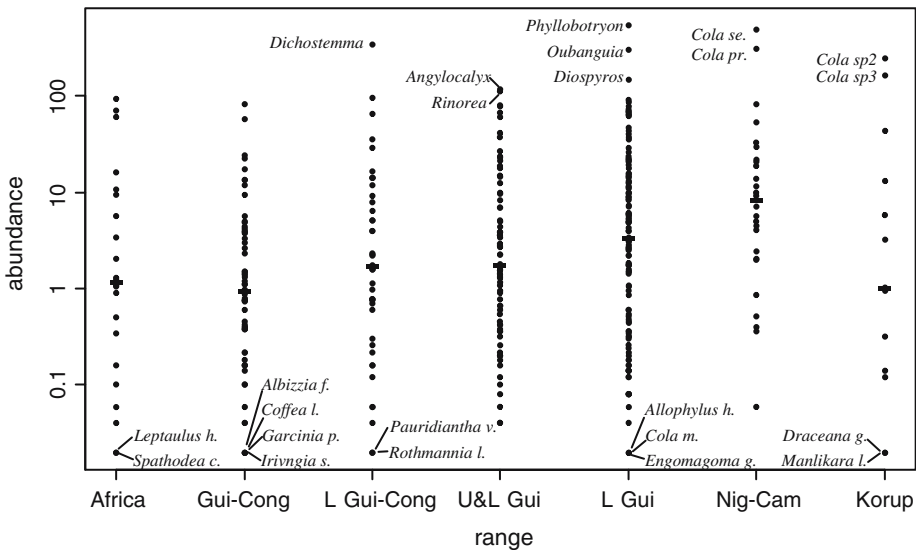
Life form

Of the 493 species in the plot, 222 were treelets, mostly <10 m tall, including many of the most abundant species in the forest. Seven of the ten dominant species in terms of stem density were treelets, four of them in the genus *Cola* (Table 2). Another 85 species in the plot were understory trees <20 m tall, seldom reaching the canopy. All told, 307 species were thus largely confined to the understory, while 112 were main canopy species and 74 were emergent trees.

Several of the treelet species have an unusual form, with a single unbranched stem bearing a terminal rosette of large leaves. The two most abundant species in the plot fall in this category (*Phyllobotryon spathulatum* and *Cola semecarpophylla*), plus several other *Cola*'s, *Alexis cauliflora*, and *Crotonogynopsis* sp. nov. The rosettes form wide, shallow funnels that collect leaf litter, which decomposes in situ to form a ball of humus over the stem apex.

Discussion

We discovered in a census of half a square kilometer nearly 500 tree species, and a quarter of these remain unidentified. To date, we know that 13 of the species were



**Fig. 5** Abundance of each species as a function of geographic range. The ranges are categorical, ordered from the most widespread (Africa) to the narrowest (Korup NP only); the position along the axis does not reflect range size quantitatively. Each point shows the abundance, on a log-scale, of a single species. Several of the most and least abundant species are named

previously unknown, and we expect this number to increase a lot. Most of the 128 unidentified species, though, are probably already described and many of them belong to difficult genera with many species and poorly-documented intra-specific variation. Full identification of these difficult taxa is slow, requiring the careful examination of material in several European herbaria.

Pushing the minimum diameter limit down to 1 cm, in contrast to the 10-cm limit used in most African tree inventories, uncovered a high density and diversity in the understory. Over 300 of the species in the plot typically reproduce in the forest understory, at least according to our preliminary observations on diameter distributions. Many of these did grow beyond 10 cm dbh, but 187 did not: our census would have included only 306 species had we not included the smaller trees. The understory is dominated by an odd group of litter-trapping treelets, several in the diverse African genus *Cola*.

The size of the plot also allows us to document rarity. The Korup abundance distribution has a mode well above the rarest species, nevertheless, there is a long tail of uncommon species. Abundance varied over four orders of magnitude, from singletons in 50 ha to *Phyllobotryon spathulatum*, with nearly 27,000 trees; basal area varied by six orders of magnitude, from species with single individuals of 1 cm dbh to *Oubanguia alata*, with 4 m<sup>2</sup> ha<sup>-1</sup>. Surprisingly, though, Korup abundances are no different from other tropical forests, indeed all large plots have very similar ranges of abundance and abundance distributions (Condit et al. 2005). At Barro Colorado in Panama, 45% of 301 species had <1 tree ha<sup>-1</sup>, exactly the figure at Korup, and at Pasoh in Malaysia, it was 34%. The most abundant species at Korup, including individuals above 1 cm dbh, had 535 trees ha<sup>-1</sup>, compared to 808 ha<sup>-1</sup> at Barro Colorado and 179 ha<sup>-1</sup> at Pasoh (Condit et al. 1996a; Manokaran et al. 1992). Among trees above 10-cm dbh, though, *Oubanguia* at Korup was strikingly abundant, with 82 trees ha<sup>-1</sup>, compared to *Trichilia tuberculata* (Meliaceae) in Panama, with 35 ha<sup>-1</sup> and *Xerospermum noronhainum* (Sapindaceae) at Pasoh, with 11 ha<sup>-1</sup>.

A parallel large inventory in monodominant forest in the Congo, however, found abundances far different from those at Korup (Makana et al. 1998, 2004; Condit et al. 2005). The dominant species above 10 cm dbh, *Gilbertiodendron dewevrei* (Fabaceae), had 180 trees ha<sup>-1</sup>, and in the understory, *Scaphopetalum dewevrei* (Malvaceae) had a remarkable 3,067 ha<sup>-1</sup> trees above 1 cm dbh. At the rare end, 72% of the species there had <1 tree ha<sup>-1</sup>. Although *Oubanguia alata* is very abundant at Korup, the plot in Cameroon does not resemble the monodominant stand in the Congo. Stands of gregarious legumes occur elsewhere in Korup (Newbery and Gartlan 1996; Newbery et al. 2004) and these are not monodominant either. We therefore conclude that the Korup forest is not monodominant, and is more typical of mixed-species tropical forests worldwide.

If Korup is typical of other tropical forests in terms of rarity, this should not deflect from the importance of rarity: all tropical forests have many rare species and these are the species with the greatest extinction risks. Unfortunately, they are also the most difficult to identify—among those species at Korup for which we had fewer than 10 individuals to examine, most are unidentified. We are thus missing information on geographic range for most of the rare species, which can skew our conclusions about rarity and extinction risk (Ruokolainen et al. 2002).

Linder (2001) and Burgess et al. (2005) considered ‘red-list’ species to be those with ranges <2 square degrees of latitude, about 20,000 km<sup>2</sup> following the IUCN threatened list. This is approximately the area of southeast Nigeria and southwest

Cameroon that we consider an area of narrow endemism, to which 39 of the plot species are restricted.

Species abundances are also relevant to extinction risk due to demographic stochasticity, and the plot data allow us to explore this. Of the 13 species restricted to Korup National Park, 9 have  $\geq 47$  individuals, and thus have estimated populations throughout the park of several thousand trees. Overall, it does not seem likely that demographic stochasticity is a threat to plot species. What about those species so rare we missed them? Based on evidence from Panama and Malaysia (Condit et al. 1996b) and our field work around the park, we estimate that the 50-ha plot includes on the order of half the tree species occurring in the park. Some of these may have populations rare enough that extinction due to demographic fluctuations is a plausible risk; but if these unobserved species follow the patterns observed in the plot, there would still be very few species at risk. On the other hand, the 39 species restricted to 20,000 km<sup>2</sup> near Korup may be at some risk of extinction due to habitat loss. If most of the forest in this area were cleared, and much is already cultivated, even the abundant among these could approach extinction.

Burgess et al. (2005) found 26% of the species they analyzed had ranges below the 20,000-km<sup>2</sup> limit, compared to our estimate of 11% of the tree species. Our lower figure may be because trees have wider ranges than other life forms, since the Burgess analysis included a greater variety of angiosperm taxa. On the other hand, in forests around the Panama Canal, we found 1.1% of 630 tree species had highly restricted distributions, limited to the 3,000 km<sup>2</sup> Panama Canal watershed (Condit et al. 2001), an area about twice the size of the Korup National Park. At total of 9.6% were endemic to Panama and Costa Rica, which at 127,000 km<sup>2</sup> approaches the size of the Lower Guinea forest block. The Korup plot includes 162 tree species restricted to Lower Guinea, or 44% of the total, suggesting that coastal central Africa indeed has considerably narrower tree ranges than Central America.

Our knowledge of rare tropical trees remains scanty, however, they are hard to find and hard to identify. Fully documenting the flora of tropical Africa requires considerably more work—thorough field inventories at many more sites. We hazard an estimate that 10%–20% of the flora remains undiscovered, and 25%–40% remains so poorly known that geographic ranges are just crude approximations. Large and precise inventories uncover new species and reveal a window into how many remain unknown.

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## Appendices

### Appendix 1 Species of the Korup 50-ha plot

| Genus                | Species                | Family           | Code  | <i>N</i> | <i>BA</i> | Form       | Range      |
|----------------------|------------------------|------------------|-------|----------|-----------|------------|------------|
| <i>Afzelia</i>       | <i>bella</i>           | Fabaceae         | AFZI  | 82       | 5.155     | Emergent   | L Gui-Cong |
| <i>Afzelia</i>       | <i>bipindensis</i>     | Fabaceae         | AFBI  | 3        | 0.7377    | Emergent   | L Gui-Cong |
| <i>Aidia</i>         | <i>genipiflora</i>     | Rubiaceae        | RUBT2 | 33       | 0.2303    | Understory | U&L Gui    |
| <i>Albizia</i>       | <i>ferruginea</i>      | Fabaceae         | ALFE  | 1        | 0.509     | Canopy     | Gui-Cong   |
| <i>Allexis</i>       | <i>cauliflora</i>      | Violaceae        | ALCA  | 883      | 1.2924    | Treelet    | L Gui      |
| <i>Allophylus</i>    | <i>africanus</i>       | Sapindaceae      | ALAF  | 3        | 7e-04     | Treelet    | Africa     |
| <i>Allophylus</i>    | <i>hirtellus</i>       | Sapindaceae      | ALLO  | 1        | 1e-04     | Treelet    | L Gui      |
| <i>Allophylus</i>    | <i>megaphyllus</i>     | Sapindaceae      | KLGH  | 122      | 0.0261    | Treelet    | Nig-Cam    |
| <i>Alsodeiopsis</i>  | <i>weissenborniana</i> | Icacinaceae      | ERYT  | 16       | 0.0022    | Treelet    | L Gui      |
| <i>Alstonia</i>      | <i>boonei</i>          | Apocynaceae      | ALBO  | 66       | 14.8402   | Emergent   | Gui-Cong   |
| <i>Amphimas</i>      | <i>ferrugineus</i>     | Fabaceae         | SAPS  | 22       | 0.8963    | Emergent   | L Gui      |
| <i>Angylocalyx</i>   | <i>oligophyllus</i>    | Fabaceae         | ANTA  | 5801     | 3.3937    | Treelet    | U&L Gui    |
| <i>Angylocalyx</i>   | <i>pynaaltii</i>       | Fabaceae         | FAB3  | 57       | 0.5717    | Canopy     | L Gui-Cong |
| <i>Anisophyllea</i>  | <i>meniaudii</i>       | Anisophylleaceae | ANME  | 13       | 0.6697    | Canopy     | U&L Gui    |
| <i>Anisophyllea</i>  | <i>purpurascens</i>    | Anisophylleaceae | ANPU  | 52       | 1.5137    | Canopy     | L Gui      |
| <i>Anisophyllea</i>  | <i>sororia</i>         | Anisophylleaceae | ANSO  | 157      | 2.4597    | Canopy     | L Gui      |
| <i>Annickia</i>      | <i>chlorantha</i>      | Annonaceae       | ENCH  | 707      | 8.3172    | Canopy     | L Gui-Cong |
| <i>Anthocleista</i>  | <i>schweinfurthii</i>  | Gentianaceae     | ANSC  | 19       | 1.5124    | Canopy     | Gui-Cong   |
| <i>Anthocleista</i>  | <i>vogelii</i>         | Gentianaceae     | ANNO  | 40       | 2.1206    | Canopy     | Gui-Cong   |
| <i>Anthonotha</i>    | <i>fragrans</i>        | Fabaceae         | ANFR  | 247      | 8.8175    | Emergent   | U&L Gui    |
| <i>Anthonotha</i>    | <i>lamprophylla</i>    | Fabaceae         | ANLA  | 89       | 0.4126    | Understory | L Gui      |
| <i>Anthonotha</i>    | <i>macrophylla</i>     | Fabaceae         | ANMA  | 76       | 1.9556    | Understory | Gui-Cong   |
| <i>Anthonotha</i>    | sp.                    | Fabaceae         | ANTH  | 7        | 0.8031    | Emergent   | .          |
| <i>Antidesma</i>     | <i>laciniatum</i>      | Phyllanthaceae   | ANTI  | 18       | 0.0804    | Treelet    | U&L Gui    |
| <i>Antidesma</i>     | <i>vogelianum</i>      | Phyllanthaceae   | ANVO  | 706      | 2.0852    | Understory | L Gui-Cong |
| <i>Antrocaryon</i>   | <i>micraster</i>       | Anacardiaceae    | ANTR  | 8        | 0.0091    | Emergent   | Gui-Cong   |
| <i>Aorranthe</i>     | <i>cladantha</i>       | Rubiaceae        | POCL  | 79       | 0.5942    | Understory | L Gui-Cong |
| <i>Aporrhiza</i>     | sp.                    | Sapindaceae      | SAP5  | 171      | 0.6366    | Understory | .          |
| <i>Araliopsis</i>    | <i>soyauxii</i>        | Rutaceae         | ARSO  | 168      | 3.1839    | Emergent   | L Gui      |
| <i>Asystasia</i>     | <i>macrophylla</i>     | Acanthaceae      | ACAN  | 8        | 0.0011    | Treelet    | L Gui      |
| <i>Aulacocalyx</i>   | <i>caudata</i>         | Rubiaceae        | ROT2  | 631      | 0.3988    | Treelet    | L Gui      |
| <i>Aulacocalyx</i>   | <i>jasminiflora</i>    | Rubiaceae        | AUCA  | 258      | 0.4781    | Treelet    | L Gui-Cong |
| <i>Aulacocalyx</i>   | <i>talbotii</i>        | Rubiaceae        | AUTA  | 1846     | 2.3689    | Understory | L Gui      |
| <i>Baikiaea</i>      | <i>insignis</i>        | Fabaceae         | BAIN  | 20       | 0.0588    | Canopy     | Gui-Cong   |
| <i>Baillonella</i>   | <i>toxisperma</i>      | Sapotaceae       | BATO  | 4        | 1.0854    | Emergent   | L Gui      |
| <i>Baphia</i>        | <i>capparidifolia</i>  | Fabaceae         | BAPI  | 1769     | 12.8059   | Canopy     | L Gui      |
| <i>Baphia</i>        | <i>laurifolia</i>      | Fabaceae         | BAP2  | 1069     | 4.3992    | Canopy     | U&L Gui    |
| <i>Baphia</i>        | sp.                    | Fabaceae         | BAPS  | 51       | 0.2982    | Understory | .          |
| <i>Barteria</i>      | <i>fistulosa</i>       | Passifloraceae   | BAFI  | 79       | 0.3336    | Understory | L Gui-Cong |
| <i>Beilschmiedia</i> | <i>acuta</i>           | Lauraceae        | BEI4  | 324      | 0.5498    | Canopy     | L Gui-Cong |
| <i>Beilschmiedia</i> | <i>jacques-felixii</i> | Lauraceae        | BEI3  | 365      | 0.449     | Canopy     | L Gui      |
| <i>Beilschmiedia</i> | sp.                    | Lauraceae        | BEIH  | 1        | 0.0665    | Understory | .          |
| <i>Beilschmiedia</i> | sp. 1                  | Lauraceae        | BEI2  | 1352     | 1.7262    | Treelet    | .          |
| <i>Beilschmiedia</i> | sp. 2                  | Lauraceae        | BEI6  | 372      | 4.2152    | Canopy     | .          |
| <i>Beilschmiedia</i> | sp. 3                  | Lauraceae        | BEIP  | 181      | 0.1994    | Understory | .          |
| <i>Beilschmiedia</i> | sp. 4                  | Lauraceae        | BEIS  | 475      | 2.2991    | Understory | .          |
| <i>Belonophora</i>   | <i>talbotii</i>        | Rubiaceae        | BELI  | 1467     | 0.495     | Treelet    | Nig-Cam    |
| <i>Belonophora</i>   | <i>wernhamii</i>       | Rubiaceae        | BEWE  | 1081     | 0.2021    | Treelet    | Nig-Cam    |
| <i>Berlinia</i>      | <i>auriculata</i>      | Fabaceae         | BEAU  | 726      | 5.053     | Canopy     | U&L Gui    |
| <i>Berlinia</i>      | <i>craibiana</i>       | Fabaceae         | BECR  | 3        | 0.0607    | Understory | L Gui      |
| <i>Berlinia</i>      | <i>hollandii</i>       | Fabaceae         | BEHO  | 101      | 0.8533    | Emergent   | Nig-Cam    |
| <i>Bersama</i>       | sp.                    | Melanthaceae     | WSAP  | 9        | 0.0048    | Treelet    | .          |
| <i>Bertiera</i>      | <i>laxa</i>            | Rubiaceae        | BELA  | 54       | 0.0062    | Treelet    | L Gui      |

## Appendix 1 continued

| Genus                 | Species                | Family           | Code  | <i>N</i> | <i>BA</i> | Form       | Range      |
|-----------------------|------------------------|------------------|-------|----------|-----------|------------|------------|
| <i>Bertiera</i>       | <i>racemosa</i>        | Rubiaceae        | RUB5  | 671      | 0.1268    | Treelet    | Gui-Cong   |
| <i>Blighia</i>        | sp.                    | Sapindaceae      | COLL  | 20       | 0.4155    | Emergent   | .          |
| <i>Brenania</i>       | <i>brieyi</i>          | Rubiaceae        | OPLA  | 10       | 0.0057    | Emergent   | L Gui      |
| <i>Bridelia</i>       | <i>micrantha</i>       | Phyllanthaceae   | BRMI  | 45       | 0.4337    | Canopy     | Africa     |
| <i>Bridelia</i>       | sp.                    | Phyllanthaceae   | BRID  | 14       | 0.4054    | Canopy     | .          |
| <i>Caloncoba</i>      | <i>glauca</i>          | Salicaceae       | CAGL  | 88       | 6.6273    | Canopy     | L Gui      |
| <i>Calpocalyx</i>     | <i>dinklagei</i>       | Fabaceae         | CADI  | 3066     | 7.7904    | Understory | L Gui      |
| <i>Calycosiphonia</i> | <i>spathicalyx</i>     | Rubiaceae        | BEL2  | 112      | 0.1034    | Treelet    | L Gui-Cong |
| <i>Camplostylus</i>   | <i>mannii</i>          | Achariaceae      | CAMP  | 143      | 0.3376    | Understory | L Gui      |
| <i>Campylospermum</i> | <i>calanthum</i>       | Ochnaceae        | OURA  | 498      | 0.5449    | Treelet    | L Gui      |
| <i>Campylospermum</i> | <i>flavum</i>          | Ochnaceae        | OUR2  | 221      | 0.0351    | Treelet    | U&L Gui    |
| <i>Campylospermum</i> | <i>mannii</i>          | Ochnaceae        | OUEL  | 222      | 0.0573    | Treelet    | Nig-Cam    |
| <i>Campylospermum</i> | <i>sulcatum</i>        | Ochnaceae        | OUR6  | 91       | 0.0132    | Treelet    | U&L Gui    |
| <i>Canthium</i>       | sp. 1                  | Rubiaceae        | CABL  | 1        | 1e-04     | Treelet    | .          |
| <i>Canthium</i>       | sp. 2                  | Rubiaceae        | CAN4  | 33       | 0.1148    | Canopy     | .          |
| <i>Canthium</i>       | sp. 3                  | Rubiaceae        | CANI  | 145      | 0.2011    | Understory | .          |
| <i>Carapa</i>         | <i>dinklagei</i>       | Meliaceae        | CABM  | 18       | 1.0477    | Canopy     | L Gui      |
| <i>Carapa</i>         | <i>parvifolia</i>      | Meliaceae        | CAPR  | 782      | 7.1042    | Canopy     | L Gui      |
| <i>Carpolobia</i>     | <i>lutea</i>           | Polygalaceae     | CALU  | 485      | 0.1245    | Treelet    | U&L Gui    |
| <i>Casearia</i>       | <i>barteri</i>         | Salicaceae       | WHOM  | 80       | 0.3792    | Understory | L Gui      |
| <i>Cassipourea</i>    | <i>korupensis</i>      | Rhizophoraceae   | RUDR  | 47       | 0.1495    | Understory | Korup      |
| <i>Ceiba</i>          | <i>pentandra</i>       | Malvaceae        | CEPE  | 2        | 0.0114    | Emergent   | Africa     |
| <i>Cephaelis</i>      | sp.                    | Rubiaceae        | CEPH  | 10       | 0.004     | Treelet    | .          |
| <i>Chrysobalanus</i>  | <i>icaco</i>           | Chrysobalanaceae | WIRG  | 62       | 0.4534    | Canopy     | Africa     |
| <i>Chrysophyllum</i>  | <i>delevoyi</i>        | Sapotaceae       | GAAF  | 33       | 0.3322    | Canopy     | U&L Gui    |
| <i>Chrysophyllum</i>  | sp. nov.               | Sapotaceae       | SAPO  | 160      | 0.3549    | Understory | Korup      |
| <i>Chytranthus</i>    | sp. 1                  | Sapindaceae      | CHY1  | 1        | 13e-04    | Treelet    | .          |
| <i>Chytranthus</i>    | sp. 2                  | Sapindaceae      | CHY2  | 47       | 0.0105    | Treelet    | .          |
| <i>Chytranthus</i>    | sp.3                   | Sapindaceae      | CHY4  | 89       | 0.0347    | Treelet    | .          |
| <i>Chytranthus</i>    | <i>talbotii</i>        | Sapindaceae      | CHTA  | 345      | 0.4915    | Understory | U&L Gui    |
| <i>Cleistanthus</i>   | <i>letouzeyi</i>       | Phyllanthaceae   | WDAS  | 43       | 0.2203    | Understory | L Gui      |
| <i>Cleistopholis</i>  | <i>patens</i>          | Annonaceae       | CLPA  | 38       | 0.7995    | Canopy     | Gui-Cong   |
| <i>Cleistopholis</i>  | <i>staudtii</i>        | Annonaceae       | CLSP  | 11       | 1.5895    | Canopy     | L Gui      |
| <i>Coelocaryon</i>    | <i>preussii</i>        | Myristicaceae    | COPR  | 87       | 5.3102    | Emergent   | L Gui-Cong |
| <i>Coffea</i>         | <i>liberica</i>        | Rubiaceae        | COSS  | 1        | 12e-04    | Treelet    | Gui-Cong   |
| <i>Cola</i>           | <i>acuminata</i>       | Malvaceae        | CONI  | 189      | 2.8933    | Understory | Gui-Cong   |
| <i>Cola</i>           | <i>altissima</i>       | Malvaceae        | COAL  | 4        | 0.0019    | Canopy     | L Gui      |
| <i>Cola</i>           | <i>cauliflora</i>      | Malvaceae        | COCA  | 4272     | 4.8927    | Treelet    | L Gui      |
| <i>Cola</i>           | <i>chlamydantha</i>    | Malvaceae        | COCH  | 191      | 0.3249    | Understory | U&L Gui    |
| <i>Cola</i>           | <i>digitata</i>        | Malvaceae        | CODI  | 414      | 0.1433    | Treelet    | U&L Gui    |
| <i>Cola</i>           | <i>flaviflora</i>      | Malvaceae        | COTL  | 23       | 0.016     | Treelet    | L Gui      |
| <i>Cola</i>           | <i>gabonensis</i>      | Malvaceae        | COGA  | 4        | 45e-04    | Treelet    | L Gui      |
| <i>Cola</i>           | <i>heterophylla</i>    | Malvaceae        | COLS  | 47       | 0.0102    | Treelet    | U&L Gui    |
| <i>Cola</i>           | <i>lateritia</i>       | Malvaceae        | COLA  | 465      | 16.2496   | Emergent   | Gui-Cong   |
| <i>Cola</i>           | <i>lepidota</i>        | Malvaceae        | COLE  | 285      | 1.5807    | Understory | L Gui      |
| <i>Cola</i>           | <i>marsupium</i>       | Malvaceae        | COMA  | 1        | 0.002     | Treelet    | L Gui      |
| <i>Cola</i>           | <i>megalophylla</i>    | Malvaceae        | COME  | 20       | 0.8221    | Emergent   | Nig-Cam    |
| <i>Cola</i>           | <i>pachycarpa</i>      | Malvaceae        | COPA  | 27       | 0.1311    | Understory | L Gui      |
| <i>Cola</i>           | <i>praeacuta</i>       | Malvaceae        | COL2  | 15498    | 34.8528   | Treelet    | Nig-Cam    |
| <i>Cola</i>           | <i>rostrata</i>        | Malvaceae        | CORO  | 3288     | 25.3913   | Understory | L Gui      |
| <i>Cola</i>           | <i>semecarpophylla</i> | Malvaceae        | COSE  | 24535    | 33.3014   | Treelet    | Nig-Cam    |
| <i>Cola</i>           | sp. 2                  | Malvaceae        | COBE  | 1        | 13e-04    | Treelet    | .          |
| <i>Cola</i>           | sp. 5                  | Malvaceae        | COLSL | 2        | 22e-04    | Treelet    | .          |
| <i>Cola</i>           | sp. 6                  | Malvaceae        | COMT  | 4        | 0.002     | Treelet    | .          |
| <i>Cola</i>           | sp. nov. 2             | Malvaceae        | COAT  | 12396    | 6.8912    | Treelet    | Korup      |

## Appendix 1 continued

| Genus                  | Species                 | Family           | Code | N     | BA      | Form       | Range      |
|------------------------|-------------------------|------------------|------|-------|---------|------------|------------|
| <i>Cola</i>            | sp. nov. 3              | Malvaceae        | OCTI | 8244  | 5.9463  | Treelet    | Korup      |
| <i>Cola</i>            | <i>suboppositifolia</i> | Malvaceae        | CONS | 358   | 0.14    | Treelet    | Nig-Cam    |
| <i>Cola</i>            | <i>verticillata</i>     | Malvaceae        | COVE | 87    | 4.2119  | Emergent   | U&L Gui    |
| <i>Copaifera</i>       | <i>mildbraedii</i>      | Fabaceae         | CAE3 | 8     | 0.1553  | Emergent   | L Gui-Cong |
| <i>Cordia</i>          | sp.                     | Boraginaceae     | SIFB | 5     | 0.0482  | Understory | .          |
| <i>Coula</i>           | <i>edulis</i>           | Olacaceae        | COED | 8     | 0.3554  | Canopy     | U&L Gui    |
| <i>Crateranthus</i>    | <i>talbotii</i>         | Lecythidaceae    | CRTA | 18    | 0.0246  | Understory | Nig-Cam    |
| <i>Craterispermum</i>  | <i>aristatum</i>        | Rubiaceae        | CRAR | 2625  | 2.7173  | Treelet    | Nig-Cam    |
| <i>Craterispermum</i>  | <i>caudatum</i>         | Rubiaceae        | RUGA | 59    | 0.0306  | Treelet    | U&L Gui    |
| <i>Croton</i>          | <i>longiracemosus</i>   | Euphorbiaceae    | NEGL | 112   | 3.9922  | Canopy     | .          |
| <i>Crotonogyne</i>     | <i>strigosa</i>         | Euphorbiaceae    | CRST | 3888  | 1.2752  | Treelet    | L Gui      |
| <i>Crotonogynopsis</i> | sp. nov.                | Euphorbiaceae    | ALEX | 2158  | 0.9347  | Treelet    | Korup      |
| <i>Crudia</i>          | sp.                     | Fabaceae         | CRUD | 1     | 0.2489  | Emergent   | .          |
| <i>Dacryodes</i>       | <i>edulis</i>           | Burseraceae      | DAED | 75    | 5.0607  | Canopy     | L Gui      |
| <i>Dacryodes</i>       | <i>klaineana</i>        | Burseraceae      | DAKL | 114   | 2.2306  | Canopy     | U&L Gui    |
| <i>Dactyladenia</i>    | <i>pallescens</i>       | Chrysobalanaceae | ACI2 | 155   | 0.5435  | Understory | L Gui      |
| <i>Dactyladenia</i>    | <i>staudtii</i>         | Chrysobalanaceae | ACST | 75    | 0.1607  | Understory | L Gui      |
| <i>Dasylepis</i>       | <i>blackii</i>          | Achariaceae      | DABL | 2144  | 7.2305  | Understory | L Gui      |
| <i>Deinbollia</i>      | <i>maxima</i>           | Sapindaceae      | CHY3 | 501   | 0.2791  | Treelet    | U&L Gui    |
| <i>Deinbollia</i>      | <i>pychnophylla</i>     | Sapindaceae      | COSL | 109   | 0.7361  | Understory | L Gui      |
| <i>Deinbollia</i>      | <i>unijuga</i>          | Sapindaceae      | DEUN | 6     | 7e-04   | Treelet    | Korup      |
| <i>Desbordesia</i>     | <i>glaucescens</i>      | Irvingiaceae     | DEGL | 85    | 25.0731 | Emergent   | L Gui-Cong |
| <i>Dialium</i>         | <i>pachyphyllum</i>     | Fabaceae         | DIAL | 353   | 3.5118  | Canopy     | L Gui      |
| <i>Dialium</i>         | sp.                     | Fabaceae         | DIA3 | 66    | 2.4708  | Canopy     | .          |
| <i>Dichaeatanthera</i> | <i>africana</i>         | Melastomataceae  | DIAP | 3     | 0.0213  | Treelet    | Gui-Cong   |
| <i>Dichostemma</i>     | <i>glaucescens</i>      | Euphorbiaceae    | DIGL | 17255 | 78.804  | Canopy     | L Gui-Cong |
| <i>Dicranolepis</i>    | <i>disticha</i>         | Thymelaeaceae    | DIDI | 9     | 0.0017  | Treelet    | U&L Gui    |
| <i>Dicranolepis</i>    | sp.                     | Thymelaeaceae    | DICR | 2     | 0.1495  | Treelet    | .          |
| <i>Didymosalpinx</i>   | sp.                     | Rubiaceae        | RUBT | 470   | 0.5067  | Treelet    | .          |
| <i>Dinophora</i>       | <i>spenneroides</i>     | Melastomataceae  | DINO | 2     | 2e-04   | Treelet    | Gui-Cong   |
| <i>Diogoia</i>         | <i>zenkeri</i>          | Olacaceae        | DIOG | 3220  | 12.4436 | Canopy     | L Gui-Cong |
| <i>Diospyros</i>       | <i>bipindensis</i>      | Ebenaceae        | DIBI | 3     | 0.0095  | Understory | L Gui-Cong |
| <i>Diospyros</i>       | <i>gabunensis</i>       | Ebenaceae        | DIGA | 3899  | 27.6102 | Canopy     | U&L Gui    |
| <i>Diospyros</i>       | <i>gracilescens</i>     | Ebenaceae        | DICI | 163   | 2.5099  | Emergent   | L Gui      |
| <i>Diospyros</i>       | <i>hoyleana</i>         | Ebenaceae        | DIHO | 281   | 0.6836  | Understory | Gui-Cong   |
| <i>Diospyros</i>       | <i>iturensis</i>        | Ebenaceae        | DIIT | 4795  | 13.6023 | Understory | L Gui-Cong |
| <i>Diospyros</i>       | <i>mannii</i>           | Ebenaceae        | DIMA | 87    | 0.3206  | Emergent   | U&L Gui    |
| <i>Diospyros</i>       | <i>obliquifolia</i>     | Ebenaceae        | DIOB | 729   | 0.3901  | Treelet    | L Gui      |
| <i>Diospyros</i>       | <i>physocalycina</i>    | Ebenaceae        | DIO2 | 9     | 0.0082  | Treelet    | L Gui      |
| <i>Diospyros</i>       | <i>preussii</i>         | Ebenaceae        | DIPR | 7359  | 3.3379  | Treelet    | L Gui      |
| <i>Diospyros</i>       | <i>pseudomespilus</i>   | Ebenaceae        | DIPS | 1039  | 3.3276  | Canopy     | Nig-Cam    |
| <i>Diospyros</i>       | sp. 1                   | Ebenaceae        | DIBM | 8     | 0.4093  | Canopy     | .          |
| <i>Diospyros</i>       | sp. 2                   | Ebenaceae        | DIOY | 111   | 0.0846  | Treelet    | .          |
| <i>Diospyros</i>       | sp. 3                   | Ebenaceae        | NDIO | 5     | 0.1415  | Canopy     | Gui-Cong   |
| <i>Diospyros</i>       | <i>zenkeri</i>          | Ebenaceae        | DIZE | 655   | 4.8005  | Understory | L Gui      |
| <i>Discoclaosylon</i>  | <i>hexandrum</i>        | Euphorbiaceae    | CLHE | 37    | 0.2272  | Canopy     | Gui-Cong   |
| <i>Discoglypemma</i>   | <i>caloneura</i>        | Euphorbiaceae    | DICA | 167   | 6.7191  | Emergent   | Gui-Cong   |
| <i>Dorstenia</i>       | <i>turbinata</i>        | Moraceae         | DORS | 10    | 0.001   | Treelet    | U&L Gui    |
| <i>Dracaena</i>        | <i>bicolor</i>          | Ruscaceae        | DRAI | 171   | 0.088   | Treelet    | U&L Gui    |
| <i>Dracaena</i>        | <i>cf. goldieana</i>    | Ruscaceae        | DRAT | 1     | 1e-04   | Treelet    | Korup      |
| <i>Dracaena</i>        | <i>laxissima</i>        | Ruscaceae        | DRAJ | 54    | 0.0081  | Treelet    | Africa     |
| <i>Dracaena</i>        | sp.                     | Ruscaceae        | DRA2 | 12    | 0.0062  | Treelet    | .          |
| <i>Dracaena</i>        | <i>surculosa</i>        | Ruscaceae        | DRA3 | 4     | 5e-04   | Treelet    | U&L Gui    |
| <i>Drypetes</i>        | <i>ivorensis</i>        | Putrangivaceae   | DRYS | 113   | 0.1428  | Treelet    | U&L Gui    |
| <i>Drypetes</i>        | <i>laciniata</i>        | Putrangivaceae   | DRLA | 249   | 0.138   | Treelet    | L Gui      |
| <i>Drypetes</i>        | <i>molunduana</i>       | Putrangivaceae   | DRY3 | 26    | 0.0091  | Treelet    | Nig-Cam    |



## Appendix 1 continued

| Genus                   | Species               | Family            | Code  | <i>N</i> | <i>BA</i> | Form       | Range      |
|-------------------------|-----------------------|-------------------|-------|----------|-----------|------------|------------|
| <i>Drypetes</i>         | <i>principum</i>      | Putrangivaceae    | DRSI2 | 3043     | 1.7722    | Treelet    | U&L Gui    |
| <i>Drypetes</i>         | sp.                   | Putrangivaceae    | CAR2  | 47       | 0.2281    | Understory | .          |
| <i>Drypetes</i>         | <i>staudtii</i>       | Putrangivaceae    | DRST  | 4101     | 25.9534   | Understory | Nig-Cam    |
| <i>Duboscia</i>         | <i>macrocarpa</i>     | Malvaceae         | DUMA  | 2        | 0.0012    | Canopy     | L Gui-Cong |
| <i>Endodesmia</i>       | <i>calophylloides</i> | Clusiaceae        | ENCA  | 270      | 3.4477    | Emergent   | L Gui      |
| <i>Englerophyllum</i>   | sp. nov.              | Sapotaceae        | ENGI  | 652      | 2.4754    | Understory | Korup      |
| <i>Engomegoma</i>       | <i>gordonii</i>       | Olacaceae         | WCOU  | 1        | 0.5555    | Canopy     | L Gui      |
| <i>Entandrophragma</i>  | <i>cylindricum</i>    | Meliaceae         | ENTI  | 44       | 0.0585    | Emergent   | Gui-Cong   |
| <i>Eriocoelum</i>       | sp.                   | Sapindaceae       | ERIO  | 76       | 1.5052    | Canopy     | .          |
| <i>Erismadelphus</i>    | <i>exsul</i>          | Vochysiaceae      | EREX  | 251      | 13.7765   | Emergent   | L Gui      |
| <i>Erythrina</i>        | sp.                   | Fabaceae          | ERAD  | 8        | 0.1152    | Canopy     | .          |
| <i>Erythrophleum</i>    | <i>ivorense</i>       | Fabaceae          | ERIV  | 79       | 24.5632   | Emergent   | U&L Gui    |
| <i>Erythroxylum</i>     | <i>mannii</i>         | Rhizophoraceae    | ALFB  | 21       | 1.3316    | Emergent   | U&L Gui    |
| <i>Euclinia</i>         | <i>longiflora</i>     | Rubiaceae         | EULO  | 131      | 0.0872    | Treelet    | Gui-Cong   |
| <i>Eugenia</i>          | <i>calophylloides</i> | Myrtaceae         | EUG2  | 30       | 0.0273    | Treelet    | U&L Gui    |
| <i>Eugenia</i>          | <i>fernandopoana</i>  | Myrtaceae         | EUGT  | 24       | 0.0885    | Understory | L Gui      |
| <i>Eugenia</i>          | <i>talbotii</i>       | Myrtaceae         | EUGI  | 285      | 0.0433    | Treelet    | Nig-Cam    |
| <i>Eurypetalum</i>      | <i>unijugum</i>       | Fabaceae          | EUUN  | 7        | 0.3198    | Understory | L Gui      |
| <i>Fagara</i>           | <i>macrophylla</i>    | Rutaceae          | ZAMA  | 109      | 2.7442    | Canopy     | L Gui-Cong |
| <i>Ficus</i>            | sp.                   | Moraceae          | FICU  | 3        | 0.0773    | Treelet    | .          |
| <i>Funtumia</i>         | <i>elastica</i>       | Apocynaceae       | FUEL  | 11       | 0.2239    | Canopy     | Gui-Cong   |
| <i>Gaertnera</i>        | <i>bieleri</i>        | Rubiaceae         | GABI  | 714      | 0.1575    | Treelet    | L Gui-Cong |
| <i>Gaertnera</i>        | <i>letouzeyi</i>      | Rubiaceae         | GAET  | 7        | 0.001     | Treelet    | Korup      |
| <i>Garcinia</i>         | <i>conrauana</i>      | Clusiaceae        | GACO  | 1287     | 11.5199   | Understory | L Gui      |
| <i>Garcinia</i>         | <i>Guietoides</i>     | Clusiaceae        | GAR2  | 1141     | 1.5443    | Understory | U&L Gui    |
| <i>Garcinia</i>         | <i>kola</i>           | Clusiaceae        | GAKO  | 20       | 0.0935    | Canopy     | Gui-Cong   |
| <i>Garcinia</i>         | <i>mannii</i>         | Clusiaceae        | GAMA  | 158      | 0.6207    | Understory | L Gui      |
| <i>Garcinia</i>         | <i>ovalifolia</i>     | Clusiaceae        | GAOV  | 151      | 0.2874    | Understory | Gui-Cong   |
| <i>Garcinia</i>         | <i>polyandra</i>      | Clusiaceae        | GATB  | 1        | 2e-04     | Treelet    | Gui-Cong   |
| <i>Garcinia</i>         | <i>smeathmannii</i>   | Clusiaceae        | GAR4  | 38       | 0.2925    | Understory | Gui-Cong   |
| <i>Garcinia</i>         | sp.1                  | Clusiaceae        | GAR3  | 29       | 0.0086    | Treelet    | .          |
| <i>Garcinia</i>         | sp. 2                 | Clusiaceae        | GAR5  | 2        | 4e-04     | Treelet    | .          |
| <i>Garcinia</i>         | sp. 3                 | Clusiaceae        | NGAR  | 1        | 1e-04     | Treelet    | .          |
| <i>Gilbertiodendron</i> | <i>demonstrans</i>    | Fabaceae          | GIDE  | 288      | 2.0869    | Understory | L Gui      |
| <i>Glossocalyx</i>      | <i>brevipes</i>       | Monimiaceae       | GLBR  | 1070     | 0.8259    | Treelet    | L Gui      |
| <i>Glyphaea</i>         | sp.                   | Malvaceae         | HGRE  | 14       | 0.0091    | Treelet    | .          |
| <i>Guarea</i>           | <i>glomerulata</i>    | Meliaceae         | GUGL  | 17       | 0.0064    | Treelet    | L Gui      |
| <i>Guarea</i>           | sp.                   | Meliaceae         | GUA2  | 16       | 0.005     | Treelet    | .          |
| <i>Guarea</i>           | <i>thompsonii</i>     | Meliaceae         | GUAR  | 116      | 7.8413    | Emergent   | Gui-Cong   |
| <i>Hallea</i>           | <i>ledermannii</i>    | Rubiaceae         | MICI  | 69       | 5.5641    | Emergent   | Gui-Cong   |
| <i>Heckeldora</i>       | <i>staudtii</i>       | Meliaceae         | SMEL  | 6        | 8e-04     | Treelet    | L Gui      |
| <i>Heinsia</i>          | <i>crinita</i>        | Rubiaceae         | HECR  | 103      | 0.359     | Treelet    | Africa     |
| <i>Heisteria</i>        | <i>parvifolia</i>     | Olacaceae         | HEPA  | 1174     | 0.1943    | Treelet    | U&L Gui    |
| <i>Homalium</i>         | <i>africanum</i>      | Salicaceae        | HOMO  | 45       | 3.0684    | Canopy     | U&L Gui    |
| <i>Homalium</i>         | <i>africanum</i>      | Salicaceae        | HOSA  | 88       | 0.4298    | Understory | L Gui      |
| <i>Homalium</i>         | <i>letestui</i>       | Salicaceae        | HOM2  | 618      | 2.5702    | Emergent   | U&L Gui    |
| <i>Homalium</i>         | <i>longistylum</i>    | Salicaceae        | HOLO  | 535      | 8.9453    | Emergent   | Africa     |
| <i>Homalium</i>         | sp.                   | Salicaceae        | HOM4  | 1        | 0.0028    | Understory | .          |
| <i>Hoplostigma</i>      | <i>kleineanum</i>     | Hoplostigmataceae | ALTB  | 19       | 0.3611    | Canopy     | U&L Gui    |
| <i>Hunteria</i>         | <i>umbellata</i>      | Apocynaceae       | HUUM  | 874      | 8.462     | Canopy     | Gui-Cong   |
| <i>Hylodendron</i>      | <i>gabunense</i>      | Fabaceae          | HYGA  | 13       | 1.9989    | Emergent   | L Gui-Cong |
| <i>Hymenostegia</i>     | <i>afzelii</i>        | Fabaceae          | HYAF  | 4025     | 27.6981   | Canopy     | U&L Gui    |
| <i>Hymenostegia</i>     | <i>bakeriana</i>      | Fabaceae          | HYBA  | 203      | 6.4259    | Emergent   | Nig-Cam    |
| <i>Hymenostegia</i>     | sp. nov.              | Fabaceae          | CAE2  | 51       | 2.4632    | Emergent   | Korup      |
| <i>Hypodaphnis</i>      | <i>zenkeri</i>        | Lauraceae         | HYZE  | 299      | 16.026    | Canopy     | L Gui      |
| <i>Irvingia</i>         | <i>gabonensis</i>     | Irvingiaceae      | IRGA  | 134      | 10.0348   | Emergent   | U&L Gui    |
| <i>Irvingia</i>         | <i>grandifolia</i>    | Irvingiaceae      | IRGR  | 15       | 0.5895    | Emergent   | L Gui-Cong |

## Appendix 1 continued

| Genus                | Species                | Family           | Code  | <i>N</i> | <i>BA</i> | Form       | Range      |
|----------------------|------------------------|------------------|-------|----------|-----------|------------|------------|
| <i>Irvingia</i>      | <i>smithii</i>         | Irvingiaceae     | IRVI  | 1        | 0.7776    | Emergent   | Gui-Cong   |
| <i>Isolona</i>       | <i>campanulata</i>     | Annonaceae       | MONO  | 256      | 1.2568    | Canopy     | U&L Gui    |
| <i>Isolona</i>       | sp.                    | Annonaceae       | WMON  | 86       | 0.0563    | Treelet    | .          |
| <i>Ixora</i>         | <i>hippoperifera</i>   | Rubiaceae        | IXHI  | 552      | 0.152     | Treelet    | L Gui      |
| <i>Ixora</i>         | <i>nematopoda</i>      | Rubiaceae        | RUBI  | 1446     | 0.3427    | Treelet    | L Gui      |
| <i>Jollydora</i>     | <i>duparquetiana</i>   | Connaraceae      | JOLY  | 585      | 0.2804    | Treelet    | L Gui-Cong |
| <i>Jollydora</i>     | <i>glandulosa</i>      | Connaraceae      | JOL2  | 583      | 0.4115    | Treelet    | Nig-Cam    |
| <i>Keayodendron</i>  | <i>bridelioides</i>    | Euphorbiaceae    | KEBR  | 2        | 0.3641    | Canopy     | U&L Gui    |
| <i>Kigelia</i>       | <i>africana</i>        | Bignoniaceae     | KIAF  | 8        | 0.0345    | Canopy     | Africa     |
| <i>Klaineanthus</i>  | <i>gabonensis</i>      | Euphorbiaceae    | KLGI  | 2032     | 30.8603   | Canopy     | L Gui      |
| <i>Klainedoxa</i>    | <i>gabonensis</i>      | Irvingiaceae     | KLGA  | 8        | 2.9646    | Emergent   | L Gui-Cong |
| <i>Klainedoxa</i>    | <i>trillesii</i>       | Irvingiaceae     | KLTR  | 7        | 2.4587    | Emergent   | Gui-Cong   |
| <i>Korupodendron</i> | <i>songweanum</i>      | Vochysiaceae     | PTHY  | 16       | 2.1417    | Emergent   | L Gui      |
| <i>Laccodiscus</i>   | <i>ferrugineus</i>     | Sapindaceae      | LAFE  | 492      | 0.1625    | Treelet    | L Gui      |
| <i>Laccodiscus</i>   | <i>pseudostipulari</i> | Sapindaceae      | LACC  | 39       | 0.1412    | Canopy     | L Gui-Cong |
| <i>Lannea</i>        | sp.                    | Anacardiaceae    | LANN  | 16       | 0.0728    | Treelet    | Korup      |
| <i>Lasianthera</i>   | <i>africana</i>        | Icacinaceae      | LAAP  | 792      | 0.508     | Treelet    | L Gui      |
| <i>Lasianthus</i>    | <i>batangensis</i>     | Rubiaceae        | LABA  | 5        | 5e-04     | Treelet    | U&L Gui    |
| <i>Lasiodiscus</i>   | sp.                    | Rhamnaceae       | LASI  | 164      | 0.0798    | Treelet    | .          |
| <i>Lecomtedoxa</i>   | <i>klaineana</i>       | Sapotaceae       | LEKL  | 303      | 99.2725   | Emergent   | L Gui      |
| <i>Lepidobotrys</i>  | <i>staudtii</i>        | Lepidobotryaceae | PAPI  | 11       | 1.6955    | Canopy     | Gui-Cong   |
| <i>Leptaulus</i>     | <i>daphnoides</i>      | Icacinaceae      | LEDA  | 474      | 4.9051    | Understory | Africa     |
| <i>Leptaulus</i>     | <i>holstii</i>         | Icacinaceae      | LEPT  | 1        | 1e-04     | Treelet    | Africa     |
| <i>Leptonychia</i>   | <i>echinocarpa</i>     | Malvaceae        | LEEC  | 576      | 0.1615    | Treelet    | L Gui      |
| <i>Leptonychia</i>   | <i>pallida</i>         | Malvaceae        | LEPA  | 961      | 0.3807    | Treelet    | L Gui      |
| <i>Licania</i>       | <i>elaeosperma</i>     | Chrysobalanaceae | LIEL  | 2        | 0.3063    | Canopy     | Gui-Cong   |
| <i>Lophira</i>       | <i>alata</i>           | Ochnaceae        | LOAL  | 39       | 9.8259    | Emergent   | U&L Gui    |
| <i>Macaranga</i>     | <i>monandra</i>        | Euphorbiaceae    | MAMO  | 199      | 1.9403    | Canopy     | Gui-Cong   |
| <i>Maesobotrya</i>   | <i>barteri</i>         | Phyllanthaceae   | MABA  | 2357     | 1.8686    | Treelet    | L Gui      |
| <i>Maesobotrya</i>   | <i>dusenii</i>         | Phyllanthaceae   | MADU  | 1081     | 4.1649    | Understory | L Gui      |
| <i>Maesobotrya</i>   | <i>staudtii</i>        | Phyllanthaceae   | MAST  | 212      | 0.3384    | Understory | L Gui      |
| <i>Maesopsis</i>     | <i>emini</i>           | Rhamnaceae       | MAEM  | 52       | 2.1183    | Canopy     | Africa     |
| <i>Magnistipula</i>  | <i>cuneatifolia</i>    | Chrysobalanaceae | MAGUI | 9        | 0.7615    | Treelet    | L Gui      |
| <i>Magnistipula</i>  | <i>glaberrima</i>      | Chrysobalanaceae | MAGL  | 167      | 1.5137    | Canopy     | L Gui      |
| <i>Magnistipula</i>  | sp.                    | Chrysobalanaceae | CHR2  | 5        | 0.0023    | Canopy     | .          |
| <i>Mammea</i>        | <i>africana</i>        | Clusiaceae       | MAAF  | 56       | 0.8646    | Canopy     | Gui-Cong   |
| <i>Manilkara</i>     | <i>lososiana</i>       | Sapotaceae       | ENG2  | 1        | 4e-04     | Canopy     | Korup      |
| <i>Maprounea</i>     | <i>membranacea</i>     | Euphorbiaceae    | MAME  | 69       | 1.9353    | Canopy     | U&L Gui    |
| <i>Maranthes</i>     | sp.                    | Chrysobalanaceae | CHRY  | 30       | 0.3989    | Emergent   | .          |
| <i>Mareya</i>        | <i>micrantha</i>       | Euphorbiaceae    | MAMI  | 19       | 0.1905    | Understory | Gui-Cong   |
| <i>Mareyopsis</i>    | <i>longifolia</i>      | Euphorbiaceae    | MALO  | 464      | 0.9861    | Treelet    | L Gui-Cong |
| <i>Margaritaria</i>  | <i>discoidea</i>       | Phyllanthaceae   | MADI  | 17       | 0.9885    | Canopy     | Africa     |
| <i>Massularia</i>    | <i>acuminata</i>       | Rubiaceae        | MAAC  | 2844     | 2.7275    | Treelet    | Gui-Cong   |
| <i>Memecylon</i>     | <i>afzelii</i>         | Memecylaceae     | MEM4  | 247      | 0.1701    | Treelet    | Gui-Cong   |
| <i>Memecylon</i>     | <i>englerianum</i>     | Memecylaceae     | MEML  | 193      | 0.0658    | Treelet    | U&L Gui    |
| <i>Memecylon</i>     | <i>lateriflorum</i>    | Memecylaceae     | MEMT3 | 890      | 1.0163    | Understory | U&L Gui    |
| <i>Memecylon</i>     | <i>laurentii</i>       | Memecylaceae     | MEMT  | 109      | 0.7579    | Canopy     | L Gui      |
| <i>Memecylon</i>     | sp.                    | Memecylaceae     | WMEM  | 74       | 0.0998    | Treelet    | .          |
| <i>Memecylon</i>     | <i>zenkeri</i>         | Memecylaceae     | WWAR  | 3        | 8e-04     | Treelet    | Nig-Cam    |
| <i>Micocos</i>       | <i>coriacea</i>        | Malvaceae        | GRCO  | 198      | 3.4558    | Canopy     | L Gui      |
| <i>Microdesmis</i>   | <i>puberula</i>        | Pandaceae        | MIPU  | 823      | 0.1854    | Treelet    | L Gui-Cong |
| <i>Monodora</i>      | <i>brevipes</i>        | Annonaceae       | MOBI  | 21       | 0.5919    | Canopy     | U&L Gui    |
| <i>Morelia</i>       | <i>senegalensis</i>    | Rubiaceae        | RUDO  | 54       | 0.2499    | Understory | U&L Gui    |
| <i>Morinda</i>       | <i>lucida</i>          | Rubiaceae        | MOLU  | 10       | 0.3351    | Canopy     | U&L Gui    |
| <i>Mostuea</i>       | <i>brunonis</i>        | Gelsemiaceae     | MOBR  | 64       | 0.0072    | Treelet    | U&L Gui    |
| <i>Musanga</i>       | <i>cecropioides</i>    | Urticaceae       | MUCE  | 169      | 5.7304    | Canopy     | Africa     |
| <i>Mussaenda</i>     | sp.                    | Rubiaceae        | MUSA  | 1        | 1e-04     | Treelet    | .          |

## Appendix 1 continued

| Genus                   | Species              | Family           | Code | <i>N</i> | <i>BA</i> | Form       | Range      |
|-------------------------|----------------------|------------------|------|----------|-----------|------------|------------|
| <i>Napoleonaea</i>      | <i>heudelotii</i>    | Lecythidaceae    | NAK5 | 6        | 0.0138    | Treelet    | U&L Gui    |
| <i>Napoleonaea</i>      | <i>talbotii</i>      | Lecythidaceae    | NATA | 135      | 0.1194    | Treelet    | L Gui      |
| <i>Napoleonaea</i>      | <i>vogelii</i>       | Lecythidaceae    | NAPS | 26       | 0.0508    | Treelet    | L Gui      |
| <i>Nauclea</i>          | <i>diderrichii</i>   | Rubiaceae        | NADI | 19       | 6.5174    | Emergent   | Gui-Cong   |
| <i>Nauclea</i>          | <i>vanderguchtii</i> | Rubiaceae        | MITR | 7        | 0.0891    | Canopy     | L Gui      |
| <i>Newtonia</i>         | <i>duparquetiana</i> | Fabaceae         | NEDU | 78       | 1.9473    | Emergent   | U&L Gui    |
| <i>Newtonia</i>         | <i>griffoniana</i>   | Fabaceae         | NEWI | 39       | 0.0788    | Emergent   | L Gui-Cong |
| <i>Nichallea</i>        | <i>soyauxii</i>      | Rubiaceae        | ROT5 | 30       | 0.0079    | Treelet    | Gui-Cong   |
| <i>Octoknema</i>        | <i>affinis</i>       | Olacaceae        | OCAF | 256      | 2.4398    | Canopy     | L Gui-Cong |
| <i>Olox</i>             | <i>latifolia</i>     | Olacaceae        | OLAI | 71       | 0.0088    | Treelet    | L Gui      |
| <i>Olox</i>             | <i>triplinerva</i>   | Olacaceae        | OLTR | 47       | 0.0061    | Treelet    | L Gui      |
| <i>Omphalocarpum</i>    | <i>elatum</i>        | Sapotaceae       | OMPI | 16       | 0.9482    | Emergent   | U&L Gui    |
| <i>Opilia</i>           | sp.                  | Opiaceae         | OPIL | 4        | 0.0014    | Treelet    | .          |
| <i>Oricia</i>           | <i>lecomteana</i>    | Rutaceae         | ARAL | 99       | 0.0665    | Treelet    | Nig-Cam    |
| <i>Oricia</i>           | <i>renieri</i>       | Rutaceae         | RUTA | 3        | 0.0031    | Treelet    | U&L Gui    |
| <i>Ormocarpum</i>       | <i>megalophyllum</i> | Fabaceae         | ORMO | 10       | 0.0016    | Treelet    | U&L Gui    |
| <i>Oubanguia</i>        | <i>alata</i>         | Lecythidaceae    | OUAL | 14932    | 218.6065  | Canopy     | L Gui      |
| <i>Oubanguia</i>        | <i>laurifolia</i>    | Lecythidaceae    | OULA | 93       | 0.2448    | Canopy     | L Gui      |
| <i>Ouratea</i>          | sp. 1                | Ochnaceae        | OUIB | 13       | 0.0132    | Treelet    | .          |
| <i>Oxyanthus</i>        | <i>formosus</i>      | Rubiaceae        | RUAS | 2        | 7e-04     | Treelet    | L Gui      |
| <i>Oxyanthus</i>        | <i>laxiflorus</i>    | Rubiaceae        | OXY2 | 129      | 0.0575    | Treelet    | L Gui      |
| <i>Pachypodanthium</i>  | sp.                  | Annonaceae       | PACH | 173      | 0.6091    | Emergent   | .          |
| <i>Pachypodanthium</i>  | <i>staudtii</i>      | Annonaceae       | PAST | 8        | 0.6146    | Emergent   | Gui-Cong   |
| <i>Panda</i>            | <i>oleosa</i>        | Pandaceae        | PAOL | 35       | 1.59      | Canopy     | L Gui-Cong |
| <i>Pauridiantha</i>     | <i>afzelii</i>       | Rubiaceae        | RUBG | 84       | 0.0083    | Treelet    | U&L Gui    |
| <i>Pauridiantha</i>     | <i>floribunda</i>    | Rubiaceae        | PAFL | 264      | 1.5269    | Understory | L Gui      |
| <i>Pauridiantha</i>     | <i>viridiflora</i>   | Rubiaceae        | PSYC | 1        | 0.0043    | Treelet    | L Gui-Cong |
| <i>Pausinystalia</i>    | <i>macroceras</i>    | Rubiaceae        | RUB9 | 447      | 5.5646    | Canopy     | L Gui      |
| <i>Pavetta</i>          | <i>rigida</i>        | Rubiaceae        | COBN | 43       | 0.0055    | Treelet    | Nig-Cam    |
| <i>Pavetta</i>          | sp. 1                | Rubiaceae        | PANO | 74       | 0.0267    | Treelet    | .          |
| <i>Pavetta</i>          | sp. 2                | Rubiaceae        | RUBN | 15       | 0.0055    | Treelet    | .          |
| <i>Pentadesma</i>       | <i>butyracea</i>     | Clusiaceae       | PEBU | 66       | 3.6517    | Emergent   | U&L Gui    |
| <i>Pentadesma</i>       | <i>grandifolia</i>   | Clusiaceae       | PENT | 30       | 0.9017    | Canopy     | L Gui      |
| <i>Pettiocodon</i>      | <i>parviflorus</i>   | Rubiaceae        | COF2 | 125      | 0.0615    | Treelet    | L Gui      |
| <i>Phyllanthus</i>      | sp.                  | Phyllanthaceae   | RUT2 | 2        | 0.0026    | Treelet    | .          |
| <i>Phyllanthus</i>      | sp.                  | Phyllanthaceae   | RUTS | 7        | 0.1114    | Canopy     | .          |
| <i>Phyllobotryon</i>    | sp.                  | Salicaceae       | PHYP | 8        | 0.0027    | Treelet    | .          |
| <i>Phyllobotryon</i>    | <i>spathulatum</i>   | Salicaceae       | PHSP | 26741    | 12.2868   | Treelet    | L Gui      |
| <i>Pierreodendron</i>   | <i>africanum</i>     | Simaroubaceae    | ENT2 | 7        | 0.5472    | Canopy     | L Gui      |
| <i>Piptadeniastrum</i>  | <i>africanum</i>     | Fabaceae         | PIAF | 21       | 3.4182    | Emergent   | Gui-Cong   |
| <i>Piptostigma</i>      | <i>oyemense</i>      | Annonaceae       | PIPI | 1032     | 3.6617    | Understory | L Gui      |
| <i>Placodiscus</i>      | sp.                  | Sapindaceae      | PLA  | 1290     | 2.0654    | Treelet    | .          |
| <i>Pleiocarpa</i>       | <i>bicarpellata</i>  | Apocynaceae      | PLEI | 6        | 0.0052    | Treelet    | L Gui-Cong |
| <i>Pleiocarpa</i>       | <i>rostrata</i>      | Apocynaceae      | PLTA | 482      | 0.1858    | Treelet    | L Gui      |
| <i>Poga</i>             | <i>oleosa</i>        | Anisophylleaceae | POOL | 11       | 13.4212   | Emergent   | L Gui-Cong |
| <i>Polyceratocarpus</i> | <i>parviflorus</i>   | Annonaceae       | POPA | 2048     | 2.9843    | Treelet    | U&L Gui    |
| <i>Polysphaeria</i>     | <i>macrophylla</i>   | Rubiaceae        | POMA | 737      | 0.3906    | Treelet    | U&L Gui    |
| <i>Protomegabaria</i>   | <i>stapfiana</i>     | Phyllanthaceae   | PRST | 3375     | 73.2105   | Canopy     | U&L Gui    |
| <i>Pseudospondias</i>   | <i>microcarpa</i>    | Anacardiaceae    | PSEU | 60       | 2.3765    | Canopy     | Gui-Cong   |
| <i>Psilanthus</i>       | <i>mannii</i>        | Rubiaceae        | RUWS | 75       | 0.0112    | Treelet    | Gui-Cong   |
| <i>Psorospermun</i>     | <i>tenuifolium</i>   | Clusiaceae       | PSOR | 15       | 0.0039    | Treelet    | L Gui      |
| <i>Psychotria</i>       | <i>dorotheae</i>     | Rubiaceae        | PSYI | 925      | 0.2059    | Treelet    | U&L Gui    |
| <i>Psychotria</i>       | sp. 1                | Rubiaceae        | NPSY | 3        | 9e-04     | Treelet    | .          |
| <i>Psychotria</i>       | sp. 10               | Rubiaceae        | PSYT | 1        | 1e-04     | Treelet    | .          |
| <i>Psychotria</i>       | sp. 2                | Rubiaceae        | PSEL | 1        | 1e-04     | Treelet    | .          |
| <i>Psychotria</i>       | sp. 3                | Rubiaceae        | PSY2 | 43       | 0.0067    | Treelet    | .          |

## Appendix 1 continued

| Genus                   | Species                 | Family         | Code  | <i>N</i> | <i>BA</i> | Form       | Range      |
|-------------------------|-------------------------|----------------|-------|----------|-----------|------------|------------|
| <i>Psychotria</i>       | sp. 4                   | Rubiaceae      | PSY3  | 21       | 0.0035    | Treelet    | .          |
| <i>Psychotria</i>       | sp. 5                   | Rubiaceae      | PSY4  | 27       | 0.0056    | Treelet    | .          |
| <i>Psychotria</i>       | sp. 6                   | Rubiaceae      | PSY5  | 6        | 0.0011    | Treelet    | .          |
| <i>Psychotria</i>       | sp. 7                   | Rubiaceae      | PSY6  | 5        | 8e-04     | Treelet    | .          |
| <i>Psychotria</i>       | sp. 8                   | Rubiaceae      | PSYL  | 141      | 0.1145    | Treelet    | .          |
| <i>Psychotria</i>       | sp. 9                   | Rubiaceae      | PSYS  | 43       | 0.0063    | Treelet    | .          |
| <i>Pterocarpus</i>      | <i>soyauxii</i>         | Fabaceae       | DIA4  | 18       | 0.0183    | Emergent   | L Gui      |
| <i>Ptychopetalum</i>    | <i>petiolatum</i>       | Olcaceae       | PTPE  | 243      | 0.9132    | Understory | L Gui      |
| <i>Pycnanthus</i>       | <i>angolensis</i>       | Myristicaceae  | PYAN  | 25       | 0.1101    | Emergent   | Africa     |
| <i>Pycnocomia</i>       | <i>macrophylla</i>      | Euphorbiaceae  | PYMA  | 1332     | 1.0179    | Treelet    | U&L Gui    |
| <i>Rauvolfia</i>        | <i>caffra</i>           | Apocynaceae    | RAMA  | 49       | 3.786     | Canopy     | Gui-Cong   |
| <i>Rauvolfia</i>        | <i>mannii</i>           | Apocynaceae    | VOA2  | 115      | 0.0172    | Treelet    | L Gui-Cong |
| <i>Rauvolfia</i>        | <i>vomitorea</i>        | Apocynaceae    | RAVO  | 56       | 0.4359    | Understory | Gui-Cong   |
| <i>Rhabdophyllum</i>    | sp.                     | Ochnaceae      | RHAB  | 13       | 0.0043    | Treelet    | .          |
| <i>Rhaptopetalum</i>    | sp. 1                   | Lecythidaceae  | RHA3  | 47       | 0.8529    | Canopy     | .          |
| <i>Rhaptopetalum</i>    | sp. 2                   | Lecythidaceae  | RHA4  | 2        | 7e-04     | Treelet    | .          |
| <i>Rhaptopetalum</i>    | sp. nov.                | Lecythidaceae  | RHA2  | 292      | 0.7115    | Understory | Korup      |
| <i>Rinorea</i>          | cf. <i>woermanniana</i> | Violaceae      | RIN9  | 1049     | 0.1624    | Treelet    | .          |
| <i>Rinorea</i>          | <i>crassifolia</i>      | Violaceae      | RINB  | 697      | 0.0909    | Treelet    | Nig-Cam    |
| <i>Rinorea</i>          | <i>dentata</i>          | Violaceae      | RIN6  | 3499     | 2.6413    | Treelet    | Africa     |
| <i>Rinorea</i>          | <i>gabunensis</i>       | Violaceae      | RINC2 | 4572     | 1.9577    | Treelet    | L Gui      |
| <i>Rinorea</i>          | <i>kamerunensis</i>     | Violaceae      | RINA  | 3401     | 0.6102    | Treelet    | L Gui      |
| <i>Rinorea</i>          | <i>leiophylla</i>       | Violaceae      | RINI  | 3404     | 2.4442    | Treelet    | L Gui      |
| <i>Rinorea</i>          | <i>lepidobotrys</i>     | Violaceae      | RILE  | 5512     | 9.5489    | Treelet    | U&L Gui    |
| <i>Rinorea</i>          | <i>longicuspis</i>      | Violaceae      | NRIN  | 11       | 0.0093    | Treelet    | U&L Gui    |
| <i>Rinorea</i>          | <i>oblongifolia</i>     | Violaceae      | RIN2  | 3021     | 8.3864    | Understory | Africa     |
| <i>Rinorea</i>          | sp. 2                   | Violaceae      | RIN8  | 193      | 0.0297    | Treelet    | .          |
| <i>Rinorea</i>          | sp. 3                   | Violaceae      | RISP  | 3        | 0.0021    | Treelet    | .          |
| <i>Rinorea</i>          | <i>subintegrifolia</i>  | Violaceae      | RIN3  | 4707     | 1.8189    | Treelet    | Africa     |
| <i>Rinorea</i>          | <i>thomasii</i>         | Violaceae      | RINO  | 461      | 0.0887    | Treelet    | Nig-Cam    |
| <i>Ritchiea</i>         | sp.                     | Brassicaceae   | RITC  | 1        | 1e-04     | Treelet    | .          |
| <i>Rothmannia</i>       | <i>hispidia</i>         | Rubiaceae      | ROTH  | 181      | 0.3015    | Treelet    | U&L Gui    |
| <i>Rothmannia</i>       | <i>lujae</i>            | Rubiaceae      | ROBS  | 1        | 0.0119    | Understory | L Gui-Cong |
| <i>Rothmannia</i>       | sp.                     | Rubiaceae      | ROT4  | 2        | 5e-04     | Treelet    | .          |
| <i>Rothmannia</i>       | <i>talbotii</i>         | Rubiaceae      | ROLU  | 398      | 0.2316    | Treelet    | L Gui-Cong |
| <i>Sacoglottis</i>      | <i>gabonensis</i>       | Humiriaceae    | SAGA  | 2        | 1.1931    | Emergent   | U&L Gui    |
| <i>Salacia</i>          | <i>lehmbachii</i>       | Celastraceae   | SAL2  | 1106     | 0.6664    | Treelet    | Gui-Cong   |
| <i>Salacia</i>          | <i>loloensis</i>        | Celastraceae   | SALI  | 739      | 0.2353    | Treelet    | L Gui      |
| <i>Salacia</i>          | sp.                     | Celastraceae   | SAAB  | 1        | 4e-04     | Treelet    | .          |
| <i>Salacia</i>          | sp. nov.                | Celastraceae   | SALS  | 564      | 0.085     | Treelet    | L Gui      |
| <i>Santiria</i>         | <i>balsamifera</i>      | Burseraceae    | SATR  | 138      | 7.304     | Emergent   | U&L Gui    |
| <i>Sapium</i>           | <i>ellipticum</i>       | Euphorbiaceae  | EUPI  | 64       | 3.0913    | Canopy     | Africa     |
| <i>Scaphopetalum</i>    | <i>blackii</i>          | Malvaceae      | SCAI  | 428      | 0.0631    | Treelet    | L Gui      |
| <i>Schumanniophyton</i> | <i>magnificum</i>       | Rubiaceae      | SCMA  | 1425     | 0.3828    | Treelet    | L Gui-Cong |
| <i>Scottellia</i>       | <i>klaineana</i>        | Achariaceae    | SCCO  | 599      | 11.5492   | Emergent   | Gui-Cong   |
| <i>Scyphocephalum</i>   | <i>mannii</i>           | Myristicaceae  | SCYP  | 4        | 0.0116    | Emergent   | L Gui      |
| <i>Scytopetalum</i>     | <i>klaineianum</i>      | Lecythidaceae  | SCKL  | 200      | 6.6969    | Emergent   | L Gui      |
| <i>Sericanthe</i>       | <i>auriculata</i>       | Rubiaceae      | HEI2  | 30       | 0.0341    | Treelet    | L Gui      |
| <i>Sibangea</i>         | <i>similis</i>          | Putrangivaceae | DRSI  | 713      | 0.4419    | Treelet    | L Gui      |
| <i>Sorindeia</i>        | <i>grandifolia</i>      | Anacardiaceae  | DAMA  | 12       | 0.0144    | Treelet    | L Gui      |
| <i>Sorindeia</i>        | <i>juglandifolia</i>    | Anacardiaceae  | SOJU  | 344      | 1.5937    | Understory | U&L Gui    |
| <i>Soyauxia</i>         | <i>gabonensis</i>       | Medusandraceae | SOTA  | 3182     | 16.7249   | Understory | L Gui      |
| <i>Spathodea</i>        | <i>campanulata</i>      | BiGuioniaceae  | SPCA  | 1        | 0.0257    | Canopy     | Africa     |
| <i>Staudtia</i>         | <i>gabunensis</i>       | Myristicaceae  | STST  | 8        | 1.8503    | Emergent   | L Gui      |
| <i>Staudtia</i>         | <i>kamerunensis</i>     | Myristicaceae  | STAU  | 194      | 13.4438   | Emergent   | Gui-Cong   |
| <i>Sterculia</i>        | <i>oblonga</i>          | Malvaceae      | EROB  | 5        | 0.2334    | Canopy     | Gui-Cong   |

## Appendix 1 continued

| Genus                  | Species               | Family          | Code  | <i>N</i> | <i>BA</i> | Form       | Range      |
|------------------------|-----------------------|-----------------|-------|----------|-----------|------------|------------|
| <i>Sterculia</i>       | <i>tragacantha</i>    | Malvaceae       | STER  | 38       | 0.6308    | Emergent   | Gui-Cong   |
| <i>Stipularia</i>      | <i>africana</i>       | Rubiaceae       | RUBR  | 78       | 0.0111    | Treelet    | U&L Gui    |
| <i>Strephonema</i>     | <i>pseudocola</i>     | Combretaceae    | STPO  | 146      | 14.217    | Emergent   | U&L Gui    |
| <i>Strombosia</i>      | <i>grandifolia</i>    | Olacaceae       | STGR  | 18       | 0.4006    | Understory | U&L Gui    |
| <i>Strombosia</i>      | <i>pustulata</i>      | Olacaceae       | STPU  | 4119     | 34.4039   | Canopy     | Gui-Cong   |
| <i>Strombosia</i>      | <i>scheffleri</i>     | Olacaceae       | STSC  | 1216     | 14.0917   | Canopy     | Gui-Cong   |
| <i>Strombosia</i>      | sp.                   | Olacaceae       | STRO  | 2523     | 16.0292   | Canopy     | .          |
| <i>Strombosiopsis</i>  | <i>tetrandra</i>      | Olacaceae       | STTE  | 1763     | 23.0436   | Canopy     | L Gui-Cong |
| <i>Strychnos</i>       | sp.                   | Loganiaceae     | STCO  | 7        | 0.6695    | Canopy     | .          |
| <i>Symphonia</i>       | <i>globulifera</i>    | Clusiaceae      | SYGL  | 805      | 1.463     | Emergent   | Africa     |
| <i>Synsepalum</i>      | <i>stipulatum</i>     | Sapotaceae      | SYST  | 199      | 2.2383    | Understory | L Gui-Cong |
| <i>Syzygium</i>        | <i>guineense</i>      | Myrtaceae       | SYGU  | 5        | 0.2188    | Canopy     | Africa     |
| <i>Syzygium</i>        | <i>rowlandii</i>      | Myrtaceae       | SYRO  | 72       | 2.1322    | Canopy     | U&L Gui    |
| <i>Tabernaemontana</i> | <i>brachyantha</i>    | Apocynaceae     | TABR  | 3583     | 15.3003   | Canopy     | L Gui      |
| <i>Tabernaemontana</i> | <i>crassa</i>         | Apocynaceae     | TACR  | 674      | 2.0902    | Canopy     | Gui-Cong   |
| <i>Talbotiella</i>     | <i>eketensis</i>      | Fabaceae        | TAEK  | 924      | 10.6727   | Canopy     | Nig-Cam    |
| <i>Tapura</i>          | <i>africana</i>       | Dichapetalaceae | TAAF  | 418      | 11.2514   | Canopy     | L Gui      |
| <i>Tarenna</i>         | <i>conferta</i>       | Rubiaceae       | RUTL  | 49       | 0.0233    | Treelet    | L Gui-Cong |
| <i>Tarenna</i>         | <i>lasiorachis</i>    | Rubiaceae       | RUB8  | 88       | 0.0543    | Treelet    | L Gui      |
| <i>Tetrapleura</i>     | <i>tetraptera</i>     | Fabaceae        | TETE  | 8        | 0.8596    | Emergent   | Gui-Cong   |
| <i>Thecacoris</i>      | <i>leptobotrya</i>    | Phyllanthaceae  | EUP2  | 39       | 0.0071    | Treelet    | L Gui-Cong |
| <i>Thecacoris</i>      | sp.                   | Phyllanthaceae  | THEC  | 131      | 1.9599    | Canopy     | .          |
| <i>Treculia</i>        | <i>acuminata</i>      | Moraceae        | TREI  | 133      | 0.0321    | Treelet    | L Gui      |
| <i>Treculia</i>        | <i>africana</i>       | Moraceae        | TRAF  | 71       | 0.5562    | Emergent   | Gui-Cong   |
| <i>Treculia</i>        | <i>obovoidea</i>      | Moraceae        | TROB  | 38       | 1.0111    | Canopy     | L Gui-Cong |
| <i>Tricalysia</i>      | <i>achoundongiana</i> | Rubiaceae       | RUBP  | 625      | 0.1849    | Treelet    | L Gui      |
| <i>Tricalysia</i>      | <i>pangolina</i>      | Rubiaceae       | ROT3  | 13       | 0.0183    | Treelet    | L Gui      |
| <i>Trichilia</i>       | <i>prieureana</i>     | Meliaceae       | TRSP  | 210      | 1.0495    | Understory | Gui-Cong   |
| <i>Trichilia</i>       | sp.                   | Meliaceae       | TRWE  | 207      | 0.5796    | Canopy     | .          |
| <i>Trichoscypha</i>    | <i>acuminata</i>      | Anacardiaceae   | TRAC  | 30       | 1.725     | Canopy     | L Gui-Cong |
| <i>Trichoscypha</i>    | <i>klainei</i>        | Anacardiaceae   | TRI3  | 1338     | 0.6636    | Treelet    | .          |
| <i>Trichoscypha</i>    | <i>patens</i>         | Anacardiaceae   | TRI2  | 1120     | 1.5909    | Understory | L Gui      |
| <i>Trichoscypha</i>    | <i>preussii</i>       | Anacardiaceae   | TRIC  | 193      | 0.619     | Understory | U&L Gui    |
| <i>Trichoscypha</i>    | sp.                   | Anacardiaceae   | TRIR  | 752      | 0.6728    | Treelet    | .          |
| <i>Trichoscypha</i>    | sp. 1                 | Anacardiaceae   | TR22  | 77       | 0.0221    | Treelet    | .          |
| <i>Trichoscypha</i>    | sp. 2                 | Anacardiaceae   | TRBM  | 25       | 1.0108    | Emergent   | .          |
| <i>Trichoscypha</i>    | sp. 3                 | Anacardiaceae   | TRHM  | 147      | 0.6309    | Understory | .          |
| <i>Trichoscypha</i>    | sp. 4                 | Anacardiaceae   | TRI4  | 302      | 0.5262    | Understory | .          |
| <i>Trichoscypha</i>    | sp. 5                 | Anacardiaceae   | TRI72 | 80       | 0.2913    | Understory | .          |
| <i>Turraeanthus</i>    | <i>mannii</i>         | Meliaceae       | TUMA  | 251      | 0.0563    | Treelet    | Nig-Cam    |
| <i>Turraeanthus</i>    | sp.                   | Meliaceae       | TUMA2 | 11       | 0.0017    | Treelet    | .          |
| <i>Uapaca</i>          | <i>acuminata</i>      | Phyllanthaceae  | UAAC  | 6        | 0.0013    | Emergent   | L Gui      |
| <i>Uapaca</i>          | <i>staudtii</i>       | Phyllanthaceae  | UAST  | 1184     | 9.6957    | Emergent   | L Gui      |
| <i>Urobotrya</i>       | <i>congolana</i>      | Opiliaceae      | EULI  | 23       | 0.0103    | Treelet    | Gui-Cong   |
| <i>Uvariastrum</i>     | <i>pynaertii</i>      | Annonaceae      | ANNS  | 446      | 1.5969    | Understory | L Gui      |
| <i>Uvariiodendron</i>  | sp.                   | Annonaceae      | UOI   | 3248     | 6.5358    | Understory | .          |
| <i>Uvariopsis</i>      | <i>bakeriana</i>      | Annonaceae      | UVBA  | 1630     | 0.732     | Treelet    | Nig-Cam    |
| <i>Uvariopsis</i>      | <i>congolana</i>      | Annonaceae      | UVCO  | 4        | 0.0051    | Treelet    | L Gui      |
| <i>Uvariopsis</i>      | <i>korupensis</i>     | Annonaceae      | UVAI  | 490      | 1.1131    | Understory | Nig-Cam    |
| <i>Vernonia</i>        | <i>conferta</i>       | Asteraceae      | VECO  | 9        | 0.0276    | Treelet    | Gui-Cong   |
| <i>Vernonia</i>        | <i>frondosa</i>       | Asteraceae      | VERH  | 27       | 0.0611    | Treelet    | U&L Gui    |
| <i>Vitex</i>           | <i>grandifolia</i>    | Lamiaceae       | VIGR  | 181      | 5.9731    | Canopy     | U&L Gui    |
| <i>Vitex</i>           | sp. 1                 | Lamiaceae       | VIT2  | 77       | 17.5556   | Emergent   | .          |
| <i>Vitex</i>           | sp. 2                 | Lamiaceae       | VIT3  | 1        | 1e-04     | Emergent   | .          |
| <i>Vitex</i>           | sp. 3                 | Lamiaceae       | VITI  | 135      | 7.6492    | Emergent   | .          |
| <i>Vitex</i>           | sp. 5                 | Lamiaceae       | VITV  | 18       | 0.0134    | Treelet    | .          |
| <i>Vitex</i>           | sp. 6                 | Lamiaceae       | VITP  | 59       | 0.3192    | Canopy     | .          |

## Appendix 1 continued

| Genus              | Species              | Family           | Code  | <i>N</i> | <i>BA</i> | Form       | Range      |
|--------------------|----------------------|------------------|-------|----------|-----------|------------|------------|
| <i>Voacanga</i>    | <i>psilocalyx</i>    | Apocynaceae      | VOAI  | 299      | 0.0583    | Treelet    | L Gui      |
| <i>Warneckea</i>   | <i>jasminoides</i>   | Melastomataceae  | WAR2  | 199      | 0.6043    | Understory | L Gui-Cong |
| <i>Warneckea</i>   | <i>membranifolia</i> | Melastomataceae  | WAME  | 1857     | 1.3283    | Treelet    | U&L Gui    |
| <i>Warneckea</i>   | <i>pulcherrima</i>   | Melastomataceae  | WARI  | 240      | 1.57      | Understory | L Gui      |
| <i>Xylopia</i>     | <i>acutiflora</i>    | Annonaceae       | XYAC  | 245      | 0.6578    | Understory | Gui-Cong   |
| <i>Xylopia</i>     | <i>aethiopica</i>    | Annonaceae       | XYAE  | 217      | 8.9498    | Canopy     | Gui-Cong   |
| <i>Xylopia</i>     | sp. 1                | Annonaceae       | UVAR  | 55       | 0.4442    | Canopy     | .          |
| <i>Xylopia</i>     | sp. 2                | Annonaceae       | XYLO  | 3        | 0.1841    | Canopy     | .          |
| <i>Xylopia</i>     | <i>villosa</i>       | Annonaceae       | XYVI  | 23       | 0.4367    | Canopy     | U&L Gui    |
| <i>Zanthoxylum</i> | <i>gillettii</i>     | Rutaceae         | ZATE  | 282      | 17.7113   | Emergent   | Africa     |
| <i>Zanthoxylum</i> | sp. 1                | Rutaceae         | ZANG  | 3        | 0.0029    | Understory | .          |
| <i>Zanthoxylum</i> | sp. 2                | Rutaceae         | ZANH  | 9        | 0.0023    | Treelet    | .          |
| <i>Zanthoxylum</i> | sp. 3                | Rutaceae         | ZATM  | 19       | 0.0092    | Canopy     | .          |
| <i>Zeyherella</i>  | <i>letestui</i>      | Sapotaceae       | ZELE  | 7        | 0.1578    | Canopy     | L Gui      |
| .                  | .                    | Acanthaceae      | ACA2  | 52       | 0.013     | Treelet    | .          |
| .                  | .                    | Sapindaceae      | ALEL  | 1        | 0.5027    | Treelet    | .          |
| .                  | .                    | Annonaceae       | ANN2  | 1        | 0.0015    | Treelet    | .          |
| .                  | .                    | Annonaceae       | ANNV  | 2        | 2e-04     | Treelet    | .          |
| .                  | .                    | Rubiaceae        | COF3  | 15       | 0.0025    | Treelet    | .          |
| .                  | .                    | Rubiaceae        | COF4  | 91       | 0.1399    | Understory | .          |
| .                  | .                    | Rubiaceae        | COF5  | 4        | 0.0018    | Treelet    | .          |
| .                  | .                    | Icacinaceae      | EUP3  | 19       | 0.0068    | Treelet    | .          |
| .                  | .                    | Fabaceae         | FATD  | 2        | 9e-04     | Treelet    | .          |
| .                  | .                    | .                | FLAI  | 1        | 6e-04     | Treelet    | .          |
| .                  | .                    | Rubiaceae        | HRUB  | 1        | 2e-04     | Treelet    | .          |
| .                  | .                    | Sapindaceae      | LACS  | 7        | 0.0012    | Treelet    | .          |
| .                  | .                    | Rubiaceae        | LAS2  | 1        | 9e-04     | Treelet    | .          |
| .                  | .                    | Fabaceae         | LEG2  | 1        | 0.0177    | Understory | .          |
| .                  | .                    | Rubiaceae        | MIT2  | 3        | 0.0345    | Understory | .          |
| .                  | .                    | Rubiaceae        | MOKO  | 2        | 0.0685    | Understory | .          |
| .                  | .                    | Rubiaceae        | NRUB  | 2        | 0.0016    | Treelet    | .          |
| .                  | .                    | Ochnaceae        | OURI  | 184      | 0.0734    | Treelet    | .          |
| .                  | .                    | Rubiaceae        | RUB3  | 1        | 1e-04     | Treelet    | .          |
| .                  | .                    | Rubiaceae        | RUB7  | 825      | 0.3924    | Treelet    | .          |
| .                  | .                    | Rubiaceae        | RUBB  | 109      | 0.0182    | Treelet    | .          |
| .                  | .                    | Rubiaceae        | RUBM  | 17       | 0.3779    | Canopy     | .          |
| .                  | .                    | Rubiaceae        | RUBS  | 144      | 0.1162    | Treelet    | .          |
| .                  | .                    | Rubiaceae        | RUBT3 | 32       | 0.1122    | Treelet    | .          |
| .                  | .                    | Rubiaceae        | RUBY  | 7        | 0.0101    | Treelet    | .          |
| .                  | .                    | .                | RUT3  | 6        | 0.0049    | Treelet    | .          |
| .                  | .                    | Rubiaceae        | RUTR  | 13       | 0.032     | Treelet    | .          |
| .                  | .                    | Rubiaceae        | RUTR2 | 4        | 0.022     | Understory | .          |
| .                  | .                    | Rubiaceae        | RUYR  | 2        | 0.0177    | Understory | .          |
| .                  | .                    | Chrysobalanaceae | SOYA  | 65       | 0.6595    | Canopy     | .          |
| .                  | .                    | .                | UNID  | 680      | 6.4573    | .          | .          |
| .                  | .                    | .                | WDIG  | 11       | 0.0036    | Treelet    | .          |
| .                  | .                    | Sapindaceae      | WLOV  | 1        | 6e-04     | Treelet    | .          |

Species names with sp. indicate unnamed but recognizable morphospecies; those with sp. nov. are novel species which have not yet been described. The 4-letter code is our field designation, and is necessary here only for the unidentified species at the end of the table, which otherwise have no designation. All codes but one refer to single morphospecies; the exception, UNID, encompasses all individuals not assigned to one of the morphospecies. *N* = number of individuals  $\geq 1$  cm dbh in 50 ha. *BA* = basal area in m<sup>2</sup> per 50 ha. Range descriptions: Nig-Cam = SE Nigeria and SW Cameroon endemic; L Gui = Lower Guinea endemic; U&L Gui = Upper and Lower Guinea; L Gui-Cong = Lower Guinea-Congolian; Gui-Cong = Guineo-Congolian; Africa = Widespread in Africa. We omit authorities here, but refer instead to <http://www.ctfs.si.edu/africatree>, where more information is given for all the species

**Appendix 2** Genera of the Korup 50-ha plot

| Genus                 | Family           | Species | <i>N</i> | <i>BA</i> |
|-----------------------|------------------|---------|----------|-----------|
| <i>Azelia</i>         | Fabaceae         | 2       | 85       | 5.8927    |
| <i>Aidia</i>          | Rubiaceae        | 1       | 33       | 0.2303    |
| <i>Albizia</i>        | Fabaceae         | 1       | 1        | 0.509     |
| <i>Allaxis</i>        | Violaceae        | 1       | 883      | 1.2924    |
| <i>Allophylus</i>     | Sapindaceae      | 3       | 126      | 0.0269    |
| <i>Alsodeiopsis</i>   | Icacinaceae      | 1       | 16       | 0.0022    |
| <i>Alstonia</i>       | Apocynaceae      | 1       | 66       | 14.8402   |
| <i>Amphimas</i>       | Fabaceae         | 1       | 22       | 0.8963    |
| <i>Angylocalyx</i>    | Fabaceae         | 2       | 5858     | 3.9654    |
| <i>Anisophyllea</i>   | Anisophylleaceae | 3       | 222      | 4.6431    |
| <i>Annickia</i>       | Annonaceae       | 1       | 707      | 8.3172    |
| <i>Anthocleista</i>   | Gentianaceae     | 2       | 59       | 3.633     |
| <i>Anthonotha</i>     | Fabaceae         | 4       | 419      | 11.9888   |
| <i>Antidesma</i>      | Phyllanthaceae   | 2       | 724      | 2.1656    |
| <i>Antrocaryon</i>    | Anacardiaceae    | 1       | 8        | 0.0091    |
| <i>Aorranthe</i>      | Rubiaceae        | 1       | 79       | 0.5942    |
| <i>Aporrhiza</i>      | Sapindaceae      | 1       | 171      | 0.6366    |
| <i>Araliopsis</i>     | Rutaceae         | 1       | 168      | 3.1839    |
| <i>Asystasia</i>      | Acanthaceae      | 1       | 8        | 0.0011    |
| <i>Aulacocalyx</i>    | Rubiaceae        | 3       | 2735     | 3.2458    |
| <i>Baikiaea</i>       | Fabaceae         | 1       | 20       | 0.0588    |
| <i>Baillonella</i>    | Sapotaceae       | 1       | 4        | 1.0854    |
| <i>Baphia</i>         | Fabaceae         | 3       | 2889     | 17.5033   |
| <i>Barteria</i>       | Passifloraceae   | 1       | 79       | 0.3336    |
| <i>Beilschmiedia</i>  | Lauraceae        | 7       | 3070     | 9.5052    |
| <i>Belonophora</i>    | Rubiaceae        | 2       | 2548     | 0.6971    |
| <i>Berlinia</i>       | Fabaceae         | 3       | 830      | 5.967     |
| <i>Bersama</i>        | Meliantaceae     | 1       | 9        | 0.0048    |
| <i>Bertiara</i>       | Rubiaceae        | 2       | 725      | 0.133     |
| <i>Blighia</i>        | Sapindaceae      | 1       | 20       | 0.4155    |
| <i>Brenania</i>       | Rubiaceae        | 1       | 10       | 0.0057    |
| <i>Bridelia</i>       | Phyllanthaceae   | 2       | 59       | 0.8391    |
| <i>Caloncoba</i>      | Salicaceae       | 1       | 88       | 6.6273    |
| <i>Calpocalyx</i>     | Fabaceae         | 1       | 3066     | 7.7904    |
| <i>Calycosiphonia</i> | Rubiaceae        | 1       | 112      | 0.1034    |
| <i>Campostylus</i>    | Achariaceae      | 1       | 143      | 0.3376    |
| <i>Campylospermum</i> | Ochnaceae        | 4       | 1032     | 0.6505    |
| <i>Canthium</i>       | Rubiaceae        | 3       | 179      | 0.316     |
| <i>Carapa</i>         | Meliaceae        | 2       | 800      | 8.1519    |
| <i>Carpolobia</i>     | Polygalaceae     | 1       | 485      | 0.1245    |
| <i>Casearia</i>       | Salicaceae       | 1       | 80       | 0.3792    |
| <i>Cassipourea</i>    | Rhizophoraceae   | 1       | 47       | 0.1495    |
| <i>Ceiba</i>          | Malvaceae        | 1       | 2        | 0.0114    |
| <i>Cephaelis</i>      | Rubiaceae        | 1       | 10       | 0.004     |
| <i>Chrysobalanus</i>  | Chrysobalanaceae | 1       | 62       | 0.4534    |
| <i>Chrysophyllum</i>  | Sapotaceae       | 2       | 193      | 0.6871    |
| <i>Chytranthus</i>    | Sapindaceae      | 4       | 482      | 0.537     |
| <i>Cleistanthus</i>   | Phyllanthaceae   | 1       | 43       | 0.2203    |
| <i>Cleistopholis</i>  | Annonaceae       | 2       | 49       | 2.389     |
| <i>Coelocaryon</i>    | Myristicaceae    | 1       | 87       | 5.3102    |
| <i>Coffea</i>         | Rubiaceae        | 1       | 1        | 2e-04     |
| <i>Cola</i>           | Malvaceae        | 23      | 70355    | 137.8057  |
| <i>Copaifera</i>      | Fabaceae         | 1       | 8        | 0.1553    |
| <i>Cordia</i>         | Boraginaceae     | 1       | 5        | 0.0482    |
| <i>Coula</i>          | Olacaceae        | 1       | 8        | 0.3554    |

## Appendix 2 continued

| Genus                   | Family            | Species | N     | BA      |
|-------------------------|-------------------|---------|-------|---------|
| <i>Crateranthus</i>     | Lecythidaceae     | 1       | 18    | 0.0246  |
| <i>Craterispermum</i>   | Rubiaceae         | 2       | 2684  | 2.7479  |
| <i>Croton</i>           | Euphorbiaceae     | 1       | 112   | 3.9922  |
| <i>Crotonogyne</i>      | Euphorbiaceae     | 1       | 3888  | 1.2752  |
| <i>Crotonogynopsis</i>  | Euphorbiaceae     | 1       | 2158  | 0.9347  |
| <i>Crudia</i>           | Fabaceae          | 1       | 1     | 0.2489  |
| <i>Dacryodes</i>        | Burseraceae       | 2       | 189   | 7.2913  |
| <i>Dactyladenia</i>     | Chrysobalanaceae  | 2       | 230   | 0.7042  |
| <i>Dasylepis</i>        | Achariaceae       | 1       | 2144  | 7.2305  |
| <i>Deinbollia</i>       | Sapindaceae       | 3       | 616   | 1.0159  |
| <i>Desbordesia</i>      | Irvingiaceae      | 1       | 85    | 25.0731 |
| <i>Dialium</i>          | Fabaceae          | 2       | 419   | 5.9826  |
| <i>Dichaetanthera</i>   | Melastomataceae   | 1       | 3     | 0.0213  |
| <i>Dichostemma</i>      | Euphorbiaceae     | 1       | 17255 | 78.804  |
| <i>Dicranolepis</i>     | Thymelaeaceae     | 2       | 11    | 0.1512  |
| <i>Didymosalpinx</i>    | Rubiaceae         | 1       | 470   | 0.5067  |
| <i>Dinophora</i>        | Melastomataceae   | 1       | 2     | 2e-04   |
| <i>Diogoa</i>           | Olacaceae         | 1       | 3220  | 12.4436 |
| <i>Diospyros</i>        | Ebenaceae         | 14      | 19143 | 57.2358 |
| <i>Discoclaoxylon</i>   | Euphorbiaceae     | 1       | 37    | 0.2272  |
| <i>Discoglypsemna</i>   | Euphorbiaceae     | 1       | 167   | 6.7191  |
| <i>Dorstenia</i>        | Moraceae          | 1       | 10    | 0.001   |
| <i>Dracaena</i>         | Ruscaceae         | 5       | 242   | 0.1029  |
| <i>Drypetes</i>         | Putrangivaceae    | 6       | 7579  | 28.2436 |
| <i>Duboscia</i>         | Malvaceae         | 1       | 2     | 0.0012  |
| <i>Endodesmia</i>       | Clusiaceae        | 1       | 270   | 3.4477  |
| <i>Englerophyium</i>    | Sapotaceae        | 1       | 652   | 2.4754  |
| <i>Engomegoma</i>       | Olacaceae         | 1       | 1     | 0.5555  |
| <i>Entandrophragma</i>  | Meliaceae         | 1       | 44    | 0.0585  |
| <i>Eriocoelum</i>       | Sapindaceae       | 1       | 76    | 1.5052  |
| <i>Erismadelphus</i>    | Vochysiaceae      | 1       | 251   | 13.7765 |
| <i>Erythrina</i>        | Fabaceae          | 1       | 8     | 0.1152  |
| <i>Erythrophleum</i>    | Fabaceae          | 1       | 79    | 24.5632 |
| <i>Erythroxylum</i>     | Rhizophoraceae    | 1       | 21    | 1.3316  |
| <i>Euclinia</i>         | Rubiaceae         | 1       | 131   | 0.0872  |
| <i>Eugenia</i>          | Myrtaceae         | 3       | 339   | 0.1591  |
| <i>Eurypetalum</i>      | Fabaceae          | 1       | 7     | 0.3198  |
| <i>Fagara</i>           | Rutaceae          | 1       | 109   | 2.7442  |
| <i>Ficus</i>            | Moraceae          | 1       | 3     | 0.0773  |
| <i>Funtumia</i>         | Apocynaceae       | 1       | 11    | 0.2239  |
| <i>Gaertnera</i>        | Rubiaceae         | 2       | 721   | 0.1585  |
| <i>Garcinia</i>         | Clusiaceae        | 10      | 2828  | 14.3676 |
| <i>Gilbertiodendron</i> | Fabaceae          | 1       | 288   | 2.0869  |
| <i>Glossocalyx</i>      | Monimiaceae       | 1       | 1070  | 0.8259  |
| <i>Glyphaea</i>         | Malvaceae         | 1       | 14    | 0.0091  |
| <i>Guarea</i>           | Meliaceae         | 3       | 149   | 7.8527  |
| <i>Hallea</i>           | Rubiaceae         | 1       | 69    | 5.5641  |
| <i>Heckeldora</i>       | Meliaceae         | 1       | 6     | 8e-04   |
| <i>Heinsia</i>          | Rubiaceae         | 1       | 103   | 0.359   |
| <i>Heisteria</i>        | Olacaceae         | 1       | 1174  | 0.1943  |
| <i>Homalium</i>         | Salicaceae        | 4       | 1287  | 15.0165 |
| <i>Hoplestigma</i>      | Hoplestigmataceae | 1       | 19    | 0.3611  |
| <i>Hunteria</i>         | Apocynaceae       | 1       | 874   | 8.462   |
| <i>Hylodendron</i>      | Fabaceae          | 1       | 13    | 1.9989  |
| <i>Hymenostegia</i>     | Fabaceae          | 3       | 4279  | 36.5872 |



**Appendix 2** continued

| Genus                | Family           | Species | N     | BA       |
|----------------------|------------------|---------|-------|----------|
| <i>Hypodaphnis</i>   | Lauraceae        | 1       | 299   | 16.026   |
| <i>Irvingia</i>      | Irvingiaceae     | 3       | 150   | 11.4019  |
| <i>Isolona</i>       | Annonaceae       | 2       | 342   | 1.3131   |
| <i>Ixora</i>         | Rubiaceae        | 2       | 1998  | 0.4947   |
| <i>Jollydora</i>     | Connaraceae      | 2       | 1168  | 0.6919   |
| <i>Keayodendron</i>  | Euphorbiaceae    | 1       | 2     | 0.3641   |
| <i>Kigelia</i>       | Bignoniaceae     | 1       | 8     | 0.0345   |
| <i>Klaineanthus</i>  | Euphorbiaceae    | 1       | 2032  | 30.8603  |
| <i>Klainedoxa</i>    | Irvingiaceae     | 2       | 15    | 5.4233   |
| <i>Korupodendron</i> | Vochysiaceae     | 1       | 16    | 2.1417   |
| <i>Laccodiscus</i>   | Sapindaceae      | 2       | 531   | 0.3037   |
| <i>Lannea</i>        | Anacardiaceae    | 1       | 16    | 0.0728   |
| <i>Lasianthera</i>   | Icacinaceae      | 1       | 792   | 0.508    |
| <i>Lasianthus</i>    | Rubiaceae        | 1       | 5     | 5e-04    |
| <i>Lasiodiscus</i>   | Rhamnaceae       | 1       | 164   | 0.0798   |
| <i>Lecomtedoxa</i>   | Sapotaceae       | 1       | 303   | 99.2725  |
| <i>Lepidobotrys</i>  | Lepidobotryaceae | 1       | 11    | 1.6955   |
| <i>Leptaulus</i>     | Icacinaceae      | 2       | 475   | 4.9052   |
| <i>Leptonychia</i>   | Malvaceae        | 2       | 1537  | 0.5422   |
| <i>Licania</i>       | Chrysobalanaceae | 1       | 2     | 0.3063   |
| <i>Lophira</i>       | Ochnaceae        | 1       | 39    | 9.8259   |
| <i>Macaranga</i>     | Euphorbiaceae    | 1       | 199   | 1.9403   |
| <i>Maesobotrya</i>   | Phyllanthaceae   | 3       | 3650  | 6.3719   |
| <i>Maesopsis</i>     | Rhamnaceae       | 1       | 52    | 2.1183   |
| <i>Magnistipula</i>  | Chrysobalanaceae | 3       | 181   | 2.2775   |
| <i>Mammea</i>        | Clusiaceae       | 1       | 56    | 0.8646   |
| <i>Manilkara</i>     | Sapotaceae       | 1       | 1     | 4e-04    |
| <i>Maprounea</i>     | Euphorbiaceae    | 1       | 69    | 1.9353   |
| <i>Maranthes</i>     | Chrysobalanaceae | 1       | 30    | 0.3989   |
| <i>Mareya</i>        | Euphorbiaceae    | 1       | 19    | 0.1905   |
| <i>Mareyopsis</i>    | Euphorbiaceae    | 1       | 464   | 0.9861   |
| <i>Margaritaria</i>  | Phyllanthaceae   | 1       | 17    | 0.9885   |
| <i>Massularia</i>    | Rubiaceae        | 1       | 2844  | 2.7275   |
| <i>Memecylon</i>     | Memecylaceae     | 6       | 1516  | 2.1107   |
| <i>Microcos</i>      | Malvaceae        | 1       | 198   | 3.4558   |
| <i>Microdesmis</i>   | Pandaceae        | 1       | 823   | 0.1854   |
| <i>Monodora</i>      | Annonaceae       | 1       | 21    | 0.5919   |
| <i>Morelia</i>       | Rubiaceae        | 1       | 54    | 0.2499   |
| <i>Morinda</i>       | Rubiaceae        | 1       | 10    | 0.3351   |
| <i>Mostuea</i>       | Gelsemiaceae     | 1       | 64    | 0.0072   |
| <i>Musanga</i>       | Urticaceae       | 1       | 169   | 5.7304   |
| <i>Mussaenda</i>     | Rubiaceae        | 1       | 1     | 0.0001   |
| <i>Napoleonaea</i>   | Lecythidaceae    | 3       | 167   | 0.184    |
| <i>Nauclea</i>       | Rubiaceae        | 2       | 26    | 6.6065   |
| <i>Newtonia</i>      | Fabaceae         | 2       | 117   | 2.0261   |
| <i>Nichallea</i>     | Rubiaceae        | 1       | 30    | 0.0079   |
| <i>Octoknema</i>     | Olacaceae        | 1       | 256   | 2.4398   |
| <i>Olax</i>          | Olacaceae        | 2       | 118   | 0.0149   |
| <i>Omphalocarpum</i> | Sapotaceae       | 1       | 16    | 0.9482   |
| <i>Opilia</i>        | Opiliaceae       | 1       | 4     | 0.0014   |
| <i>Oricia</i>        | Rutaceae         | 2       | 102   | 0.0696   |
| <i>Ormocarpum</i>    | Fabaceae         | 1       | 10    | 0.0016   |
| <i>Oubanguia</i>     | Lecythidaceae    | 2       | 15025 | 218.8513 |
| <i>Ouratea</i>       | Ochnaceae        | 1       | 13    | 0.0132   |
| <i>Oxyanthus</i>     | Rubiaceae        | 2       | 131   | 0.0582   |

## Appendix 2 continued

| Genus                   | Family           | Species | N     | BA      |
|-------------------------|------------------|---------|-------|---------|
| <i>Pachypodanthium</i>  | Annonaceae       | 2       | 181   | 1.2237  |
| <i>Panda</i>            | Pandaceae        | 1       | 35    | 1.59    |
| <i>Pauridiantha</i>     | Rubiaceae        | 3       | 349   | 1.5395  |
| <i>Pausinystalia</i>    | Rubiaceae        | 1       | 447   | 5.5646  |
| <i>Pavetta</i>          | Rubiaceae        | 3       | 132   | 0.0377  |
| <i>Pentadesma</i>       | Clusiaceae       | 2       | 96    | 4.5534  |
| <i>Petitiododon</i>     | Rubiaceae        | 1       | 125   | 0.0615  |
| <i>Phyllanthus</i>      | Phyllanthaceae   | 1       | 9     | 0.114   |
| <i>Phyllobotryon</i>    | Salicaceae       | 2       | 26749 | 12.2895 |
| <i>Pierreodendron</i>   | Simaroubaceae    | 1       | 7     | 0.5472  |
| <i>Piptadeniastrum</i>  | Fabaceae         | 1       | 21    | 3.4182  |
| <i>Piptostigma</i>      | Annonaceae       | 1       | 1032  | 3.6617  |
| <i>Placodiscus</i>      | Sapindaceae      | 1       | 1290  | 2.0654  |
| <i>Pleiocarpa</i>       | Apocynaceae      | 2       | 488   | 0.191   |
| <i>Poga</i>             | Anisophylleaceae | 1       | 11    | 13.4212 |
| <i>Polyceratocarpus</i> | Annonaceae       | 1       | 2048  | 2.9843  |
| <i>Polysphaeria</i>     | Rubiaceae        | 1       | 737   | 0.3906  |
| <i>Protomegalaria</i>   | Phyllanthaceae   | 1       | 3375  | 73.2105 |
| <i>Pseudospondias</i>   | Anacardiaceae    | 1       | 60    | 2.3765  |
| <i>Psilanthus</i>       | Rubiaceae        | 1       | 75    | 0.0112  |
| <i>Psorospermun</i>     | Clusiaceae       | 1       | 15    | 0.0039  |
| <i>Psychotria</i>       | Rubiaceae        | 11      | 1216  | 0.3455  |
| <i>Pterocarpus</i>      | Fabaceae         | 1       | 18    | 0.0183  |
| <i>Ptychopetalum</i>    | Olacaceae        | 1       | 243   | 0.9132  |
| <i>Pycnanthus</i>       | Myristicaceae    | 1       | 25    | 0.1101  |
| <i>Pycnocomia</i>       | Euphorbiaceae    | 1       | 1332  | 1.0179  |
| <i>Rauwolfia</i>        | Apocynaceae      | 3       | 220   | 4.2391  |
| <i>Rhabdophyllum</i>    | Ochnaceae        | 1       | 13    | 0.0043  |
| <i>Rhaptopetalum</i>    | Lecythidaceae    | 3       | 341   | 1.5651  |
| <i>Rinorea</i>          | Violaceae        | 13      | 30530 | 27.7907 |
| <i>Ritchiea</i>         | Brassicaceae     | 1       | 1     | 0.0001  |
| <i>Rothmannia</i>       | Rubiaceae        | 4       | 582   | 0.5455  |
| <i>Sacoglottis</i>      | Humiriaceae      | 1       | 2     | 1.1931  |
| <i>Salacia</i>          | Celastraceae     | 4       | 2410  | 0.9871  |
| <i>Santiria</i>         | Burseraceae      | 1       | 138   | 7.304   |
| <i>Sapium</i>           | Euphorbiaceae    | 1       | 64    | 3.0913  |
| <i>Scaphopetalum</i>    | Malvaceae        | 1       | 428   | 0.0631  |
| <i>Schumanniohyton</i>  | Rubiaceae        | 1       | 1425  | 0.3828  |
| <i>Scottellia</i>       | Achariaceae      | 1       | 599   | 11.5492 |
| <i>Scyphocephalum</i>   | Myristicaceae    | 1       | 4     | 0.0116  |
| <i>Scytopetalum</i>     | Lecythidaceae    | 1       | 200   | 6.6969  |
| <i>Sericanthe</i>       | Rubiaceae        | 1       | 30    | 0.0341  |
| <i>Sibangea</i>         | Putrangivaceae   | 1       | 713   | 0.4419  |
| <i>Sorindeia</i>        | Anacardiaceae    | 2       | 356   | 1.6081  |
| <i>Soyauxia</i>         | Medusandraceae   | 1       | 3182  | 16.7249 |
| <i>Spathodea</i>        | Bignoniaceae     | 1       | 1     | 0.0257  |
| <i>Staudtia</i>         | Myristicaceae    | 2       | 202   | 15.2941 |
| <i>Sterculia</i>        | Malvaceae        | 2       | 43    | 0.8642  |
| <i>Stipularia</i>       | Rubiaceae        | 1       | 78    | 0.0111  |
| <i>Strephonema</i>      | Combretaceae     | 1       | 146   | 14.217  |
| <i>Strombosia</i>       | Olacaceae        | 4       | 7876  | 64.9254 |
| <i>Strombosiopsis</i>   | Olacaceae        | 1       | 1763  | 23.0436 |
| <i>Strychnos</i>        | Loganiaceae      | 1       | 7     | 0.6695  |
| <i>Symphonia</i>        | Clusiaceae       | 1       | 805   | 1.463   |
| <i>Synsepallum</i>      | Sapotaceae       | 1       | 199   | 2.2383  |

**Appendix 2** continued

| Genus                  | Family          | Species | <i>N</i> | <i>BA</i> |
|------------------------|-----------------|---------|----------|-----------|
| <i>Syzygium</i>        | Myrtaceae       | 2       | 77       | 2.351     |
| <i>Tabernaemontana</i> | Apocynaceae     | 2       | 4257     | 17.3905   |
| <i>Talbotiella</i>     | Fabaceae        | 1       | 924      | 10.6727   |
| <i>Tapura</i>          | Dichapetalaceae | 1       | 418      | 11.2514   |
| <i>Tarenna</i>         | Rubiaceae       | 2       | 137      | 0.0776    |
| <i>Tetrapleura</i>     | Fabaceae        | 1       | 8        | 0.8596    |
| <i>Thecacoris</i>      | Phyllanthaceae  | 2       | 170      | 1.967     |
| <i>Treculia</i>        | Moraceae        | 3       | 242      | 1.5994    |
| <i>Tricalysia</i>      | Rubiaceae       | 2       | 638      | 0.2032    |
| <i>Trichilia</i>       | Meliaceae       | 2       | 417      | 1.6291    |
| <i>Trichoscypha</i>    | Anacardiaceae   | 10      | 4064     | 7.7526    |
| <i>Turraeanthus</i>    | Meliaceae       | 1       | 251      | 0.0563    |
| <i>Turreanthus</i>     | Meliaceae       | 1       | 11       | 0.0017    |
| <i>Uapaca</i>          | Phyllanthaceae  | 2       | 1190     | 9.697     |
| <i>Urobotrya</i>       | Opiliaceae      | 1       | 23       | 0.0103    |
| <i>Uvariastrum</i>     | Annonaceae      | 1       | 446      | 1.5969    |
| <i>Uvariadendron</i>   | Annonaceae      | 1       | 3248     | 6.5358    |
| <i>Uvariopsis</i>      | Annonaceae      | 3       | 2124     | 1.8502    |
| <i>Vernonia</i>        | Asteraceae      | 2       | 36       | 0.0887    |
| <i>Vitex</i>           | Lamiaceae       | 6       | 471      | 31.5106   |
| <i>Voacanga</i>        | Apocynaceae     | 1       | 299      | 0.0583    |
| <i>Warneckea</i>       | Melastomataceae | 3       | 2296     | 3.5026    |
| <i>Xylopia</i>         | Annonaceae      | 5       | 543      | 10.6726   |
| <i>Zanthoxylum</i>     | Rutaceae        | 4       | 313      | 17.7257   |
| <i>Zeyherella</i>      | Sapotaceae      | 1       | 7        | 0.1578    |

*N* = number of individuals  $\geq 1$  cm dbh in 50 ha. *BA* = basal area in m<sup>2</sup> per 50 ha

**Appendix 3** Families of the Korup 50-ha plot

| Family           | Genera | Species | <i>N</i> | <i>BA</i> |
|------------------|--------|---------|----------|-----------|
| Acanthaceae      | 1      | 2       | 60       | 0.0141    |
| Achariaceae      | 3      | 3       | 2886     | 19.1173   |
| Anacardiaceae    | 5      | 15      | 4504     | 11.8191   |
| Anisophylleaceae | 2      | 4       | 233      | 18.0643   |
| Annonaceae       | 11     | 22      | 10744    | 41.1381   |
| Apocynaceae      | 7      | 11      | 6215     | 45.405    |
| Asteraceae       | 1      | 2       | 36       | 0.0887    |
| Bignoniaceae     | 2      | 2       | 9        | 0.0602    |
| Boraginaceae     | 1      | 1       | 5        | 0.0482    |
| Brassicaceae     | 1      | 1       | 1        | 0.0001    |
| Burseraceae      | 2      | 3       | 327      | 14.5953   |
| Celastraceae     | 1      | 4       | 2410     | 0.9871    |
| Chrysobalanaceae | 5      | 9       | 570      | 4.7998    |
| Clusiaceae       | 6      | 16      | 4070     | 24.7002   |
| Combretaceae     | 1      | 1       | 146      | 14.2170   |
| Connaraceae      | 1      | 2       | 1168     | 0.6919    |
| Dichapetalaceae  | 1      | 1       | 418      | 11.2514   |
| Ebenaceae        | 1      | 14      | 19143    | 57.2358   |
| Euphorbiaceae    | 14     | 14      | 27798    | 132.3382  |
| Fabaceae         | 24     | 39      | 19393    | 143.6448  |
| Gelsemiaceae     | 1      | 1       | 64       | 0.0072    |
| Gentianaceae     | 1      | 2       | 59       | 3.6330    |

**Appendix 3** continued

| Family            | Genera | Species | <i>N</i> | <i>BA</i> |
|-------------------|--------|---------|----------|-----------|
| Hoplostigmataceae | 1      | 1       | 19       | 0.3611    |
| Humiriaceae       | 1      | 1       | 2        | 1.1931    |
| Icacinaceae       | 3      | 5       | 1302     | 5.4222    |
| Irvingiaceae      | 3      | 6       | 250      | 41.8983   |
| Lamiaceae         | 1      | 6       | 471      | 31.5106   |
| Lauraceae         | 2      | 8       | 3369     | 25.5312   |
| Lecythidaceae     | 5      | 10      | 15751    | 227.3219  |
| Lepidobotryaceae  | 1      | 1       | 11       | 1.6955    |
| Loganiaceae       | 1      | 1       | 7        | 0.6695    |
| Malvaceae         | 8      | 32      | 72579    | 142.7527  |
| Medusandraceae    | 1      | 1       | 3182     | 16.7249   |
| Melastomataceae   | 3      | 5       | 2301     | 3.5241    |
| Meliaceae         | 7      | 11      | 1678     | 17.7510   |
| Meliantaceae      | 1      | 1       | 9        | 0.0048    |
| Memecylaceae      | 1      | 6       | 1516     | 2.1107    |
| Monimiaceae       | 1      | 1       | 1070     | 0.8259    |
| Moraceae          | 3      | 5       | 255      | 1.6777    |
| Myristicaceae     | 4      | 5       | 318      | 20.726    |
| Myrtaceae         | 2      | 5       | 416      | 2.5101    |
| Ochnaceae         | 4      | 8       | 1281     | 10.5673   |
| Olacaceae         | 9      | 13      | 14659    | 104.8857  |
| Opiliaceae        | 2      | 2       | 27       | 0.0117    |
| Pandaceae         | 2      | 2       | 858      | 1.7754    |
| Passifloraceae    | 1      | 1       | 79       | 0.3336    |
| Phyllanthaceae    | 9      | 16      | 9237     | 95.5739   |
| Polygalaceae      | 1      | 1       | 485      | 0.1245    |
| Putrangivaceae    | 2      | 7       | 8292     | 28.6855   |
| Rhamnaceae        | 2      | 2       | 216      | 2.1981    |
| Rhizophoraceae    | 2      | 2       | 68       | 1.4811    |
| Rubiaceae         | 38     | 86      | 22953    | 35.7871   |
| Ruscaceae         | 1      | 5       | 242      | 0.1029    |
| Rutaceae          | 4      | 8       | 692      | 23.7234   |
| Salicaceae        | 4      | 9       | 28204    | 34.3125   |
| Sapindaceae       | 8      | 19      | 3321     | 7.0107    |
| Sapotaceae        | 8      | 9       | 1375     | 106.8651  |
| Simaroubaceae     | 1      | 1       | 7        | 0.5472    |
| Thymelaeaceae     | 1      | 2       | 11       | 0.1512    |
| Urticaceae        | 1      | 1       | 169      | 5.7304    |
| Violaceae         | 2      | 14      | 31413    | 29.0831   |
| Vochysiaceae      | 2      | 2       | 267      | 15.9182   |

*N* = number of individuals  $\geq 1$  cm dbh in 50 ha. *BA* = basal area in m<sup>2</sup> per 50 ha

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