



## **A central Amazonian terra firme forest. I. High tree species richness on poor soils**

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**Abstract.** Tree size, density, and species richness were established for three one-hectare plots of terra firme forest in central Amazonian Brazil. In the three hectares, 1916 individual trees with DBH  $\geq 10$  cm were sampled. A total of 58 families, 181 genera, and 513 species were determined. Hectare A had 285 species, 138 genera, and 47 families; hectare B 280 species, 123 genera, and 48 families; and hectare C 280 species, 125 genera, and 44 families. Comparably high species richness in Amazonia has heretofore only been reported from western Amazonia. This dispels the idea that high species richness can only develop in areas with rich soils and relatively high rainfall. It is suggested that such high species richness is the result of a combination of habitat heterogeneity and geological history. These high diversity forests, because they occur on nutrient poor soils, can be protected with little or no impact on development in the region because the soils are essentially useless for agriculture and for supporting long-term cattle pasture.

**Key words:** Amazonia, species richness, terra firme forest, tree alpha diversity

### **Introduction**

Studies of species richness have demonstrated that tropical lowland moist or wet forests harbor the greatest number of tree species per unit area (Richards 1996; Whitmore 1990). Moreover, the Amazon Basin is a center for tree species richness (Gentry 1982).

In Amazonia, the highest tree species richness is reported from its western portion where Gentry (1988a) and Valencia et al. (1994) recorded 283 and 307 species respectively, among trees with diameters  $\geq 10$  cm in one-hectare plots. The relatively high rainfall and more nutrient-rich soils of western Amazonia have been cited as possible contributing factors to this high tree species richness (Gentry 1982, 1988b). We report the results of a tree inventory of three hectares of lowland moist forest in central Amazonian Brazil where tree richness is nearly as great as the maxima reported from western Amazonia. In contrast to western Amazonia, these plots are located in a region with relatively low, markedly seasonal rainfall and poor soils.

## Study area and methods

### *Study area*

The three-hectare sample was executed as part of the Biological Dynamics of Forest Fragments Project (BDFFP) of the Instituto Nacional de Pesquisas da Amazônia (INPA) and the Smithsonian Institution (SI). A description of the project and the locations of all reserves in the BDFFP system are provided by Lovejoy and Bierregaard (1990).

The three-hectare sample was taken from a 100-hectare study plot located in Reserve 1501 ( $2^{\circ}24'26''$ – $2^{\circ}25'31''$  S,  $59^{\circ}43'40''$ – $59^{\circ}45'50''$ ) which is part of a 1000-hectare control reserve of the BDFFP located within more or less continuous forest. Reserve 1501 is also called Km 41 because it is situated 41 km along state highway ZF-3 from federal highway BR-174 (the Manaus-Boa Vista highway).

The mean annual temperature for Manaus, some 90 km south of Reserve 1501, is  $26.7^{\circ}\text{C}$  with monthly means fluctuating only by about  $2^{\circ}\text{C}$ . Maximum temperatures range between  $35$  and  $39^{\circ}\text{C}$  and minimum temperatures between  $19$  and  $21^{\circ}\text{C}$ . Cool air masses, often occurring at the transition between the rainy and dry seasons, can drop temperatures to  $17^{\circ}\text{C}$ . There is a distinct dry season between July and September and these months normally receive less than 100 mm of rain (Biological Dynamics of Forest Fragments Project 1990; Lovejoy and Bierregaard 1990). This climate is classified as Am in the Köppen system. Local winds may on occasion be strong enough to topple trees (Nelson 1994; Nelson et al. 1994) although no large blowdowns are known to have occurred within recent times at Reserve 1501. The difference in day length between the longest and shortest days of the year at Manaus is approximately 18 min (List 1950).

The plot is dissected by a small stream that flows north/south in the middle of the eastern half of the plot (Mori and Becker 1991). Although there are wetter areas along small streams and the formation of periodic small ponds for unusually long periods during years of excessive rainfall (Mori and Becker 1991), this plot is typical of the terra firme habitat found throughout central Amazonia. As in any other tropical forest, the formation of small and mid-sized gaps is common (Denslow 1980).

The reserves of the BDFFP are located on extensive Tertiary sediments within the meander plain of the Amazon. However, Reserve 1501 is not situated near any major river and, as a result, there are no recent alluvial deposits in the plot. The soils in the plot are sandy or clayey latosols which have been subjected to long periods of leaching and are therefore generally poor in nutrients (Lovejoy and Bierregaard 1990). In the 100-hectare study plot, soils dominated by clay are prevalent, but soils richer in sand occur in the northwestern and southwestern corners (Becker et al., unpublished data). Charcoal is ubiquitous in the soil of the plot (Bassini and Becker 1990), but there is no evidence, based on study of phytoliths, that crops were ever grown there (Piperno and Becker 1996).

Reserve 1501 is situated in a lowland, non-flooded (terra firme) forest at between 80 and 110 m altitude. The forest is dominated mostly by species of Sapotaceae, Lecythidaceae, and Burseraceae (Oliveira 1997). Palms, especially spiny *Astrocaryum* spp, are abundant in the understory. Within all of the reserves of the BDFFP, there are at least 58 families (Oliveira 1997) and over 800 species of trees (Biological Dynamics of Forest Fragments Project 1990). Nee (1995) has produced a preliminary vascular plant Flora of the BDFFP reserves.

## Methods

We selected three hectares from the 100-hectare study plot described above. In order to sample terra firme forest, our draw came from those plots not influenced by superficial drainage, i.e., all hectares through which the stream in the eastern half of the plot flowed were excluded. Hectares with coordinates 10, 10 (A); 25, 30 (B) and 5, 35 (C) were chosen from the remaining hectares by a random draw (Figure 1). All individual trees with diameters  $\geq 10$  cm at breast height (DBH) were marked with metal tags attached to their trunks.

The diameter of each tree was recorded at 1.3 m from the ground or from just above the buttresses in trees with buttresses surpassing 1.3 m. This measurement was taken from the upper side of the tree if the tree was growing on an incline. Herbarium specimens were collected from all trees for which there was any doubt in determination.

The collections were numbered in the series of the senior author and are deposited in the herbaria of the University of São Paulo (SPF), Instituto Nacional de Pesquisas da Amazônia (INPA), and The New York Botanical Garden (NY). The most complete collection is found at SPF. The only exceptions to this are for the Lecythidaceae which had already been collected by the junior author (Mori and Lepsch-Cunha 1995), and are deposited at INPA and NY, and for Sapotaceae collected by TD. Pennington (Royal Botanic Gardens, Kew), deposited at INPA, NY and KEW. In addition, easily recognized trees such as *Oenocarpus bacaba* Martius, *Minuartia guianensis* Aublet and *Scleronema micranthum* (Ducke) Ducke were collected only when we had some doubt in field identification. Specimens were identified using the literature, by comparison in herbaria, and by specialists in given plant families. Those taxa for which names could not be obtained were grouped as morphospecies at the level to which they were identified, e.g. Family Indet. sp. 1, Lauraceae sp. 1, Ocotea sp. 1.

## Results

Tree size, as represented by DBH, showed the negative exponential curve typical of most forests (Figure 2). The largest trees were individuals of *Dinizia excelsa* Ducke,

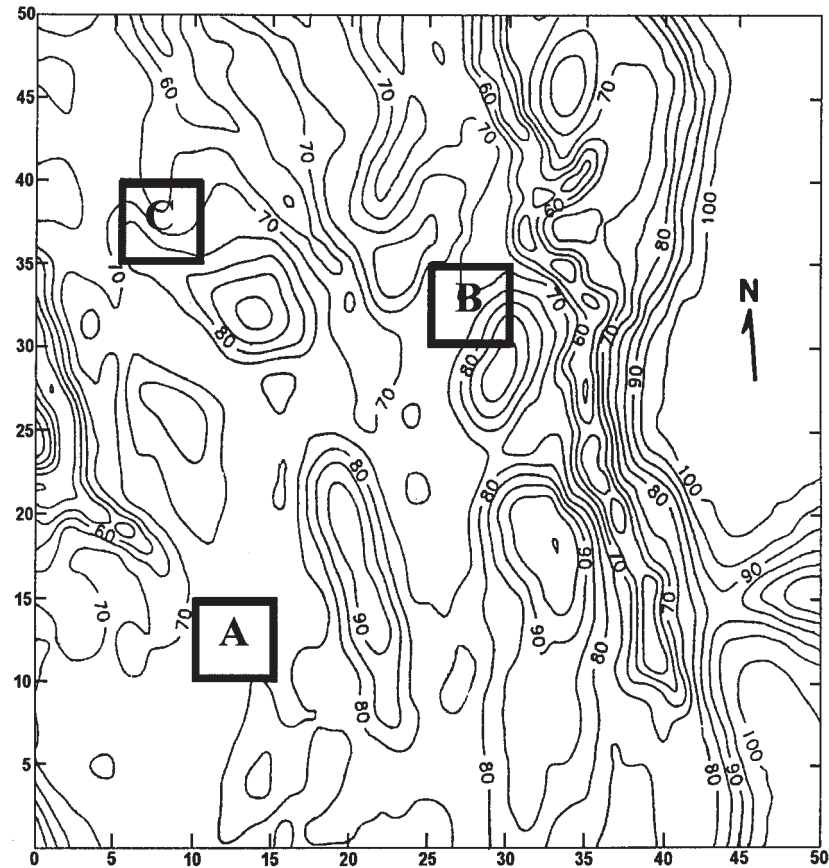


Figure 1. One hundred-hectare study plot in Reserve 1501 (Km 41). The coordinates for the hectares sampled for this study are 5, 35 (A); 10, 10 (B); and 25, 30 (C).

*Sloanea sinemariensis* Aublet, and *Minquartia guianensis* which obtained diameters over 90 cm DBH. In the three hectares, a total of 1916 individual trees with  $\text{DBH} \geq 10$  cm were sampled (hectare A with 618, hectare B with 654, and hectare C with 644) (Table 1). This excludes 35 individuals of the originally marked trees that died during the first two years of the study before they were identified. A total of 58 families, 181 genera, and 513 species were determined (Table 1). Fifty-five individuals (2.9%) were placed only to genus and 14 (0.7%) only to family. We were unable to obtain family determinations for eight collections (0.4%). Nevertheless, all collections not provided with species names were placed in morphospecies and included in the total number of species. A list of species and their voucher collections is found in Appendix 1. Hectare A had 285 species, 138 genera, and 47 families; hectare B 280 species, 123 genera, and 48 families; and hectare C 280 species, 125 genera, and 44 families (Table 1).

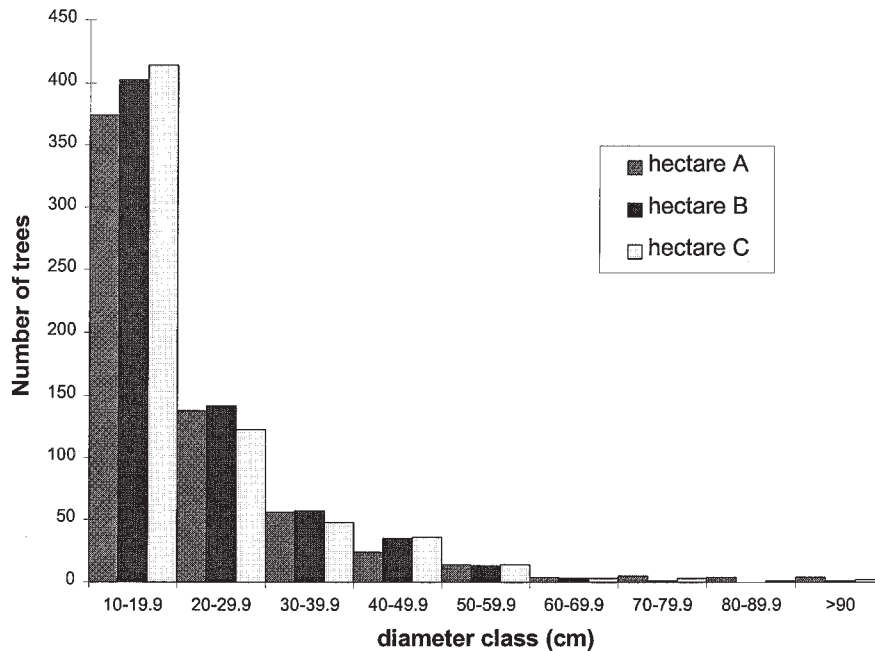


Figure 2. Distribution of trees according to size class based on DBH at 1.3 m from the ground.

## Discussion

The number of trees per hectare  $\geq 10$  cm DBH, ranging from 618 to 654 in the three hectares, is comparable to that found for other Amazonian forests (Almeida et al. 1993; Valencia et al. 1994). Moreover, the negative exponential distribution of tree diameters suggests that this forest has not undergone large-scale disturbance in the recent past. Massive disturbance in Amazonia is often followed by the establishment of cohorts of pioneers such as species of *Cecropia* which dominate the forest structure and composition for years after the disturbance, thereby reducing diversity.

Although we know that fire has had an impact within the 100-hectare study plot (Bassini and Becker 1990; Piperno and Becker 1996), these fires probably took place 6000–400 yr BP and therefore fire's impact on present size and species richness of

Table 1. Number of individuals, species, genera, and families in three hectares of terra firme forest in central Amazonian Brazil.

	Hectare A	Hectare B	Hectare C	Total
Trees	618	654	644	1916
Species	285	280	280	513
Genera	138	123	125	181
Families	47	48	44	58

trees in these plots may no longer be obvious. Piperno and Becker (1996), based on data from soil phytoliths, provided evidence that the study plot has been under continuous forest cover since at least 4500 BP and maintain that the area was never cleared for swidden agriculture.

The size of individual trees in the overall study plot also supports the argument that the area has not undergone major disturbance for hundreds of years. Trees of *Bertholletia excelsa* Humb. & Bonpl. in the 140–150 cm DBH size class have been estimated by radiocarbon dating to be 270 years old (Camargo et al. 1994). The lone *B. excelsa* in the Lecythidaceae plot is 115 cm DBH and therefore probably became established after the last significant fire to sweep across the plot. Lecythidaceae are exceedingly vulnerable to fire such that forest regenerated from old slash and burn fields usually have very few individuals and species of the family (Prance 1975). We conclude that this forest has had ample time to produce large trees and regenerate high species diversity after the last large-scale disturbances caused by fires.

Smaller, more localized disturbances such as small-scale gap formation (Denslow 1980), tree mortality resulting from periodic flooding (Mori and Becker 1991), and blowdowns caused by excessive winds (Nelson 1994; Nelson et al. 1994) frequently occur, but their influence is similar in all central Amazonian terra firme forests. This intermediate type of disturbance, in contrast to large-scale disturbance followed by invasion of secondary species, probably favors rather than hinders high tree species richness (Connell 1978; Denslow 1980; Phillips et al. 1994).

Tree species richness in one-hectare plots throughout Amazonia varies from as low as 87 (Pires 1957) in eastern Amazonia to as high as near 300 (Gentry 1988a; Valencia et al. 1994; Oliveira 1997) in western Amazonia for trees with DBH  $\geq$  10 cm. Some of this variation can be attributed to the climate and soils at the different plot sites. For example, plots in periodically inundated sites have fewer tree species and different species composition than plots in terra firme (Campbell et al. 1986), and forests on white sands have fewer species and distinct species composition than those on clay soils (Davis and Richards 1934). These differences in species composition reflect the rich  $\beta$ -diversity of Amazonia which may occur on a much finer scale than previous studies have indicated (Tuomisto et al. 1995). Some of the variation in plot species tree richness may also be attributed to the location of the plots and the past geological events associated with the location (Ducke and Black 1954).

Data from Prance et al. (1976) provided the first indication that such high tree species richness occurs in central Amazonia. They found 179 species of trees greater than or equal to 15 cm DBH, a figure comparable to the number of species found for these size classes in our study (189–197 species). This high species richness is especially surprising in an area where the soils are notoriously poor and the rainfall relatively low and unevenly distributed throughout the year (Gentry and Emmons 1987; Gentry 1988b; Clinebell et al. 1995). This dispels the idea that high species richness can only develop in areas with nutrient rich soils and relatively high rainfall. Huston (1993, 1994) has argued that the highest species richness is found on

the poorest soils because, on more favorable soils, superior competitors outcompete inferior competitors and species richness is limited. Moreover, the mosaic pattern of soil types in tropical forests offers many different niches into which different species may adapt (Tuomisto et al. 1995). This, in combination with constant, low level disturbance caused by tree fall gaps, flooding, disease, and insects may contribute to keeping superior competitors in check.

Another explanation for high species richness in central Amazonia is that this area, after recession of Lago Amazonas (Frailey et al. 1988; Tuomisto et al. 1992) or a similar kind of embayment, may have been colonized by different species from different areas. The result is a central Amazonian biodiversity crossroads (Mori 1990; Prance 1994) which has greatly enhanced species richness. This idea has been investigated in more detail by Oliveira (1997) and Oliveira and Daly (1999).

The high species richness in central Amazonia has important conservation implications. A considerable percent of the Amazon's tree diversity would be protected by establishing large reserves in central Amazonia. Because this rich diversity is found on very poor soils, these forests have very little potential for agricultural development and therefore tree species can be protected in central Amazonia at little cost to agricultural development (Huston 1993).

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## Appendix 1

Species and vouchers for collections of trees found in three hectares of terra firme forest in central Amazonian Brazil (Collector numbers: A = Adalardo de Oliveira; C = Cunha; F = Freitas; M = Mori; P = Pennington).

Family/Species	Collector numbers
<b>Anacardiaceae</b>	
<i>Anacardium parvifolium</i> Ducke	A1142, A1295, A1508, A1860
<i>Anacardium spruceanum</i> Benth. ex Engler	A1330, A1687, A1767, A1894
<i>Astronium lecontei</i> Ducke	A0771, A1613, A1930
<i>Astronium cf. ulei</i> Mattick	A2063
<i>Tapirira guianensis</i> Aubl.	A0251, A0968
<i>Thyrsodium spruceanum</i> Benth.	A0228
<b>Annonaceae</b>	
<i>Bocageopsis multiflora</i> (Mart.) R.E. Fr.	A0365, A0587, A0685, A0850, A1255, A1262, A1387, A1768
<i>Duguetia echinophora</i> R.E. Fr.	A1385, A1688, A1838
<i>Duguetia marcgraviana</i> Mart.	A1583, A1830, A2027
<i>Duguetia</i> sp 03	A0222, A0960, A1620
<i>Duguetia stelacantha</i> (Diels) R.E. Fr.	A0083
<i>Fusaea longifolia</i> Saff.	A1559
<i>Guatteria foliosa</i> Benth.	A1769
<i>Guatteria olivacea</i> R.E. Fr.	A0096
<i>Nycopetalum amazonicum</i> R.E. Fr.	A0209, A1157, A1382
<i>Pseudoxandra coriacea</i> R.E. Fr.	A1402, A1712, A1876
<i>Rollinia insignis</i> R.E. Fr.	A0663, A1626
<i>Unonopsis stipitata</i> Diels	A0501, A0640, A652, A0869, A0956, A0998, A1284, A1326, A1487, A1662, A1674, A1915
<i>Xylopia benthami</i> R.E. Fr.	A0932
<i>Xylopia crinata</i> R.E. Fr.	A0449, A1135, A1924
<b>Apocynaceae</b>	
<i>Ambelania acida</i> Aubl.	A0761
<i>Ambelania duckei</i> Markg.	A1322
<i>Aspidosperma carapanauba</i> Pichon	A0803
<i>Aspidosperma excelsum</i> Benth.	A0893, A1781
<i>Aspidosperma oblongum</i> A. DC.	A0624
<i>Aspidosperma williamsii</i> Duarte	A1598
<i>Couma macrocarpa</i> Barb. Rodr.	A1353
<i>Geissospermum argentatum</i> Woodson	A0744, A0787, A0948, A2060
<i>Geissospermum sericeum</i> Benth. & Hook. f.	A0808, A1698, A1900, A2059
<i>Himatanthus stenophyllus</i> Plumel	A0466, A0883
<i>Lacmellea arborescens</i> (Muell. Arg.) Markg.	A1161
<i>Rauwolfia sprucei</i> Muell. Arg.	A0790
<b>Aquifoliaceae</b>	
<i>Ilex cf. divaricata</i> Mart. ex Reissek	A1888
<b>Arecaceae</b>	
<i>Euterpe precatória</i> Mart.	not collected
<i>Oenocarpus bacaba</i> Mart.	not collected



## Appendix 1. Continued.

Family/Species	Collector numbers
<b>Bignoniaceae</b>	
<i>Jacaranda copaia</i> D. Don	A0793
<i>Tabebuia cf. impetiginosa</i> (Mart.) Standl.	A0676, A0962
<b>Bombacaceae</b>	
<i>Bombacopsis nervosa</i> (Vitt) A. Robyns	A1204, A2073
<i>Catostemma albuquerquei</i> Paula	A1111
<i>Eriotheca globosa</i> (Aubl.) A. Robyns	A1923
<i>Quararibea ochracalyx</i> Vischer	A0923, A2070
<i>Scleronema micranthum</i> (Ducke) Ducke	A0046, A0620, A0702, A0785, A0788, A1081, A1716, A1756
<b>Boraginaceae</b>	
<i>Cordia lommatoloba</i> I.M. Johnst.	A0053, A0614, A780
<i>Cordia sagotii</i> I.M. Johnst.	A0344, A1963
<i>Cordia cf. ulei</i> I.M. Johnst.	A1069
<b>Burseraceae</b>	
<i>Crepidospermum rhoifolium</i> (Benth.) Triana & Panch	A0604
<i>Protium altsoni</i> Sandwith	A0554, A0555, A0578, A0625, A0691, A0884, A0906, A1533, A1806, A1911
<i>Protium apiculatum</i> Swart	A0296, A0308, A0510, A0539, A0648, A0650, A0721, A0815, A0910, A0990, A1018, A1031, A1201, A1297, A1302, A1343, A1418, A1427, A1563, A1606, A1722, A1997
<i>Protium aracouchini</i> (Aubl.) March.	A1428
<i>Protium cf. morii</i> Daly	A1553, A1760
<i>Protium decandrum</i> March.	A0394, A0500, A0517, A0542, A0715, A0742, A0754, A0765, A0779, A0840, A0861, A0897, A1113, A1551, A1582, A1607, A1789, A1870, A1909, A1942, A1956
<i>Protium gallosum</i> Daly	A0686, A1141, A1145, A1172, A1229, A1248, A1442, A1449, A1499, A1541, A1552, A1585, A1625, A1863
<i>Protium giganteum</i> Engl.	A1579
<i>Protium grandifolium</i> Engl.	A0506, A0513, A0557, A0574, A0627, A0646, A0647, A0693, A0760, A0777, A0812, A0925, A0932, A0942, A0955, A0963, A0973, A0980, A0986, A0994, A1023, A1024, A1090, A1165, A1260, A1267, A1281, A1308, A1417, A1419, A1479, A1514, A1524, A1568, A1577, A1799, A1926, A1939, A1961, A1988, A2025

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Protium hebetatum</i> Daly	A0547, A0609, A0618, A0630, A0631, A0696, A0749, A0816, A0819, A0835, A0847, A0865, A0898, A0904, A0929, A0949, A0981, A0983, A1015, A1053, A1057, A1101, A1121, A1127, A1159, A1218, A1222, A1257, A1375, A1439, A1448, A1492, A1507, A1515, A1516, A1565, A1572, A1600, A1666, A1757, A1771, A1773, A1790, A1812, A1824, A1828, A1902, A1940, A1964, A1987
<i>Protium krukoffii</i> Swart	A0642, A0729, A0873, A0888, A1797, A1836
<i>Protium occultum</i> Daly	A1543, A1973
<i>Protium opacum</i> Swart	A0508, A0511, A1566, A1580, A1599, A1849, A1949
<i>Protium paniculatum</i> Engl.	A0806, A1004, A1012, A1033, A1164, A1210, A1288, A1483, A1640, A1683, A1693, A1720, A1736, A1786, A1829, A1841, A1867
<i>Protium sagotianum</i> March.	A0919, A1481, A1539
<i>Protium spruceanum</i> Engl.	A1331, A1493, A1825
<i>Protium strumosum</i> Daly	A0223, A0827, A0828, A1144, A1530, A1569, A1675, A1749, A1793, A1927, A1969
<i>Protium trifoliolatum</i> Engl.	A0086, A0566, A0750, A1491, A1741
<i>Tetragastris panamensis</i> (Engl.) Kuntze	A0236, A0782, A0863, A1016, A1041, A1327, A1991
<i>Trattinnickia burserifolia</i> Mart.	A1329
<i>Trattinnickia glaziovii</i> Swart.	A0671, A1392, A2070
<i>Trattinnickia lawrancei</i> Standl. ex Swart	A1918
Caesalpinaceae	
<i>Dialium guianensis</i> Steud.	A0941
<i>Dimorphandra multiflora</i> Ducke	A0568, A1318
<i>Dimorphandra parviflora</i> Spruce ex Benth.	A1670
<i>Eperua glabrifolia</i> (Ducke) Cowan	A1032, A1126, A1184, A1190, A1211, A1576
<i>Hymenaea parvifolia</i> Huber	A0342
<i>Peltogyne catingae</i> Ducke	A0716, A1206, A1907
<i>Peltogyne paniculata</i> Benth.	A1206
<i>Sclerolobium amplifolium</i> Ducke	A1189, A1715
<i>Sclerolobium cf. guianensis</i> Benth.	A0608, A0710, A0751, 1564
<i>Sclerolobium goeldianum</i> Huber	A1501
<i>Sclerolobium melinonii</i> Harms	A0543
<i>Sclerolobium</i> sp 01	A1574

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Tachigali myrmecophyla</i> (Ducke) Ducke	A0186, A0564, A0585, A0623, A0628, A0748, A1046, A109, A1105, A1130, A1241, A1268, A1711, A1816, A1873, A1977, A2040
Caryocaraceae	
<i>Caryocar glabrum</i> (Aubl.) Pers.	A0541, A0700, A1672
Cecropiaceae	
<i>Cecropia purpuracens</i> C.C. Berg	A1177
<i>Coussapoua orthoneura</i> Standl.	A1639
<i>Coussapoua trinervia</i> Mildbr.	A1934
<i>Coussapoua</i> sp 01	A0632
<i>Pourouma bicolor</i> Mart.	A1588
<i>Pourouma cucura</i> Standl. & Cuatrec.	A0451
<i>Pourouma ferruginea</i> Standl.	A0575, A0606, A0868, A0882, A1404, A1502, A1546
<i>Pourouma guianensis</i> Aubl.	A0522, A1074
<i>Pourouma minor</i> Benoist	A0558, A0588, A0602, A0637, A1080, A1131, A1379
<i>Pourouma</i> cf. <i>melinonni</i> Benoist	A0747, A1071
<i>Pourouma ovata</i> Trécul	A0159, A0161, A0862, A1014, A1099, A1108, A1312, A1608
<i>Pourouma tomentosa</i> Miq.	A0434, A0520, A0714, A0945, A0964, A1000, A1665
Celastraceae	
<i>Goupia glabra</i> Aubl.	A0366, A1050, A1242
<i>Maytenus guianensis</i> Klotzch	A1787
Chrysobalanaceae	
<i>Couepia bracteosa</i> Benth.	A1055
<i>Couepia</i> aff. <i>canomensis</i> (Mart.) Hook. f.	A0881, A0947, A1393
<i>Couepia caryophylloides</i> Benoist	A1294, A1305, A1343, A1380, A1398, A1452, A1467, A1663, A1677, A1810
<i>Couepia elata</i> Ducke	A1391
<i>Couepia longipendula</i> Pilg.	A1631, A1840, A2034, A2074
<i>Couepia morii</i> Prance	A1446
<i>Couepia obovata</i> Ducke	A1573
<i>Couepia rankinae</i> Prance	A1484
<i>Couepia robusta</i> Huber	A1062, A1472
<i>Couepia sandwithii</i> Prance	A1254, A1596
<i>Hirtella bicornis</i> Mart. & Zucc.	A0362, A0891, A1595, A1805, A1844, A2041
<i>Hirtella obidensis</i> Ducke	A1433
<i>Hirtella piresii</i> Prance	A1636
<i>Licania apetala</i> (E. Mey.) Fritsch	A0712, A1422, A1480, A1928
<i>Licania bracteata</i> Prance	A0673, A1945
<i>Licania canescens</i> Benoist	A0917
<i>Licania discolor</i> Pilger	A1388, A1602, A1916
<i>Licania egleri</i> Prance	A1643

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Licania heteromorpha</i> Benth.	A0817, A1180, A1212, A629, A1721, A1984, A2021
<i>Licania hypoleuca</i> Benth.	A2029
<i>Licania kunthiana</i> Hook. f.	A1642
<i>Licania laevigata</i> Prance	A0866, A1277, A1504
<i>Licania latifolia</i> Benth.	A0880
<i>Licania micrantha</i> Miq.	A1635, A1738, A1858, A1931
<i>Licania oblongifolia</i> Standl.	A1653, A1800, A1855
<i>Licania octandra</i> (Roem. & Schult.) Kuntze	A1780, A1784, A1851
<i>Licania rodriguesii</i> Prance	A1220
<i>Licania silvae</i> Prance	A0514, A0820, A0890, A1214
<i>Licania sprucei</i> Hook. f.	A1009
<i>Licania unguiculata</i> Prance	A1128, A1724
Clusiaceae	
<i>Symphonia globulifera</i> L.	A0656, A0909
<i>Tovomita spinosa</i> Ducke	A0528, A1558
<i>Tovomita</i> aff. <i>tenuifolia</i> Benth. ex Planch. & Triana	A0768
<i>Vismia cayennensis</i> (Jacq.) Pers.	A0122
<i>Vismia japurensis</i> Reichardt	A0425, A0427, A1948, A1972
<i>Vismia macrophylla</i> H.B.K.	A0285, A0521, A1678
Combretaceae	
<i>Buchenavia amazonica</i> Alwan & Stace	A0531, A0689, A1750
<i>Buchenavia parvifolia</i> Ducke	A0899, A1609
<i>Buchenavia sericocarpa</i> Ducke	A1097
<i>Buchenavia viridifolia</i> Ducke	A1584, A1603
Dichapetalaceae	
<i>Tapura amazonica</i> Poepp. & Endl.	A01746
Duckeodendraceae	
<i>Duckeodendron cestroides</i> Kuhlmann	A0589, A1968
Ebenaceae	
<i>Diospyros pseudoxylopi</i> Mildbr.	A0561
<i>Diospyros tetandra</i> Hiern	A0677, A1272
Elaeocarpaceae	
<i>Sloanea</i> aff. <i>latifolia</i> Schulm.	A1795
<i>Sloanea</i> cf. <i>nitida</i> G. Don	A0786, A1521, A1833
<i>Sloanea</i> cf. <i>pubescens</i> (Poepp. & Endl.) Benth.	A0683
<i>Sloanea floribunda</i> Spruce ex Benth.	A0659, A1252
<i>Sloanea longipes</i> Ducke	A1040
<i>Sloanea pubescens</i> (Poepp. & Endl.) Benth.	A1847
<i>Sloanea sinemariensis</i> Aubl.	A0563, A1301
<i>Sloanea synandra</i> Spruce ex Benth.	A1110
<i>Sloanea</i> sp 01	A0842
<i>Sloanea</i> sp 02	A0966
<i>Elaeocarpaceae</i> sp 03	A1950

## Appendix 1. Continued.

Family/Species	Collector numbers
Erythroxylaceae	
<i>Erythroxylum albertianum</i> Kuhl. & W.A. Rodrigues	A1340, A1416
Euphorbiaceae	
<i>Alchorneopsis floribunda</i> (Benth.) Muell. Arg.	A1866
<i>Conceveiba guianensis</i> Aubl.	A1842, A1848
<i>Conceveiba hostmanii</i> Benth.	A0870, A1115, A1259, A1473, A1612, A1751, A1914
<i>Croton lajouwensis</i> Jabl.	A0328
<i>Drypetes variabilis</i> Vittien	A0666, A2072
<i>Hevea guianensis</i> Aubl.	A0271, A0598, A1067
<i>Mabea caudata</i> Pax & K.Hoffm.	A0572, A0655, A0699, A1452, A1529, A1540, A1547, A1713
<i>Mabea aff. maynensis</i> Muell. Arg.	A0697
<i>Micrandropsis scleroxylon</i> (W.A. Rodrigues) W.A. Rodrigues	A0953, A1318, A1383
<i>Pera schomburgkiana</i> (Benth.) Muell. Arg.	A1684
Fabaceae	
<i>Andira micrantha</i> Ducke	A0420, A1363
<i>Andira cf. trifoliolata</i> Ducke	A1395, A1701
<i>Andira unifoliolata</i> Ducke	A1650
<i>Bocoa viridiflora</i> (Ducke) R.S. Cowan	A0755, A0950, A0991, A1691, A1723
<i>Diptotropis triloba</i> Gleason	A0639, A1818, A1905
<i>Dipteryx magnifica</i> (Ducke) Ducke	A0149, A0518, A0987, A1685, A1944, A2006
<i>Dipteryx odorata</i> (Aubl.) Willd.	A1138, A1255, A1581
<i>Hymenolobium petraeum</i> Ducke	A0993, A1571, A1717, A1962, A2064
<i>Ormosia lignivalvis</i> Rudd	A0740, A1482
<i>Ormosia</i> sp 02	A0077
<i>Pterocarpus cf. amazonicus</i> Huber	A01850, A1865
<i>Pterocarpus officinalis</i> Jacq.	A0381, A0581, A0601, A0636, A0731, A0841, A0901, A1013, A1085, A1454, A1494, A1594, A1627, A1692, A1702
<i>Pterocarpus</i> sp 01	A0638
<i>Swartzia apetala</i> Raddi	A0864, A1743
<i>Swartzia cf. arborescens</i> (Aubl.) Pittier	A0951, A1549, A1687
<i>Swartzia ingifolia</i> Ducke	A1249
<i>Swartzia lamellata</i> Ducke	A0937, A1517
<i>Swartzia polyphylla</i> DC.	A0774

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Swartzia recurva</i> Poepp.	A0758, A0853, A0845, A0858, A0878, A1137, A1350, A1852, A1871, A2028, A2076
<i>Swartzia reticulata</i> Ducke	A0311, A0546, A0562, A0902, A0927, A1153, A1538, A1660, A1695, A1727, A1802
<i>Swartzia cf. tessmanii</i> Harms	A0529, A0855, A1667
<i>Swartzia</i> sp 01	A0903, A1782, A1884
<i>Swartzia</i> sp 02	A0570, A1236, A1519
<i>Swartzia</i> sp 03	A0905
Fabaceae	
<i>Swartzia</i> sp 04	A1017, A1316
<i>Swartzia</i> sp 05	A1154, A1468
<i>Swartzia</i> sp 06	A1102
Flacourtiaceae	
<i>Casearia javitensis</i> H.B.K.	A0664
<i>Casearia sylvestris</i> Sw.	A0701, A1447, A1451
<i>Casearia</i> sp 01	A0930
<i>Casearia</i> sp 02	A2023
Humiriaceae	
<i>Duckesia verrucosa</i> (Ducke) Cuatrec.	A1475
<i>Endopleura uchi</i> (Huber) Cuatrec.	A0802
<i>Humiriastrum colombianum</i> (Cuatrec.) Cuatrec.	A1570
<i>Sacoglottis matogrossensis</i> Malme	A0076, A0235, A0796, A0846, A1952
<i>Vantanea macrocarpa</i> Ducke	A1203
<i>Vantanea micrantha</i> Ducke	A2014
<i>Vantanea parviflora</i> Lam.	A1645, A1734, A1868
Icacinaceae	
<i>Dendrobangia boliviana</i> Rusby	A0736, A0911
<i>Emmotum nitens</i> (Benth.) Miers	A0080,
Lacistemataceae	
<i>Lacistema aggregatum</i> (Berg.) Rusby	A0193, A2036
<i>Lacistema grandifolium</i> Schniz.	A0050, A0867
Lauraceae	
<i>Aiouea cf. guianensis</i> Aubl.	A1226
<i>Aiouea cf. impressa</i> (Meisn.) Kosterm.	A0147, A1735
<i>Aniba burchellii</i> Kosterm.	A1335, A0886
<i>Aniba canelilla</i> (H.B.K.) Mez	A0681, A0704, A0719, A1745, A1831
<i>Aniba panurensis</i> (Meisn.) Mez	A0728, AA0851, A1399, A1788, A1910

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Aniba cf. roseodora</i> Ducke	A1405, A1755
<i>Aniba terminalis</i> Ducke	A0809, A1704, A1981
<i>Aniba williamsii</i> O.C. Schmidt	A0805, A1737, A1778
<i>Aniba</i> sp 01	A1408, A1755
<i>Endlicheria cf. tessmannii</i> O.C. Schmidt	A1056
<i>Licaria cannella</i> (Meisn.) Kosterm.	A0860, A1199, A1306, A1409, A1443, A1464, A1623, A1739, A1748
<i>Licaria guianensis</i> Aubl.	A1875, A1965
<i>Licaria</i> sp 01	A0669
<i>Mezilaurus duckei</i> Van der Werff	A1173
<i>Mezilaurus itauba</i> (Meisn.) Teub. ex Mez	A0082, A1060, A1084, A1287, A1289, A1488, A1498, A1604, A1772, A1901
<i>Mezilaurus cf. pyrifolia</i> Van der Werff	A1349
<i>Mezilaurus</i> sp 01	A1438, A1778, A1823, A1952
<i>Mezilaurus</i> sp 02	A0552, A0573, A1104, A1307, A1362
<i>Ocotea cf. aciphylla</i> (Ness) Mez	A1441
<i>Ocotea amazonica</i> (Meisn.) Mez	A0055, A0512, A0679, A0849, A0946, A1133, A1149, A1160, A1196, A1338, A1410, A1548, A1770, A1846, A1881, A1895, A1960
<i>Ocotea cf. cujumary</i> Mart.	A1470, A1879, A1906
<i>Ocotea canaliculata</i> (Rich.) Mez	A1179
<i>Ocotea guianensis</i> Aubl.	A0135, A0687, A0706
<i>Ocotea longifolia</i> H.B.K.	A1531, A1766, A1887, A1891, A1992
<i>Ocotea myriantha</i> Mez	A1913
<i>Ocotea cf. neesiana</i> (Miq.) Kosterm.	A1686
<i>Ocotea splendens</i> (Meisn.) Baill.	A1401, A1435, A1615, A1714, A1754, A1792
<i>Pleurothyrium aff. parviflorum</i> Ducke	A1522, A1664, A1775, A1777, A1877
<i>Rhodostemonodaphne grandis</i> (Mez) Rohwer	A1124
<i>Williamnodendron spectabile</i> Kubitzk & Richter	A1421
<i>Lauraceae</i> sp 01	A1077
<i>Lauraceae</i> sp 02	A1843
<i>Lauraceae</i> sp 03	A0814
Lecythidaceae	
<i>Cariniana decandra</i> Ducke	A0294, A355
<i>Corythophora alta</i> R. Knuth	A1835
<i>Corythophora rimosa</i> W.A. Rodrigues	M20034
<i>Couratari guianensis</i> Aubl.	C0344
<i>Couratari longipedicellata</i> W.A. Rodrigues	M20707
<i>Couratari stellata</i> A.C. Sm.	C0965

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Eschweilera amazoniciformis</i> S.A. Mori	M19294
<i>Eschweilera atropetiolata</i> S.A. Mori	M19414
<i>Eschweilera bracteosa</i> (Berg) Miers	M19676
<i>Eschweilera carinata</i> S.A. Mori	F0438
<i>Eschweilera collina</i> Eyma	M19310
<i>Eschweilera coriacea</i> (A. DC.) S.A. Mori	M21492
<i>Eschweilera cyathiformis</i> S.A. Mori	M19385
<i>Eschweilera grandiflora</i> (Aubl.) Sandwith	C0434
<i>Eschweilera laevicarpa</i> S.A. Mori	A0348
<i>Eschweilera micrantha</i> (Berg) Miers.	A0138
<i>Eschweilera pedicellata</i> (Rich.) S.A. Mori	C0382
<i>Eschweilera pseudodecolorans</i> S.A. Mori	M20701
<i>Eschweilera rankinae</i> S.A. Mori	M19348
<i>Eschweilera romeu-cardosoi</i> S.A. Mori	M21353
<i>Eschweilera tessmanii</i> R. Knuth	M19446
<i>Eschweilera truncata</i> A.C. Smith	M19961
<i>Eschweilera wachenheimii</i> (Benoist) Sandwith	M21407
<i>Gustavia elliptica</i> S.A. Mori	C0454
<i>Lecythis barnebyi</i> S.A. Mori	M20629
<i>Lecythis gracieana</i> S.A. Mori	FO577
<i>Lecythis parvifructa</i> S.A. Mori	A0254
<i>Lecythis pisonis</i> S.A. Mori	M19418
<i>Lecythis prancei</i> S.A. Mori	M19336
<i>Lecythis zabucajo</i> Aubl.	M20187
<i>Lecythis</i> sp 01	M19444
<i>Lecythis</i> sp 05	M19600
Linaceae	
<i>Roucheria laxiflora</i> Winkl.	A1412
Malpighiaceae	
<i>Byrsonima duckeana</i> W.R. Anderson	A0329, A1532
<i>Byrsonima fernandezii</i> Cuatrec.	A1037
<i>Pterandra arborea</i> Ducke	A1386
Melastomataceae	
<i>Miconia crassinervia</i> Cogn.	A0502, A0698
<i>Miconia dispar</i> Benth.	A0120
<i>Miconia elaeagnoides</i> Cogn.	A1093, A1123
<i>Miconia gratissima</i> Benth. ex Triana	A1472
<i>Miconia lepidota</i> DC.	A1103
<i>Miconia phanerostyla</i> Pilg.	A0134
<i>Miconia phaeophylla</i> Triana	A0370, A0634, A1966
<i>Miconia punctata</i> (Desr.) D. Don	A0097
<i>Miconia regelli</i> Cogn.	A0194, A0688
<i>Miconia tomentosa</i> (Rich.) D. Don	A0851
<i>Miconia</i> sp 01	A0426, A428
<i>Mouriri angulicosta</i> Morley	A1681
<i>Mouriri callocarpa</i> Ducke	A940



## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Mouriri duckeana</i> Morley	A0238, A0576, A0596, A0713
<i>Mouriri nigra</i> (DC.) Morley	A1341, A1462
Meliaceae	
<i>Guarea carinata</i> Ducke	A0722, A0763, A1021, A1191, A1225, A1941
<i>Guarea kunthiana</i> A. Juss.	A0079, AA0653, A0695, A0739, A1275, A1557, A1657, A1682, A1803, A1834
<i>Guarea scabra</i> A. Juss.	A0971, A1096, A1185
<i>Guarea sylvatica</i> C. DC	A0960, A1345, A1618, A1726
<i>Guarea</i> sp 01	A1804
<i>Trichilia cipo</i> C. DC.	A1042, A1339
<i>Trichilia martiana</i> C. DC.	A1614
<i>Trichilia micrantha</i> Benth.	A0872, A1052, A1384, A1445, A1450, A1731
<i>Trichilia septentrionalis</i> C. DC.	A1465, A1813, A1856
<i>Trichilia</i> sp 01	A0527, A1266
<i>Trichilia</i> sp 02	A1328, A1765
Mimosaceae	
<i>Abarema piresii</i> Barneby & J.W. Grimes	A0613, A1744
<i>Cedrelinga catenaeformis</i> Ducke	A0690, A1975
<i>Dinizia excelsa</i> Ducke	A1562
<i>Inga bracteosa</i> Benth.	A0703, A1512, A1696
<i>Inga cf. breviaolata</i> Ducke	A1528, A1544, A1560
<i>Inga glomeriflora</i> Ducke	A0682
<i>Inga heterophylla</i> Willd.	A1575
<i>Inga cf. huberi</i> Ducke	A1118
<i>Inga inflata</i> Ducke	A0726, A1859
<i>Inga paraensis</i> Ducke	A0066, A0633, A672, A1095, A1415, A1525, A1578, A1652, A1758
<i>Inga cf. tenuistipulata</i> Ducke	A1796
<i>Inga cf. thibaudiana</i> DC.	A1752, A1761
<i>Inga</i> sp 01	A1122, A1378, A1719
<i>Inga</i> sp 02	A1100, A1140, A1432
<i>Inga</i> sp 03	A1791
<i>Inga</i> sp 04	A1324
<i>Parkia decussata</i> Ducke	A0612, A0824, A1819
<i>Parkia multijuga</i> Benth.	A1348
<i>Parkia nitida</i> Miq.	A0052, A0577, A0705, A0782, A0874, A1112, A1279, A1352, A1394, A1601, A1669, A1808, A1814, A1892, A1986, A2057, A2058, A2066

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Parkia panurensis</i> H.C. Hopkins	A1621
<i>Parkia pendula</i> (Willd.) Walp.	A1162
<i>Pseudopiptadenia suaveolens</i> (Miq.) J.W. Grimes	A1120, A1129, A1634, A1864
<i>Stryphnodendron pulcherrimum</i> (Willd.) Hochr.	A0934
<i>Stryphnodendron racemiferum</i> (Ducke) W.A. Rodrigues	A0047, A0629, A0831, A0887, A1537, A1658
<i>Zygia ramiflora</i> (Benth.) Barneby J.W. Grimes	A0794, A1832, A1857, A1862
Monimiaceae	
<i>Siparuna argyrochrysea</i> Perkins	A1869
<i>Siparuna cuspidata</i> (Tul.) A. DC.	A1898
<i>Siparuna decipiens</i> (Tul.) A. DC.	A0832, A0857, A1638, A2024
<i>Siparuna emarginata</i> R.S. Cowan	A0603, A0877
Moraceae	
<i>Brosimum acutifolium</i> Huber	A0582
<i>Brosimum guianensis</i> (Aubl.) Huber	A0548, A0895
<i>Brosimum lactescens</i> (S. Moore) C.C. Berg	A1181
<i>Brosimum melanopotamicum</i> C.C. Berg	A0839, A1730
<i>Brosimum parinarioides</i> Ducke	A0756, A0892, A1347, A1513, A1611, A1742
<i>Brosimum rubescens</i> Taub.	A0826, A1250, A1346
<i>Clarisia racemosa</i> R. & P.	A0829, A1150, A1178, A1641, A1890, A1995, A2013
<i>Ficus krukovii</i> Standl.	A0283
<i>Helianthostylis sprucei</i> Baill.	A0252, A0524, A0662, A0924, A0992, A1030, A1183, A1318, A1624, A2004, A2011
<i>Helicostylis tomentosa</i> (Poepp. & Endl.) Rusby	A1605, A1794
<i>Maquira calophylla</i> (Poepp. & Endl.) C.C. Berg	A0745, A1208, A1325
<i>Maquira guianensis</i> Aubl.	A0821, A2002
<i>Maquira sclerophylla</i> (Ducke) C.C. Berg	A0789
<i>Naucleopsis caloneura</i> (Huber) Ducke	A0087, A0664, A969, A1059, A1209, A1232, A1303, A1369, A1397, A1489, A1632, A1729, A1785, A1826, A1845, A1854, A1897, A1912, A1913, A1943, A1996, A2022
<i>Naucleopsis terstroemiiiflora</i> (Milbr.) C.C. Berg	A0207
<i>Naucleopsis ulei</i> (Warb.) Ducke	A0879, A0912
<i>Pseudolmedia laevis</i> (R. & P.) Macbr.	A0054, A0586, A0927, A1009, A1326, A1425, A1466, A1807

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Sorocea guilleminiana</i> Gaud.	A0505, A1390, A1500, A1661, A1899
<i>Trymatococcus amazonicus</i> Poepp. & Endl.	A0567, A0753, A0810, A0943, A0989, A1034, A1148, A1151, A1186, A1197, A1256, A1313, A1366, A1587, A1617, A1680, A1815, A1947, A1980, A2010
Myrsinaceae	
<i>Stylogyne rodriguesiana</i> Pipoly	A0067
<i>Myrsinaceae</i> sp 01	A0732
Myristicaceae	
<i>Iryanthera elliptica</i> Ducke	A0908, A1216, A1365, A1586, A1673, A1706, A1861
<i>Iryanthera laevis</i> Markgr.	A1882
<i>Iryanthera polyneura</i> Ducke	A0523, A0742, A1006, A1423, A1469, A1550, A1554, A1619, A1622, A1866, A1880, A1967, A1985, A1999
<i>Iryanthera</i> sp 01	A0935
<i>Osteophloeum platysperma</i> Warb.	A0090, A1198, A1811
<i>Virola calophylla</i> Warb.	A0192, A0707, A1292, A1314, A1510, A1671, A1893, A1920
<i>Virola aff. multicostata</i> Ducke	A1242, A1935
<i>Virola pavonis</i> (A. DC.) A.C. Sm.	A0147
<i>Virola rufula</i> Warb.	A0579, A1496
<i>Virola theiodora</i> (Benth.) Warb.	A0240
<i>Virola venosa</i> (Benth.) Warb.	A0419, A507
<i>Virola</i> sp 01	A0371, A0550
<i>Myristicaceae</i> sp 01	A1994
Myrtaceae	
<i>Eugenia cf. citrifolia</i> Poir.	A1527
<i>Eugenia excelsa</i> Berg	A2003
<i>Eugenia feijoi</i> Berg	A0228, AA1534, A1577, A1654, A1659
<i>Eugenia cf. grandis</i> Mc Vaugh	A0205
<i>Eugenia heterochroma</i> Diels	A0725
<i>Eugenia patrisii</i> Vahl	A0282, A0323, A0770, A1356, A1747
<i>Eugenia pseudopsidium</i> Jacq.	A0772
<i>Eugenia cf. quadrijulga</i> McVaugh	A0885, A1152, A1170, A1224
<i>Marleria umbraticulum</i> (H.B. K.) Berg	A1367
<i>Myrcia cuprea</i> (O. Berg.) Kiaersk.	A1361

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Myrcia deflexa</i> (Poir.) DC.	A1278
<i>Myrcia grandis</i> McVaugh	A0243, A1591
<i>Myrcia magnoliifolia</i> DC.	A0959
<i>Myrcia paivae</i> O. Berg	A0237, AA0643, AA0920, A1616, A1759
<i>Myrcia guianensis</i> (Aubl.) DC.	A1036
<i>Myrciaria floribunda</i> (Willd.) O. Berg	A0599, A0830, A1545
Nyctaginaceae	
<i>Neea cf. altissima</i> Poepp. & Endl.	A0661, A0694, A1979
<i>Neea cf. divaricata</i> Poepp. & Endl.	A02068
<i>Neea cf. madeirana</i> Standl.	A0871, A1690
<i>Neea cf. obovata</i> Spruce ex Heimerl.	A0250, A1098
<i>Neea oppositifolia</i> Ruiz & Pav.	A0308, A0544, A0984, A1029, A1119, A1163, A1187, A1202, A1258, A1358, A1937, A1958
<i>Neea stellulata</i> (Huber) Heimerl.	A01837
Ochnaceae	
<i>Ouratea discophora</i> Ducke	A0883, A0914, A1027, A1309, A1699, A1970
Olacaceae	
<i>Heisteria barbata</i> Cuatrec.	A1535
<i>Heisteria laxiflora</i> Engl.	A1311
<i>Minquartia guianensis</i> Aubl.	A0509, A0533, A0551, A0654, A0711, A0804, A0823, A2053
<i>Ptychopetalum olacoides</i> Benth.	A0762, A1878
Opiliaceae	
<i>Agonandra sylvatica</i> Ducke	A2008
Proteaceae	
<i>Roupala</i> sp 01	A0757, A1936
Quiinaceae	
<i>Quiina amazonica</i> A.C. Sm.	A0303
<i>Quiina negrensis</i> A.C. Sm.	A0767, A1066, A2016
<i>Quiina obovata</i> (Tul.) A.C. Sm.	A1233, A2001
<i>Touroulia guianensis</i> Aubl.	A0723
Rhabdodendraceae	
<i>Rhabdodendron amazonicum</i> (Benth.) Huber	A1276
Rhizophoraceae	
<i>Anisophyllea amazonica</i> Pires & W.A. Rodrigues	A1885
<i>Cassipourea guianensis</i> Aubl.	A0458, A0916, A0926
<i>Sterigma petalum obovatum</i> Kuhl.	A0535
Rubiaceae	
<i>Alibertia cf. curviflora</i> K. Schum.	A1495
<i>Alibertia cf. latifolia</i> (Benth.) K. Schum.	A1192

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Bathysa obovata</i> (Ruiz) Standl.	A1924
<i>Coussarea grandis</i> Muell. Arg.	A0559, A0896
<i>Duroia macrophylla</i> Huber	A0889
<i>Duroia saccifera</i> (Mart.) Hook. f.	A0167, A1344
<i>Ferdinandusa cf. elliptica</i> Pohl	A2020
<i>Kotchubaea sericantha</i> Standl.	A0364
<i>Palicourea grandifolia</i> (Willd. ex R. & S.) Standl.	A2012
<i>Rudgea cf. amazonica</i> Müll. Arg.	A1270, A1783
<i>Rudgea cf. graciliflora</i> Standl.	A0800
<i>Stachyarrhena acuminata</i> Standl.	A1668
Rutaceae	
<i>Zanthoxylum</i> sp 01	A0970
Sapindaceae	
<i>Allophyllus</i> sp 01	A0775
<i>Matayba</i> sp 01	A1357
<i>Talisia cf. veraluciana</i> Guarim	A0242
<i>Talisia guianensis</i> Aubl.	A1063, A1370, A1711, A1936
<i>Sapindaceae</i> sp 04	A0092
Sapotaceae	
<i>Chrysophyllum amazonicum</i> T.D. Penn.	A0224, A0255, F0256
<i>Chrysophyllum pomiferum</i> (Eyma) T.D. Penn.	A1982
<i>Chrysophyllum sanguinolentum</i> (Pierre) Baehni	A0560, A0778, A0876, A1007, A109, A1253, A1263, A1269, A1286, A1332, A1411, A1453, A1455, A1459
<i>Ecclinusa guianensis</i> Eyma	A0848, A1116, A1240 A1261, A1296, A1371, F0360, N0587
<i>Ecclinusa</i> sp 01	A0967, A1061, A1275
<i>Ecclinusa</i> sp 02	F0224
<i>Manilkara bidentata</i> (A. DC.) Chev.	A1025, A1064, A1238, A1440, F0253, N0593
<i>Manilkara huberi</i> (Ducke) Standl.	A0675, A1043, A1234
<i>Micropholis casiquiarensis</i> Aubr.	A2005, F0261, N1169
<i>Micropholis guianensis</i> (A. DC.) Pierre	A0119, A0284, A0641, A0665, A0784, A1044, A1047, A1107, A1207, A1219, A1227, A1336, A1377, A1414, A1426, A1431, A2054, F0223, N0589, N597, N973, N1072, N1083, N1085, N1094, N1141, N1166
<i>Micropholis obscura</i> T.D. Penn.	A0331, N1156
<i>Micropholis trunciflora</i> Ducke	A0408, A0444, A1051

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Micropholis venulosa</i> (J. Macbr. & Field.) Pierre	A0590
<i>Pouteria ambelaniifolia</i> (Sandwith) T.D.Penn.	A0649, A1195, A1231, A2031, N0602, N0972
<i>Pouteria anomala</i> (Pires) T.D. Penn.	A0232, A0607, A0610, A0611, A0615, A0730, A0781, A0807, A0852, A0935, A0965, A1008, A1010, A1045, A1114, A1134, A1147, A1217, A1239, A1282, A1342, A1376, A1407, A1424, A1430, A1434, A1458, A1461, A1463, A1477, A1916, A1917, A1974, A1976, A2046, F0252, F0363
<i>Pouteria bilocularis</i> (Winkl.) Baehni	N0968, N1167
<i>Pouteria campanulata</i> Baehni	A0583, A0651, A0933, A1136, A1265, N0604, N0988
<i>Pouteria cladantha</i> Sandwith	A0553, A0743, A1083, A1139, A1299, F0365
<i>Pouteria aff. collina</i> (Little) T.D. Penn.	N0978
<i>Pouteria coriacea</i> (Pierre) Pierre	P13042
<i>Pouteria decorticans</i> T.D. Penn.	N0978
<i>Pouteria deliciosa</i> T.D. Penn.	A0605, A0972, A1005, A1086, A1471
<i>Pouteria engleri</i> Eyma	A0735, A0837, A0918, A1026, A1028, A1300, A1354, A2043, A2056, F0257, N1076, N1172
<i>Pouteria eugeniifolia</i> (Pierre) Baehni	A0915, A1079, A1106, A1283
<i>Pouteria fimbriata</i> Baehni	A0978, A0985, A1035, A1223, A1368
<i>Pouteria fulva</i> T.D. Penn.	A0304
<i>Pouteria glomerata</i> (Milq.) Radlk.	A0716, N0590
<i>Pouteria guianensis</i> Aubl.	A0530, A0556, A0875, A0922, A1155, A1176, A1235, A1372, A1389, A1456, A1474, A1476, F0255, F0359, N0596, N1077
<i>Pouteria hispida</i> Eyma	A0415, A0504, A0537, A0859, A1020, A2045, N0595, N1154, N1171
<i>Pouteria jariensis</i> Pires & T.D. Penn.	A1168
<i>Pouteria macrophylla</i> (Lam.) Eyma	A0644, A0645, A0724, A0844, A1932, N0594
<i>Pouteria manauensis</i> (Aubr. & Pell.) T.D. Penn.	A1174

## Appendix 1. Continued.

Family/Species	Collector numbers
<i>Pouteria oblanceolata</i> Pires	N0600
<i>Pouteria opposita</i> (Ducke) T.D. Penn.	A0813, A0836, A0894, A1396, N0598, N1079
<i>Pouteria pachyphylla</i> T.D. Penn.	F0356
<i>Pouteria peruviansis</i> (Aubr.) Bernardi	A0795, A1049, A1334, A2044, A2049, N0985, N1173
<i>Pouteria reticulata</i> (Engl.) Eyma	A0357, A0580, A0591, N0981
<i>Pouteria retinervis</i> T.D. Penn.	A0525, A0584, A0738, A0741, A0818, A1194, A1955, N0601, N1078, N1155
<i>Pouteria aff. simulans</i> Monach.	A1993
<i>Pouteria venosa</i> (Mart.) Baehni	A0907, A429, A1954, A1957, F0358
<i>Pouteria vernicosa</i> T.D. Penn.	A0527, A0534, A0626, A0766, A1011, A1337, A1403, F0355
<i>Pouteria virescens</i> T.D. Penn.	A0146, A1228, A1351, A1360
<i>Pouteria</i> sp 01	A1290
<i>Pouteria</i> sp 02	A1089, A1200
<i>Pouteria</i> sp 03	A0674, A1048, A2029, N0980, N984
<i>Pouteria</i> sp 04	A0727, N0588
<i>Pouteria</i> sp 05	A0621, A1251, A1310, A1321, A1400, F0357
<i>Pouteria</i> sp 06	A0404, A1054, A1167, A1213, A1457, A2042, A2047, F0353
<i>Pouteria</i> sp 07	N0599
<i>Pouteria</i> sp 08	A1221
<i>Pouteria</i> sp 09	A0622, A1049
<i>Pouteria</i> sp 10	A0565, A0569, A0825
<i>Pouteria</i> sp 11	A1188
<i>Pouteria</i> sp 12	N0592
<i>Pouteria</i> sp 13	A0519
<i>Pouteria</i> sp 14	A2048, F0350, F0364
<i>Pouteria</i> sp 15	A2019
<i>Pradosia</i> sp 01	F0351
<i>Sarcaulus brasiliensis</i> (A. DC.) Eyma	A2050
Sterculiaceae	
<i>Sterculia frondosa</i> A. Rich.	A0051, A1946
<i>Sterculia parviflora</i> (Ducke) E. Tayler	A1764
<i>Sterculia pruniensis</i> (Aubl.) K. Schum.	A0595, A0936, A1158
<i>Theobroma subincanum</i> Mart.	A0591, A1125, A1762
<i>Theobroma sylvestre</i> Mart.	A0961, A1070, A1076, A1333, A1460, A1490, A1903, A1933, A2026, A2038, A2073

## Appendix 1. Continued.

Family/Species	Collector numbers
Tiliaceae	
<i>Lueheopsis rosea</i> (Ducke) Burret	A1801
Ulmaceae	
<i>Ampelocera edentula</i> Kuhlm.	A0467, A1774
Verbenaceae	
<i>Vitex triflora</i> Vahl	A1853
Violaceae	
<i>Amphirrhox surinamensis</i> Eichl.	A0773, A0854, A1921
<i>Leonia cymosa</i> Mart.	A1094, A1304, A1592, A1728
<i>Leonia glycocarpa</i> R. & P.	A1285, A1733
<i>Papayrola grandiflora</i> Tul.	A0081, A0538
<i>Rinorea guianensis</i> Aubl.	A0239, A0345, A0431, A1038, A1156, A1298, A1406, A1518, A1559, A1644, A1646, A1647, A1648, A1649, A1703, A1821, A2033
<i>Rinorea racemosa</i> (Mart. & Zucc.) Kuntze	A0811, A1753, A1989
<i>Rinorea</i> sp 01	A1280
<i>Rinoreocarpus ulei</i> (Melch.) Ducke	A0301, A0776, A0900, A0913, A0931, A0974, A0995, A1590, A1593, A1740, A1820, A2065
<i>Violaceae</i> sp 01	A0709
Vochysiaceae	
<i>Erisma bicolor</i> Ducke	A0619, A0746
<i>Erisma fuscum</i> Ducke	A0799, A939
<i>Qualea brevipedicellata</i> Stafleu	A0928, A1655, A1656, A2055
<i>Qualea cf. homosepala</i> Ducke	A1705, A1938
<i>Ruizterania albiflora</i> (Warm.) Marc.-Berti	A0169, A0386
<i>Ruizterania</i> sp 01	A0069
<i>Vochysia odidensis</i> (Huber) Ducke	A1092, A1486
Indetermined	
Indet. sp 01	A1058
Indet. sp 02	A1561
Indet. sp 03	A1589
Indet. sp 04	A0078
Indet. sp 05	A0797
Indet. sp 06	A1505
Indet. sp 07	A1146
Leguminosae sp 01	A0680
Leguminosae sp 02	A1896
Leguminosae sp 03	A0944



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