American Journal of Botany

American Journal of Botany 98(1): 140–149. 2011.

BRIEF COMMUNICATION

Within-individual variation of trunk and branch xylem density in tropical trees[1]

Carolina Sarmiento[2,5], Sandra Patiño[2], C. E. Timothy Paine[3], Jacques Beauchêne[4], Anne Thibaut[4], and Christopher Baraloto[2]

[2]INRA, UMR Écologie des Forêts de Guyane 97310 Kourou, French Guiana; [3]ENGREF, UMR Écologie des Forêts de Guyane 97310 Kourou, French Guiana; and [4]CIRAD, UMR Écologie des Forêts de Guyane 97310 Kourou, French Guiana

- *Premise of the study*: Wood density correlates with mechanical and physiological strategies of trees and is important for estimating global carbon stocks. Nonetheless, the relationship between branch and trunk xylem density has been poorly explored in neotropical trees. Here, we examine this relationship in trees from French Guiana and its variation among different families and sites, to improve the understanding of wood density in neotropical forests.
- *Methods*: Trunk and branch xylem densities were measured for 1909 trees in seven sites across French Guiana. A major-axis fit was performed to explore their general allometric relationship and its variation among different families and sites.
- *Key results*: Trunk xylem and branch xylem densities were significantly positively correlated, and their relationship explained 47% of the total variance. Trunk xylem was on average 9% denser than branch xylem. Family-level differences and interactions between family and site accounted for more than 40% of the total variance, whereas differences among sites explained little variation.
- *Conclusions*: Variation in xylem density within individual trees can be substantial, and the relationship between branch xylem and trunk xylem densities varies considerably among families and sites. As such, whole-tree biomass estimates based on non-destructive branch sampling should correct for both taxonomic and environmental factors. Furthermore, detailed estimates of the vertical distribution of wood density within individual trees are needed to determine the extent to which relying solely upon measures of trunk wood density may cause carbon stocks in tropical forests to be overestimated.

Key words: branch xylem density; French Guiana; functional trait; tropical trees; trunk xylem density; wood economics.

Wood density (ρ_w) is a key functional trait due to its strong correlation with plant form and function (Niklas, 1993; Hacke et al., 2001; Tyree and Zimmermann, 2002; Chave et al., 2009). Recently, ρ_w has been proposed as an integrator of wood properties (Chave et al., 2009), and it has also been largely used both to explain woody species' distributions across environmental gradients (e.g., ter Steege et al., 2006; Poorter et al., 2008) and to estimate aboveground carbon stocks and dynamics (Fearnside, 1997; Baker et al., 2004; Chave et al., 2005). Accurate estimations of wood density are thus critical for our understanding of tree diversity and forest structure in the face of global climate change (Malhi et al., 2006). And yet, despite empirical evidence for radial variation from bark to pith, as well as vertical variation along the main stem of a tree (Wiemann and Williamson, 1988; Rueda and Williamson, 1992; Butterfield et al., 1993; Parolin, 2002; Woodcock and Shier, 2002, Williamson and Wiemann, 2010), within-individual variation in wood density is often ignored in comparative ecology and when estimating carbon stocks. Here, we explore the allometric relationship between xylem density from trunks and branches of tropical trees from French Guiana and its variation among different families and sites, to improve the understanding of this important trait in neotropical forests.

We expect a positive relationship between branch xylem density (ρ_{bx}) and trunk xylem density (ρ_{tx}) because they each reflect physiologic, hydraulic, and mechanical strategies of trees. For example, xylem density may change owing to changes in the demands for storage tissue, water transport safety and efficiency, water storage capacity, and self-support (Niklas, 1993; Hacke and Sperry, 2001; Scholz et al., 2007). Nevertheless, trunks and branches are subject to different ontogenetic, hydraulic, and architectural constraints (Domec and Gartner, 2002; Cochard et al., 2005), which may lead to different ρ_{bx} and ρ_{tx} values. Such differences could be modulated by environmental factors and shaped by taxonomic constraints (Gartner, 1995; Carlquist, 2001; Tyree and Zimmermann, 2002). For example, environmental factors (i.e., heat and drought) affect the densities of branches and trunks in *Pseudotsuga menziesii*, resulting in a significant influence of site conditions in the wood density within this species (Dalla-Salda et al., 2009). Moreover,

[1] Manuscript received 24 January 2010; revision accepted 3 November 2010.

The authors thank all members of the project BRIDGE who participated in field and laboratory collection and treatment of specimens. Field research was facilitated by the Guyafor permanent plot network in French Guiana, which is managed by CIRAD and ONF. The authors thank Dr. D. Warton for statistical advice and J. Chave, B. Thibaut, P.–C. Zalamea, and three anonymous reviewers for helpful comments on early drafts of the manuscript. They are extremely grateful to the taxonomic specialists who shared time at CAY during the project and helped with taxon identification, including Bruce Holst, Scott Mori, Terrence Pennington, Odile Poncy, and Henk van der Werff. Research was supported by a grant from the Biodiversité section of the Agence National de la Recherche, France and by the Institut National de la Recherche Agronomique (INRA).

[5] Author for correspondence (e-mail: carolinasar@gmail.com), present address: Universidad de Los Andes, Departamento de Ciencias Biológicas, Carrera 1 No. 18A – 70 Bogotá, Colombia

doi:10.3732/ajb.1000034

variation in branch xylem density correlates with changes in soil chemical composition at the landscape scale (Patiño et al., 2009), but whether a comparable variation occurs in terms of trunk xylem density remains unknown.

On the other hand, taxonomy also constrains the wood density values of tropical trees (Chave et al., 2006, 2009). This variation has important consequences for the hydraulic, mechanical, and physiological performance of wood and may affect the costs of maintenance respiration (Larjavaara and Muller-Landau, 2010). Moreover, the anatomical structure of wood has also a strong influence on wood density by controlling the proportion of carbon (i.e., wood tissue) allocated in a given wood volume. Anatomical structure of wood also varies ontogenetically and taxonomically, with the potential to generate differences in the relationship between branch and trunk xylem density in different families. Despite the important implications for both comparative ecology and carbon stock estimates, the generality of this relationship has yet to be examined for a large number of angiosperm species.

We expect differences in the allometric relationship between trunk and branch xylem density among sites and major taxonomic groups. In this paper, we present a comprehensive evaluation of the relationships between branch and trunk xylem density for 1909 tropical trees, representing 57 families, 205 genera, and 565 species, that were sampled in seven permanent plots, and we evaluate how this relationship varies among families and sites across northern French Guiana.

MATERIALS AND METHODS

Study sites and field sampling—As part of the BRIDGE project (http://www.ecofog.gf/Bridge), three individuals of every species with a diameter at breast height (DBH) > 10 cm were sampled for both trunk and branch sapwood (functional xylem) density in seven permanent 1-ha plots in French Guiana between November 2007 and September 2008. Sampled sites were distributed across northern French Guiana and covered a wide range of soil types and a strong precipitation gradient. Rainfall varies from 2600 mm/year in the most western site to 4000 mm/year in some eastern sites (for full field sampling methods, see Baraloto et al., 2010); details of each site are provided in Appendix S1 (see Supplemental Data online at http://www.amjbot.org/cgi/content/full/ajb.1000034/DC1).

For the trunks, a 7-mm diameter core sampler was used to extract recent sapwood at 1.3 m above ground level. Bark and cambium tissue were removed manually from each core, and cores were resampled until a representative sample that did not break was obtained. Cores were 6 mm long (2.4 SD, range 2–10 mm), depending on the hardness of the sampled wood, and extended only into sapwood. The samples were placed in a 2-mL plastic tube, stored at −20°C in a portable freezer in the field, and transported to a laboratory at Kourou, French Guiana for density measurements.

For branch sampling, a small branch, bearing sun-exposed leaves whenever possible, was cut from each tree by a professional climber and a 10–20 mm diameter twig segment was placed in a plastic bag with a zipper seal to avoid desiccation, stored at −20°C immediately in the field, and then transported to the laboratory. Additionally, herbarium specimens were made for every sampled individual to establish its botanical identity (Appendix 1). All voucher specimens are deposited in the Herbier de Guyane (CAY); a complete list of the studied taxa is shown online in Appendix S2.

Laboratory measurements—Trunk xylem density was calculated as the dry mass per fresh volume of each sample. Samples were saturated with water and fresh volume was estimated using the principle of water displacement and the Sartorius (Goettingen, Germany) density determination kit. After fresh volume was measured, samples were dried at 103°C for 72 h, and dry mass was determined. For twig samples, outer bark, phloem, and pith wider than 1 mm in diameter were removed, and densities were estimated using the same procedure as for trunk samples.

Statistical analysis—We first verified that there was no relationship between the length of core samples and the variability of the trunk xylem density. We performed a Breusch–Pagan test (lmtest package for the program R; Zeileis and Hothorn, 2002), which fits a linear regression model to the residuals of a linear regression model (using the same explanatory variables). There was no significant effect of the core length on the variability of the trunk xylem density ($P = 0.40$).

A major axis (MA) analysis was then performed to explore the relationship between trunk and branch xylem densities using the smatr package for R (Warton, 2007; R Development Core Team, 2008). Standardized major axis (SMA) and major axis line fits are identical when the variance of the two data sets is similar (Warton, 2007), and for testing that the slope of the relationship is one, they are identical (Warton et al., 2006). Here, as we compare branch and trunk xylem density, we chose, for simplicity, to skip the step of standardizing the data. Nevertheless, we repeated our overall analysis using SMA and found that it gave quantitatively identical results to MA. Thus, we present the simpler MA approach.

Separate MA line-fittings were subsequently performed for the 14 most common families, each with more than 40 sampled individuals, as well as for the seven sites. After a major axis estimation, the variance explained by the relationship was partitioned by comparing the slope coefficients to estimate the variance explained by families and sites, as well as their interaction. This step was done by first calculating the MA slopes and standard errors for each combination of site and family. We then constructed a random effects model that predicted log-transformed slope coefficients, weighted by their standard errors, by family, plot, and their interaction (as suggested by D. Warton, University of New South Wales, personal communication). This model yielded an effectively perfect fit, meaning that F-tests were unreliable, but provided sums of squares that were used to calculate the percentage of variance explained by each factor. Log-transformation of the slope coefficients allowed them to approximate a normal distribution.

RESULTS

Overall mean density values of trunk and branch xylem density were 625 ± 122 (SD) kg·m^{-3} and 607 ± 114 (SD) kg·m^{-3}, respectively. There was great variation in both trunk xylem density (range: 237–949 kg·m^{-3}, coefficient of variation: 19.4%), and in branch xylem density (range: 201–960 kg·m^{-3}, coefficient of variation: 18.9%).

The densities of branch and trunk xylem were strongly positively correlated (Fig. 1). The slope of the major-axis line fit was slightly but significantly greater than unity (slope: 1.09, CI: 1.04–1.15, $P = 0.0003$, $N = 1909$), and the intercept was significantly negative (−38.15, CI: −70.3 to 6.05, $P = 0.020$), indicating that trees with dense trunks have relatively light branches. Though the relationship was strong ($R^2 = 0.47$), substantial variation remained unexplained.

We partitioned the variance explained in the overall branch–trunk xylem density relationship among families, sites, and their interaction (Table 1). Variation among families explained four times as much variance than did variation among sites (family: 16.1%, site: 5.4%). Furthermore, 25.4% of the variance in the relationship was explained by the interaction between sites and families, indicating that the slope of the relationship for a given family varied among sites.

To explore the variation among families and sites, we calculated separate regressions for each, and tested their slopes and intercepts against the values from the overall data set (Figs. 2, 3). Family-level, mean xylem densities varied widely, from 475 in Malvaceae to 748 kg·m^{-3} in Chrysobalanaceae (Fig. 2). Even so, the branch–trunk xylem density relationship differed significantly from the community-level expectation in only three families. In Lauraceae, individuals with particularly dense trunks have relatively less dense branches, causing the slope of the branch–trunk relationship to be greater than the community-level slope and the intercept to be significantly less (slope: 1.36, CI: 1.11–1.68, $P = 0.0305$, $N = 112$). In Sapindaceae and Sapotaceae,

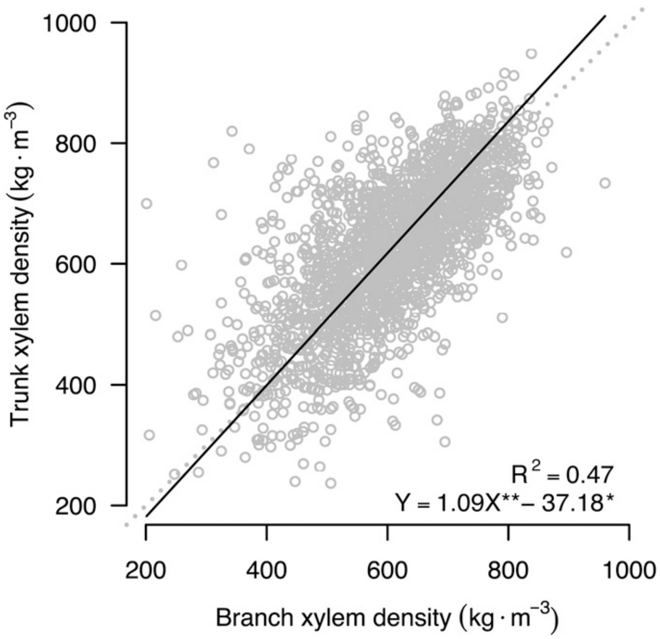

Fig. 1. Trunk and branch xylem densities are significantly positively correlated across rain forest trees in French Guiana. Each point represents an individual tree (N = 1909), the solid line presents the observed major-axis fit, and the dotted line represents the isometric equation $y = x$. * P < 0.05; ** P < 0.001.

the opposite relationship was observed, in that individuals with particularly light trunk xylem tended to have denser branch xylem, leading to a significantly shallow slope and positive intercept (Sapindaceae, slope: 0.50, CI: 0.23–0.85, P = 0.0056, N = 51; Sapotaceae, slope: 0.83, CI: 0.67–1.02, P = 0.0097, N = 226).

Variation among sites was less substantial (Fig. 3). In one plot, Nouragues-11L, the slope of the branch–trunk relationship was steeper than that of the community-level relationship (slope: 1.24, CI: 1.11–1.40, P = 0.030). In contrast, in Lavilette, the slope of the branch–trunk relationship was shallower than that of the overall data set relationship (slope: 0.85, CI: 0.69–1.03, P = 0.0095). And in a third plot, Tresor, trunks were slightly, though consistently, less dense than branches (intercept: −81, CI: −160 to −2.44, P = 0.043). The substantial interaction between families and sites in explaining variance in the overall branch–trunk relationship occurred because families had different slopes in different sites. We illustrate this interaction with Fabaceae in Fig. 3. In Acarouany, the slope of the branch–trunk relationship for Fabaceae was significantly shallower than the slope for non-Fabaceae individuals. In Nouragues, the situation was reversed, with Fabaceae having a much steeper relationship between branch and trunk density than did non-Fabaceae.

Table 1. Percentage of variance explained in the branch–trunk xylem relationship by family, site, and their interaction.

Source	df	Sum of squares	Mean squares	Percentage of variance explained
Family	14	10.83	0.77	16.1
Site	6	3.67	0.61	5.4
Family × site	72	17.03	0.24	25.4

DISCUSSION

Across seven French Guiana rain forests, we found trunk xylem to be slightly but significantly denser than branch xylem. To our knowledge, few studies have assessed the variation in density between branches and trunks of the same individual tree. A study of two Ghanaian timber species found overall branch density to be greater than average trunk density in both (Okai et al., 2004), whereas a study of 19 tree species in Puerto Rico found trunks to be an average of 15% denser than branches (Swenson and Enquist, 2008). In the present study, which included 565 species, we found trunk xylem density to be on average 9% greater than branch xylem density (Fig. 1). Our results thus concur with those of Swenson and Enquist (2008) in that we found trunks to have overall denser wood than do branches. Swenson and Enquist (2008) further reported a very tight relationship between trunk and branch density (R^2 = 0.89), whereas we found this relationship to be far noisier (R^2 = 0.47). This difference in relationship strength is not simply methodological. Our cores sampled only sapwood, were no more than 10 mm long, and showed no relationship between core length and variance in xylem density. Swenson and Enquist (2008) took cores up to 100 mm long, thus probably including both sapwood and heartwood, which can differ in density (Parolin, 2002; Woodcock and Shier, 2002, Williamson and Wiemann, 2010) and which occur in different proportions relative to tree size, species, and site (Panshin and de Zeeuw, 1980). Next, we discuss several factors that may affect within-tree variation in wood density and thus may help explain deviations from this allometric relationship.

One factor affecting the vertical distribution of wood density within individual trees is that growth strategies and architectural models differentially allocate carbon between trunks and branches (Hallé et al., 1978; Woodcock and Shier, 2002). To the extent that such growth strategies are phylogenetically conserved (Keller, 2004), we would predict differential allometries among trees from different families. Indeed, we did find strong evidence not only for family-level differences in average xylem density, but also in the allometric relationship between branches and trunks (Fig. 2), which is consistent with the phylogenetic conservatism of wood density in neotropical trees found by Chave et al. (2006). However, there is no apparent general pattern relating these differences to growth strategies. For example, tree families with trunk xylem density higher than branch xylem density generally had a shallower allometric slope (Fig. 2), but these included both Sapotaceae (shade tolerant canopy and subcanopy trees, often cauliflorous, trunks monopodial and, for *Micropholis*, sympodial) and Sapindaceae (heliophilic subcanopy and understory trees, trunks mostly sympodial). Similarly, families with steeper allometric slopes included both Lauraceae (canopy and subcanopy trees, mostly monopodial trunks) and Lecythidaceae (canopy trees with sympodial trunks).

Variation in wood anatomical structure may further affect the relationship between branch and trunk xylem density. Wood density reflects the amount of wood tissue (i.e., cell wall substance) per unit volume, which varies accordingly to the size of the cells, the thickness of the cell walls, and the proportion of each cellular type in the xylem. Our results may reflect the anatomical variation observed in the xylem and its tight correlation with density values. For example, compared to main stems, branches have shorter, narrower tracheids and vessels, narrower growth rings, more numerous rays, higher vessel density, and lower vessel volume (Gartner, 1995), which may differentially

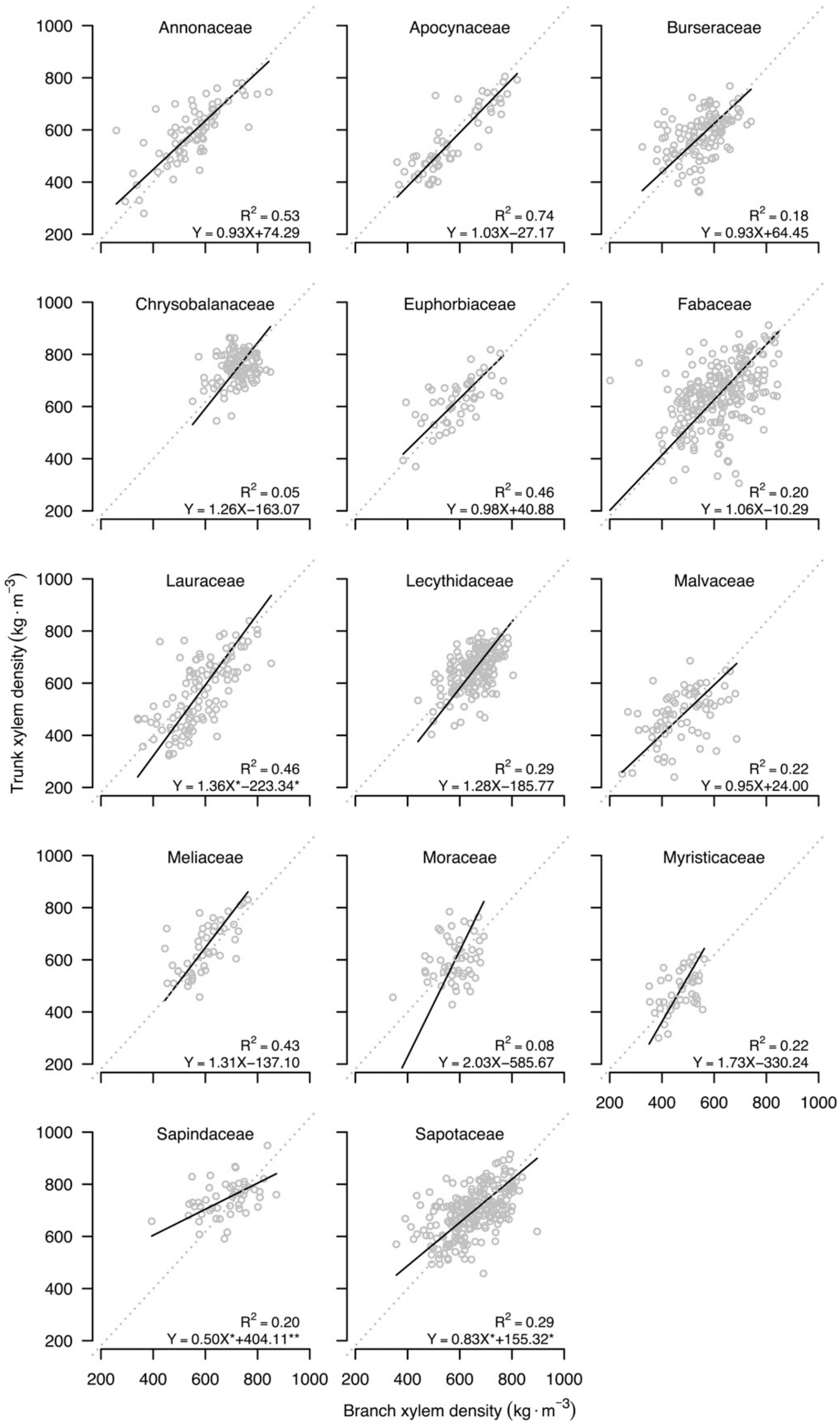

Fig. 2. The major-axis fit between trunk and branch xylem densities for the 14 most common families. Points represent individual trees, the solid line represents the major-axis-fitted line for each family, and the dotted line represents the community-level fitted-line. Asterisks in the equation indicate whether the slope or intercept, respectively, differ from community-level values. Asterisks indicate significance as in Fig. 1.

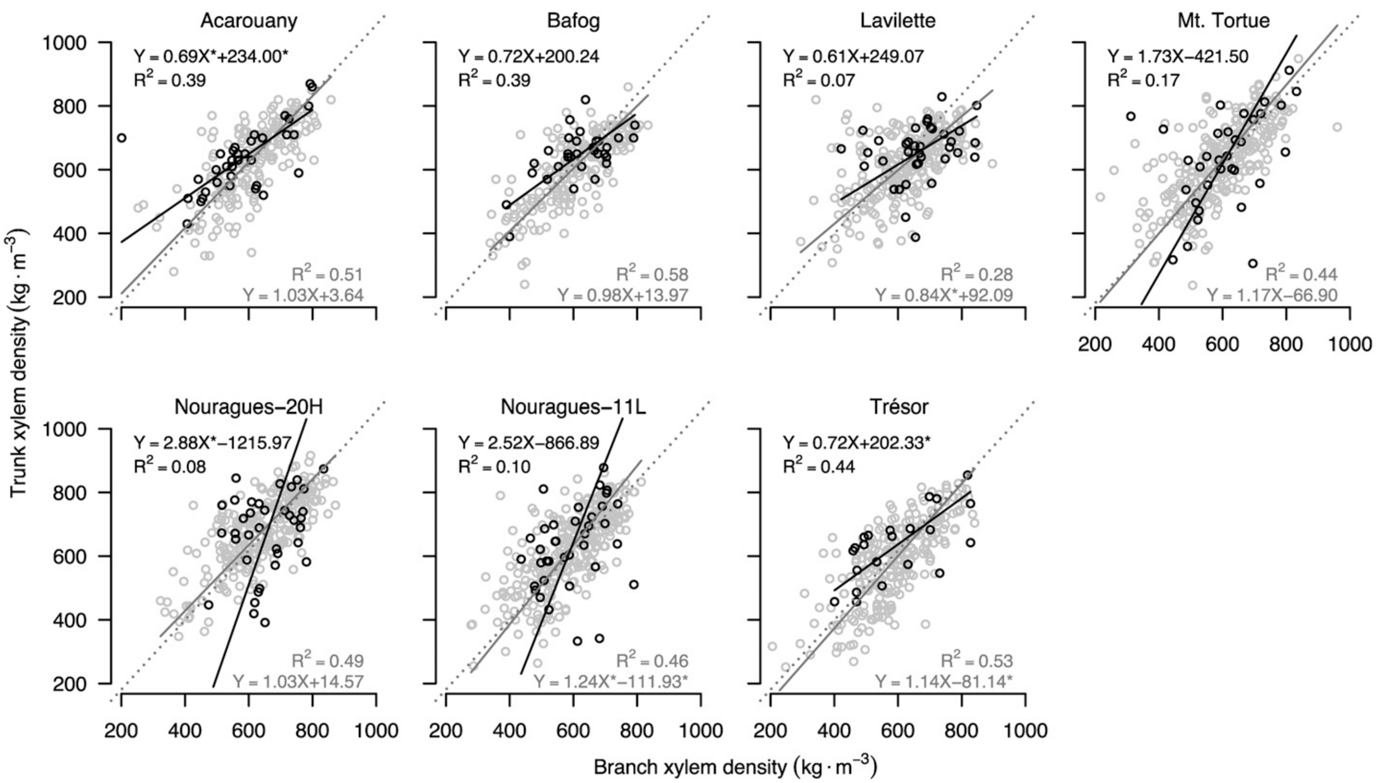

Fig. 3. The major-axis (MA) fit between trunk and branch xylem density in seven rain forest sites from French Guiana. The gray points and solid gray line indicate the site-level relationship, whereas the black points and lines indicate individuals of Fabaceae in each site. The dotted line represents the MA-fitted line for all 1909 samples together. Asterisks indicate significance as in Fig. 1.

affect density. Moreover, because branches are subject to non-vertical strain, they tend to develop tension wood more frequently than do trunks, resulting in higher overall density values (Panshin and de Zeeuw, 1980). Anatomical variation may also be shaped by ontogeny as, for example, vessels may be subject to infilling by secondary material, resulting in increasing wood density with wood age. All these factors highlight the need for future studies involving information on the age, position, and anatomical structure of branches to determine the influence of these potential sources of variation on the relationship between trunk and branch wood density.

A third potential explanatory factor for deviations from the general allometric relationship is environmental variation. Among-site variation in wood density has been reported in several studies (Gonzalez and Fisher, 1998; Baker et al., 2004; Muller-Landau, 2004; Chave et al., 2006; ter Steege et al., 2006). Perhaps more importantly, some evidence suggests that wood density can vary with environmental conditions within species. For example, soil nutrients, water availability, altitude, and temperature are suggested as important factors influencing intraspecific variation in wood density across environmental gradients (Beets et al., 2001; Patiño et al., 2009). In our data set, variation among sites had relatively little impact on the relationship between trunk and branch xylem density, possibly because we sampled relatively few sites, all of which occurred on low-fertility *terra firme* soils (Table 1; Fig. 3). Nonetheless, the site by family interaction explained 25.4% of the variance in the branch–trunk xylem density relationship, such that many families had different allometries in different sites (Fig. 3). Still, it remains difficult to derive a general pattern from our results, underlining the need for further studies investigating intraspecific variation in wood density across broad environmental gradients.

Estimates of aboveground biomass (AGB) in tropical forests are crucial to our understanding of the impact of climate change on the global carbon cycle (Saatchi et al., 2007), and wood density is an important variable for accurately estimating carbon stocks (Baker et al., 2004; Nogueira et al., 2005, 2007; Malhi et al., 2006). Our finding that trunk xylem density is slightly but significantly greater than branch xylem density suggests that estimates based solely upon measures of trunk density lead to slight overestimates of AGB. On the other hand, applying branch estimates obtained via less-destructive sampling may underestimate aboveground biomass because of the 9% mean difference in xylem density between branches and trunks. To test this possibility, we estimated AGB using the xylem density values of branches and trunks separately in our seven French Guianan forests. Then, we estimated trunk xylem density using branch xylem density and the equation in Fig. 1 (Table 2). Estimates of AGB based solely on branch xylem density values varied among plots and were 4–12% lower than estimates using trunk xylem density, suggesting that in some sites the large trees, which contribute predominantly to AGB, belong to species for which branches are especially less dense than trunks. Calculations using estimated trunk xylem density were very similar to the values obtained from measured trunk xylem densities, underlying the utility of our model to predict biomass in studies in which only branch density is measured. Even though differences between branch and trunk xylem density may be offset by radial or even vertical variation in trunk wood density, it is important that we understand all these sources of variation

Table 2. Effects of xylem density (ρ_x) sampling methods on aboveground biomass estimates (AGB) in French Guianan *terra firme* forests. Shown are mean (with standard deviation) values for seven permanent plots located across the gradient of sites sampled in this study, using the allometric relationships with tree height as detailed by Chave et al. (2005).

Sampling method	Community ρ_x, kg·m^{-3} (SD)	AGB, Mg C·ha^{-1} (SD)	Difference in percentage from AGB estimated by trunk ρ_x (SD)
Branch	610 (20)	374 (54)	−6.9 (3.1)
Estimated Trunk [a]	670 (20)	407 (58)	1.5 (3.3)
Trunk	650 (20)	402 (64)	—

[a] Using the model detailed in Fig. 1

to improve AGB estimates. In particular, covariates that might explain within-tree variation, such as branch location and tree and branch size, should be explored. In addition, studies of variation in the vertical distribution of wood specific gravity over gradients of precipitation and soil fertility will be important to understand the mechanisms behind this change in allometry and their interactions with floristic turnover (e.g., ter Steege et al., 2006). Such studies will provide a better understanding of within-tree variation in wood density, allow better insight into the carbon budgets of individual trees, and improve estimates of carbon stocks in tropical forests.

LITERATURE CITED

Baker, T. R., O. L. Phillips, Y. Malhi, S. Almeida, L. Arroyo, A. Di Fiore, T. Erwin, et al. 2004. Variation in wood density determines spatial patterns in Amazonian forest biomass. *Global Change Biology* 10: 545–562.

Baraloto, C., C. E. T. Paine, S. Patiño, D. Bonal, B. Hérault, and J. Chave. 2010. Functional trait variation and sampling designs in species-rich plant communities. *Functional Ecology* 24: 208–216.

Beets, P. N., K. Gilchrist, and M. P. Jeffreys. 2001. Wood density of radiata pine: Effect of nitrogen supply. *Forest Ecology and Management* 145: 173–180.

Butterfield, R. P., R. P. Crook, R. Adams, and R. Morris. 1993. Radial variation in wood specific gravity, fibre length and vessel area for two Central American hardwoods: *Hyeronima alchorneoides* and *Vochysia guatemalensis*: natural and plantation-grown trees. *International Association of Wood Aanatomists Journal* 14: 153–161.

Carlquist, S. 2001. Comparative wood anatomy: Systematic, ecological, and evolutionary aspects of dicotyledon wood, 2nd ed. Springer-Verlag, Berlin, Germany.

Chave, J., C. Andalo, S. Brown, M. Cairns, J. Q. Chambers, D. Eamus, H. Fölster, et al. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. *Oecologia* 145: 87–99.

Chave, J., D. Coomes, S. Jansen, S. L. Lewis, N. G. Swenson, and A. E. Zanne. 2009. Towards a worldwide wood economics spectrum. *Ecology Letters* 12: 351–366.

Chave, J., H. C. Muller-Landau, T. R. Baker, T. Easdale, H. ter Steege, and C. O. Webb. 2006. Regional and phylogenetic variation of wood density across 2456 neotropical tree species. *Ecological Applications* 16: 2356–2367.

Cochard, H., S. Coste, B. Chanson, J. M. Guehl, and E. Nicolini. 2005. Hydraulic architecture correlates with bud organogenesis and primary shoot growth in beech (*Fagus sylvatica*). *Tree Physiology* 25: 1545–1552.

Dalla-Salda, G., A. Martinez-Meier, H. Cochard, and P. Rozenberg. 2009. Variation of wood density and hydraulic properties of Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) clones related to a heat and drought wave in France. *Forest Ecology and Management* 257: 182–189.

Domec, J. C., and B. L. Gartner. 2002. Age- and position-related changes in hydraulic versus mechanical dysfunction of xylem: Inferring the design criteria for Douglas-fir wood structure. *Tree Physiology* 22: 91–104.

Fearnside, P. 1997. Wood density for estimating forest biomass in Brazilian Amazonia. *Forest Ecology and Management* 90: 59–87.

Gartner, B. L. 1995. Plant stems: Physiology and functional morphology. Academic Press, San Diego, California, USA.

Gonzalez, E., and R. F. Fisher. 1998. Variation in selected wood properties of *Vochysia guatemalensis* from four sites in Costa Rica. *Forest Science* 44: 185–191.

Hacke, U. G., and J. S. Sperry. 2001. Functional and ecological xylem anatomy. *Perspectives in Plant Ecology, Evolution and Systematics* 4: 97–115.

Hacke, U. G., J. S. Sperry, W. T. Pockman, S. D. Davis, and K. A. McCulloh. 2001. Trends in wood density and structure are linked to prevention of xylem implosion by negative pressure. *Oecologia* 126: 457–461.

Hallé, F., R. A. A. Oldeman, and P. B. Tomlinson. 1978. Tropical trees and forests: An architectural analysis. Springer-Verlag, Berlin, Germany.

Keller, R. 2004. Identification of tropical woody plants in the absence of flowers: A field guide, 2nd ed. Springer-Birkhauser, Berlin, Germany.

Larjavaara, M., and H. C. Muller-Landau. 2010. Rethinking the value of high wood density. *Functional Ecology* 24: 701–705.

Malhi, Y., D. Wood, T. R. Baker, J. Wright, O. L. Phillips, T. Cochrane, P. Meir, et al. 2006. The regional variation of aboveground live biomass in old-growth Amazonian forests. *Global Change Biology* 12: 1107–1138.

Muller-Landau, H. C. 2004. Interspecific and inter-site variation in wood specific gravity of tropical trees. *Biotropica* 36: 20–32.

Niklas, K. J. 1993. Influence of tissue density-specific mechanical properties on the scaling of plant height. *Annals of Botany* 72: 173–179.

Nogueira, E., P. Fearnside, B. Nelson, and M. B. França. 2007. Wood density in forests of Brazil's 'arc of deforestation': Implications for biomass and flux of carbon from land-use change in Amazonia. *Forest Ecology and Management* 248: 119–135.

Nogueira, E., B. Nelson, and P. Fearnside. 2005. Wood density in dense forest in central Amazonia, Brazil. *Forest Ecology and Management* 208: 261–286.

Okai, R., K. Frimpong-Mensah, and D. Yeboah. 2004. Characterization of strength properties of branchwood and stemwood of some tropical hardwood species. *Wood Science and Technology* 38: 163–171.

Panshin, A. J., and C. de Zeeuw. 1980. Textbook of wood technology: Structure, identification, properties, and uses of the commercial woods of the United States and Canada, 4th ed. McGraw-Hill, New York, New York, USA.

Parolin, P. 2002. Radial gradients in wood specific gravity in trees of central Amazonian floodplains. *International Association of Wood Anatomists Journal* 23: 449–457.

Patiño, S., J. Lloyd, R. Paiva, T. R. Baker, C. A. Quesada, L. M. Mercado, J. Schmerler, et al. 2009. Branch xylem density variations across the Amazon Basin. *Biogeosciences* 6: 545–568.

Poorter, L., S. J. Wright, H. Paz, D. Ackerly, R. Condit, G. Ibarra-Manríquez, K. E. Harms, et al. 2008. Are functional traits good predictors of demographic rates? Evidence from five Neotropical forests. *Ecology* 89: 1908–1920.

R Development Core Team. 2008. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, website http://www.R-project.org.

Rueda, R., and G. B. Williamson. 1992. Radial and vertical wood specific gravity in *Ochroma pyramidale* (Cav. ex Lam.) Urb. (Bombacaceae). *Biotropica* 24: 512–518.

Saatchi, S. S., R. A. Houghton, R. C. Dos Santos Alvala, J. V. Soares, and Y. Yu. 2007. Distribution of aboveground live biomass in the Amazon basin. *Global Change Biology* 13: 816–837.

Scholz, F. G., S. J. Bucci, G. Goldstein, F. C. Meinzer, A. C. Franco, and F. Miralles-Wilhelm. 2007. Biophysical properties and functional significance of stem water storage tissues in Neotropical savanna trees. *Plant, Cell & Environment* 30: 236–248.

SWENSON, N. G., AND B. J. ENQUIST. 2008. The relationship between stem and branch wood specific gravity and the ability of each measure to predict leaf area. *American Journal of Botany* 95: 516–519.

TER STEEGE, H., N. C. A. PITMAN, O. L. PHILLIPS, J. CHAVE, D. SABATIER, A. DUQUE, J. F. MOLINO, ET AL. 2006. Continental-scale patterns of canopy tree composition and function across Amazonia. *Nature* 443: 444–447.

TYREE, M. T., AND M. H. ZIMMERMANN. 2002. Xylem structure and the ascent of sap, 2nd ed. Springer-Verlag, Berlin, Germany.

WARTON, D. [and translated to R by J. Ormerod]. 2007. smatr: (Standardised) Major Axis Estimation and Testing Routines. R package version 2.1. Website http://web.maths.unsw.edu.au/~dwarton.

WARTON, D. I., I. J. WRIGHT, D. S. FALSTER, AND M. WESTOBY. 2006. Bivariate line-fitting methods for allometry. *Biological Reviews of the Cambridge Philosophical Society* 81: 259–291.

WIEMANN, M. C., AND G. B. WILLIAMSON. 1988. Extreme radial changes in wood specific gravity in some tropical pioneers. *Wood and Fiber Science* 20: 344–349.

WILLIAMSON, G. B., AND M. C. WIEMANN. 2010. Measuring wood specific gravity...Correctly. *American Journal of Botany* 97: 519–524.

WOODCOCK, D. W., AND A. D. SHIER. 2002. Wood specific gravity and its radial variations: The many ways to make a tree. *Trees (Berlin)* 16: 437–443.

ZEILEIS, A., AND T. HOTHORN. 2002. Diagnostic checking in regression relationships. *R News* 2: 7–10. Website http://CRAN.R-project.org/doc/Rnews/.

APPENDIX 1. Taxa used in this study and voucher information. All vouchers were collected from permanent plots in French Guiana, with duplicates deposited at Cayenne, French Guiana (CAY) and were in the process of being sent to taxonomic specialists for final determinations at the time of publication. Send inquiries on voucher location to chris.baraloto@ecofog.gf.

Family. ***Taxon***, *Voucher specimen.*

Anacardiaceae. ***Anacardium spruceanum*** Benth. ex Engl., *Baraloto et al. 3052*; ***Astronium lecointei*** Ducke, *Baraloto et al. 3290*; ***Astronium ulei*** Mattick, *Baraloto et al. 3291*; ***Tapirira bethanniana*** J.D. Mitch., *Baraloto et al. 3292*; ***Tapirira guianensis*** Aubl., *Baraloto et al. 3293*; ***Tapirira obtusa*** (Benth.) J.D. Mitch., *Baraloto et al. 3901*; ***Thyrsodium guianense*** Sagot ex Marchand, *Baraloto et al. 3263*; ***Thyrsodium puberulum*** J.D. Mitch. & D.C. Daly, *Baraloto et al. 3091*.

Annonaceae. ***Annona prevostiae*** H. Rainer, *Baraloto et al. 3312*; ***Duguetia calycina*** Benoist, *Baraloto et al. 3313*; ***Duguetia surinamensis*** R.E. Fr., *Baraloto et al. 3002*; ***Fusaea longifolia*** (Aubl.) Saff., *Baraloto et al. 3127*; ***Guatteria anthracina*** Scharf & Maas, *Baraloto et al. 3011*; ***Guatteria wachenheimi*** Benoist, *Baraloto et al. 3120*; ***Oxandra asbeckii*** (Pulle) R.E. Fr., *Baraloto et al. 3330*; ***Pseudoxandra cuspidata*** Maas, *Baraloto et al. 3335*; ***Rollinia elliptica*** R.E. Fr., *Baraloto et al. 3903*; ***Tetrameranthus* sp.,** *Baraloto et al. 3254*; ***Unonopsis perrottetii*** (A. DC.) R.E. Fr., *Baraloto et al. 3336*; ***Unonopsis rufescens*** (Baill.) R.E. Fr., *Baraloto et al. 3053*; ***Xylopia frutescens*** Aubl., *Baraloto et al. 3358*; ***Xylopia nitida*** Dunal, *Baraloto et al. 3359*; ***Genus undetermined***, *Baraloto et al. 3902*.

Apocynaceae. ***Ambelania acida*** Aubl., *Baraloto et al. 3271*; ***Anartia meyeri*** (G. Don) Miers, *Baraloto et al. 3286*; ***Aspidosperma album*** (Vahl) Benoist ex Pichon, *Baraloto et al. 3300*; ***Aspidosperma cruentum*** Woodson, *Baraloto et al. 3138*; ***Aspidosperma marcgravianum*** Woodson, *Baraloto et al. 3030*; ***Aspidosperma oblongum*** A. DC., *Baraloto et al. 3302*; ***Aspidosperma spruceanum*** Benth. ex Müll. Arg., *Baraloto et al. 3904*; ***Bonafousia undulata*** (Vahl) A. DC., *Baraloto et al. 3303*; ***Couma guianensis*** Aubl., *Baraloto et al. 3282*; ***Geissospermum laeve*** (Vell.) Miers, *Baraloto et al. 3283*; ***Himatanthus* sp. B1**, *Baraloto et al. 3905*; ***Lacmellea aculeata*** (Ducke) Monach., *Baraloto et al. 3295*; ***Macoubea guianensis*** Aubl., *Baraloto et al. 3285*; ***Malouetia guianensis*** (Aubl.) Miers, *Baraloto et al. 3260*; ***Parahancornia fasciculata*** (Poir.) Benoist, *Baraloto et al. 3308*.

Aquifoliaceae. ***Ilex* sp. 2**, *Baraloto et al. 3906*; ***Ilex* sp. B1**, *Baraloto et al. 3907*.

Araliaceae. ***Schefflera decaphylla*** (Sagot ex Seem.) Harms, *Baraloto et al. 3037*; ***Schefflera morototoni*** (Aubl.) Maguire, Steyerm. & Frodin, *Baraloto et al. 3311*.

Bignoniaceae. ***Jacaranda copaia*** (Aubl.) D. Don subsp. *copaia, Baraloto et al. 3378*; ***Tabebuia capitata*** (Bureau & K. Schum.) Sandwith, *Baraloto et al. 3908*; ***Tabebuia serratifolia*** (Vahl) G. Nicholson, *Baraloto et al. 3909*; ***Tabebuia* sp. B1**, *Baraloto et al. 3910*.

Boraginaceae. ***Cordia sagotii*** I.M. Johnst., *Baraloto et al. 3374*; ***Cordia* sp. B2**, *Baraloto et al. 3101*.

Brassicaceae. ***Capparis maroniensis*** Benoist, *Baraloto et al. 3911*.

Burseraceae. ***Crepidospermum goudotianum*** (Tul.) Triana & Planch., *Baraloto et al. 3912*; ***Dacryodes cuspidata*** (Cuatrec.) D.C. Daly, *Baraloto et al. 3060*; ***Dacryodes nitens*** Cuatrec., *Baraloto et al. 3382*; ***Dacryodes* sp. B1**, *Baraloto et al. 3141*; ***Protium apiculatum*** Swart, *Baraloto et al. 3402*; ***Protium cuneatum*** Swart, *Baraloto et al. 3913*; ***Protium decandrum*** (Aubl.) Marchand, *Baraloto et al. 3106*; ***Protium demerarense*** Swart, *Baraloto et al. 4132*; ***Protium gallicum*** D.C. Daly, *Baraloto et al. 3008*; ***Protium giganteum*** Engl. var. *crassifolium* (Engl.) D.C. Daly, *Baraloto et al. 3914*; ***Protium morii*** D.C. Daly, *Baraloto et al. 3133*; ***Protium opacum*** Swart subsp. *rabelianum* D.C. Daly, *Baraloto et al. 3119*; ***Protium pallidum*** Cuatrec., *Baraloto et al. 3397*; ***Protium sagotianum*** Marchand, *Baraloto et al. 3391*; ***Protium subserratum*** (Engl.) Engl., *Baraloto et al. 3388*; ***Protium trifoliolatum*** Engl., *Baraloto et al. 3032*; ***Protium* sp. B2**, *Baraloto et al. 3401*; ***Tetragastris altissima*** (Aubl.) Swart, *Baraloto et al. 3433*; ***Tetragastris panamensis*** (Engl.) Kuntze, *Baraloto et al. 3177*; ***Trattinnickia demerarae*** Sandwith, *Baraloto et al. 3129*; ***Trattinnickia* sp. B1**, *Baraloto et al. 3915*.

Caryocaraceae. ***Caryocar glabrum*** Pers. subsp. *album* Prance & M.F. Silva, *Baraloto et al. 3027*.

Celastraceae. ***Cheiloclinium cognatum*** (Miers) A.C. Sm., *Baraloto et al. 3916*; ***Goupia glabra*** Aubl., *Baraloto et al. 3917*; ***Maytenus guyanensis*** Klotzsch., *Baraloto et al. 3919*; ***Maytenus myrsinoides*** Reissek, *Baraloto et al. 3920*; ***Maytenus oblongata*** Reissek, *Baraloto et al. 3921*; ***Maytenus* sp. B1**, *Baraloto et al. 3112*; ***Maytenus* species undetermined**, *Baraloto et al. 3918*.

Chrysobalanaceae. ***Couepia bracteosa*** Benth., *Baraloto et al. 3043*; ***Couepia caryophylloides*** Benoist, *Baraloto et al. 3922*; ***Couepia guianensis*** Aubl. subsp. *divaricata* (Huber) Prance, *Baraloto et al. 3923*; ***Couepia habrantha*** Standl., *Baraloto et al.* 3924; ***Couepia joaquinae*** Prance, *Baraloto et al. 3536*; ***Couepia magnoliifolia*** Benth. ex Hook. f., *Baraloto et al. 3925*; ***Couepia parillo*** DC., *Baraloto et al. 3483*; ***Exellodendron barbatum*** (Ducke) Prance, *Baraloto et al. 3926*; ***Hirtella bicornis*** Mart. & Zucc. var. *bicornis, Baraloto et al. 3479*; ***Hirtella glandulosa*** Spreng., *Baraloto et al. 3031*; ***Hirtella suffulta*** Prance, *Baraloto et al. 3534*; ***Licania alba*** (Bernoulli) Cuatrec., *Baraloto et al. 3502*; ***Licania canescens*** Benoist, *Baraloto et al. 4133*; ***Licania glabriflora*** Prance, *Baraloto et al. 3929*; ***Licania heteromorpha*** Benth. var. *glabra* (Mart. ex Hook. f.) Prance, *Baraloto et al. 3500*; ***Licania kunthiana*** Hook. f., *Baraloto et al. 3930*; ***Licania laevigata*** Prance, *Baraloto et al. 3477*; ***Licania latistipula*** Prance, *Baraloto et al. 3478*; ***Licania laxiflora*** Fritsch, *Baraloto et al. 3499*; ***Licania majuscula*** Sagot, *Baraloto et al. 3467*; ***Licania membranacea*** Sagot ex Laness., *Baraloto et al. 3003*; ***Licania minutiflora*** (Sagot) Fritsch, *Baraloto et al. 3931*; ***Licania octandra*** (Hoffmanns. ex Roem. & Schult.) Kuntze, *Baraloto et al. 3932*; ***Licania ovalifolia*** Kleinhoonte, *Baraloto et al. 3498*; ***Licania sprucei*** (Hook. f.) Fritsch, *Baraloto et al. 3381*; ***Licania* sp. 2**, *Baraloto et al. 3934*; ***Licania* sp. 11**, *Baraloto et al. 3933*; ***Licania* sp. B1**, *Baraloto et al. 3935*;

Licania* sp. B3**, *Baraloto et al. 3936*; ***Licania* sp. B4**, *Baraloto et al. 3937*; ***Licania* species undetermined**, *Baraloto et al. 3928*; ***Parinari excelsa Sabine, *Baraloto et al. 3938*; ***Parinari montana*** Aubl., *Baraloto et al. 3508*; ***Genus undetermined* sp. B1**, *Baraloto et al. 3927*.

Clusiaceae. ***Moronobea coccinea*** Aubl., *Baraloto et al. 3708*; ***Rheedia madruno*** (Kunth) Planch. & Triana, *Baraloto et al. 3704*; ***Symphonia globulifera*** L.f., *Baraloto et al. 3683*; ***Symphonia* sp. 1**, *Baraloto et al. 3686*; ***Tovomita* sp. 2**, *Baraloto et al. 3939*; ***Tovomita* sp. B4**, *Baraloto et al. 3942*; ***Tovomita* sp. B9**, *Baraloto et al. 3943*; ***Tovomita* sp. B10**, *Baraloto et al. 3940*; ***Tovomita* sp. B12**, *Baraloto et al. 3941*; ***Vismia cayennensis*** (Jacq.) Pers., *Baraloto et al. 3682*.

Combretaceae. ***Buchenavia grandis*** Ducke, *Baraloto et al. 3945*; ***Buchenavia guianensis*** (Aubl.) Alwan & Stace, *Baraloto et al. 3712*; ***Buchenavia* species undetermined**, *Baraloto et al. 3944*; ***Terminalia guyanensis*** Eichl., *Baraloto et al. 3067*; ***Terminalia* sp. B1**, *Baraloto et al. 3946*.

Dichapetalaceae. ***Tapura amazonica*** Poepp. & Endl., *Baraloto et al. 3722*; ***Tapura guianensis*** Aubl., *Baraloto et al. 3723*.

Ebenaceae. ***Diospyros capreifolia*** Mart. ex Hiern, *Baraloto et al. 3669*; ***Diospyros carbonaria*** Benoist, *Baraloto et al. 3034*; ***Diospyros cavalcantei*** Sothers, *Baraloto et al. 3674*; ***Diospyros dichroa*** Sandwith, *Baraloto et al. 3671*.

Elaeocarpaceae. ***Sloanea brevipes*** Benth., *Baraloto et al. 3742*; ***Sloanea echinocarpa*** Uittien, *Baraloto et al. 3727*; ***Sloanea eichleri*** K. Schum., *Baraloto et al. 3741*; ***Sloanea garckeana*** K. Schum., *Baraloto et al. 3724*; ***Sloanea guianensis*** (Aubl.) Benth., *Baraloto et al. 3110;* ***Sloanea* sp. B1**, *Baraloto et al. 3728;* ***Sloanea* sp. B3**, *Baraloto et al. 3729*; ***Sloanea* sp. B6**, *Baraloto et al. 3739*; ***Sloanea* sp. B7**, *Baraloto et al. 3028*; ***Sloanea* sp. B8**, *Baraloto et al. 3738*; ***Sloanea* sp. B9**, *Baraloto et al. 3733*; ***Sloanea* sp. B11**, *Baraloto et al. 3736*; ***Sloanea* sp. B12**, *Baraloto et al. 3735*; ***Sloanea* sp. B15**, *Baraloto et al. 3734*; ***Sloanea* sp. B16**, *Baraloto et al. 3725*.

Euphorbiaceae. ***Chaetocarpus schomburgkianus*** (Kuntze) Pax & K. Hoffm., *Baraloto et al. 3662*; ***Conceveiba guianensis*** Aubl., *Baraloto et al. 3628*; ***Drypetes fanshawei*** Sandwith, *Baraloto et al. 3627*; ***Drypetes variabilis*** Uittien, *Baraloto et al. 3633*; ***Glycydendron amazonicum*** Ducke, *Baraloto et al. 3010*; ***Hevea guianensis*** Aubl., *Baraloto et al. 3622*; ***Hyeronima alchorneoides*** Allemão, *Baraloto et al. 3130*; ***Mabea piriri*** Aubl., *Baraloto et al. 3947*; ***Mabea speciosa*** Müll. Arg. subsp. A, *Baraloto et al. 3949*; ***Mabea* sp. B1**, *Baraloto et al. 3948*; ***Maprounea guianensis*** Aubl., *Baraloto et al. 3950*; ***Pogonophora schomburgkiana*** Miers ex Benth., *Baraloto et al. 3651*; ***Sandwithia guyanensis*** Landj., *Baraloto et al. 3638*.

Fabaceae. ***Abarema jupunba*** (Willd.) Britton & Killip var. *jupunba, Baraloto et al. 3951*; ***Alexa wachenheimii*** Benoist, *Baraloto et al. 4138*; ***Andira surinamensis*** (Bondt) Splitg. ex Pulle, *Baraloto et al. 3952*; ***Balizia pedicellaris*** (DC.) Barneby & J.W. Grimes, *Baraloto et al. 3953*; ***Bocoa prouacensis*** Aubl., *Baraloto et al. 3045*; ***Cedrelinga cateniformis*** (Ducke) Ducke, *Baraloto et al. 3954*; ***Dialium guianense*** (Aubl.) Sandwith, *Baraloto et al. 3955*; ***Dicorynia guianensis*** Amshoff, *Baraloto et al. 3012*; ***Diplotropis purpurea*** (Rich.) Amshoff, *Baraloto et al. 3956*; ***Dipteryx odorata*** (Aubl.) Willd., *Baraloto et al. 3838*; ***Eperua falcata*** Aubl., *Baraloto et al. 3957*; ***Eperua grandiflora*** (Aubl.) Benth. subsp. *grandiflora, Baraloto et al. 3018*; ***Hymenaea courbaril*** L. var. *courbaril, Baraloto et al. 3042*; ***Hymenolobium flavum*** Kleinhoonte, *Baraloto et al. 3958*; ***Hymenolobium* sp. B1**, *Baraloto et al. 3841*; ***Inga acreana*** Harms, *Baraloto et al. 3041*; ***Inga acrocephala*** Steud., *Baraloto et al. 3088*; ***Inga alba*** (Sw.) Willd., *Baraloto et al. 3154*; ***Inga albicoria*** Poncy, *Baraloto et al. 4147*; ***Inga brachystachys*** Ducke, *Baraloto et al. 3040*; ***Inga fanchoniana*** Poncy, *Baraloto et al. 3158*; ***Inga gracilifolia*** Ducke, *Baraloto et al. 3159*; ***Inga huberi*** Ducke, *Baraloto et al. 4136*; ***Inga leiocalycina*** Benth., *Baraloto et al. 3080*; ***Inga longipedunculata*** Ducke, *Baraloto et al. 3166*; ***Inga loubryana*** Poncy, *Baraloto et al. 3165*; ***Inga melinonis*** Sagot, *Baraloto et al. 3959*; ***Inga nouraguensis*** Poncy, *Baraloto et al. 3168*; ***Inga paraensis*** Ducke, *Baraloto et al. 3062*; ***Inga pezizifera*** Benth., *Baraloto et al. 3170*; ***Inga rubiginosa*** (Rich.) DC., *Baraloto et al. 3171*; ***Inga sarmentosa*** Glaz. ex Harms, *Baraloto et al. 4137*; ***Inga* sp. B1**, *Baraloto et al. 3960*; ***Inga* sp. B2**, *Baraloto et al. 3961*; ***Inga* sp. B3**, *Baraloto et al. 3962*; ***Inga* sp. B4**, *Baraloto et al. 3963*; ***Macrolobium bifolium*** (Aublet) Pers., *Baraloto et al. 3964*; ***Ormosia coccinea*** (Aubl.) Jacks., *Baraloto et al. 3839*; ***Ormosia flava*** (Ducke) Rudd, *Baraloto et al. 3965*; ***Parkia nitida*** Miq., *Baraloto et al. 3966*; ***Parkia ulei*** (Harms) Kuhlm. var. *surinamensis* Kleinhoonte, *MG 12*; ***Peltogyne* sp. 1**, *Baraloto et al. 3967*; ***Platymiscium pinnatum*** (Jacq.) Dugand, *Baraloto et al. 3968*; ***Poecilanthe effusa*** (Huber) Ducke, *Baraloto et al. 3969*; ***Pseudopiptadenia psilostachya*** (DC.) G.P. Lewis & M.P. Lima, *Baraloto et al. 3100*; ***Pseudopiptadenia suaveolens*** (Miq.) J.W. Grimes, *Baraloto et al. 3007*; ***Stryphnodendron moricolor*** Barneby & J.W. Grimes, *Baraloto et al. 3970*; ***Stryphnodendron polystachyum*** (Miq.) Kleinhoonte, *Baraloto et al. 3971;* ***Swartzia amshoffiana*** R.S. Cowan, *Baraloto et al. 3972*; ***Swartzia arborescens*** (Aubl.) Pittier, *Baraloto et al. 3973*; ***Swartzia benthamiana*** Miq. var. *benthamiana, Baraloto et al. 4139*; ***Swartzia canescens*** Torke, *Baraloto et al. 3974*; ***Swartzia leblondii*** R.S. Cowan, *Baraloto et al. 3975*; ***Swartzia oblanceolata*** Sandwith, *Baraloto et al. 3813*; ***Swartzia panacoco*** (Aubl.) R.S. Cowan var. *panacoco*, *Baraloto et al. 3976*; ***Swartzia polyphylla*** DC., *Baraloto et al. 3978*; ***Swartzia* sp. B1**, *Baraloto et al. 3979*; ***Tachigali bracteolata*** Dwyer, *Baraloto et al. 3980*; ***Tachigali guianensis*** (Benth.) Zarucchi & Herend., *Baraloto et al. 3981*; ***Tachigali melinonii*** (Harms) Zarucchi & Herend., *Baraloto et al. 3982*; ***Tachigali paniculata*** Aubl., *Baraloto et al. 3983*; ***Tachigali paraensis*** (Huber) Barneby, *Baraloto et al. 3984*; ***Vatairea erythrocarpa*** (Ducke) Ducke, *Baraloto et al. 3837*; ***Vataireopsis surinamensis*** H.C. Lima, *Baraloto et al. 3985*; ***Vouacapoua americana*** Aubl., *Baraloto et al. 3004*; ***Zygia racemosa*** (Ducke) Barneby & J.W. Grimes comb. nov. ined., *Baraloto et al. 3050*; ***Genus undetermined* sp. B1**, *Baraloto et al. 3816*; ***Genus undetermined* sp. B2**, *Baraloto et al. 3815*; ***Genus undetermined* sp. B3**, *Baraloto et al. 3814*.

Humiriaceae. ***Sacoglottis cydonioides*** Cuatrec., *Baraloto et al. 3986*; ***Sacoglottis guianensis*** Benth. var. *guianensis, Baraloto et al. 3987*; ***Sacoglottis* sp. B1**, *Baraloto et al. 3988*; ***Vantanea parviflora*** Lam. var. *parviflora, Baraloto et al. 3989*.

Icacinaceae. ***Dendrobangia boliviana*** Rusby, *Baraloto et al. 3258*; ***Discophora guianensis*** Miers, *Baraloto et al. 3992*; ***Poraqueiba guianensis*** Aubl., *Baraloto et al. 3070*.

Ixonanthaceae. ***Cyrillopsis paraensis*** Kuhlm., *Baraloto et al. 3020*.

Lauracae. ***Aiouea longipetiolata*** van der Werff, *Baraloto et al. 3788*; ***Aniba guianensis*** Aubl., *Baraloto et al. 3621*; ***Aniba hostmanniana*** (Nees) Mez, *Baraloto et al. 3783*; ***Aniba panurensis*** (Meisn.) Mez, *Baraloto et al. 3784*; ***Aniba terminalis*** Ducke, *Baraloto et al. 3099*; ***Aniba williamsii*** O.C. Schmidt, *Baraloto et al. 3993*; ***Endlicheria melinonii*** Benoist, *Baraloto et al. 4141*; ***Licaria cannella*** (Meisn.) Kosterm., *Baraloto et al. 3619*; ***Licaria chrysophylla*** (Meisn.) Kosterm., *Baraloto et al. 4142*; ***Licaria guianensis*** Aubl., *Baraloto et al. 3797*; ***Ocotea amazonica*** (Meisn.) Mez, *Baraloto et al. 3793*; ***Ocotea argyrophylla*** Ducke, *Baraloto et al. 3606*; ***Ocotea cinerea*** van der Werff, ined., *Baraloto et al. 3615*; ***Ocotea indirectinervia*** C.K. Allen, *Baraloto et al. 4143*; ***Ocotea percurrens*** Vicent., *Baraloto et al. 3614*; ***Ocotea schomburgkiana*** (Nees) Mez, *Baraloto et al. 3782*; ***Ocotea subterminalis*** van der Werff, *Baraloto et al. 4144*; ***Ocotea tomentella*** Sandwith, *Baraloto et al. 4135*; ***Ocotea* sp. B1**, *Baraloto et al. 3792*; ***Rhodostemonodaphne grandis*** (Mez) Rohwer, *Baraloto et al. 3602*; ***Rhodostemonodaphne kunthiana*** (Nees) Rohwer, *Baraloto et al. 3056*; ***Rhodostemonodaphne praeclara*** (Sandwith) Madriñán, *Baraloto et al. 3613*; ***Rhodostemonodaphne rufovirgata*** Madriñán, *Baraloto et al. 3017*; ***Sextonia rubra*** (Mez) van der Werff, *Baraloto et al. 3068*; ***Genus undetermined* sp. B2**, *Baraloto et al. 3081*; ***Genus undetermined* sp. 7**, *Baraloto et al. 3753*; ***Genus undetermined* sp. B8**, *Baraloto et al. 3768*; ***Genus undetermined* sp. B10**, *Baraloto et al. 3103*; ***Genus undetermined* sp. B12**, *Baraloto et al. 3769*; ***Genus undetermined* sp. B13**, *Baraloto et al. 3770*; ***Genus undetermined* sp. B15**, *Baraloto et al. 3771*; ***Genus undetermined* sp. B16**, *Baraloto et al. 3772*; ***Genus undetermined* sp. B17**, *Baraloto et al. 3994*; ***Genus undetermined* sp. B18**, *Baraloto et al. 3773*; ***Genus undetermined* sp. B19**, *Baraloto et al. 3774*; ***Genus undetermined* sp. B22**, *Baraloto et al. 3777*; ***Genus undetermined* sp. B23**, *Baraloto et al. 3776*; ***Genus undetermined* sp. B24**, *Baraloto et al. 3778*; ***Genus undetermined* sp. B25**, *Baraloto et al. 3779*; ***Genus undetermined* sp. B26**, *Baraloto et al. 3780*; ***Genus undetermined* sp. B27**, *Baraloto et al. 3781*; ***Genus undetermined* sp. B28**, *Baraloto et al. 3995*; ***Genus undetermined* sp. B29**, *Baraloto et al. 3757*; ***Genus undetermined* sp. B30**, *Baraloto et al. 3758*; ***Genus undetermined* sp. B32**, *Baraloto et al. 3762*; ***Genus undetermined* sp. B33**, *Baraloto et al. 3755*; ***Genus undetermined* sp. B34**, *Baraloto et al. 3754*; ***Genus***

***undetermined* sp. B35**, *Baraloto et al. 3756*; ***Genus undetermined* sp. B36**, *Baraloto et al. 3761*; ***Genus undetermined* sp. B37**, *Baraloto et al. 3760*; ***Genus undetermined* sp. B38**, *Baraloto et al. 3759*.

Lecythidaceae. ***Couratari calycina*** Sandwith, *Baraloto et al. 3597*; ***Couratari guianensis*** Aubl., *Baraloto et al. 3595*; ***Couratari multiflora*** (Sm.) Eyma, *Baraloto et al. 3598*; ***Couratari oblongifolia*** Ducke & R. Knuth, *Baraloto et al. 4145*; ***Eschweilera apiculata*** (Miers) A.C. Sm., *Baraloto et al. 3996*; ***Eschweilera chartaceifolia*** S.A. Mori, *Baraloto et al. 3997*; ***Eschweilera coriacea*** (DC.) S.A. Mori, *Baraloto et al. 3115*; ***Eschweilera decolorans*** Sandwith, *Baraloto et al. 3582*; ***Eschweilera grandiflora*** (Aubl.) Sandwith, *Baraloto et al. 3118*; ***Eschweilera micrantha*** (O. Berg) Miers, *Baraloto et al. 3751*; ***Eschweilera parviflora*** (Aubl.) Miers, *Baraloto et al. 3998*; ***Eschweilera pedicellata*** (Rich.) S.A. Mori, *Baraloto et al. 3079*; ***Eschweilera praeclara*** Sandwith, *Baraloto et al. 3563*; ***Eschweilera sagotiana*** Miers, *Baraloto et al. 4140*; ***Eschweilera simiorum*** (Benoist) Eyma, *Baraloto et al. 3546*; ***Eschweilera squamata*** S.A. Mori, *Baraloto et al. 3561*; ***Gustavia hexapetala*** (Aubl.) Sm., *Baraloto et al. 3543*; ***Lecythis chartacea*** O. Berg, *Baraloto et al. 3999*; ***Lecythis corrugata*** Poit. subsp. *corrugata, Baraloto et al. 3557*; ***Lecythis holcogyne*** (Sandwith) S.A. Mori, *Baraloto et al. 3562*; ***Lecythis idatimon*** Aubl., *Baraloto et al. 4146*; ***Lecythis persistens*** Sagot subsp. *aurantiaca* S.A. Mori, *Baraloto et al. 3804*; ***Lecythis persistens*** Sagot subsp. *persistens*, *Baraloto et al. 3540*; ***Lecythis poiteaui*** O. Berg, *Baraloto et al. 3151*; ***Lecythis zabucajo*** Aubl., *Baraloto et al. 3537*; ***Genus undetermined* sp. B2**, *Baraloto et al. 3803*; ***Genus undetermined* sp. B4**, *Baraloto et al. 3801*; ***Genus undetermined* sp. B5**, *Baraloto et al. 3800*; ***Genus undetermined* sp. B6**, *Baraloto et al. 3799*.

Linaceae. ***Hebepetalum humiriifolium*** (Planch.) Benth., *Baraloto et al. 4000*.

Loganiaceae. ***Antonia ovata*** Pohl, *Baraloto et al. 4001*; ***Strychnos* sp. B1**, *Baraloto et al. 4002*.

Malpighiaceae. ***Bunchosia* sp. B1**, *Baraloto et al. 3805*; ***Byrsonima laevigata*** (Poir.) DC., *Baraloto et al. 4003*.

Malvaceae. ***Apeiba glabra*** Aubl., *Baraloto et al. 3089*; ***Apeiba petoumo*** Aubl., *Baraloto et al. 3019*; ***Bombacopsis nervosa*** (Uittien) A. Robyns, *Baraloto et al. 4004*; ***Catostemma fragrans*** Benth., *Baraloto et al. 4005*; ***Eriotheca longitubulosa*** A. Robyns, *Baraloto et al. 4006*; ***Eriotheca* sp. B1**, *Baraloto et al. 4007*; ***Pachira dolichocalyx*** A. Robyns, *Baraloto et al. 4010*; ***Quararibea duckei*** Huber, *Baraloto et al. 3063*; ***Quararibea spatulata*** Ducke, *Baraloto et al. 4011*; ***Sterculia frondosa*** Rich., *Baraloto et al. 4012*; ***Sterculia lisae*** E.L. Taylor, sp. nov. ined., *Baraloto et al. 4013*; ***Sterculia multiovula*** E.L. Taylor sp. nov. ined., *Baraloto et al. 3066*; ***Sterculia parviflora*** Roxb., *Baraloto et al. 4014*; ***Sterculia pruriens*** (Aubl.) K. Schum. var. *glabrescens* E.L. Taylor var. nov. ined., *Baraloto et al. 3006*; ***Sterculia speciosa*** K. Schum., *Baraloto et al. 4016*; ***Sterculia villifera*** Steud., *Baraloto et al. 4017*; ***Sterculia* sp. B1**, *Baraloto et al. 4015*; ***Theobroma subincanum*** Mart., *Baraloto et al. 3076*; ***Genus undetermined* sp. B1**, *Baraloto et al. 4008*; ***Genus undetermined* sp. B3**, *Baraloto et al. 4009*.

Melastomataceae. ***Henriettella flavescens*** (Aubl.) Triana, *Baraloto et al. 4018*; ***Loreya arborescens*** (Aubl.) DC., *Baraloto et al. 4019*; ***Miconia acuminata*** (Steud.) Naudin, *Baraloto et al. 4020*; ***Miconia fragilis*** Naudin, *Baraloto et al. 4021*; ***Miconia punctata*** (Desr.) D. Don ex D.C., *Baraloto et al. 3806*; ***Miconia* sp. B1**, *Baraloto et al. 3807*; ***Miconia* sp. B2**, *Baraloto et al. 3808*; ***Miconia* sp. B3**, *Baraloto et al. 3809*; ***Mouriri crassifolia*** Sagot, *Baraloto et al. 4022*; ***Mouriri huberi*** Cogn., *Baraloto et al. 4023*; ***Mouriri sagotiana*** Triana, *Baraloto et al. 4024*.

Meliaceae. ***Carapa procera*** DC., *Baraloto et al. 3009*; ***Guarea costata*** A. Juss., *Baraloto et al. 3811*; ***Guarea grandifolia*** DC., *Baraloto et al. 4025*; ***Guarea guidonia*** (L.) Sleumer, *Baraloto et al. 3810*; ***Guarea scabra*** A. Juss., *Baraloto et al. 4026*; ***Guarea silvatica*** C. DC., *Baraloto et al. 3117*; ***Trichilia cipo*** (A. Juss.) C. DC., *Baraloto et al. 3065*; ***Trichilia euneura*** C. DC., *Baraloto et al. 4027*; ***Trichilia micrantha*** Benth., *Baraloto et al. 4028*; ***Trichilia pallida*** Sw., *Baraloto et al. 4029*; ***Trichilia schomburgkii*** C. DC. subsp. *schomburgkii, Baraloto et al. 4030*; ***Trichilia surinamensis*** (Miq.) C. DC., *Baraloto et al. 3812*.

Monimiaceae. ***Siparuna cristata*** (Poepp. & Endl.) A. DC., *Baraloto et al. 3137*; ***Siparuna decipiens*** (Tul.) A. DC., *Baraloto et al. 4031*; ***Siparuna pachyantha*** A.C. Sm., *Baraloto et al. 4032*.

Moraceae. ***Bagassa guianensis*** Aubl., *Baraloto et al. 3123*; ***Brosimum guianense*** (Aubl.) Huber, *Baraloto et al. 3078*; ***Brosimum rubescens*** Taub., *Baraloto et al. 4033*; ***Brosimum utile*** (Kunth) Pittier subsp. *ovatifolium* (Ducke) C.C. Berg, *Baraloto et al. 4034*; ***Ficus* sp. B2**, *Baraloto et al. 3819*; ***Helicostylis pedunculata*** Benoist, *Baraloto et al. 3096*; ***Helicostylis tomentosa*** (Poepp. & Endl.) Rusby, *Baraloto et al. 3820*; ***Maquira calophylla*** (Poepp. & Endl.) C.C. Berg, *Baraloto et al. 3124*; ***Maquira guianensis*** Aubl., *Baraloto et al. 4035*; ***Naucleopsis guianensis*** (Mildbr.) C.C. Berg, *Baraloto et al. 4036*; ***Perebea guianensis*** Aubl. subsp. *guianensis, Baraloto et al. 3086*; ***Perebea rubra*** (Trécul) C.C. Berg subsp. *rubra, Baraloto et al. 4037*; ***Trymatococcus oligandrus*** (Benoist) Lanj., *Baraloto et al. 3051*.

Myristicaceae. ***Iryanthera hostmannii*** (Benth.) Warb., *Baraloto et al. 4038*; ***Iryanthera sagotiana*** (Benth.) Warb., *Baraloto et al. 3048*; ***Osteophloeum platyspermum*** (Spruce ex A. DC.) Warb., *Baraloto et al. 3255*; ***Virola kwatae*** Sabatier, *Baraloto et al. 3256*; ***Virola michelii*** Heckel, *Baraloto et al. 3832*; ***Virola multicostata*** Ducke, *Baraloto et al. 4039*.

Myrtaceae. ***Calyptranthes speciosa*** Sagot., *Baraloto et al. 3830*; ***Eugenia coffeifolia*** DC., *Baraloto et al. 3015*; ***Eugenia cucullata*** Amshoff, *Baraloto et al. 4040*; ***Eugenia cupulata*** Amshoff, *Baraloto et al. 4041*; ***Eugenia feijoi*** O. Berg, *Baraloto et al. 4042*; ***Eugenia macrocalyx*** (Rusby) McVaugh, *Baraloto et al. 3024*; ***Eugenia patrisii*** Vahl, *Baraloto et al. 4043*; ***Eugenia pseudopsidium*** Jacq., *Baraloto et al. 4044*; ***Eugenia* sp. B1**, *Baraloto et al. 4045*; ***Eugenia* sp. FG 20**, *Baraloto et al. 3823*; ***Eugenia* sp. FG 21**, *Baraloto et al. 3824*; ***Eugenia* sp. FG 6**, *Baraloto et al. 3825*; ***Eugenia tapacumensis*** O. Berg, *Baraloto et al. 3831*; ***Eugenia tetramera*** (McVaugh) M.L. Kawasaki & B. Holst, *Baraloto et al. 4046*; ***Myrcia decorticans*** DC., *Baraloto et al. 3818*; ***Myrcia deflexa*** (Poir.) DC., *Baraloto et al. 4048*; ***Myrcia fallax*** (Rich.) DC., *Baraloto et al. 3821*; ***Myrcia* sp. B1**, *Baraloto et al. 3822*; ***Myrciaria floribunda*** (H. West ex Willd.) O. Berg, *Baraloto et al. 4049*; ***Plinia rivularis*** (Cambess.) Rotman, *Baraloto et al. 3829*; ***Genus undetermined* sp. B10**, *Baraloto et al. 3828*; ***Genus undetermined* sp. FG 1**, *Baraloto et al. 3826*; ***Genus undetermined* sp. FG 2**, *Baraloto et al. 3827*; ***Genus undetermined***, *Baraloto et al. 4047*.

Nyctaginaceae. ***Neea floribunda*** Poepp. & Endl., *Baraloto et al. 4050*; ***Neea* sp. B1**, *Baraloto et al. 3840*; ***Neea* sp. B2**, *Baraloto et al. 3835*; ***Neea* sp. B3**, *Baraloto et al. 3834*; ***Neea* sp. B4**, *Baraloto et al. 3833*; ***Genus undetermined* sp. 5**, *Baraloto et al. 3836*.

Ochnaceae. ***Ouratea melinonii*** (Tiegh.) Lemée, *Baraloto et al. 4051*.

Olacaceae. ***Chaunochiton kappleri*** (Sagot ex Engl.) Ducke, *Baraloto et al. 4052*; ***Dulacia guianensis*** (Engl.) Kuntze, *Baraloto et al. 4053*; ***Minquartia guianensis*** Aubl., *Baraloto et al. 3069*; ***Ptychopetalum olacoides*** Benth., *Baraloto et al. 4134*.

Opiliaceae. ***Agonandra silvatica*** Ducke, *Baraloto et al. 3259*.

Polygalaceae. ***Moutabea guianensis*** Aubl., *Baraloto et al. 3817*.

Polygonaceae. ***Coccoloba mollis*** Casar., *Baraloto et al. 4054*.

Quiinaceae. ***Lacunaria crenata*** (Tul.) A.C. Sm., *Baraloto et al. 3178*; ***Lacunaria jenmanii*** (Oliv.) Ducke, *Baraloto et al. 3033*; **Quiina guianensis** Aubl., *Baraloto et al. 4055*; ***Quiina obovata*** Tul., *Baraloto et al. 4056*; ***Quiina* sp. B1**, *Baraloto et al. 4057*; ***Touroulia guianensis*** Aubl., *Baraloto et al. 4058*.

Rhabdodendraceae. ***Rhabdodendron amazonicum*** (Spruce ex Benth.) Huber, *Baraloto et al. 4059*.

Rhizophoraceae. ***Cassipourea guianensis*** Aubl., *Baraloto et al. 4060*.

Rubiaceae. ***Amaioua corymbosa*** Kunth, *Baraloto et al. 4061*; ***Amaioua guianensis*** Aubl. var. *guianensis, Baraloto et al. 4062*; ***Capirona decorticans*** Spruce, *Baraloto et al. 4063*; ***Chimarrhis turbinata*** DC., *Baraloto et al. 4064*; ***Duroia aquatica*** (Aubl.) Bremek., *Baraloto et al. 4065*; ***Duroia eriopila*** L. f. var. *eriopila, Baraloto et al. 3058*; ***Duroia longiflora*** Ducke, *Baraloto et al. 4066*; ***Ferdinandusa paraensis*** Ducke, *Baraloto et al. 4067*; ***Guettarda acreana*** K. Krause, *Baraloto et al. 4068*; ***Isertia spiciformis*** DC., *Baraloto et al. 4069*; ***Palicourea guianensis*** Aubl. subsp. *guianensis, Baraloto et al. 3432*; ***Posoqueria latifolia*** (Rudge) Roem. & Schult. subsp. *gracilis* (Rudge) Steyerm., *Baraloto*

et al. 4070; ***Psychotria ficigemma*** DC., *Baraloto et al. 4071*; ***Psychotria mapourioides*** DC. var. *chionantha* (DC.) Steyerm., *Baraloto et al. 3093*; ***Stachyarrhena acuminata*** Standl., *Baraloto et al. 4072*.

Rutaceae. ***Hortia excelsa*** Ducke, *Baraloto et al. 4073*.

Salicaceae. ***Casearia javitensis*** Kunth, *Baraloto et al. 3054*; ***Casearia sylvestris*** Sw., *Baraloto et al. 4075*; ***Casearia* sp. B4**, *Baraloto et al. 4074*; ***Laetia procera*** (Poepp.) Eichler, *Baraloto et al. 4076*; ***Xylosma benthamii*** (Tul.) Triana & Planch., *Baraloto et al. 4077*.

Sapindaceae. ***Allophylus angustatus*** (Triana & Planch.) Radlk., *Baraloto et al. 3057*; ***Allophylus latifolius*** Huber, *Baraloto et al. 4078*; ***Cupania diphylla*** Vahl, *Baraloto et al. 4079*; ***Cupania rubiginosa*** (Poir.) Radlk., *Baraloto et al. 4080*; ***Cupania scrobiculata*** Rich., *Baraloto et al. 4081*; ***Cupania scrobiculata*** Rich. var. *guianensis*., *Baraloto et al. 4082*; ***Matayba inelegans*** Spruce ex. Radlk., *Baraloto et al. 4084*; ***Matayba laevigata*** Radlk., *Baraloto et al. 4085*; ***Melicoccus pedicellaris*** (Radlk.) Acev.-Rodr., *Baraloto et al. 4086*; ***Talisia clathrata*** Acev.-Rodr., *Baraloto et al. 4087*; ***Talisia hexaphylla*** Vahl, *Baraloto et al. 4088*; ***Talisia microphylla*** Uittien, *Baraloto et al. 4089*; ***Talisia praealta*** Sagot ex Radlk., *Baraloto et al. 4090*; ***Talisia simaboides*** K.U. Kramer, *Baraloto et al. 4091*; ***Talisia* sp. B1**, *Baraloto et al. 4092*; ***Vouarana guianensis*** Aubl., *Baraloto et al. 3116*; ***Genus undetermined sp. B1***, *Baraloto et al. 4083*.

Sapotaceae. ***Chrysophyllum argenteum*** Jacq., *Baraloto et al. 3200*; ***Chrysophyllum cuneifolium*** (Rudge) A. DC., *Baraloto et al. 4093*; ***Chrysophyllum eximium*** Ducke, *Baraloto et al. 3135*; ***Chrysophyllum lucentifolium*** Cronquist subsp. *pachycarpum* Pires & T.D. Penn., *Baraloto et al. 3072*; ***Chrysophyllum prieurii*** A. DC., *Baraloto et al. 3197*; ***Chrysophyllum sanguinolentum*** (Pierre) Baehni subsp. *balata* (Ducke) T.D. Penn., *Baraloto et al. 3016*; ***Chrysophyllum* sp. B1**, *Baraloto et al. 3227*; ***Diploon cuspidatum*** (Hoehne) Cronquist, *Baraloto et al. 3209*; ***Ecclinusa lanceolata*** (Mart. & Eichler) Pierre, *Baraloto et al. 4094*; ***Ecclinusa ramiflora*** Mart., *Baraloto et al. 3207*; ***Manilkara bidentata*** (A. DC.) A. Chev. subsp. *bidentata, Baraloto et al. 4095*; ***Manilkara huberi*** (Ducke) Chevalier, *Baraloto et al. 3014*; ***Micropholis cayennensis*** T.D. Penn., *Baraloto et al. 3216*; ***Micropholis egensis*** (A. DC.) Pierre, *Baraloto et al. 3211*; ***Micropholis guyanensis*** (A. DC.) Pierre, *Baraloto et al. 3107*; ***Micropholis longipedicellata*** Aubrév., *Baraloto et al. 4131*; ***Micropholis melinoniana*** Pierre, *Baraloto et al. 3122*; ***Micropholis mensalis*** (Baehni) Aubrév., *Baraloto et al. 4096*; ***Micropholis obscura*** T.D. Penn., *Baraloto et al. 3217*; ***Micropholis porphyrocarpa*** (Baehni) Monach., *Baraloto et al. 4097*; ***Micropholis sanctae-rosae*** (Baehni) T.D. Penn., *Baraloto et al. 3219*; ***Micropholis venulosa*** (Mart. & Eichler) Pierre, *Baraloto et al. 3114*; ***Micropholis* sp. B2**, *Baraloto et al. 4098*; ***Pouteria ambelaniifolia*** (Sandwith) T.D. Penn., *Baraloto et al. 3186*; ***Pouteria bangii*** (Rusby) T.D. Penn., *Baraloto et al. 3187*; ***Pouteria benai*** (Aubrév. & Pellegr.) T.D. Penn., *Baraloto et al. 3232*; ***Pouteria bilocularis*** (H. Winkl.) Baehni, *Baraloto et al. 3181*; ***Pouteria cladantha*** Sandwith, *Baraloto et al. 3044*; ***Pouteria cuspidata*** (A. DC.) Baehni subsp. *cuspidata, Baraloto et al. 3231*; ***Pouteria decorticans*** T.D. Penn., *Baraloto et al. 3029*; ***Pouteria durlandii*** (Standl.) Baehni subsp. *durlandii, Baraloto et al. 3230*; ***Pouteria egregia*** Sandwith, *Baraloto et al. 4100*; ***Pouteria engleri*** Eyma, *Baraloto et al. 3179*; ***Pouteria eugeniifolia*** (Pierre) Baehni, *Baraloto et al. 3136*; ***Pouteria filipes*** Eyma, *Baraloto et al. 3104;* ***Pouteria fimbriata*** Baehni, *Baraloto et al. 3229*; ***Pouteria flavilatex*** T.D. Penn., *Baraloto et al. 4101*; ***Pouteria gongrijpii*** Eyma, *Baraloto et al. 3087*; ***Pouteria grandis*** Eyma, *Baraloto et al. 3236*; ***Pouteria guianensis*** Aubl., *Baraloto et al. 3102*; ***Pouteria hispida*** Eyma, *Baraloto et al. 4102*; ***Pouteria jariensis*** Pires & T.D. Penn., *Baraloto et al. 4103*; ***Pouteria laevigata*** (Mart.) Radlk., *Baraloto et al. 4104*; ***Pouteria macrocarpa*** (Mart.) D. Dietr., *Baraloto et al. 3237*; ***Pouteria macrophylla*** (Lam.) Eyma, *Baraloto et al. 4105*; ***Pouteria maxima*** T.D. Penn., *Baraloto et al. 3250*; ***Pouteria melanopoda*** Eyma, *Baraloto et al. 3095*; ***Pouteria petiolata*** T.D. Penn., *Baraloto et al. 4106*; ***Pouteria putamen-ovi*** T.D. Penn., *Baraloto et al. 3221*; ***Pouteria reticulata*** (Engl.) Eyma, *Baraloto et al. 3222*; ***Pouteria retinervis*** T.D. Penn., *Baraloto et al. 3192*; ***Pouteria rodriguesiana*** Pires & T.D. Penn., *Baraloto et al. 3195*; ***Pouteria singularis*** T.D. Penn., *Baraloto et al. 3184*; ***Pouteria torta*** (Mart.) Radlk., *Baraloto et al. 3047*; ***Pouteria* species undetermined**, *Baraloto et al. 4099*; ***Pouteria* sp. B11**, *Baraloto et al. 4107*; ***Pouteria* sp. B15**, *Baraloto et al. 3097*; ***Pouteria* sp. B19**, *Mori et al. 26640*; ***Pouteria* sp. B20**, *Baraloto et al. 3199*; ***Pouteria* sp. B27**, *Baraloto et al. 4108*; ***Pradosia ptychandra*** (Eyma) T.D. Penn., *Baraloto et al. 3111*; ***Pradosia* sp. B1**, *Baraloto et al. 4109*.

Simaroubaceae. ***Simaba cedron*** Planch., *Baraloto et al. 3049*; ***Simaba polyphylla*** (Cavalcante) W.W. Thomas, *Baraloto et al. 3026*; ***Simarouba amara*** Aubl., *Baraloto et al. 4110*.

Styracaceae. ***Styrax pallidus*** A. DC., *Baraloto et al. 4111*; ***Styrax* sp. B1**, *Baraloto et al. 4112*.

Symplocaceae. ***Symplocos martinicensis*** Jacq., *Baraloto et al. 4113*.

Theaceae. ***Ternstroemia dentata*** (Aubl.) Sw., *Baraloto et al. 4114*.

Urticaceae. ***Cecropia obtusa*** Trécul, *Baraloto et al. 4115*; ***Pourouma bicolor*** Mart. subsp. *bicolor, Baraloto et al. 4116*; ***Pourouma melinonii*** Benoist subsp. *melinonii, Baraloto et al. 4117*; ***Pourouma minor*** Benoist, *Baraloto et al. 4118*; ***Pourouma tomentosa*** Mart. ex Miq. subsp. *essequiboensis* (Standl.) C.C. Berg & Heusden, *Baraloto et al. 4119*; ***Pourouma villosa*** Trécul, *Baraloto et al. 4120*.

Verbenaceae. ***Vitex triflora*** Vahl, *Baraloto et al. 4121*.

Violaceae. ***Amphirrhox longifolia*** (A. St.-Hil.) Spreng., *Baraloto et al. 3082*; ***Leonia glycycarpa*** Ruiz & Pav., *Baraloto et al. 4122*; ***Rinorea* sp. B1**, *Baraloto et al. 4123*; ***Rinorea* sp. B2**, *Baraloto et al. 4124*.

Vochysiaceae. ***Erisma floribundum*** Rudge var. *floribundum, Baraloto et al. 4125*; ***Erisma uncinatum*** Warm., *Baraloto et al. 3092;* ***Qualea rosea*** Aubl., *Baraloto et al. 4126*; ***Qualea* sp. B1**, *Baraloto et al. 4127;* ***Ruizterania albiflora*** (Warm.) Marc.-Berti, *Baraloto et al. 4128;* ***Vochysia guianensis*** Aubl., *Baraloto et al. 4129;* ***Vochysia tomentosa*** (G. Mey.) DC., *Baraloto et al. 4130*.

Family undetermined. ***Genus undetermined* sp. B1**, *Baraloto et al. 3991.*