Data Article

Dataset of permanent plots of trees with dbh > 10cm in Mashpi rainforest biodiversity reserve, a remnant of the Chocó forest in Northern Ecuador

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A R T I C L E  I N F O

Article history:
Received 15 April 2020
Revised 2 June 2020
Accepted 4 June 2020
Available online 12 June 2020

Keywords:
Biodiversity
Chocó forest
Forest survey
Tree

A B S T R A C T

This data reports a list of all trees DBH > 10 cm in four 50 × 50 m (0.25 ha) permanent plots at Mashpi Rainforest Biodiversity Reserve in the Ecuadorian Chocó forest. Plots were established within an altitudinal gradient from 800 to 1200 m. We collected, labelled, measure and identify all trees found within the plots. All voucher specimens are available at the herbarium of Universidad Tecnológica Indoamérica (HUTI) in Quito, Ecuador. We found a total 133 stems representing 93 species and 36 families. Each plot had between 27 and 40 trees. Our list of species includes four threatened species under IUCN criteria. We also report the number of individuals of each species and its diameter at breast height (DBH) and height. This information is a baseline for further studies to contribute to the conservation of the Chocó, one of the 35 biodiversity hotspots is the Tumbes-Chocó-Magdalena. Even though this area is one of the most biodiverse in the

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https://doi.org/10.1016/j.dib.2020.105845
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planet, the botanical composition of the Chocó is still poorly known.

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### Specifications table

| Subject | Agricultural and Biological Sciences |
|---------|--------------------------------------|
| Specific subject area | Forestry and Plant Science |
| Type of data | Table and Figure |
| How data were acquired | Data was obtained from April 10 to April 20, 2014. Our inventory consisted in four permanent 1/4 ha plots of 50 x 50 m each within the reserve. Plots were located within a distance of 900 to 1800 m with the aim of having a good representation of the altitudinal gradient in the area. We collected, labelled, and measure the diameter of all the trees with DBH ≥ 10 cm found within the plots. DBH was measure with a tape measure at 1.30 m taken from the base of the tree. Tree height was estimated by eye, because the canopy was too dense to calculate it with other methods. Each tree was marked with an aluminum tag, and the place where the DBH was measure was marked for future surveys. Herbarium specimens were deposited at the Herbario de la Universidad Tecnológica Indoamérica (HUTI) in Quito, Ecuador. |
| Data format | Raw |
| Parameters for data collection | Data collection considered trees of stem diameter ≥10 cm within permanent plots. |
| Description of data collection | Data was collected as part of the establishment of four permanent plots at Mashpi Rainforest Biodiversity Reserve, in Ecuador. Dataset comprises diameters at breast height (DBH) of all trees of stem diameter ≥ 10 cm found in the sampling area. |
| Data source location | Mashpi Rainforest Biodiversity Reserve, in Ecuador. Sampling plots names: PA: Puerco, PB: Limones, PC: San Vicente, PD: Malimpia. Plots geographic location: PA N 0.16077, W 78.87280, PB N 0.15870, W 78.88184, PC N 0.16712, W 78.86774, PD N 0.16849, W 78.87623 |
| Data accessibility | With the article |

### Value of the data

- Our sample represents a first survey of tree diversity at Mashpi Rainforest Biodiversity Reserve, a Chocó forest relict in Ecuador.
- Our results will serve to better understand the species diversity and conservation status of one of the remnant forests of the Ecuadorian Chocó.
- The generated data will be use as a baseline of further ecological studies such as carbon caption.

### 1. Data Description

Our dataset includes two tables. Table 1 compile a checklist of all the tree species and individuals found in each plot. A total of 133 stems of 92 species and 36 families were found. Each parcel of 0.25 ha has 27 to 40 trees with DBH > 10 cm. The most diverse family was Fabaceae with 10 species, followed by Lauraceae (7) and Rubiaceae (7). Most of the species were represented by one individual within the 0.25 ha plots. *Eschweiler caudiculata* (Lecythidaceae) was
Table 1
Checklist and number of individuals of tree species with DBH > 10 cm in four parcels of 0.25 ha in Mashpi Rainforest Biodiversity Reserve in the Ecuadorian Chocó forest. Sampling plots names: PA: Puercos, PB: Limones, PC: San Vicente, PD: Malimpia; IUCN: conservation status.

| Taxon                               | PA   | PB   | PC   | PD   | Total | IUCN  |
|-------------------------------------|------|------|------|------|-------|-------|
| Annonaceae                          | 1    | 2    | 3    |      |       |       |
| Guatteria sp1.                      | 1    |      |      |      |       |       |
| Guatteria sp2.                      |      | 1    | 1    | 1    |       |       |
| Rollinia pittieri Saff.             |      | 1    | 1    |      |       |       |
| Aquifoliaceae                       | 2    |      |      |      |       |       |
| Ilex yurumanguinus Cuatrec.         | 2    |      |      |      |       |       |
| Araliaceae                          | 1    | 1    |      | 1    |       |       |
| Dendropanax macrophyllus Cuatrec.   | 1    | 1    |      | 1    |       |       |
| Arecaceae                           | 1    | 1    |      |      |       |       |
| Wettinia aequalis (O.F. Cook & Doyle) R. Bernal | 1    | 1    |      |      |       |       |
| Asteraceae                          | 1    | 1    |      |      |       |       |
| Critoniopsis occidentalis (Cuatrec.) H. Rob. | 1    | 1    |      |      |       |       |
| Boraginaceae                        | 1    | 2    | 1    | 1    |       |       |
| Cordia colombiana Killip            | 1    | 1    | 1    | 1    |       |       |
| Cordia cylindrostachya (Ruiz & Pav.) Roem. & Schult. | 1    | 1    |      |      |       |       |
| Cordia lomatoloba I.M. Johnst.      | 1    | 1    |      | 1    |       |       |
| Burseraceae                         | 2    | 1    | 1    | 3    | CR    |       |
| Dacyryodes cupularis Cuatrec.       | 2    | 2    |      | 2    |       |       |
| Protium ecuadorense Benoist         | 1    | 1    |      | 1    |       |       |
| Celastraceae                        | 1    | 1    | 1    | 2    |       |       |
| Salacia cordata (Miers) Mennega     | 1    | 1    | 1    | 2    |       |       |
| Chrysobalanaceae                    | 1    | 1    | 1    | 2    |       |       |
| Licania durifolia Cuatrec.          | 1    | 1    |      | 2    |       |       |
| Clusiaceae                          | 1    | 1    | 1    | 2    |       |       |
| Chrysochlamys dependens Planch. & Triana | 1    | 1    |      | 1    |       |       |
| Garcinia macrophylla Mart.          | 1    | 1    |      |      |       |       |
| Cyatheaceae                         | 1    | 1    |      |      |       |       |
| Cyathea caracasana (Klotzsch) Domin | 1    | 1    |      |      |       |       |
| Euphorbiaceae                       | 1    | 2    | 2    | 5    |       |       |
| Alchornea aff. grandis Benth.       | 1    | 1    |      | 1    |       |       |
| Croton pachypodus G.L. Webster      | 1    | 1    | 1    | 2    |       |       |
| Tetrochidium euryphylhum Standl.    | 1    | 1    | 1    | 2    |       |       |
| Fabaceae                            | 8    | 2    | 3    | 13   |       |       |
| Andira macrothyrsa Ducke            | 1    | 1    | 1    | 2    |       |       |
| Brownea cocinea Jacq.               | 1    | 1    |      | 1    |       |       |
| Browneopsis macrofoliolata Klitg.   | 1    | 1    | 1    | 2    | CR    |       |
| Dussia lehmannii Harms              | 1    | 1    | 1    | 2    |       |       |
| Inga aff. laurina (Sw.) Willd.      | 1    | 1    |      |      |       |       |
| Inga corrascans Hum. & Bonpl. Ex Willd. | 1    | 1    | 2    | 1    |       |       |
| Inga punctata Willd.                | 1    | 1    |      | 1    |       |       |
| Inga silanchensis T. D. Penn.       | 1    | 1    |      | 1    | VU    |       |
| Inga spectabilis (Vahl) Willd.      | 1    | 1    |      | 1    |       |       |
| Zygia sp.                           | 1    | 1    |      |      |       |       |
| Icacinaceae                         | 1    | 1    | 1    | 3    |       |       |
| Calatola costaricensis Standl.      | 1    | 1    | 1    | 3    |       |       |
| Lauraceae                           | 3    | 3    | 1    | 4    | 11    |       |
| Beilschmiedia costaricensis (Mez & Pattier) C.K. Allen | 1    | 1    | 1    | 2    |       |       |
| Endlicheria formosa (Meisn.) Mez    | 1    | 1    | 1    | 1    |       |       |
| Licaria applanata van der Werff     | 1    | 1    |      | 1    |       |       |
| Nectandra sp.                       | 1    | 1    |      | 1    |       |       |
| Ocotea insularis (Meisn.) Mez       | 2    | 1    | 1    | 3    |       |       |
| Pleurothyrium cinereum              | 1    | 1    | 1    | 2    |       |       |
| Rhodostemonodonaphine kunthiana     | 1    | 1    |      | 1    |       |       |
| Lecythidaceae                       | 5    | 3    | 2    | 10   |       |       |
| Eschweillera antioquensis           | 2    | 1    | 1    | 3    |       |       |
| Eschweillera caudiculata            | 3    | 3    |      | 3    |       |       |
| Eschweillera rimbachii              | 1    | 1    |      | 2    |       |       |

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Table 1 (continued)

| Taxon                                | PA | PB | PC | PD | Total | IUCN |
|--------------------------------------|----|----|----|----|-------|------|
| Gustavia dodsonii                    | 1  |    |    |    | 1     |      |
| Gustavia sp.                         | 1  |    |    |    | 1     |      |
| Malvaceae                            | 1  | 4  | 1  | 6  |       |      |
| Matisia castano                      | 1  | 2  | 1  | 4  |       |      |
| Matisia giacometti                   | 2  |    |    |    | 2     |      |
| Melastomataceae                      | 1  | 1  | 1  | 3  |       |      |
| Loreya sp.                           | 1  |    |    |    | 1     |      |
| Miconia brevitheca                   |    |    |    | 1  | 1     |      |
| Miconia sp. 1                       | 1  |    |    | 1  | 1     |      |
| Meliaceae                            | 1  | 2  | 2  | 5  |       |      |
| Carapa nicaraguensis                 | 1  |    |    | 1  |       |      |
| Guarea kunthiana                     | 1  | 1  |    | 2  |       |      |
| Trichilia pallida                    | 1  |    |    | 1  |       |      |
| Trichilia septentriphericalis         |    |    |    | 1  | 1     |      |
| Moraceae                             | 1  | 4  | 1  | 2  | 11    |      |
| Brosimum utile subsp. occidentale    |    |    |    | 1  | 1     |      |
| Ficus brevibracteata                 | 1  | 1  |    | 2  |       |      |
| Ficus tonduzii                       |    |    | 2  | 2  |       |      |
| Naucleopsis capreensis               | 1  | 1  | 2  | 4  |       |      |
| Naucleopsis naga                     | 2  |    |    | 2  |       |      |
| Myristicaceae                        | 1  | 1  |    | 2  |       |      |
| Otoba novogranatensis                | 1  |    |    | 1  |       |      |
| Virola calophylla                    |    |    | 1  | 1  |       |      |
| Myrtaceae                            | 2  | 4  | 1  | 7  |       |      |
| Calyptranthes brevissipicata         | 1  |    |    | 1  |       |      |
| Calyptranthes sp.                    |    |    | 1  | 1  |       |      |
| Eugenia crassimarginata              | 1  | 2  | 1  | 4  |       |      |
| Myrcia sp.                           | 1  |    |    | 1  |       |      |
| Olacaceae                            |    |    | 1  | 1  |       |      |
| Heisteria pacifica                   |    |    | 1  | 1  |       |      |
| Pentaphylacaceae                     | 1  |    |    | 1  |       |      |
| Freziera sp.                         |    | 1  |    | 1  |       |      |
| Phyllanthaceae                       | 1  | 1  | 1  | 3  |       |      |
| Hieronyma duquei                     | 1  |    |    | 1  |       |      |
| Hieronyma fendleri                   | 1  |    |    | 1  |       |      |
| Richeria grandis                     |    |    | 1  | 1  |       |      |
| Polygonaceae                         |    | 1  |    | 1  |       |      |
| Cocoloba obovata                     | 1  |    |    | 1  |       |      |
| Primulaceae                          | 1  | 1  | 1  | 3  |       |      |
| Ardisia croatai subsp. correae       |    |    | 1  | 1  |       |      |
| Geissanthus longistamineus           | 1  | 1  |    | 2  |       |      |
| Proteaceae                           |    | 1  |    | 1  |       |      |
| Panopsis megistosperma               |    |    | 1  | 1  | EN    |      |
| Rubiaceae                            | 1  | 4  | 1  | 4  | 10    |      |
| Borjoa aff patinoi                   |    |    | 1  | 1  |       |      |
| Cordiera longicaudata                | 1  |    |    | 1  |       |      |
| Coussarea latifolia Standl.          | 2  | 2  | 4  | 4  |       |      |
| Duroia laevis                        | 1  |    |    | 1  |       |      |
| Faramea langlassei                   |    |    | 1  | 1  |       |      |
| Faramea parvibracteata               |    |    | 1  | 1  |       |      |
| Palicourea sp.                       | 1  |    |    | 1  |       |      |
| Sabiaceae                            | 1  |    |    | 1  |       |      |
| Meliosma occidentalis                | 1  |    |    | 1  |       |      |
| Salicaceae                           |    |    | 1  | 1  |       |      |
| Banara guianensis                    |    |    | 1  | 1  |       |      |
| Sapindaceae                          | 1  | 2  | 3  | 6  |       |      |
| Allophylus floribundus               | 1  |    |    | 1  |       |      |
| Cupania livida                       |    |    | 1  | 1  |       |      |
| Talisia macrophylla                  | 1  |    |    | 1  |       |      |
| Sapotaceae                           | 3  | 2  | 5  | 10 |       |      |
| Chrysophyllum colombianum            | 1  |    |    | 1  |       |      |

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the only species with three individuals with DBH > 10 cm within one 0.25 ha plots. None of the species were found in all four plots. Only Coussarea latifolia (Rubiaceae), Matisia castano (Malvaceae) and Naucleopsis capirensis (Moraceae) were represented by four individuals combining all four plots. Among those species we found four threatened species under IUCN criteria. Browneopsis macrofoliata (Fabaceae) is Critically Endangered (CR), under criteria A4c; B1ab(iii). Inga silanchensis (Fabaceae) is Vulnerable (VU) under criteria VU B1ab(iii), Panopsis megistosperma (Proteaceae) is Endangered (EN) under criteria EN B1ab(iv). We found one endemic species Heisteria pacifica (Oleaceae), which is Near Threatened NT.

In Table 2 we describe each individual tree collected per plot with a voucher number and DBH. The average overall DBH was 22.92 cm with a maximum of 93 cm of diameter.

2. Experimental design, materials, and methods

Our survey was conducted in the Bosque Protector Mashpi, a Natural Forest Reserve declared in September 2003. The Reserve has 1178 ha [1] and it is in the Mashpi watershed at the Pichincha province in Ecuador [2]. The area is characterized by deep slopes of 45° to 90°, which might have helped to conserve the forest from logging activities [2].

Our inventory consisted in four permanent 1/4 ha plots of 50 × 50 m each within the reserve. Plots were limited with rope tied to 1/4 inch PVC tubes painted in orange. The specific locations are listed in Table 3 (Fig. 1). Plots were located within a distance of 900 to 1800 m and they were set to have a good representation of the altitudinal gradient in the area. We collected, labelled, and measured the diameter of all the trees with DBH ≥ 10 cm found within the plots. DBH was measured at 1.30 m from the base of the tree, following methods by Campbell [3]. Tree height was estimated by eye (by Toasa), because the canopy was too dense to calculate it with other methods. Each tree was marked with an aluminum tag, and the place where the DBH was measured was marked for future surveys (Fig. 2). Specimens were identified by Germán Toasa comparing vouchers at QCNE Herbarium in Quito. The herbarium specimens were deposited at the Herbario de la Universidad Tecnológica Indoamérica (HUIT) in Quito, Ecuador. Scientific names followed APG IV [4] and were checked at http://www.tropicos.org/ [5].

This is the first survey of trees implemented in the Reserve. The plots were stablished during one fieldtrip from April 10 to April 20, 2014. Our plots represent a first approximation to estimate tree diversity at Mashpi Rainforest Biodiversity Reserve, a Chocó relict in Ecuador. Our results will serve as a base line to better understand the species diversity and conservation status of one of the relict forests of the Ecuadorian Chocó. The Reserve is managed by Mashpi Lodge https://www.mashpilodge.com/. Some of the studies associated with the plots are: Potential food abundance for reintroduction of Ateles fusciceps “spider monkey”, and CO2 absorption data [6].
Table 2
Plot inventory of tree species with DBH > 10 cm in four parcels of 0.25 ha in Mashpi Rainforest Biodiversity Reserve in the Ecuadorian Chocó forest.

| Plot | Family            | Species                                      | Voucher       | Plot number | DBH | H |
|------|-------------------|----------------------------------------------|---------------|-------------|-----|---|
| PA   | Aquifoliaceae     | *Ilex yurumanguinii* Cuatrec.                | Toasa12501    | 1           | 36  | 10|
| PA   | Aquifoliaceae     | *Ilex yurumanguinii* Cuatrec.                | Toasa12510    | 24          | 17  | 16|
| PA   | Burseraceae       | *Dacryodes cupularis* Cuatrec.               | Toasa12509    | 21          | 23  | 12|
| PA   | Burseraceae       | *Dacryodes cupularis* Cuatrec.               | Toasa12513    | 33          | 11.7| 12|
| PA   | Celastraceae      | *Salacia cordata* (Miers) Mennega            | Toasa12522    | 72          | 77.5| 30|
| PA   | Chrysobalanaceae  | *Licania durfolia* Cuatrec.                  | Toasa12502    | 2           | 34  | 16|
| PA   | Euphorbiaceae     | *Tetrodichium euphylhum* Standl.             | Toasa12514    | 48          | 12.5| 12|
| PA   | Lauraceae         | *Ocotea insignis* (Meisn.) Mez               | Toasa12504    | 5           | 13  | 15|
| PA   | Lauraceae         | *Ocotea insignis* (Meisn.) Mez               | Toasa12512    | 28          | 22  | 12|
| PA   | Lauraceae         | *Rhodostemo daphne kunthiana* (Nees) Rohwer  | Toasa12511    | 25          | 33  | 30|
| PA   | Lecythidaceae     | *Eschweillera antioquensis* Dugand & Daniel  | Toasa12505    | 7           | 17.5| 8 |
| PA   | Lecythidaceae     | *Eschweillera antioquensis* Dugand & Daniel  | Toasa12524    | 76          | 11.6| 7 |
| PA   | Lecythidaceae     | *Eschweillera rimbachii* Standl.             | Toasa12507    | 13          | 25  | 14|
| PA   | Lecythidaceae     | *Gastavia dodsonii* S.A. Mori                | Toasa12521    | 67          | 18.5| 13|
| PA   | Lecythidaceae     | *Gastavia sp.*                              | Toasa12523    | 73          | 39  | 18|
| PA   | Malvaceae         | *Matissia castano* H. Karst. & Triana        | Toasa12520    | 65          | 15  | 8 |
| PA   | Meliaceae         | *Guarea kunthiana* A. Juss.                 | Toasa12517    | 58          | 39  | 18|
| PA   | Moraceae          | *Ficus brevibracteata* W.C. Burger           | Toasa12518    | 60          | 21.5| 12|
| PA   | Myristicaceae     | *Otoha novogranatensis* Moldenke             | Toasa12503    | 4           | 15  | 12|
| PA   | Myrtaceae         | *Cypranthus brevicipitatus* McVaugh          | Toasa12515    | 54          | 16.5| 15|
| PA   | Myrtaceae         | *Eugenia crassimarginata* M.L. Kawas. & B. Holst | Toasa12526    | 80          | 18  | 4 |
| PA   | Pentaphylacaceae  | *Freiza sp.*                                 | Toasa12516    | 57          | 44.5| 35|
| PA   | Phyllanthaceae    | *Hieronyma fendleri* Briq.                  | Toasa12508    | 15          | 12.5| 20|
| PA   | Primulaceae       | *Geissanthus longistamineus* (A.C. Sm.) Pipyly | Toasa12506    | 11          | 12  | 7 |
| PA   | Rubiaceae         | *Paliocourea sp.*                            | Toasa12528    | 87          | 11.5| 4 |
| PA   | Sapindaceae       | *Talsa macrophylla* (Mart.) Radlk.           | Toasa12525    | 79          | 12  | 20|
| PA   | Sapotaceae        | *Chrysophyllum colombianum* (Aubrev.) T. D. Penn. | Toasa12527    | 82          | 17.5| 4 |
| PA   | Sapotaceae        | *Pouteria collina* (Little) T. D. Penn.      | Toasa12626    | 8           | 41  | 22|
| PA   | Sapotaceae        | *Pouteria collina* (Little) T. D. Penn.      | Toasa12627    | 71          | 54  | 30|
| PA   | Tapiocaceae       | *Huereoa glandulosa* Ruiz & Pav.             | Toasa12519    | 63          | 12.5| 5 |
| PB   | Annonaceae        | *Guatteria sp.*                              | Toasa12539    | 114         | 31  | 22|
| PB   | Boraginaceae      | *Cordia colombiana* Killip                   | Toasa12559    | 158         | 13  | 12|
| PB   | Clusiaceae        | *Garcinia macrophylla* Mart.                 | Toasa12569    | 191         | 11.7| 5 |
| PB   | Euphorbiaceae     | *Croton pachypodius* G.L. Webster            | Toasa12542    | 120         | 11.3| 18|
| PB   | Euphorbiaceae     | *Tetrodichium euphylhum* Standl.             | Toasa12548    | 131         | 10.7| 10|
| PB   | Fabaceae          | *Andira macrothyrsza* Ducke                  | Toasa12541    | 119         | 13.7| 8 |
| PB   | Fabaceae          | *Brownea coccinea* Jacq.                     | Toasa12549    | 136         | 13.8| 6 |
| PB   | Fabaceae          | *Browneaopsis macrofoliolata* Klitz.         | Toasa12551    | 138         | 11.7| 7 |
| PB   | Fabaceae          | *Inga aff laurina* (Sw.) Wild.               | Toasa12535    | 103         | 10.8| 12|
| PB   | Fabaceae          | *Inga corrucans* Hum. & Bonpl. Ex Wild.     | Toasa12564    | 181         | 19.8| 12|
| PB   | Fabaceae          | *Inga punctata* Wild.                        | Toasa12628    | 89          | 37  | 27|
| PB   | Fabaceae          | *Inga silanchensis* T. D. Penn.             | Toasa12545    | 124         | 10.8| 7 |
| PB   | Fabaceae          | *Inga spectabilis* (Vahl) Wild.              | Toasa12631    | 155         | 37.7| 25|
| PB   | Icacinaceae       | *Calatola costaricensis* Standl.             | Toasa12557    | 156         | 11.5| 4 |
| PB   | Lauraceae         | *Beilschmiedia costaricensis* (Mez & Pittier) C.K. Allen | Toasa12558    | 157         | 29  | 12|

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### Table 2 (continued)

| Plot | Family                | Species                                                                 | Voucher      | Plot number | DHB | H |
|------|-----------------------|-------------------------------------------------------------------------|--------------|-------------|-----|---|
| PB   | Malvaceae             | *Matisia castano* H. Karst. & Triana                                      | Toasa12565   | 183         | 25.5 | 15|
| PB   | Malvaceae             | *Matisia giacomettii* Romero                                             | Toasa12540   | 116         | 12   | 4 |
| PB   | Malvaceae             | *Matisia giacomettii* Romero                                             | Toasa12563   | 180         | 11.5 | 6 |
| PB   | Melastomataceae       | *Loreya* sp                                                               | Toasa12629   | 90          | 11.5 | 15|
| MB   | Meliaceae             | *Carapa nicaraguensis* C. DC.                                            | Toasa12532   | 95          | 11.8 | 8 |
| MB   | Meliaceae             | *Trichilia pallida* Sw.                                                  | Toasa12538   | 106         | 23.3 | 6 |
| PB   | Moraceae              | *Brosimum utile* subsp. occidentale                                      | Toasa12547   | 130         | 42   | 30|
| MB   | Moraceae              | *Naucleopsis capirensis* C.C. Berg                                       | Toasa12567   | 188         | 13   | 6 |
| MB   | Moraceae              | *Naucleopsis naga* Pittier                                               | Toasa12531   | 92          | 13.5 | 15|
| MB   | Moraceae              | *Naucleopsis naga* Pittier                                               | Toasa12550   | 137         | 39   | 30|
| MB   | Myristicaceae         | *Virola calophylla* (Spruce) Warb.                                       | Toasa12566   | 187         | 32   | 18|
| MB   | Myrtaceae             | *Calyptroanthes* sp.                                                     | Toasa12555   | 149         | 14.8 | 10|
| PB   | Myrtaceae             | *Eugenia crassimarginata* M.L. Kawas. & B. Holst                          | Toasa12562   | 174         | 12.8 | 4 |
| PB   | Myrtaceae             | *Eugenia crassimarginata* M.L. Kawas. & B. Holst                          | Toasa12552   | 140         | 15   | 8 |
| PB   | Myrtaceae             | *Myrcia* sp                                                              | Toasa12571   | 194         | 11   | 7 |
| PB   | Olacaceae             | *Heisteria pacifica* P. Jørg. & C. Ulloa                                 | Toasa12534   | 101         | 14.5 | 5 |
| PB   | Phyllanthaceae        | *Hieronyma duquei* Cuatrec.                                              | Toasa12537   | 105         | 25.5 | 4 |
| PB   | Polygonaceae          | *Coccoloba obovata* Kunth                                                | Toasa12554   | 142         | 65.5 | 24|
| PB   | Primulaceae           | *Geissanthus longistamineus* (A.C. Sm.) Pipoly                           | Toasa12556   | 150         | 20   | 12|
| PB   | Rubiaceae             | *Cousarea latifolia* Standl.                                             | Toasa12536   | 104         | 13.5 | 10|
| PB   | Rubiaceae             | *Cousarea latifolia* Standl.                                             | Toasa12544   | 122         | 11.5 | 6 |
| PB   | Rubiaceae             | *Duroia laevis* Devia, C.H. Perss. & C.M. Taylor                         | Toasa12561   | 163         | 21   | 12|
| PB   | Rubiaceae             | *Foramea parvibracteata* Steyerm.                                        | Toasa12529   | 90          | 21   | 15|
| PB   | Sabiaceae             | *Meliosma occidentalis* Cuatrec.                                         | Toasa12530   | 91          | 49   | 20|
| PB   | Violaceae             | *Gloeospermum aff. grandifolium Hekking*                                 | Toasa12568   | 190         | 63   | 20|
| PC   | Araliaceae            | *Dendropanax macrophyllus* Cuatrec.                                      | Toasa12596   | 319         | 28   | 15|
| PC   | Areceae               | *Wettinia aequalis* (O.F. Cook & R. Bernal)                               | Toasa12574   | 215         | 10   | 3 |
| PC   | Asteraceae            | *Crtoniopsis occidentalis* (Cuatrec.) H. Rob.                            | Toasa12588   | 266         | 92   | 12|
| PC   | Boraginaceae          | *Cordia cylindrostachya* (Ruiz & Pav.) Roem. & Schult.                   | Toasa12587   | 265         | 25   | 5 |
| PC   | Boraginaceae          | *Cordia lomatoloba* I.M. Johnst.                                         | Toasa12575   | 219         | 22.5 | 8 |
| PC   | Chrysobalanaceae      | *Licania durifolia* Cuatrec.                                             | Toasa12578   | 226         | 24.5 | 16|
| PC   | Cytaceae              | *Cytisus caracasana* (klotzsch) Domin                                    | Toasa12633   | 233         | 11   | 3 |
| PC   | Euphorbiaceae         | *Alchornea aff. grandis* Benth.                                          | Toasa12777   | 323         | 32.3 | 15|
| PC   | Euphorbiaceae         | *Croton pachypodus* G.L. Webster                                        | Toasa12593   | 285         | 17   | 4 |
| PC   | Fabaceae              | *Dussia lehmannii* Harms                                                 | Toasa12589   | 271         | 12   | 7 |
| PC   | Fabaceae              | *Inga coruscan* Hum. & Bonpl. Ex Wild.                                   | Toasa12595   | 316         | 22.5 | 15|
| PC   | Icacinaceae           | *Calatola costaricensis* Standl.                                         | Toasa12576   | 220         | 17.5 | 6 |
| PC   | Lauraceae             | *Pleurothyrium cinereum* van der Werff                                   | Toasa12581   | 231         | 13   | 12|
| PC   | Lecythidaceae         | *Eschweileria antiouquensis* Dugand & Daniel                             | Toasa12592   | 284         | 12.8 | 4 |
| PC   | Lecythidaceae         | *Eschweileria rimbaichi* Standl.                                         | Toasa12573   | 207         | 33   | 18|
| PC   | Melastomataceae       | *Miconia* sp 1                                                           | Toasa12582   | 232         | 12.8 | 6 |
| PC   | Meliaceae             | *Guarea kunthiana* A. Juss.                                              | Toasa12580   | 230         | 11.5 | 8 |
| PC   | Meliaceae             | *Trichilia septentirionalis* C. DC.                                      | Toasa12583   | 242         | 10   | 5 |
| PC   | Moraceae              | *Ficus brevibracteata* W.C. Burger                                       | Toasa12586   | 262         | 25   | 6 |
| PC   | Moraceae              | *Ficus tonduzii* Standl.                                                 | Toasa12584   | 247         | 16.2 | 14|
| PC   | Moraceae              | *Ficus tonduzii* Standl.                                                 | Toasa12591   | 278         | 19.2 | 10|
| PC   | Moraceae              | *Naucleopsis capirensis* C.C. Berg                                       | Toasa12579   | 227         | 10.3 | 4 |

(continued on next page)
Table 2 (continued)

| Plot | Family         | Species                                                                 | Voucher     | Plot number | DHB  | H   |
|------|----------------|-------------------------------------------------------------------------|-------------|-------------|------|-----|
| PC   | Primulaceae    | Ardisia croatii subsp. coroae (Lundell) Ricketson & Pipoly              | Toasa12585  | 261         | 36.8 | 12  |
| PC   | Proteaceae     | Panopsis megistosperma Bonifaz & Cornejo                                | Toasa12594  | 301         | 15   | 8   |
| PC   | Rubiaceae      | Borogia aff patinoi Cuatrec.                                            | Toasa12572  | 200         | 12.5 | 4   |
| PC   | Salicaceae     | Banara guianensis Aubl.                                                 | Toasa12590  | 272         | 15.3 | 10  |
| PC   | Violacea       | Gloeospermum aff. grandifolium                                          | Toasa12597  | 322         | 14   | 7   |
| PD   | Annonaceae     | Guatteria spz.                                                          | Toasa12612  | 367         | 93   | 20  |
| PD   | Annonaceae     | Rollinia pittieri Saff.                                                 | Toasa12611  | 357         | 28.5 | 12  |
| PD   | Boraginaceae   | Cordia colombiana Killip                                                | Toasa12621  | 405         | 22   | 13  |
| PD   | Burseraceae    | Pratium ecuadorense Benoist                                             | Toasa12618  | 386         | 33   | 14  |
| PD   | Celastraceae   | Salacia cordata (Miers) Mennega                                         | Toasa12606  | 336         | 23.3 | 8   |
| PD   | Clusiaceae     | Chrysochlamys dependens Planch. & Triana                               | Toasa12624  | 415         | 20.1 | 5   |
| PD   | Fabaceae       | Andira macrophyrsya Duce                                               | Toasa12610  | 352         | 21   | 8   |
| PD   | Fabaceae       | Dussia lehmanniii Harms                                                 | Toasa12604  | 334         | 36.2 | 15  |
| PD   | Fabaceae       | Zygia sp                                                                | Toasa12636  | 362         | 13   | 3   |
| PD   | Icacinaceae    | Calatola costaricensis Standl.                                          | Toasa12609  | 346         | 14   | 8   |
| PD   | Lauraceae      | Beilschmiedia costaricensis (Mez & Pittier) C.K. Allen                 | Toasa12602  | 331         | 25.5 | 8   |
| PD   | Lauraceae      | Endlicheria formosa (Meisn.) Mez                                        | Toasa12623  | 412         | 25   | 13  |
| PD   | Lauraceae      | Octoea insularis (Meisn.) Mez                                          | Toasa12614  | 374         | 26   | 9   |
| PD   | Lauraceae      | Pleurothyrium cinereum van der Werf                                     | Toasa12601  | 330         | 24   | 20  |
| PD   | Malvaceae      | Matisia castano H. Karst. & Triana                                      | Toasa12600  | 327         | 11.1 | 3   |
| PD   | Melastomataceae| Miconia brevitheca Gleason                                              | Toasa12598  | 325         | 10.3 | 4   |
| PD   | Moraceae       | Naucleopsis capirensis C.C. Berg                                       | Toasa12603  | 332         | 31.5 | 7   |
| PD   | Moraceae       | Naucleopsis capirensis C.C. Berg                                       | Toasa12617  | 382         | 14   | 8   |
| PD   | Myrtaceae      | Eugenia crassimarginata M.L. Kawas. & B. Holst                           | Toasa12615  | 375         | 11.5 | 6   |
| PD   | Phyllanthaceae | Richeria grandis Vahl                                                  | Toasa12619  | 388         | 10.5 | 4   |
| PD   | Rubiaceae      | Cordiera longicaudadata C.H. Perss. & Delprete                          | Toasa12622  | 407         | 11   | 5   |
| PD   | Rubiaceae      | Coussarea latifolia Standl.                                             | Toasa12599  | 326         | 16.6 | 5   |
| PD   | Rubiaceae      | Coussarea latifolia Standl.                                             | Toasa12605  | 335         | 33.3 | 10  |
| PD   | Rubiaceae      | Faramea langlasei Standl.                                               | Toasa12607  | 337         | 14   | 5   |
| PD   | Sapindaceae    | Allophylus floribundus (Poeppe.) Radl.                                  | Toasa12620  | 389         | 11   | 4   |
| PD   | Sapindaceae    | Cupania livida (Raldk.) Croat                                           | Toasa12625  | 428         | 57.5 | 20  |
| PD   | Sapotaceae     | Chrysophyllum sp                                                        | Toasa12635  | 356         | 15   | 8   |
| PD   | Sapotaceae     | Pouteria torta (Mart.) Radl.                                            | Toasa12613  | 372         | 13   | 7   |
| PD   | Simaroubaceae  | Simarouba amara Aubl.                                                  | Toasa12616  | 376         | 45   | 30  |
| PD   | Tapisciaceae   | Huertia glandulosa Ruiz & Pav.                                          | Toasa12608  | 339         | 15   | 6   |

Table 3

Summary of the plots surveyed in Mashpi Rainforest Biodiversity Reserve, Chocó, Northern Ecuador.

| Plot name | Coordinates | Altitude (m) | Slope(%) | No. Individuals (stems) | Species number | Average DHB (cm) | Max DHB (cm) |
|-----------|-------------|--------------|----------|-------------------------|----------------|------------------|--------------|
| PA        | N 0.16077, W 78.87280 | 952          | 50       | 30                      | 25             | 24.46            | 77.5         |
| PB        | N 0.15870, W 78.88184 | 846          | 40       | 46                      | 40             | 22.12            | 65.5         |
| PC        | N 0.16712, W 78.86774 | 1186         | 15       | 27                      | 26             | 21.17            | 92           |
| PD        | N 0.16849, W78.87623  | 1018         | 40–50    | 30                      | 28             | 24.16            | 93           |
| Mean      |              | 33.25        |          | 23                      | 22.98          |                  | 82           |
| Total     |              | 133          |          | 92                      |                |                  |              |
Fig. 1. Map of the geographic distribution of the permanent plots of trees with DBH > 10 in the Mashpi Rainforest Biodiversity Reserve, a remnant of the Chocó in Northern Ecuador.

Fig. 2. DHB sampling and label mark for each tree at the survey plot at Masphi Rainforest Biodiversity Reserve.
Declaration of Competing Interest

None.

Acknowledgments

Financial support to conduct this survey was provided by Mashpi Lodge. We thank our fieldwork assistants: Alicia Franco, Angel Zambrano y Rodrigo Pastrana. Also, we thank Paola Peña for herbarium assistance. We thank Paul Berry for Croton identification. We thank Mashpi Lodge for the support and facilities and to the Ministerio del Ambiente in Ecuador for collecting permit No. 03–2014-IC-FLO-DPAP-MA.

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