FEW DOMINANT NATIVE WOODY SPECIES: HOW SUBTROPICAL RAINFOREST SUCCESSIONAL PROCESS ACTS ON ABANDONED PASTURES IN SOUTHERN BRAZIL

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Abstract. In Brazil, a high number of woody species have been used for forest restoration plantings. However, this action is widely questionable due to the no re-establishment of a considered "normal" successional trajectory. In this study, we analyzed subtropical rainforest natural regeneration at abandoned pastures and we showed that vegetation is characterized, predominantly, by few high dominant native woody species, highlighting especially *Vernonanthura discolor* (Asteraceae), *Myrsine coriacea* (Primulaceae), and *Piptocarpha regnellii* (Asteraceae). Our results also indicate that these high dominance species favor the lowest diversity of natural regeneration. In this regard, we suggest implementing actions that provide improvements and facilitate natural processes of ecological succession by planting dominant native woody species. This takes into consideration the re-establishment of a considered "normal" successional trajectory.
Keywords: *forest regeneration; "normal" successional trajectory; dominant species; species diversity; CSR ecological strategies*

Introduction

The subtropical forests are exposed to a continuous degradation process, due to anthropic landscapes changes (Ribeiro et al., 2009; Vibrans et al., 2013a). These landscapes are mainly pastures mosaics, crops and urban areas fringed by small forest patches (Tabarelli et al., 2010). The forests conversion into cattle raising pastures is known for reducing biological diversity, interrupting the ecological processes (Tinoco-Ojanguren et al., 2013), and also reducing water infiltration into the soil due to soil compaction by animals trampling, what increases superficial runoff and soil erosion (Kunz et al., 2013). In these areas, natural regeneration of native species is limited by a variety of processes coming from the conversion forest–pasture, including land degradation (Holl and Aide, 2011), unfavorable microclimate (Pröll et al., 2015), lower seed dispersion (Reid et al., 2015) and competition from invasive exotic species (Mantoani and Torezan, 2016).

There are ~177.282,00 km² of potential areas for forest restoration in Brazil (Rodrigues et al., 2011). These areas are generally situated in highly fragmented forest regions and present low agricultural potential due to massive livestock farming (Rodrigues et al., 2009). Such as in other Brazilian regions, Santa Catarina Atlantic

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Forest is composed of secondary forest physiognomy with different regeneration stages, being rare the remaining with primary forests (Reis et al., 1992). The whole area has suffered destructive extractivism and disorderly soil occupation for agriculture and livestock expansion (Vibrans et al., 2013b). Although, secondary forests are important for global biological diversity conservation (Gibson et al., 2011), in Southern Brazil there are few studies on species diversity of natural regeneration at the secondary succession process of subtropical forests (Meyer et al., 2013; Fiorentin et al., 2015).

If we understand the secondary succession process of abandoned pastures and priority areas indicated for restoration in Brazil (see Rodrigues et al., 2011; Brasil, 2012; 2017), we can show potential species to be used in the forest regeneration projects (Martins, 2013; Maçaneiro et al., 2016a; Mota et al., 2017; Turchetto et al., 2017). For example, species that colonize abandoned pastures are typical from disturbed environments, once they frequently occur in open areas (such as clearings) or, on the edge of forests, where environmental conditions are unfavorable for most of the demanding plants (Chazdon and Guariguata, 2016). Besides this, those species are adapted to local environmental conditions, characterizing native regeneration vegetation in the initial stages and, therefore, being recommended for use on subtropical forests restoration (Kageyama and Reis, 1993; Meli et al., 2014; Mota et al., 2017).

Heliophytic and light demanding plants are among the species prepared to take place at abandoned pastures (Chazdon, 2008; Cheung et al., 2009). They are highly adapted to unfavorable microclimate conditions (higher light levels) and degraded soil (compacted and low in nutrients) (Holl and Aide, 2011). These species are also often described as single-dominants or monodominants (see Connell and Lowman, 1989; Hart et al., 1989), since they occur in large numbers, have relative density or relative dominance between 50-100%, and dominate the forest canopy. Some studies were developed in Santa Catarina with the purpose to understand both the natural regeneration composition and structure of the Atlantic Forest (see Schorn and Galvão, 2009; Siminski, 2009; Meyer et al., 2013; Fiorentin et al., 2015; Higuchi et al., 2015; Maçaneiro et al., 2016a). Those studies verified that successional trajectories vary in function of the land use and the anthropic history. Although its descriptive content focus, those researches contribute to meta-analysis studies and also serves as basis for forest restoration projects in similar areas (Mota et al., 2017; Turchetto et al., 2017). However, none of these studies emphasized the relationship between natural regeneration dominant species and diversity in abandoned pastures.

The use of a large number of woody species in plantations for forest regeneration purpose is a widely questionable action, although it is a traditional practice in Brazil (Naeem, 2006; Wright et al., 2009; Durigan et al., 2010; Durigan and Engel, 2015). For instance, a degraded ecosystem is a highly organizaded system opened to matter and energy flows, with dissipative structure, presenting internal (among the system components) and external interactions (with the landscape) (Aumond and Maçaneiro, 2014). In this context, the answer for how many species would be necessary in order to have a stable community and a functional ecosystem must take into account how a considered “normal” successional trajectory re-establishment happens (see Suding and Gross, 2006; Naeem, 2006; Durigan and Engel, 2015). Furthermore, there are few woody species that seems to dominate at the beginning of forest succession of the subtropical forests (see Klein, 1980; Schorn and Galvão, 2009; Siminski, 2009; Meyer et al., 2013). In this regard, the aim of this study was to analyze natural regeneration woody species composition, structure, diversity, and abundance at abandoned pastures

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in order to respond tree key issues: (1) How many and which are the species growing at a four-year abandoned pasture? The pasture mentioned was used by cattle raising for more than a half century. (2) Do distribution abundance patterns of the natural regeneration woody species present important implications to the choice of new species for forest restoration projects?

Material and Methods

Study area

The study area is inserted in Faxinal do Bepe locality, Serra do Itajaí National Park, state of Santa Catarina, Southern Brazil. The area is within the limits of Itajaí river watershed, being the river Warnow a sub-watershed. Faxinal do Bepe has a total area of ~250 ha, altitude which varies of 700 to 1,039 m s.n.m. and is located between 27°05' - 27°07' S e 49°11' - 49º13' W (*Figure 1*).

The climate is Cfa - humid subtropical climate, without dry season and with hot summer (Alvares et al., 2014). The average annual temperature range between 16-18 °C, with temperature average monthly varying between 12-14 °C in the coldest month (July) and 20-23 ºC in the warmer months (January and February). The annual relative humidity varies between 82-84% and the total annual rainfall is between 1,500-1,700 mm well distributed during the year (Pandolfo et al., 2002).

The predominant vegetation is Subtropical Upper Hills Broadleaved Evergreen Rainforest (*sensu* Oliveira-Filho, 2015), hereafter referred to as Subtropical Rainforest, inserted at Atlantic Forest Domain. Regarding the natural resources historical use, after the year 1953, it has initiated the colonization and occupation process at Faxinal do Bepe, that lasted until 2004. At that period, large part of the forests were submitted to selective logging and posterior conversion to vast pasture areas that, currently, are found abandoned and at an initial regeneration stage.

Data collection

We selected three four-year abandoned pastures which were at an initial regeneration stage (*Figures 1 and 2*). Each area was constituted by a slope with the same historical use. We used plots arranged in transects (Soares et al., 2012), to represent the possible greatest variation throughout the three areas with abandoned pastures. At each area we distributed, systematically, 15 sample plots of 10 x 20 m (200 m²), corresponding to 3,000 m² sampling area and making up 20% of the total studied. We disposed these sample plots in three transects, all of them starting at the base of the slope and ending at the top of the slope. We distanced these sample plots approximately 25 m each other and 35 m from the transects. At each sample plot we sampled the upper layer, characterized by live individuals with diameter at breast height (DBH) ≥ 5 cm. Inside each sample plot we inserted a 10 x 10 m (100 m²) subplot, to sample lower layer, characterized by individuals with height ≥ 50 cm and DBH < 5 cm.

We identified botanical material collected by comparison with exsiccates deposited at the Dr. Roberto Miguel Klein Herbarium of Fundação Universidade Regional de Blumenau (FURB) and, also, through taxonomic literature and FURB experts consultation. We used the species classification system proposed by APG IV (2016) and PPG I (2016).

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Figure 1*. Studied area at Faxinal do Bepe, Serra do Itajaí National Park, Santa Catarina State, Southern Brazil.*

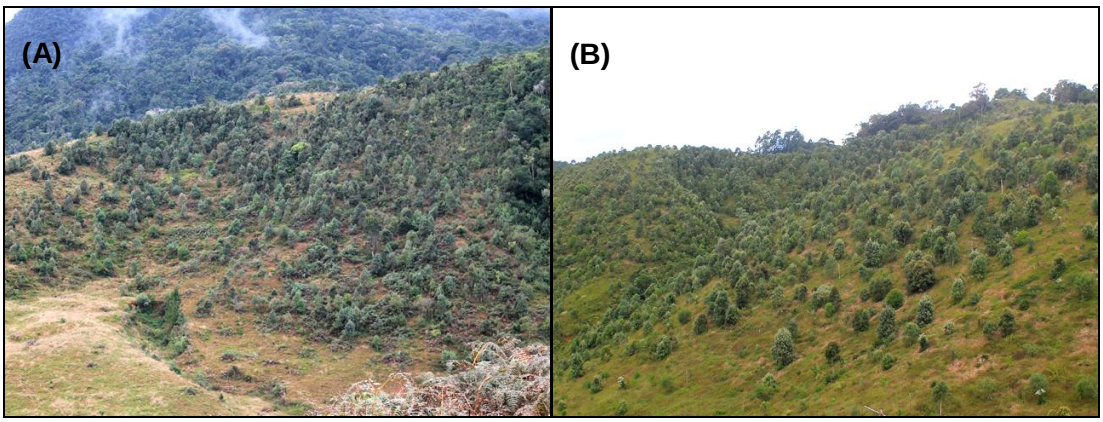

Figure 2*. Photos of studied areas 1 (A) and 3 (B) at Faxinal do Bepe, Serra do Itajaí National Park, Santa Catarina State, Southern Brazil.*

Data analysis

We calculated, for upper layer, Mueller-Dombois and Ellenberg (2002) structural parameters, in other words, density, dominance and frequency absolute and relative, and importance value for each species. For lower layer, besides the parameter described above, we calculated absolute and relative height classes and the natural regeneration importance value for each species (Hosokawa et al.,

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2008). Afterward, we classified these species by CRS ecological strategy (see Grime et al., 1997), adopting the methodology suggested by Pierce et al. (2013) into the following categories: C – competitor specie with high potential growth rate and rapidly biomass expanding; S – stress-tolerant specie and slow-growing; R – ruderal specie with premature reproduction for prolonged period.

We verified species abundance distribution patterns (PDSA) of the natural regeneration by Whittaker diagram (Magurran, 2004). Similarities or differences between PDSA layers analyzed were verified by Kolmogorov-Smirnov test for two sample plots, at the significance level $\alpha = 0.01$ (Sokal and Rohlf, 2011). The Whittaker diagram is considered a useful tool to analyze species PSDA into plant communities, once contrasting patterns between species richness and vegetation uniformity can be clearly observed (Krebs, 2014; Maçaneiro et al., 2016b).

We estimated the vegetation heterogeneity (Krebs, 2014) by Shannon index (*H*', Napier's logarithms) and Simpson index (1-*D*). Afterwards, we converted these indexes to the effective number of species – ENS (see Jost, 2006) by the following expressions: Shannon index = exp(*H*') and Simpson index = 1/(1-(1-*D*)). Indexes *H*' and 1-*D* conversion into real diversity (effective number of species) giving it a set of common behaviors and properties, easily interpretable. After this conversion, the diversity is always measured as species number, regardless of the index used (Jost, 2010). Additionally, we used Pearson correlation coefficient and scatterplots to verify the relationship between the diversity and abundance of dominant woody species at the layers. First, we correlated relative density (*DR*%) of the specie with the greatest individual number of each sample plot with its respective *H*' e 1-*D* converted into ENS. Next, we investigated the statistical significance ($\alpha = 0.01$) of the correlations through *t* test for correlation existence (Zar, 2010). Finally, we constructed dispersion graphics between diversity evidences (axis y) and *DR*% (axis x), and inserted a linear trend line for the relation between *H*' and *DR*%, and 1-*D* and *DR*% , both converted into ENS.

Results

We sampled 1,079 individuals belonging to 45 woody species *(Table 1*) in both layers. The natural regeneration presented 497.8 ind.ha^{-1} and monodominance of *Vernonanthura discolor* (*DR* > 50%), in the upper layer. Besides *Vernonanthura discolor*, *Piptocarpha regnellii*, *Piptocarpha axillaris*, *Myrsine coriacea* and *Piptocarpha angustifolia* (*VI* = 266.2%) also characterize the upper layer.

In the lower layer, we found density of 1,402.2 ind.ha^{-1} and the mains species that characterized the vegetation structure were *Vernonanthura discolor*, *Myrsine coriacea*, *Clethra scabra*, *Piptocarpha regnellii* and *Piptocarpha axillaris* (*RNR* = 186.2%). Similar to what was found on the upper layer, *Vernonanthura discolor*, *Myrsine coriacea*, *Piptocarpha regnellii* and *Piptocarpha axillaris* also were the main species at the lower layer (*Table 1*).

We observed that woody species presented different ecological regeneration strategies (*Table 1*). However, competitors and stress tolerant plants (S/SC) were predominant at the analyzed layers (upper layer = 64.4%; lower layer = 70.5%).

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Table 1. *Phytosociological parameters for woody species in two layers of natural regeneration of a Subtropical Rainforest in Southern Brazil.*

Upper layer								
Species	***DA***	***DR***	***FA***	***FR***	***DoA***	***DoR***	***VI***	**ES**
Vernonanthura discolor (Spreng.) H.Rob.	256.7	51.6	88.9	31.0	1.88	57.1	139.7	S/SC
Piptocarpha regnellii (Sch.Bip.) Cabrera	87.8	17.6	46.7	16.3	0.67	20.3	54.2	S/SC
Piptocarpha axillaris (Less.) Baker	58.9	11.8	42.2	14.7	0.25	7.5	34.1	S/SC
Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	31.1	6.3	33.3	11.6	0.13	3.8	21.7	S/SC
Piptocarpha angustifolia Dusén ex Malme	27.8	5.6	22.2	7.8	0.14	4.2	17.5	S/SC
Clethra scabra Pers.	10.0	2.0	15.6	5.4	0.03	0.8	8.2	S/SC
Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	6.7	1.3	11.1	3.9	0.05	1.4	6.6	R/CSR
Baccharis semiserrata DC.	7.8	1.6	8.9	3.1	0.06	1.9	6.5	S
Ocotea puberula (Rich.) Nees	3.3	0.7	6.7	2.3	0.01	0.3	3.3	SR/CSR
Annona emarginata (Schltdl.) H.Rainer	3.3	0.7	2.2	0.8	0.03	1.0	2.5	S/SC
Ocotea odorifera (Vell.) Rohwer	1.1	0.2	2.2	0.8	0.04	1.2	2.2	S/SC
Baccharis dracunculifolia DC.	1.1	0.2	2.2	0.8	0.01	0.2	1.2	S
Solanum lacerdae Dusén	1.1	0.2	2.2	0.8	0.004	0.1	1.1	S/SC
Aspidosperma tomentosum Mart.	1.1	0.2	2.2	0.8	0.003	0.1	1.1	S/SC
Total	497.8	100.0	286.7	100.0	3.30	100.0	300.0	-
Lower layer								
Species	***DA***	***DR***	***FA***	***FR***	***CAT***	***CRT***	***RNR***	**ES**
Vernonanthura discolor (Spreng.) H.Rob.	433.3	30.9	84.4	16.1	51.8	31.0	78.0	S/SC
Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	177.8	12.7	55.6	10.6	18.9	11.3	34.6	S/SC
Clethra scabra Pers.	126.7	9.0	51.1	9.7	15.4	9.2	28.0	S/SC
Piptocarpha regnellii (Sch.Bip.) Cabrera	115.6	8.2	48.9	9.3	13.9	8.3	25.9	S/SC
Piptocarpha axillaris (Less.) Baker	113.3	8.1	37.8	7.2	13.7	8.2	23.5	S/SC
Piptocarpha angustifolia Dusén ex Malme	57.8	4.1	28.9	5.5	7.0	4.2	13.8	S/SC
Miconia tristis Spring	53.3	3.8	20.0	3.8	6.0	3.6	11.2	S/SC
Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	33.3	2.4	20.0	3.8	4.4	2.7	8.8	R/CSR
Myrsine umbellata Mart.	35.6	2.5	20.0	3.8	4.0	2.4	8.7	S/SC
Solanum americanum Mill.	53.3	3.8	4.4	0.8	6.4	3.8	8.5	S/SC
Baccharis semiserrata DC.	31.1	2.2	13.3	2.5	2.7	1.6	6.3	S/SC
Miconia sellowiana Naudin	13.3	1.0	13.3	2.5	1.8	1.1	4.6	S/SC
Solanum mauritianum Scop.	13.3	1.0	13.3	2.5	1.7	1.0	4.5	S/SC
Ocotea puberula (Rich.) Nees	13.3	1.0	8.9	1.7	1.7	1.0	3.7	SR/CSR
Baccharis oblongifolia (Ruiz & Pav.) Pers.	8.9	0.6	6.7	1.3	1.2	0.7	2.6	S/SC
Baccharis dracunculifolia DC.	6.7	0.5	6.7	1.3	1.0	0.6	2.3	S/SC
Ficus luschnathiana (Miq.) Miq.	6.7	0.5	6.7	1.3	1.0	0.6	2.3	S/SC
Campomanesia guaviroba (DC.) Kiaersk.	8.9	0.6	4.4	0.8	1.4	0.8	2.3	S/SC
Solanum lacerdae Dusén	6.7	0.5	6.7	1.3	0.9	0.5	2.3	S/SC
Annona emarginata (Schltdl.) H.Rainer	6.7	0.5	6.7	1.3	0.9	0.5	2.3	S/SC
Inga vera subsp. *affinis* (DC.) T.D.Penn.	6.7	0.5	6.7	1.3	0.8	0.5	2.2	S/SC
Myrcia splendens (Sw.) DC.	8.9	0.6	4.4	0.8	1.0	0.6	2.1	S/SC
Syagrus romanzoffiana (Cham.) Glassman	6.7	0.5	4.4	0.8	0.9	0.5	1.8	S/SC
Miconia cabucu Hoehne	4.4	0.3	4.4	0.8	0.7	0.4	1.6	S/SC
Alchornea triplinervia (Spreng.) Müll.Arg.	4.4	0.3	4.4	0.8	0.5	0.3	1.5	S/SC
Ocotea elegans Mez	6.7	0.5	2.2	0.4	0.9	0.5	1.4	S/SC
Aspidosperma tomentosum Mart.	4.4	0.3	2.2	0.4	0.7	0.4	1.2	S/SC
Zanthoxylum rhoifolium Lam.	4.4	0.3	2.2	0.4	0.7	0.4	1.2	S/SC
Casearia sylvestris Sw.	4.4	0.3	2.2	0.4	0.7	0.4	1.2	SC/CSR
Cyathea phalerata Mart.	4.4	0.3	2.2	0.4	0.6	0.4	1.1	S
Guatteria australis A.St.-Hil.	2.2	0.2	2.2	0.4	0.3	0.2	0.8	S/SC

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Critoniopsis quinqueflora (Less.) H.Rob.	2.2	0.2	2.2	0.4	0.3	0.2	0.8	S/SC
Solanum variabile Mart.	2.2	0.2	2.2	0.4	0.3	0.2	0.8	SC/CSR
Dalbergia brasiliensis Vogel	2.2	0.2	2.2	0.4	0.3	0.2	0.8	SC/CSR
Leandra carassana (DC.) Cogn.	2.2	0.2	2.2	0.4	0.3	0.2	0.8	S/SC
Miconia inconspicua Miq.	2.2	0.2	2.2	0.4	0.3	0.2	0.8	SC/CSR
Miconia lymanii Wurdack	2.2	0.2	2.2	0.4	0.3	0.2	0.8	S/SC
Cedrela fissilis Vell.	2.2	0.2	2.2	0.4	0.3	0.2	0.8	R/CR
Rubus brasiliensis Mart.	2.2	0.2	2.2	0.4	0.3	0.2	0.8	S/SC
Handroanthus chrysotrichus (Mart. ex DC.) Mattos	2.2	0.2	2.2	0.4	0.3	0.2	0.7	SR/CSR
Jacaranda puberula Cham.	2.2	0.2	2.2	0.4	0.3	0.2	0.7	S/SC
Nectandra oppositifolia Nees	2.2	0.2	2.2	0.4	0.3	0.2	0.7	S/SC
Leandra glazioviana Cogn.	2.2	0.2	2.2	0.4	0.3	0.2	0.7	S/SC
Campomanesia reitziana D.Legrand	2.2	0.2	2.2	0.4	0.3	0.2	0.7	S/SC
Total	1,402.2	100.0	524.4	100.0	167.3	100.0	300.0	-

Note: DA: absolute density (ind.ha^{-1}); DR: relative density (%); FA: absolute frequency (%); FR: relative frequency (%); DoA: absolute dominance (m².ha^{-1}); DoR: relative dominance (%); VI: importance value (%); CAT: absolute size class; CRT: relative size class (%); RNR: relative natural regeneration (%); ES: ecological strategies: competitor (C), stress tolerant (S), ruderal adapted to disorders (R), ruderal competitor in environment subjected to stress and disorders (CR/CSR), ruderal competitor (R/CR), ruderal in environment subjected to stress and disorders (R/CSR), stress tolerant and competitor (S/SC), stress tolerant and competitor in environment subjected to stress and disorders (SC/CSR) and ruderal and stress tolerant in environment subjected to stress and disorders (SR/CSR).

Differences between vegetation layers are particularly visible at the community structure (*Figure 3*). We verified PDSA significantly different throughout the analyzed layers (Kolmogorov-Smirnov, $D = 0.68$; $p < 0.01$). However, Whittaker diagram showed that natural regeneration is characterized by few high dominant woody species, highlighting *Vernonanthura discolor*, *Myrsine coriacea* and *Piptocarpha regnellii*.

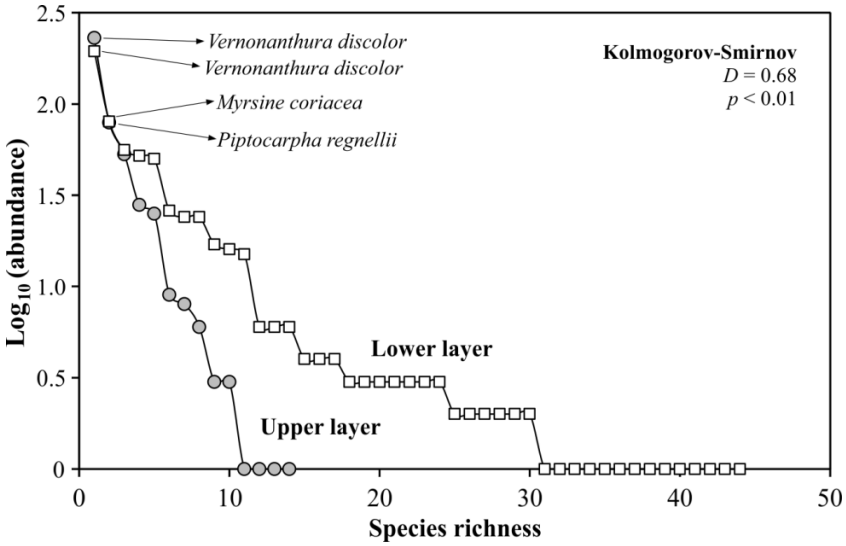

Figure 3*. Whittaker diagram for two layers of natural regeneration of a Subtropical Rainforest in Southern Brazil.*

We found highly significant correlations (Pearson, $r > -0.79$; $p < 0.01$) between diversity index (Shannon and Simpson) and relative density of the mostly abundant woody species at the sample plots analyzed (*Table 2*, *Figure 4*).

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Table 2. *Pearson coefficient correlation (r) between diversity indexes and relative density of the most abundant woody specie at the sample plots in two layers of natural regeneration of a Subtropical Rainforest in Southern Brazil.*

Diversity index	ENS	R^2	*r*	*p*
Upper layer				
Shannon	4.78	0.62	-0.79	<0.0001
Simpson	3.16	0.79	-0.89	<0.0001
Lower layer				
Shannon	13.00	0.68	-0.82	<0.0001
Simpson	7.21	0.78	-0.88	<0.0001

ENS = effective number of species.

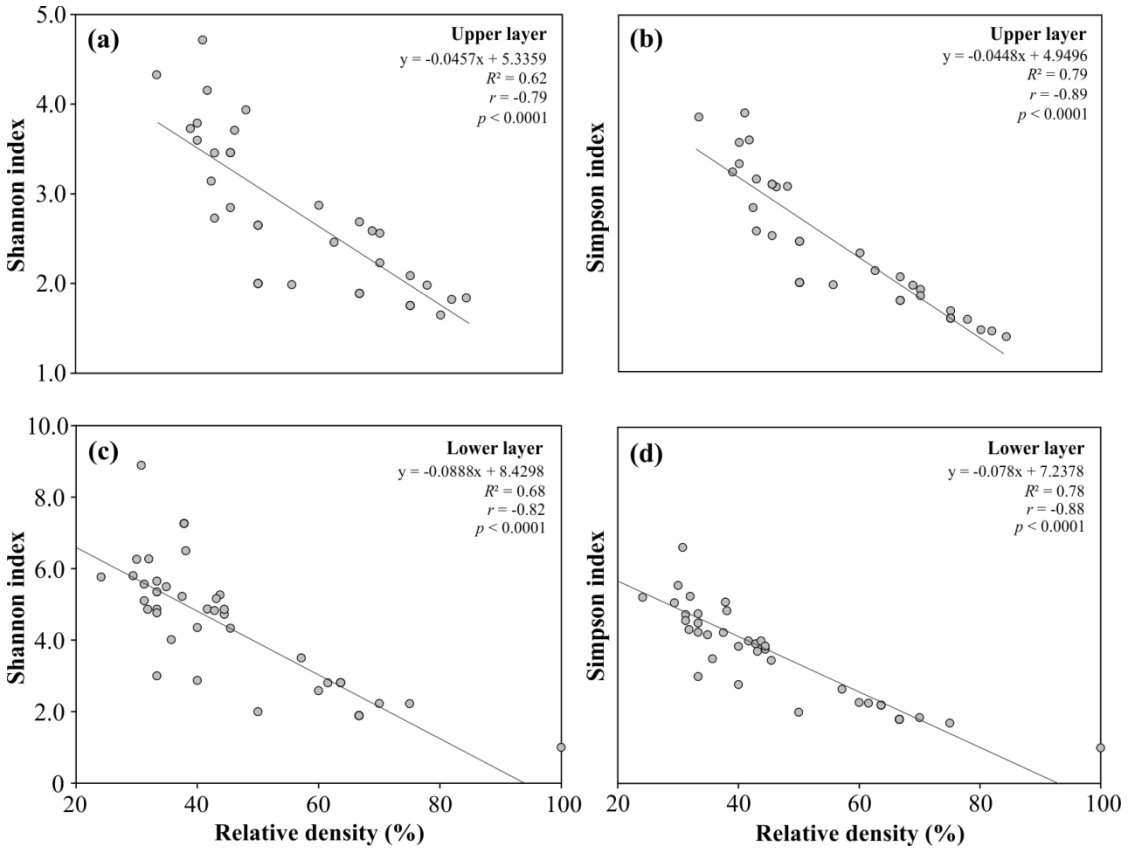

Figure 4. *Relation between diversity indexes and relative density of the most abundant woody species on upper layer (a, b) and lower (c, d). Each point represents one of 45 sample plots of the natural regeneration of a Subtropical Rainforest in Southern Brazil.*

Discussion

Our study revealed that natural regeneration of Subtropical Rainforest at abandoned pastures is characterized by few highly dominant woody species. These species have specific ecological strategies as stress physiological tolerance and competitive capacity for resources. The ecological strategies of native species are closely related to the successional process (Munoz et al., 2016), where the temporal changes of colonizers and locally persistent and more demanding species are observed at the forest ecosystem affected by a disruption (for example, clearings). In this context, ecological succession

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benefit species with physiological tolerance to stress or with competitive capacity (Caccianiga et al., 2006). Furthermore, the environmental type where the plants are subjected (for example, plains and slopes) can also influence changes at ecological strategies that species have among forest succession. For example, Navas et al. (2010) verified changes between ruderal plants to competitor plants at not stressful ambient and where vital resources are unlimited, whereas at stressful environments and with limited resources ruderal plants tend to be replaced by stress tolerant plants. At the present study, components connected to geomorphology (relief, slope, elevation) and pedology (soil types, water availability) might possibly be acting as environmental filters, as at an environmental gradient relief and soil conditions vary among the slope, enabling influence plants ecological strategies (Thuiller, 2013; Maçaneiro et al., 2016c; Munoz et al., 2016).

Dominant native woody species are common in stressful environments (Peh et al., 2011; Nascimento et al., 2015), like initial successional stage in tropical (Morais et al., 2013) and subtropical rainforests (Klein, 1980; Schorn and Galvão, 2009; Siminski, 2009; Meyer et al., 2013). For example, Steege et al. (2013) determined that Amazon watershed is represented by 16,000 woody species, but that only 227 (1.4%) represent half of all registered woody species. In secondary forests in the initial succession stage, dominant woody species generally are the first plants to grow due to its rapid growth and strong adaptation to local conditions, may formatting dense groupings that characterize young forests canopy (Klein, 1980; 1984; Kageyama and Reis, 1993; Chazdon, 2008; Schorn and Galvão, 2009; Chazdon, 2014; Chazdon and Guariguata, 2016). The establishment of these species during the forest regeneration also contributes to ecosystem resiliency, since they bring mutualist species that generate greater heterogeneity and diversity (Howe, 2016; McAlpine et al., 2016). These species form small patches that provides favorable microclimate for more demanding species grow (Scervino and Torezan, 2015) and attracts seeds dispersing agents, which provides improvement on soil conditions and facilitate forest regeneration (Bechara et al., 2016). Therefore, dominant native woody species generally occur in the initial succession stage of subtropical rainforest and are beneficial for forest regeneration, as observed on this study.

We verified that highly dominant woody species generate lowest natural regeneration diversity, especially on upper layer. In subtropical rainforests, the species located on the upper layer act as environmental filters for those species in lower layer species (see Carvalho et al., 2016; Boukili and Chazdon, 2017). These studies showed that some regenerating woody species are favored by mature species and that the future forest structure is related to the environmental filters. Beyond species, several biotic and abiotic factors act as environmental filters (for example, seeds dispersal, seedlings competition with exotic grasses, predation and germination seedlings, soil chemical and physical characteristics, decaying tree trunks, luminous intensity, herbivory etc), which selected or exclude determined woody species at biological communities (Holl, 2000; Christie and Armesto, 2003; Lortie et al., 2004; Chazdon, 2014; Reid et al., 2015; Chazdon and Guariguata, 2016). However, these environmental filters can help to understand what processes maintain biological diversity and explaining species distribution among environmental gradients (Elith and Leathwick, 2009; Lewis et al., 2014; Maçaneiro et al., 2016c).

Besides that, convert the natural regeneration in a true diversity (effective number of species) will depend on the uniformity vegetation level or on the diversity index

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applied. Considering the characteristics of diversity index in relation to rare species (Magurran, 2004; Jost, 2006; Melo, 2008; Buckland et al., 2011), our study presented that Shannon and Simpson's index are strongly influenced by dominant species. This issue is important when considering the woody species selection for subtropical rainforests regeneration projects, once at the present Brazil suffers with lack environmental legislation and also technical/scientific consistent criteria for species recommendation, leading many projects to use high diversity of species in the forest restoration plantings, what is widely questionable (Naeem, 2006; Wright et al., 2009; Durigan et al., 2010). Our results show that few species can establish themselves in an explored environment by more than half century of intensive use. In this context, implementing actions that provide improvements and facilitate the ecological natural succession processes through dominant native woody species with high density of seedlings are important for the initial stages of subtropical rainforests restauration, since it considers basic principles of "normal" ecological succession (see Suding and Gross, 2006; Naeem, 2006; Durigan and Engel, 2015), besides being an initiative much more affordable, enabling smallholder farmers to restore degraded pastures.

In Neotropical forest restorations, multiple techniques have been used for ecosystem reconstruction with the maximum biodiversity possible, especially planting a high diversity woody species (Rodrigues et al., 2009; Martins, 2013; Bechara et al., 2016; Chazdon and Guariguata, 2016). However, generally the diversity of native species available in tree seedlings nurseries is limited and determined by availability of regional fruits and seeds (Palma and Laurence, 2015; Turchetto et al., 2017). In this study, we observed that some of the most important species are common in all vegetation layers, presenting potential for restoration plantings, especially on open areas as new abandoned pastures, since the are species tolerant to stress and competitors for resources (for example, *Vernonanthura discolor*, *Myrsine coriacea*, *Piptocarpha regnellii*, *Piptocarpha axillaris*, *Piptocarpha angustifolia*, *Clethra scabra* and *Symphyopappus itatiayensis*). Another combination of species that we observed occurs only on low layer, presenting potential for restoration plantings in order to enrichment, at abandoned pasture areas in succession advanced stages (for example, *Ficus luschnathiana*, *Campomanesia guaviroba*, *Inga vera* subsp. *affinis*, *Myrcia splendens*, *Syagrus romanzoffiana*, *Miconia cabucu* and *Alchornea triplinervia*, among several others). Thus, due to structure importance and ecological strategies that these species have in Southern Brazil Subtropical Rainforest natural regeneration, we recommend preferentially this species (or this kind of species) for restoration plantings at abandoned pastures.

In this study, we indicate evidences about how the high dominance of some species (for example, *Vernonanthura discolor*, *Piptocarpha regnellii* and *Myrsine coriacea*) favor the lowest diversity of natural regeneration. However, this standard must be seen as facilitator of forest restoration, once these species presents huge adaptation to local conditions and provide the biggest soil cover and improvement in environmental conditions for more exigent new woody species colonization. These results encourage a further analysis about how these species contribute ecologically for abandoned pastures restorations. Therefore, we suggest the addition of species functional attributes in new vegetation studies, since additional information about ecological strategies of dominant woody species may indicate standards that accelerates the ecological successional process of subtropical rainforests.

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APPENDIX

Appendix 1. *Basic field data 1: species found in upper layer*

Sample plot	Individual	Species	DBH (cm)	Height (m)
PO1	1	Piptocarpha axillaris (Less.) Baker	6,05	2,5
PO1	2	Vernonanthura discolor (Spreng.) H.Rob.	4,93	2,5
PO1	3	Vernonanthura discolor (Spreng.) H.Rob.	4,97	3
PO1	3	Vernonanthura discolor (Spreng.) H.Rob.	5,54	3
PO1	3	Vernonanthura discolor (Spreng.) H.Rob.	5,41	3
PO2	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,41	3
PO2	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	4,77	3
PO2	2	Vernonanthura discolor (Spreng.) H.Rob.	6,68	4
PO2	2	Vernonanthura discolor (Spreng.) H.Rob.	4,62	4
PO2	3	Vernonanthura discolor (Spreng.) H.Rob.	9,45	5
PO2	3	Vernonanthura discolor (Spreng.) H.Rob.	7,86	5
PO2	4	Vernonanthura discolor (Spreng.) H.Rob.	6,24	2,5
PO3	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,25	2,5
PO3	2	Vernonanthura discolor (Spreng.) H.Rob.	5,25	3
PO4	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,57	3
PO4	2	Piptocarpha axillaris (Less.) Baker	5,09	3
PO4	3	Vernonanthura discolor (Spreng.) H.Rob.	5,41	3
PO4	4	Vernonanthura discolor (Spreng.) H.Rob.	4,77	3,5
PO4	5	Piptocarpha angustifolia Dusén ex Malme	5,09	2,5
PO5	1	Piptocarpha angustifolia Dusén ex Malme	8,05	3
PO5	2	Piptocarpha axillaris (Less.) Baker	5,89	3
PO5	3	Piptocarpha axillaris (Less.) Baker	6,53	3,5
PO5	4	Vernonanthura discolor (Spreng.) H.Rob.	4,93	3
PO5	5	Vernonanthura discolor (Spreng.) H.Rob.	4,93	3
PO5	6	Piptocarpha regnellii (Sch.Bip.) Cabrera	4,93	3
PO5	7	Piptocarpha angustifolia Dusén ex Malme	5,73	3
PO5	8	Piptocarpha angustifolia Dusén ex Malme	5,19	2,5
PO5	9	Piptocarpha angustifolia Dusén ex Malme	5,19	3
PO5	10	Piptocarpha angustifolia Dusén ex Malme	5,09	3
PO5	11	Vernonanthura discolor (Spreng.) H.Rob.	6,05	3,5
PO5	11	Vernonanthura discolor (Spreng.) H.Rob.	5,25	3,5
PO5	11	Vernonanthura discolor (Spreng.) H.Rob.	5,57	3,5
PO6	1	Vernonanthura discolor (Spreng.) H.Rob.	4,77	2,5
PO6	2	Vernonanthura discolor (Spreng.) H.Rob.	5,89	3,5
PO6	3	Piptocarpha axillaris (Less.) Baker	4,77	3
PO6	4	Piptocarpha angustifolia Dusén ex Malme	6,53	3,5
PO6	4	Piptocarpha angustifolia Dusén ex Malme	4,93	3
PO6	5	Piptocarpha axillaris (Less.) Baker	4,77	3
PO6	6	Piptocarpha angustifolia Dusén ex Malme	4,93	3
PO6	7	Vernonanthura discolor (Spreng.) H.Rob.	4,93	3
PO6	8	Vernonanthura discolor (Spreng.) H.Rob.	5,51	3,5
PO6	9	Piptocarpha axillaris (Less.) Baker	4,90	3
PO6	10	Piptocarpha axillaris (Less.) Baker	4,77	3
PO6	11	Piptocarpha angustifolia Dusén ex Malme	7,54	4,5
PO6	12	Vernonanthura discolor (Spreng.) H.Rob.	7,96	4,5

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PO6	13	Vernonanthura discolor (Spreng.) H.Rob.	5,25	3
PO6	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,37	3,5
PO7	1	Vernonanthura discolor (Spreng.) H.Rob.	6,21	3,5
PO7	2	Piptocarpha axillaris (Less.) Baker	6,68	4
PO7	3	Vernonanthura discolor (Spreng.) H.Rob.	6,37	4,5
PO7	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,32	3,5
PO7	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,37	3
PO7	5	Vernonanthura discolor (Spreng.) H.Rob.	6,05	4
PO7	6	Vernonanthura discolor (Spreng.) H.Rob.	4,93	3
PO7	7	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,92	3,5
PO7	8	Vernonanthura discolor (Spreng.) H.Rob.	4,77	3
PO7	9	Vernonanthura discolor (Spreng.) H.Rob.	6,37	3,5
PO7	10	Vernonanthura discolor (Spreng.) H.Rob.	6,05	4
PO7	10	Vernonanthura discolor (Spreng.) H.Rob.	5,41	4
PO7	11	Vernonanthura discolor (Spreng.) H.Rob.	7,16	4
PO7	12	Vernonanthura discolor (Spreng.) H.Rob.	5,09	4
PO7	13	Vernonanthura discolor (Spreng.) H.Rob.	5,89	3,5
PO7	14	Piptocarpha angustifolia Dusén ex Malme	6,37	4
PO7	15	Vernonanthura discolor (Spreng.) H.Rob.	7,00	4,5
PO7	16	Piptocarpha angustifolia Dusén ex Malme	5,09	3,5
PO8	1	Vernonanthura discolor (Spreng.) H.Rob.	5,41	3
PO8	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	4,77	3,5
PO8	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,09	3
PO8	3	Piptocarpha angustifolia Dusén ex Malme	5,32	3
PO8	4	Piptocarpha angustifolia Dusén ex Malme	5,63	3
PO8	5	Vernonanthura discolor (Spreng.) H.Rob.	6,21	3
PO8	6	Piptocarpha angustifolia Dusén ex Malme	5,73	4
PO8	6	Piptocarpha angustifolia Dusén ex Malme	5,25	4,5
PO8	7	Vernonanthura discolor (Spreng.) H.Rob.	4,77	3
PO8	8	Piptocarpha angustifolia Dusén ex Malme	9,87	4
PO9	1	Vernonanthura discolor (Spreng.) H.Rob.	5,09	3
PO9	2	Vernonanthura discolor (Spreng.) H.Rob.	5,89	3
PO9	2	Vernonanthura discolor (Spreng.) H.Rob.	4,93	3
PO9	3	Piptocarpha angustifolia Dusén ex Malme	6,37	3,5
PO9	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,53	3
PO9	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,41	3
PO9	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,89	3
PO9	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,21	3
PO9	5	Vernonanthura discolor (Spreng.) H.Rob.	5,09	3,5
PO9	6	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,96	3,5
PO9	6	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,68	3,5
PO9	7	Vernonanthura discolor (Spreng.) H.Rob.	5,25	3,5
PO9	8	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,21	2,5
PO9	9	Piptocarpha axillaris (Less.) Baker	5,73	2,5
PO9	10	Vernonanthura discolor (Spreng.) H.Rob.	5,25	3
PO9	11	Piptocarpha angustifolia Dusén ex Malme	6,37	3
PO10	1	Vernonanthura discolor (Spreng.) H.Rob.	5,09	3,5
PO10	2	Piptocarpha axillaris (Less.) Baker	5,09	3
PO10	3	Piptocarpha angustifolia Dusén ex Malme	8,59	4,5
PO10	3	Piptocarpha angustifolia Dusén ex Malme	7,64	4,5

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PO10	4	Vernonanthura discolor (Spreng.) H.Rob.	6,21	4,5
PO10	4	Vernonanthura discolor (Spreng.) H.Rob.	6,68	4,5
PO10	5	Piptocarpha angustifolia Dusén ex Malme	8,91	4,5
PO10	6	Vernonanthura discolor (Spreng.) H.Rob.	4,93	3
PO10	7	Piptocarpha angustifolia Dusén ex Malme	6,84	3,5
PO10	7	Piptocarpha angustifolia Dusén ex Malme	5,09	3
PO10	8	Piptocarpha angustifolia Dusén ex Malme	4,77	3,5
PO11	1	Vernonanthura discolor (Spreng.) H.Rob.	5,83	3
PO11	2	Piptocarpha axillaris (Less.) Baker	4,77	3
PO11	3	Piptocarpha regnellii (Sch.Bip.) Cabrera	4,77	2,5
PO11	4	Piptocarpha axillaris (Less.) Baker	4,77	2
PO11	5	Vernonanthura discolor (Spreng.) H.Rob.	6,84	4
PO11	6	Vernonanthura discolor (Spreng.) H.Rob.	8,91	5
PO11	7	Piptocarpha axillaris (Less.) Baker	5,41	4
PO11	7	Piptocarpha axillaris (Less.) Baker	4,77	3,5
PO11	8	Vernonanthura discolor (Spreng.) H.Rob.	4,77	3,5
PO11	9	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	4,93	2,5
PO11	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,73	3
PO12	1	Vernonanthura discolor (Spreng.) H.Rob.	5,25	4
PO13	1	Vernonanthura discolor (Spreng.) H.Rob.	6,75	4,5
PO13	1	Vernonanthura discolor (Spreng.) H.Rob.	5,51	4,5
PO14	1	Vernonanthura discolor (Spreng.) H.Rob.	5,73	3,5
PO15	1	Piptocarpha angustifolia Dusén ex Malme	7,96	5
PO15	1	Piptocarpha angustifolia Dusén ex Malme	5,41	5
PM1	1	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	11,14	5
PM1	1	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	8,28	4
PM1	2	Vernonanthura discolor (Spreng.) H.Rob.	8,91	6
PM1	3	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	6,68	6
PM1	4	Vernonanthura discolor (Spreng.) H.Rob.	11,30	6
PM1	4	Vernonanthura discolor (Spreng.) H.Rob.	8,91	6
PM1	5	Vernonanthura discolor (Spreng.) H.Rob.	14,48	8
PM1	5	Vernonanthura discolor (Spreng.) H.Rob.	12,57	8
PM1	6	Vernonanthura discolor (Spreng.) H.Rob.	12,57	4
PM1	7	Vernonanthura discolor (Spreng.) H.Rob.	10,35	6
PM1	7	Vernonanthura discolor (Spreng.) H.Rob.	12,25	7
PM1	7	Vernonanthura discolor (Spreng.) H.Rob.	6,68	6
PM1	7	Vernonanthura discolor (Spreng.) H.Rob.	10,66	6
PM1	8	Vernonanthura discolor (Spreng.) H.Rob.	10,19	6
PM1	9	Vernonanthura discolor (Spreng.) H.Rob.	8,75	6
PM2	1	Annona emarginata (Schltdl.) H.Rainer	8,28	4
PM2	1	Annona emarginata (Schltdl.) H.Rainer	6,37	4
PM2	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5,09	5
PM2	3	Vernonanthura discolor (Spreng.) H.Rob.	14,16	8
PM2	4	Annona emarginata (Schltdl.) H.Rainer	9,87	3
PM2	4	Annona emarginata (Schltdl.) H.Rainer	8,28	3
PM2	4	Annona emarginata (Schltdl.) H.Rainer	9,07	3,5
PM2	5	Vernonanthura discolor (Spreng.) H.Rob.	7,00	7
PM2	6	Annona emarginata (Schltdl.) H.Rainer	5,73	3

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PM2	7	Vernonanthura discolor (Spreng.) H.Rob.	14,64	8
PM3	1	Vernonanthura discolor (Spreng.) H.Rob.	6,68	5
PM3	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	8,59	8
PM3	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	6,21	6
PM3	3	Vernonanthura discolor (Spreng.) H.Rob.	9,07	8
PM3	4	Vernonanthura discolor (Spreng.) H.Rob.	9,23	7
PM3	5	Vernonanthura discolor (Spreng.) H.Rob.	12,10	6
PM3	6	Vernonanthura discolor (Spreng.) H.Rob.	10,66	8
PM3	7	Vernonanthura discolor (Spreng.) H.Rob.	5,73	4
PM3	8	Baccharis semiserrata DC.	6,68	5
PM3	8	Baccharis semiserrata DC.	8,28	4,5
PM3	8	Baccharis semiserrata DC.	5,09	4,5
PM4	1	Vernonanthura discolor (Spreng.) H.Rob.	8,75	8
PM4	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,91	8
PM4	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,00	7
PM4	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,84	7
PM4	3	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4,93	8
PM4	4	Vernonanthura discolor (Spreng.) H.Rob.	9,23	8
PM4	5	Clethra scabra Pers.	4,93	2,5
PM4	6	Baccharis semiserrata DC.	8,75	4
PM4	6	Baccharis semiserrata DC.	7,80	4
PM4	7	Vernonanthura discolor (Spreng.) H.Rob.	8,59	8
PM4	7	Vernonanthura discolor (Spreng.) H.Rob.	10,98	8
PM4	7	Vernonanthura discolor (Spreng.) H.Rob.	6,37	8
PM4	8	Baccharis semiserrata DC.	7,64	5
PM4	8	Baccharis semiserrata DC.	5,73	5
PM4	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,53	6,5
PM4	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,03	6,5
PM4	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,64	6,5
PM4	10	Baccharis semiserrata DC.	7,00	5
PM4	10	Baccharis semiserrata DC.	6,21	4,5
PM4	10	Baccharis semiserrata DC.	6,37	4
PM4	11	Vernonanthura discolor (Spreng.) H.Rob.	6,05	5
PM4	11	Vernonanthura discolor (Spreng.) H.Rob.	11,65	8
PM4	12	Vernonanthura discolor (Spreng.) H.Rob.	13,05	9
PM5	1	Vernonanthura discolor (Spreng.) H.Rob.	6,05	8
PM5	1	Vernonanthura discolor (Spreng.) H.Rob.	6,84	8
PM5	1	Vernonanthura discolor (Spreng.) H.Rob.	4,77	6
PM5	2	Vernonanthura discolor (Spreng.) H.Rob.	7,32	8
PM5	3	Vernonanthura discolor (Spreng.) H.Rob.	11,62	8
PM5	3	Vernonanthura discolor (Spreng.) H.Rob.	7,96	7
PM5	3	Vernonanthura discolor (Spreng.) H.Rob.	9,39	9
PM5	3	Vernonanthura discolor (Spreng.) H.Rob.	12,73	9
PM5	4	Vernonanthura discolor (Spreng.) H.Rob.	6,37	8
PM5	5	Vernonanthura discolor (Spreng.) H.Rob.	15,60	10
PM5	6	Vernonanthura discolor (Spreng.) H.Rob.	13,05	9
PM5	6	Vernonanthura discolor (Spreng.) H.Rob.	4,77	5
PM5	6	Vernonanthura discolor (Spreng.) H.Rob.	13,21	9
PM5	7	Vernonanthura discolor (Spreng.) H.Rob.	8,91	8
PM5	8	Clethra scabra Pers.	4,93	3,5

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PM5	9	Vernonanthura discolor (Spreng.) H.Rob.	9,87	9
PM5	10	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	6,53	5
PM5	10	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	4,77	5
PM5	11	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	5,09	6
PM5	11	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	4,77	2
PM5	12	Vernonanthura discolor (Spreng.) H.Rob.	4,93	7
PM5	12	Vernonanthura discolor (Spreng.) H.Rob.	7,48	8
PM5	13	Clethra scabra Pers.	5,73	4
PM5	13	Clethra scabra Pers.	5,19	4
PM5	14	Vernonanthura discolor (Spreng.) H.Rob.	15,28	9
PM5	15	Piptocarpha axillaris (Less.) Baker	8,28	7
PM5	15	Piptocarpha axillaris (Less.) Baker	9,23	6
PM6	1	Vernonanthura discolor (Spreng.) H.Rob.	12,89	8
PM6	2	Vernonanthura discolor (Spreng.) H.Rob.	9,55	7
PM6	3	Vernonanthura discolor (Spreng.) H.Rob.	5,09	7
PM6	4	Vernonanthura discolor (Spreng.) H.Rob.	15,44	10
PM6	5	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,82	6
PM6	6	Vernonanthura discolor (Spreng.) H.Rob.	6,84	8
PM6	7	Vernonanthura discolor (Spreng.) H.Rob.	6,68	7
PM6	8	Vernonanthura discolor (Spreng.) H.Rob.	9,07	9
PM6	9	Vernonanthura discolor (Spreng.) H.Rob.	10,82	8
PM6	9	Vernonanthura discolor (Spreng.) H.Rob.	10,03	7
PM6	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,21	5
PM6	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,09	5
PM6	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,89	5
PM6	11	Vernonanthura discolor (Spreng.) H.Rob.	8,91	7
PM6	12	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,32	6
PM6	12	Piptocarpha regnellii (Sch.Bip.) Cabrera	9,39	6
PM6	12	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,37	6
PM6	13	Vernonanthura discolor (Spreng.) H.Rob.	6,53	7
PM6	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	9,71	6
PM6	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,59	6
PM6	15	Vernonanthura discolor (Spreng.) H.Rob.	10,35	7
PM6	16	Vernonanthura discolor (Spreng.) H.Rob.	6,05	6
PM6	17	Clethra scabra Pers.	5,89	4
PM6	18	Clethra scabra Pers.	4,93	3
PM6	19	Vernonanthura discolor (Spreng.) H.Rob.	6,68	7
PM6	20	Vernonanthura discolor (Spreng.) H.Rob.	7,64	7
PM7	1	Vernonanthura discolor (Spreng.) H.Rob.	12,25	9
PM7	1	Vernonanthura discolor (Spreng.) H.Rob.	10,66	8
PM7	1	Vernonanthura discolor (Spreng.) H.Rob.	9,55	9
PM7	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,50	5
PM7	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	8,12	7
PM7	3	Vernonanthura discolor (Spreng.) H.Rob.	8,12	6
PM7	3	Vernonanthura discolor (Spreng.) H.Rob.	7,96	6
PM7	4	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	12,41	7
PM7	5	Vernonanthura discolor (Spreng.) H.Rob.	9,87	9

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PM7	6	Vernonanthura discolor (Spreng.) H.Rob.	10,35	9
PM7	7	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4,93	6
PM7	8	Solanum lacerdae Dusén	6,68	4
PM7	9	Vernonanthura discolor (Spreng.) H.Rob.	10,50	7
PM7	10	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5,19	4
PM7	11	Vernonanthura discolor (Spreng.) H.Rob.	15,60	9
PM7	11	Vernonanthura discolor (Spreng.) H.Rob.	11,62	8
PM7	12	Clethra scabra Pers.	3,98	4
PM7	12	Clethra scabra Pers.	4,93	4
PM7	13	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	10,98	10
PM8	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	9,07	5
PM8	2	Vernonanthura discolor (Spreng.) H.Rob.	7,32	9
PM8	2	Vernonanthura discolor (Spreng.) H.Rob.	8,59	9
PM8	2	Vernonanthura discolor (Spreng.) H.Rob.	9,39	9
PM8	3	Vernonanthura discolor (Spreng.) H.Rob.	6,37	9
PM8	4	Vernonanthura discolor (Spreng.) H.Rob.	12,57	10
PM8	4	Vernonanthura discolor (Spreng.) H.Rob.	14,96	10
PM8	5	Vernonanthura discolor (Spreng.) H.Rob.	10,66	8
PM8	5	Vernonanthura discolor (Spreng.) H.Rob.	7,16	8
PM8	6	Vernonanthura discolor (Spreng.) H.Rob.	5,73	7
PM8	7	Vernonanthura discolor (Spreng.) H.Rob.	7,96	9
PM8	8	Vernonanthura discolor (Spreng.) H.Rob.	6,68	9
PM8	9	Vernonanthura discolor (Spreng.) H.Rob.	11,62	10
PM8	9	Vernonanthura discolor (Spreng.) H.Rob.	5,73	7
PM8	10	Vernonanthura discolor (Spreng.) H.Rob.	12,41	10
PM8	11	Piptocarpha regnellii (Sch.Bip.) Cabrera	9,39	7
PM8	12	Vernonanthura discolor (Spreng.) H.Rob.	18,46	12
PM8	13	Vernonanthura discolor (Spreng.) H.Rob.	9,87	11
PM8	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,48	6
PM8	15	Vernonanthura discolor (Spreng.) H.Rob.	12,57	9
PM8	16	Vernonanthura discolor (Spreng.) H.Rob.	10,82	9
PM8	17	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	7,32	8
PM8	18	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,59	5
PM8	19	Vernonanthura discolor (Spreng.) H.Rob.	6,21	5
PM8	20	Vernonanthura discolor (Spreng.) H.Rob.	5,25	6
PM8	21	Vernonanthura discolor (Spreng.) H.Rob.	3,82	10
PM8	22	Vernonanthura discolor (Spreng.) H.Rob.	6,53	7
PM8	23	Vernonanthura discolor (Spreng.) H.Rob.	5,57	6
PM8	24	Piptocarpha axillaris (Less.) Baker	7,16	6
PM8	25	Piptocarpha axillaris (Less.) Baker	7,00	6
PM8	26	Piptocarpha axillaris (Less.) Baker	12,41	8
PM8	27	Piptocarpha axillaris (Less.) Baker	9,55	8
PM8	28	Vernonanthura discolor (Spreng.) H.Rob.	5,09	6
PM8	29	Piptocarpha regnellii (Sch.Bip.) Cabrera	9,07	7
PM8	30	Vernonanthura discolor (Spreng.) H.Rob.	9,23	9
PM8	31	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,50	8
PM8	32	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,91	8
PM8	33	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	6,68	9
PM8	34	Vernonanthura discolor (Spreng.) H.Rob.	11,46	12
PM8	34	Vernonanthura discolor (Spreng.) H.Rob.	6,05	8

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PM8	35	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,09	6
PM9	1	Vernonanthura discolor (Spreng.) H.Rob.	8,12	8
PM9	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,44	7
PM9	3	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,89	5
PM9	4	Vernonanthura discolor (Spreng.) H.Rob.	7,64	9
PM9	5	Vernonanthura discolor (Spreng.) H.Rob.	9,07	9
PM9	6	Piptocarpha regnellii (Sch.Bip.) Cabrera	11,62	7
PM9	7	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,16	5
PM9	8	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,00	4,5
PM9	8	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,44	6
PM9	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,84	7
PM9	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,05	6
PM9	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,41	7
PM9	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,57	6
PM9	11	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5,41	8
PM9	12	Vernonanthura discolor (Spreng.) H.Rob.	6,68	8
PM9	13	Vernonanthura discolor (Spreng.) H.Rob.	7,16	8
PM9	13	Vernonanthura discolor (Spreng.) H.Rob.	6,05	7
PM9	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,48	8
PM9	15	Vernonanthura discolor (Spreng.) H.Rob.	5,09	6
PM9	15	Vernonanthura discolor (Spreng.) H.Rob.	7,96	6
PM9	15	Vernonanthura discolor (Spreng.) H.Rob.	5,89	5
PM9	16	Vernonanthura discolor (Spreng.) H.Rob.	6,68	8
PM9	17	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,48	6
PM9	17	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,64	6
PM9	17	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,80	6
PM9	18	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,59	7
PM9	19	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,00	6
PM9	20	Vernonanthura discolor (Spreng.) H.Rob.	4,93	6
PM9	21	Vernonanthura discolor (Spreng.) H.Rob.	10,19	9
PM9	22	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,57	5
PM9	23	Vernonanthura discolor (Spreng.) H.Rob.	7,32	7
PM9	24	Vernonanthura discolor (Spreng.) H.Rob.	5,57	6
PM9	25	Vernonanthura discolor (Spreng.) H.Rob.	6,53	7
PM9	26	Piptocarpha regnellii (Sch.Bip.) Cabrera	9,07	8
PM9	27	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5,19	7
PM9	28	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4,77	7
PM9	29	Piptocarpha axillaris (Less.) Baker	8,59	7
PM9	29	Piptocarpha axillaris (Less.) Baker	7,64	7
PM9	30	Vernonanthura discolor (Spreng.) H.Rob.	7,48	8
PM9	30	Vernonanthura discolor (Spreng.) H.Rob.	9,87	8
PM9	30	Vernonanthura discolor (Spreng.) H.Rob.	9,07	8
PM9	31	Vernonanthura discolor (Spreng.) H.Rob.	9,39	8
PM9	32	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,80	7
PM9	33	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,53	7
PM9	33	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,68	7
PM9	33	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,48	7
PM10	1	Vernonanthura discolor (Spreng.) H.Rob.	7,00	8
PM10	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,98	7
PM10	3	Vernonanthura discolor (Spreng.) H.Rob.	4,77	4

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PM10	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,50	6
PM10	5	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,89	5
PM10	6	Baccharis semiserrata DC.	5,41	5
PM10	7	Baccharis semiserrata DC.	7,96	6
PM10	7	Baccharis semiserrata DC.	8,12	6
PM10	8	Vernonanthura discolor (Spreng.) H.Rob.	7,96	5
PM10	9	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	4,97	5
PM10	9	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	5,09	5
PM10	10	Vernonanthura discolor (Spreng.) H.Rob.	5,47	4
PM10	11	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5,25	4
PM10	12	Piptocarpha axillaris (Less.) Baker	4,93	5
PM10	12	Piptocarpha axillaris (Less.) Baker	4,93	5
PM10	13	Piptocarpha axillaris (Less.) Baker	8,12	6
PM10	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,00	4,5
PM10	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,80	6
PM10	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,68	5
PM10	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,44	7
PM10	15	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5,09	3,5
PM10	16	Vernonanthura discolor (Spreng.) H.Rob.	6,84	7
PM10	17	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,64	6
PM10	17	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,89	7
PM10	17	Piptocarpha regnellii (Sch.Bip.) Cabrera	9,17	7
PM10	18	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,84	6
PM10	19	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,00	6
PM10	19	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,37	6
PM10	20	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,03	6
PM10	21	Piptocarpha axillaris (Less.) Baker	5,09	5
PM10	22	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,41	4
PM11	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,32	7
PM11	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	18,46	8
PM11	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	12,57	8
PM11	3	Piptocarpha regnellii (Sch.Bip.) Cabrera	12,73	8
PM11	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	4,77	4
PM11	5	Vernonanthura discolor (Spreng.) H.Rob.	6,05	8
PM11	6	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,91	8
PM11	7	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,21	6
PM11	8	Piptocarpha angustifolia Dusén ex Malme	8,98	8
PM11	8	Piptocarpha angustifolia Dusén ex Malme	7,32	8
PM11	9	Vernonanthura discolor (Spreng.) H.Rob.	5,73	8
PM11	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,50	7
PM11	11	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,32	6
PM11	12	Vernonanthura discolor (Spreng.) H.Rob.	5,89	9
PM11	13	Ocotea odorifera (Vell.) Rohwer	17,19	6
PM11	13	Ocotea odorifera (Vell.) Rohwer	12,83	6
PM11	14	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5,41	9
PM11	15	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,73	5
PM11	16	Vernonanthura discolor (Spreng.) H.Rob.	4,93	5
PM11	17	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,75	7

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PM11	18	Piptocarpha regnellii (Sch.Bip.) Cabrera	12,10	9
PM11	19	Vernonanthura discolor (Spreng.) H.Rob.	8,91	8
PM11	20	Piptocarpha angustifolia Dusén ex Malme	9,87	8
PM11	20	Piptocarpha angustifolia Dusén ex Malme	10,19	8
PM11	21	Vernonanthura discolor (Spreng.) H.Rob.	5,41	8
PM11	22	Piptocarpha axillaris (Less.) Baker	6,21	8
PM11	22	Piptocarpha axillaris (Less.) Baker	4,93	8
PM11	23	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4,77	7
PM11	24	Vernonanthura discolor (Spreng.) H.Rob.	14,01	10
PM11	25	Piptocarpha regnellii (Sch.Bip.) Cabrera	14,64	8
PM11	25	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,00	8
PM11	25	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,57	6
PM12	1	Vernonanthura discolor (Spreng.) H.Rob.	9,55	8
PM12	2	Clethra scabra Pers.	4,93	5
PM12	3	Vernonanthura discolor (Spreng.) H.Rob.	7,64	5
PM12	4	Vernonanthura discolor (Spreng.) H.Rob.	10,50	7
PM12	5	Vernonanthura discolor (Spreng.) H.Rob.	7,70	7
PM12	6	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	11,78	5
PM12	7	Vernonanthura discolor (Spreng.) H.Rob.	8,28	8
PM12	7	Vernonanthura discolor (Spreng.) H.Rob.	6,84	8
PM12	8	Vernonanthura discolor (Spreng.) H.Rob.	7,19	7
PM12	9	Vernonanthura discolor (Spreng.) H.Rob.	11,62	8
PM12	10	Baccharis semiserrata DC.	7,00	5
PM13	1	Baccharis semiserrata DC.	8,28	5
PM13	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	11,78	6
PM13	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,80	4
PM13	3	Vernonanthura discolor (Spreng.) H.Rob.	5,41	5
PM13	4	Vernonanthura discolor (Spreng.) H.Rob.	8,12	7
PM13	5	Vernonanthura discolor (Spreng.) H.Rob.	8,75	6
PM13	6	Vernonanthura discolor (Spreng.) H.Rob.	9,87	7,5
PM13	7	Vernonanthura discolor (Spreng.) H.Rob.	7,70	6
PM13	7	Vernonanthura discolor (Spreng.) H.Rob.	7,32	6
PM13	7	Vernonanthura discolor (Spreng.) H.Rob.	6,91	6
PM13	8	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,86	4
PM13	8	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,28	6
PM13	8	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,96	5
PM14	-	-	-	-
PM15	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	5,73	3,5
PM15	2	Vernonanthura discolor (Spreng.) H.Rob.	8,09	7
PM15	3	Vernonanthura discolor (Spreng.) H.Rob.	5,73	7
PM15	3	Vernonanthura discolor (Spreng.) H.Rob.	8,12	7
PM15	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,59	7
PM15	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,60	7
PM15	5	Vernonanthura discolor (Spreng.) H.Rob.	8,12	7
PM15	5	Vernonanthura discolor (Spreng.) H.Rob.	9,01	7
PM15	6	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,68	5
PM15	7	Vernonanthura discolor (Spreng.) H.Rob.	10,98	8
PM15	8	Vernonanthura discolor (Spreng.) H.Rob.	10,66	6,5
PM15	8	Vernonanthura discolor (Spreng.) H.Rob.	8,59	6,5

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PM15	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	11,87	7,5
R1	1	Vernonanthura discolor (Spreng.) H.Rob.	7,48	6
R1	2	Vernonanthura discolor (Spreng.) H.Rob.	9,23	7
R1	3	Vernonanthura discolor (Spreng.) H.Rob.	9,71	7
R1	3	Vernonanthura discolor (Spreng.) H.Rob.	8,12	6
R1	4	Vernonanthura discolor (Spreng.) H.Rob.	5,09	4
R1	5	Vernonanthura discolor (Spreng.) H.Rob.	8,91	6
R1	6	Piptocarpha regnellii (Sch.Bip.) Cabrera	11,78	5
R1	7	Vernonanthura discolor (Spreng.) H.Rob.	9,07	7
R1	7	Vernonanthura discolor (Spreng.) H.Rob.	6,21	5
R1	7	Vernonanthura discolor (Spreng.) H.Rob.	7,32	6
R1	8	Vernonanthura discolor (Spreng.) H.Rob.	6,05	4
R1	8	Vernonanthura discolor (Spreng.) H.Rob.	10,66	7
R1	9	Vernonanthura discolor (Spreng.) H.Rob.	4,84	4
R1	9	Vernonanthura discolor (Spreng.) H.Rob.	4,93	4
R1	9	Vernonanthura discolor (Spreng.) H.Rob.	4,93	4
R1	10	Piptocarpha axillaris (Less.) Baker	5,57	3
R1	11	Vernonanthura discolor (Spreng.) H.Rob.	10,19	6
R2	1	Vernonanthura discolor (Spreng.) H.Rob.	8,75	7
R2	1	Vernonanthura discolor (Spreng.) H.Rob.	5,25	5
R2	1	Vernonanthura discolor (Spreng.) H.Rob.	5,57	6
R2	2	Piptocarpha axillaris (Less.) Baker	5,16	4
R2	3	Vernonanthura discolor (Spreng.) H.Rob.	9,80	8
R2	3	Vernonanthura discolor (Spreng.) H.Rob.	11,78	8
R2	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,11	4
R2	5	Vernonanthura discolor (Spreng.) H.Rob.	7,96	5
R2	6	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	7,32	7
R2	7	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,05	6
R2	7	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,16	5
R2	8	Piptocarpha regnellii (Sch.Bip.) Cabrera	4,93	4
R2	9	Aspidosperma tomentosum Mart.	6,05	3,5
R3	1	Vernonanthura discolor (Spreng.) H.Rob.	5,41	5
R3	2	Vernonanthura discolor (Spreng.) H.Rob.	5,25	5
R3	3	Vernonanthura discolor (Spreng.) H.Rob.	6,84	7
R3	4	Vernonanthura discolor (Spreng.) H.Rob.	6,05	7
R3	5	Vernonanthura discolor (Spreng.) H.Rob.	7,64	6
R4	1	Piptocarpha axillaris (Less.) Baker	8,69	7
R4	1	Piptocarpha axillaris (Less.) Baker	7,00	7
R4	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	6,75	6
R4	3	Piptocarpha axillaris (Less.) Baker	8,12	7
R4	4	Vernonanthura discolor (Spreng.) H.Rob.	10,82	10
R4	5	Piptocarpha axillaris (Less.) Baker	5,67	6
R4	6	Piptocarpha axillaris (Less.) Baker	8,91	7
R4	6	Piptocarpha axillaris (Less.) Baker	6,37	6
R4	7	Vernonanthura discolor (Spreng.) H.Rob.	7,16	8
R4	8	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	6,05	7
R4	9	Piptocarpha axillaris (Less.) Baker	5,09	4
R4	10	Vernonanthura discolor (Spreng.) H.Rob.	7,86	8
R4	11	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	6,46	8
R4	12	Vernonanthura discolor (Spreng.) H.Rob.	7,73	7

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R4	13	Piptocarpha axillaris (Less.) Baker	5,79	4,5
R4	14	Vernonanthura discolor (Spreng.) H.Rob.	5,25	6
R4	15	Vernonanthura discolor (Spreng.) H.Rob.	5,89	8
R4	16	Vernonanthura discolor (Spreng.) H.Rob.	8,44	10
R4	16	Vernonanthura discolor (Spreng.) H.Rob.	8,28	10
R4	17	Piptocarpha axillaris (Less.) Baker	8,75	7
R4	18	Ocotea puberula (Rich.) Nees	5,57	5
R4	19	Vernonanthura discolor (Spreng.) H.Rob.	8,59	10
R4	20	Piptocarpha axillaris (Less.) Baker	9,17	10
R4	21	Vernonanthura discolor (Spreng.) H.Rob.	15,12	10
R4	22	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	10,44	9
R4	23	Piptocarpha axillaris (Less.) Baker	6,68	5
R4	24	Piptocarpha axillaris (Less.) Baker	7,48	7
R4	25	Vernonanthura discolor (Spreng.) H.Rob.	9,07	9
R4	26	Piptocarpha axillaris (Less.) Baker	6,05	5
R5	1	Vernonanthura discolor (Spreng.) H.Rob.	6,84	7
R5	2	Vernonanthura discolor (Spreng.) H.Rob.	15,76	10
R5	2	Vernonanthura discolor (Spreng.) H.Rob.	12,67	10
R5	3	Vernonanthura discolor (Spreng.) H.Rob.	5,16	4
R5	3	Vernonanthura discolor (Spreng.) H.Rob.	8,28	7
R5	3	Vernonanthura discolor (Spreng.) H.Rob.	8,91	8
R5	4	Vernonanthura discolor (Spreng.) H.Rob.	6,68	7
R5	5	Clethra scabra Pers.	7,16	5
R5	6	Vernonanthura discolor (Spreng.) H.Rob.	12,10	9
R5	6	Vernonanthura discolor (Spreng.) H.Rob.	7,16	8
R5	7	Vernonanthura discolor (Spreng.) H.Rob.	10,66	7
R5	8	Vernonanthura discolor (Spreng.) H.Rob.	10,82	9
R5	9	Vernonanthura discolor (Spreng.) H.Rob.	9,87	7
R5	10	Vernonanthura discolor (Spreng.) H.Rob.	9,87	9
R5	11	Vernonanthura discolor (Spreng.) H.Rob.	6,53	8
R5	12	Vernonanthura discolor (Spreng.) H.Rob.	9,80	9
R5	13	Piptocarpha axillaris (Less.) Baker	9,93	8
R5	14	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	6,05	8
R5	15	Vernonanthura discolor (Spreng.) H.Rob.	11,62	9
R5	16	Vernonanthura discolor (Spreng.) H.Rob.	9,93	10
R5	16	Vernonanthura discolor (Spreng.) H.Rob.	5,41	8
R5	17	Vernonanthura discolor (Spreng.) H.Rob.	8,47	10
R5	18	Vernonanthura discolor (Spreng.) H.Rob.	8,21	10
R5	18	Vernonanthura discolor (Spreng.) H.Rob.	10,82	10
R5	19	Vernonanthura discolor (Spreng.) H.Rob.	7,32	6
R5	19	Vernonanthura discolor (Spreng.) H.Rob.	13,05	9
R6	1	Piptocarpha axillaris (Less.) Baker	4,84	4
R6	2	Piptocarpha axillaris (Less.) Baker	8,05	7
R6	3	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,40	6
R6	4	Piptocarpha axillaris (Less.) Baker	6,68	7
R6	5	Vernonanthura discolor (Spreng.) H.Rob.	9,87	9
R6	5	Vernonanthura discolor (Spreng.) H.Rob.	8,12	8
R6	6	Piptocarpha axillaris (Less.) Baker	5,25	5
R6	7	Vernonanthura discolor (Spreng.) H.Rob.	6,43	7
R6	8	Vernonanthura discolor (Spreng.) H.Rob.	5,73	7

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R6	9	Piptocarpha axillaris (Less.) Baker	5,41	5
R6	10	Piptocarpha axillaris (Less.) Baker	5,89	7
R6	11	Vernonanthura discolor (Spreng.) H.Rob.	5,89	6
R6	12	Piptocarpha regnellii (Sch.Bip.) Cabrera	8,28	6
R6	13	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4,84	6
R6	14	Vernonanthura discolor (Spreng.) H.Rob.	6,65	6
R6	15	Vernonanthura discolor (Spreng.) H.Rob.	6,11	5
R6	16	Piptocarpha axillaris (Less.) Baker	9,87	8
R6	17	Piptocarpha axillaris (Less.) Baker	5,35	5
R6	17	Piptocarpha axillaris (Less.) Baker	6,68	5
R6	18	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	6,84	6
R6	18	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	8,75	10
R6	19	Piptocarpha angustifolia Dusén ex Malme	6,43	6
R6	19	Piptocarpha angustifolia Dusén ex Malme	8,91	6
R6	20	Vernonanthura discolor (Spreng.) H.Rob.	7,64	7
R6	20	Vernonanthura discolor (Spreng.) H.Rob.	6,37	6
R6	21	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,00	5
R6	21	Piptocarpha regnellii (Sch.Bip.) Cabrera	7,00	6
R6	21	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,35	6
R6	22	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5,73	8
R6	23	Vernonanthura discolor (Spreng.) H.Rob.	8,28	7
R6	24	Piptocarpha axillaris (Less.) Baker	7,70	6
R6	25	Vernonanthura discolor (Spreng.) H.Rob.	6,81	5
R6	26	Piptocarpha axillaris (Less.) Baker	4,77	4
R6	27	Piptocarpha axillaris (Less.) Baker	6,68	6
R6	28	Vernonanthura discolor (Spreng.) H.Rob.	5,73	5
R6	29	Piptocarpha axillaris (Less.) Baker	6,02	5
R6	30	Piptocarpha regnellii (Sch.Bip.) Cabrera	10,89	7
R6	31	Vernonanthura discolor (Spreng.) H.Rob.	9,23	7
R6	31	Vernonanthura discolor (Spreng.) H.Rob.	4,93	4
R6	31	Vernonanthura discolor (Spreng.) H.Rob.	7,96	6
R6	32	Piptocarpha axillaris (Less.) Baker	7,64	5
R6	33	Vernonanthura discolor (Spreng.) H.Rob.	6,37	6
R6	34	Vernonanthura discolor (Spreng.) H.Rob.	6,53	6
R6	35	Piptocarpha regnellii (Sch.Bip.) Cabrera	6,37	5
R6	36	Piptocarpha axillaris (Less.) Baker	5,57	5
R6	36	Piptocarpha axillaris (Less.) Baker	5,57	4
R7	1	Piptocarpha axillaris (Less.) Baker	7,00	4
R7	2	Vernonanthura discolor (Spreng.) H.Rob.	7,00	4
R7	2	Vernonanthura discolor (Spreng.) H.Rob.	5,09	4
R7	3	Vernonanthura discolor (Spreng.) H.Rob.	8,75	6
R8	1	Vernonanthura discolor (Spreng.) H.Rob.	6,46	5
R8	2	Ocotea puberula (Rich.) Nees	5,57	3
R8	3	Vernonanthura discolor (Spreng.) H.Rob.	7,32	5
R8	4	Vernonanthura discolor (Spreng.) H.Rob.	6,84	6
R8	5	Vernonanthura discolor (Spreng.) H.Rob.	7,16	6
R8	5	Vernonanthura discolor (Spreng.) H.Rob.	9,39	7
R8	5	Vernonanthura discolor (Spreng.) H.Rob.	9,17	5
R9	1	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4,77	3,5
R10	1	Vernonanthura discolor (Spreng.) H.Rob.	5,41	4

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R10	2	Vernonanthura discolor (Spreng.) H.Rob.	10,03	6
R10	2	Vernonanthura discolor (Spreng.) H.Rob.	8,15	6
R11	-	-	-	-
R12	1	Vernonanthura discolor (Spreng.) H.Rob.	5,09	4,5
R12	2	Ocotea puberula (Rich.) Nees	7,00	3
R13	1	Vernonanthura discolor (Spreng.) H.Rob.	5,09	5
R13	2	Vernonanthura discolor (Spreng.) H.Rob.	7,80	7
R13	3	Vernonanthura discolor (Spreng.) H.Rob.	6,53	6
R13	3	Vernonanthura discolor (Spreng.) H.Rob.	7,64	6
R13	4	Clethra scabra Pers.	4,87	3
R14	1	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	6,37	5
R15	1	Vernonanthura discolor (Spreng.) H.Rob.	4,93	4
R15	1	Vernonanthura discolor (Spreng.) H.Rob.	4,93	4
R15	2	Baccharis dracunculifolia DC.	6,53	5
R15	2	Baccharis dracunculifolia DC.	4,93	5
R15	2	Baccharis dracunculifolia DC.	5,16	5

Appendix 2. *Basic field data 2: species found in lower layer*

Sample plot	**Individual**	**Species**	**Height (m)**
PO1	1	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO1	2	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO1	3	Piptocarpha angustifolia Dusén ex Malme	3
PO1	3	Piptocarpha angustifolia Dusén ex Malme	3
PO1	4	Piptocarpha axillaris (Less.) Baker	2,5
PO1	4	Piptocarpha axillaris (Less.) Baker	2,5
PO1	5	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO1	6	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,7
PO1	7	Vernonanthura discolor (Spreng.) H.Rob.	1,1
PO1	8	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	1,8
PO1	9	Piptocarpha axillaris (Less.) Baker	1,3
PO1	10	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PO1	11	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,9
PO1	12	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	2,5
PO1	13	Vernonanthura discolor (Spreng.) H.Rob.	2
PO1	14	Ficus luschnathiana (Miq.) Miq.	1,1
PO2	1	Vernonanthura discolor (Spreng.) H.Rob.	3
PO2	2	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO2	2	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO2	3	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PO2	3	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PO2	3	Piptocarpha regnellii (Sch.Bip.) Cabrera	2,5
PO2	4	Vernonanthura discolor (Spreng.) H.Rob.	0,6
PO2	5	Piptocarpha axillaris (Less.) Baker	0,8
PO2	6	Baccharis dracunculifolia DC.	1,5
PO2	7	Leandra glazioviana Cogn.	0,6
PO2	8	Vernonanthura discolor (Spreng.) H.Rob.	1,8

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PO2	9	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO2	10	Vernonanthura discolor (Spreng.) H.Rob.	0,7
PO2	11	Piptocarpha angustifolia Dusén ex Malme	1,5
PO2	12	Piptocarpha angustifolia Dusén ex Malme	2
PO2	13	Baccharis oblongifolia (Ruiz & Pav.) Pers.	2
PO2	14	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO2	14	Vernonanthura discolor (Spreng.) H.Rob.	2
PO2	14	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO2	15	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2
PO2	16	Piptocarpha angustifolia Dusén ex Malme	3
PO2	17	Piptocarpha axillaris (Less.) Baker	2,5
PO2	18	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,5
PO2	19	Piptocarpha axillaris (Less.) Baker	2
PO2	20	Vernonanthura discolor (Spreng.) H.Rob.	0,6
PO2	21	Solanum pseudoquina A.St.-Hil.	2
PO2	21	Solanum pseudoquina A.St.-Hil.	2
PO2	22	Clethra scabra Pers.	0,7
PO2	23	Piptocarpha angustifolia Dusén ex Malme	3
PO2	24	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO2	25	Vernonanthura discolor (Spreng.) H.Rob.	3
PO2	26	Vernonanthura discolor (Spreng.) H.Rob.	2
PO2	27	Piptocarpha axillaris (Less.) Baker	0,8
PO2	28	Piptocarpha regnellii (Sch.Bip.) Cabrera	2,5
PO2	29	Clethra scabra Pers.	1,3
PO2	30	Piptocarpha regnellii (Sch.Bip.) Cabrera	2,5
PO2	31	Piptocarpha regnellii (Sch.Bip.) Cabrera	2,5
PO2	32	Vernonanthura discolor (Spreng.) H.Rob.	3
PO2	33	Solanum pseudoquina A.St.-Hil.	1,9
PO2	33	Solanum pseudoquina A.St.-Hil.	1,9
PO2	34	Vernonanthura discolor (Spreng.) H.Rob.	3
PO2	35	Jacaranda puberula Cham.	1
PO2	36	Vernonanthura discolor (Spreng.) H.Rob.	0,6
PO2	37	Baccharis oblongifolia (Ruiz & Pav.) Pers.	1,8
PO3	1	Vernonanthura discolor (Spreng.) H.Rob.	2
PO3	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PO3	3	Vernonanthura discolor (Spreng.) H.Rob.	2,1
PO3	4	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO3	5	Piptocarpha regnellii (Sch.Bip.) Cabrera	2,5
PO3	6	Vernonanthura discolor (Spreng.) H.Rob.	3
PO3	7	Vernonanthura discolor (Spreng.) H.Rob.	3
PO3	8	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	1,8
PO3	9	Vernonanthura discolor (Spreng.) H.Rob.	1,3
PO3	10	Vernonanthura discolor (Spreng.) H.Rob.	1
PO3	11	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO3	12	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PO3	13	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO3	14	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO3	15	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PO3	15	Piptocarpha regnellii (Sch.Bip.) Cabrera	2,5

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PO3	16	Vernonanthura discolor (Spreng.) H.Rob.	2
PO3	17	Vernonanthura discolor (Spreng.) H.Rob.	2
PO3	18	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO3	19	Miconia sellowiana Naudin	1,5
PO3	20	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO4	1	Myrsine umbellata Mart.	1,3
PO4	2	Vernonanthura discolor (Spreng.) H.Rob.	1,9
PO4	3	Piptocarpha axillaris (Less.) Baker	2
PO4	4	Vernonanthura discolor (Spreng.) H.Rob.	2
PO4	4	Vernonanthura discolor (Spreng.) H.Rob.	2
PO4	4	Vernonanthura discolor (Spreng.) H.Rob.	2
PO4	4	Vernonanthura discolor (Spreng.) H.Rob.	2
PO4	4	Vernonanthura discolor (Spreng.) H.Rob.	1
PO4	4	Vernonanthura discolor (Spreng.) H.Rob.	1
PO4	4	Vernonanthura discolor (Spreng.) H.Rob.	0,8
PO4	4	Vernonanthura discolor (Spreng.) H.Rob.	0,8
PO4	5	Myrsine umbellata Mart.	1
PO4	6	Myrsine umbellata Mart.	0,6
PO4	7	Myrsine umbellata Mart.	0,9
PO4	8	Myrsine umbellata Mart.	0,8
PO4	9	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO4	10	Vernonanthura discolor (Spreng.) H.Rob.	1
PO4	11	Piptocarpha angustifolia Dusén ex Malme	2,5
PO4	12	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	1
PO4	13	Vernonanthura discolor (Spreng.) H.Rob.	1,6
PO4	14	Baccharis dracunculifolia DC.	2,5
PO4	15	Piptocarpha axillaris (Less.) Baker	1,6
PO4	16	Piptocarpha axillaris (Less.) Baker	2,5
PO4	16	Piptocarpha axillaris (Less.) Baker	2,5
PO4	17	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO4	17	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO4	18	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO4	18	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO4	18	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO4	18	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO4	19	Solanum lacerdae Dusén	2,5
PO4	20	Piptocarpha angustifolia Dusén ex Malme	1,5
PO4	21	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO4	21	Vernonanthura discolor (Spreng.) H.Rob.	0,5
PO4	21	Vernonanthura discolor (Spreng.) H.Rob.	1
PO4	21	Vernonanthura discolor (Spreng.) H.Rob.	2
PO4	21	Vernonanthura discolor (Spreng.) H.Rob.	0,8
PO4	21	Vernonanthura discolor (Spreng.) H.Rob.	0,7
PO4	21	Vernonanthura discolor (Spreng.) H.Rob.	2
PO4	21	Vernonanthura discolor (Spreng.) H.Rob.	2
PO4	22	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PO4	23	Piptocarpha regnellii (Sch.Bip.) Cabrera	1
PO4	24	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,8
PO4	24	Piptocarpha regnellii (Sch.Bip.) Cabrera	2

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PO4	25	Piptocarpha angustifolia Dusén ex Malme	1
PO4	26	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO4	26	Vernonanthura discolor (Spreng.) H.Rob.	2
PO5	1	Vernonanthura discolor (Spreng.) H.Rob.	2
PO5	2	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO5	2	Vernonanthura discolor (Spreng.) H.Rob.	2
PO5	2	Vernonanthura discolor (Spreng.) H.Rob.	2
PO5	3	Clethra scabra Pers.	0,8
PO5	4	Piptocarpha axillaris (Less.) Baker	3
PO5	5	Vernonanthura discolor (Spreng.) H.Rob.	2
PO5	6	Clethra scabra Pers.	2
PO5	7	Handroanthus chrysotrichus (Mart. ex DC.) Mattos	0,6
PO5	8	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO5	9	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO5	9	Vernonanthura discolor (Spreng.) H.Rob.	2
PO5	10	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	2
PO5	11	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	2
PO5	12	Vernonanthura discolor (Spreng.) H.Rob.	3
PO5	13	Piptocarpha angustifolia Dusén ex Malme	2,5
PO5	14	Piptocarpha axillaris (Less.) Baker	2
PO5	15	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO5	16	Ficus luschnathiana (Miq.) Miq.	2
PO6	1	Piptocarpha angustifolia Dusén ex Malme	2,5
PO6	2	Vernonanthura discolor (Spreng.) H.Rob.	2
PO6	3	Clethra scabra Pers.	1
PO6	4	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO6	5	Zanthoxylum rhoifolium Lam.	1,3
PO6	6	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO6	7	Vernonanthura discolor (Spreng.) H.Rob.	2
PO6	8	Piptocarpha angustifolia Dusén ex Malme	0,8
PO6	9	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO6	10	Zanthoxylum rhoifolium Lam.	1,8
PO6	11	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PO6	11	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PO6	11	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,8
PO6	12	Piptocarpha regnellii (Sch.Bip.) Cabrera	2,5
PO6	13	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PO6	14	Piptocarpha angustifolia Dusén ex Malme	3,5
PO6	15	Clethra scabra Pers.	0,6
PO6	16	Vernonanthura discolor (Spreng.) H.Rob.	0,7
PO6	17	Vernonanthura discolor (Spreng.) H.Rob.	1,3
PO6	18	Vernonanthura discolor (Spreng.) H.Rob.	3
PO6	19	Piptocarpha angustifolia Dusén ex Malme	3
PO6	19	Piptocarpha angustifolia Dusén ex Malme	3
PO6	19	Piptocarpha angustifolia Dusén ex Malme	2
PO6	20	Piptocarpha angustifolia Dusén ex Malme	2,5
PO6	21	Piptocarpha axillaris (Less.) Baker	2
PO6	22	Piptocarpha angustifolia Dusén ex Malme	1
PO6	23	Vernonanthura discolor (Spreng.) H.Rob.	1,5

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PO6	24	Solanum mauritianum Scop.	0,7
PO7	1	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO7	2	Vernonanthura discolor (Spreng.) H.Rob.	4
PO7	2	Vernonanthura discolor (Spreng.) H.Rob.	4
PO7	2	Vernonanthura discolor (Spreng.) H.Rob.	3,5
PO7	2	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO7	3	Vernonanthura discolor (Spreng.) H.Rob.	3,5
PO7	3	Vernonanthura discolor (Spreng.) H.Rob.	3
PO7	4	Vernonanthura discolor (Spreng.) H.Rob.	3,5
PO7	4	Vernonanthura discolor (Spreng.) H.Rob.	3,5
PO7	4	Vernonanthura discolor (Spreng.) H.Rob.	3
PO7	5	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO7	5	Vernonanthura discolor (Spreng.) H.Rob.	3,5
PO7	6	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO7	7	Vernonanthura discolor (Spreng.) H.Rob.	3,5
PO7	8	Clethra scabra Pers.	2
PO7	9	Piptocarpha axillaris (Less.) Baker	3
PO7	9	Piptocarpha axillaris (Less.) Baker	3,5
PO7	10	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	1,8
PO7	11	Myrsine umbellata Mart.	1,8
PO7	12	Myrsine umbellata Mart.	0,8
PO7	13	Myrsine umbellata Mart.	1
PO7	13	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO7	14	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO7	15	Piptocarpha angustifolia Dusén ex Malme	3
PO7	16	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	3
PO7	17	Piptocarpha axillaris (Less.) Baker	1,5
PO7	18	Clethra scabra Pers.	0,8
PO8	1	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO8	1	Vernonanthura discolor (Spreng.) H.Rob.	3
PO8	2	Vernonanthura discolor (Spreng.) H.Rob.	2
PO8	2	Vernonanthura discolor (Spreng.) H.Rob.	2
PO8	3	Vernonanthura discolor (Spreng.) H.Rob.	2
PO8	4	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	2,5
PO8	5	Solanum mauritianum Scop.	2,5
PO8	6	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	2
PO8	7	Vernonanthura discolor (Spreng.) H.Rob.	3
PO8	8	Baccharis dracunculifolia DC.	1,5
PO8	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PO8	10	Vernonanthura discolor (Spreng.) H.Rob.	2
PO8	11	Piptocarpha angustifolia Dusén ex Malme	2,5
PO8	12	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO8	12	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO8	13	Piptocarpha angustifolia Dusén ex Malme	2,5
PO8	14	Miconia inconspicua Miq.	1,8
PO8	15	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PO8	16	Piptocarpha axillaris (Less.) Baker	0,7

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PO8	17	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	3,5
PO8	18	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PO8	19	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2,5
PO8	19	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2
PO8	20	Piptocarpha axillaris (Less.) Baker	2,5
PO8	21	Piptocarpha angustifolia Dusén ex Malme	1,5
PO9	1	Solanum variabile Mart.	2
PO9	2	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PO9	3	Piptocarpha axillaris (Less.) Baker	2
PO9	3	Piptocarpha axillaris (Less.) Baker	1,8
PO9	4	Baccharis semiserrata DC.	3
PO9	4	Baccharis semiserrata DC.	3
PO9	5	Vernonanthura discolor (Spreng.) H.Rob.	2
PO9	6	Vernonanthura discolor (Spreng.) H.Rob.	3
PO9	6	Vernonanthura discolor (Spreng.) H.Rob.	3
PO9	7	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,5
PO9	8	Piptocarpha axillaris (Less.) Baker	2,5
PO9	9	Piptocarpha axillaris (Less.) Baker	1
PO9	10	Solanum lacerdae Dusén	2
PO9	11	Piptocarpha axillaris (Less.) Baker	2
PO9	12	Vernonanthura discolor (Spreng.) H.Rob.	2
PO9	13	Vernonanthura discolor (Spreng.) H.Rob.	2
PO9	14	Vernonanthura discolor (Spreng.) H.Rob.	2,3
PO9	15	Piptocarpha axillaris (Less.) Baker	2
PO9	16	Vernonanthura discolor (Spreng.) H.Rob.	0,7
PO9	17	Vernonanthura discolor (Spreng.) H.Rob.	2
PO9	17	Vernonanthura discolor (Spreng.) H.Rob.	2
PO9	18	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO9	19	Vernonanthura discolor (Spreng.) H.Rob.	1
PO9	20	Vernonanthura discolor (Spreng.) H.Rob.	3
PO9	20	Vernonanthura discolor (Spreng.) H.Rob.	3
PO9	20	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO9	21	Baccharis semiserrata DC.	2,5
PO9	21	Baccharis semiserrata DC.	2,5
PO9	22	Baccharis semiserrata DC.	3
PO10	1	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	1,5
PO10	2	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO10	3	Piptocarpha angustifolia Dusén ex Malme	2,5
PO10	4	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO10	5	Vernonanthura discolor (Spreng.) H.Rob.	1,6
PO10	6	Solanum mauritianum Scop.	2
PO10	6	Solanum mauritianum Scop.	2
PO10	7	Vernonanthura discolor (Spreng.) H.Rob.	2
PO10	8	Vernonanthura discolor (Spreng.) H.Rob.	3
PO10	9	Piptocarpha angustifolia Dusén ex Malme	2
PO10	10	Vernonanthura discolor (Spreng.) H.Rob.	2
PO10	11	Baccharis semiserrata DC.	3
PO10	12	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	3

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PO10	12	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	2,5
PO10	13	Vernonanthura discolor (Spreng.) H.Rob.	3
PO10	13	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO10	13	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO10	14	Vernonanthura discolor (Spreng.) H.Rob.	3
PO11	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	2,5
PO11	2	Vernonanthura discolor (Spreng.) H.Rob.	1,8
PO11	3	Annona emarginata (Schltdl.) H.Rainer	0,6
PO11	4	Piptocarpha axillaris (Less.) Baker	2,5
PO11	5	Piptocarpha axillaris (Less.) Baker	1,5
PO11	6	Vernonanthura discolor (Spreng.) H.Rob.	2
PO11	7	Piptocarpha axillaris (Less.) Baker	2,5
PO11	8	Piptocarpha axillaris (Less.) Baker	2,5
PO11	9	Vernonanthura discolor (Spreng.) H.Rob.	3
PO11	9	Vernonanthura discolor (Spreng.) H.Rob.	3
PO11	9	Vernonanthura discolor (Spreng.) H.Rob.	2
PO11	9	Vernonanthura discolor (Spreng.) H.Rob.	2
PO11	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PO11	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,5
PO11	10	Piptocarpha regnellii (Sch.Bip.) Cabrera	1
PO11	11	Piptocarpha axillaris (Less.) Baker	2
PO11	12	Vernonanthura discolor (Spreng.) H.Rob.	3
PO11	13	Baccharis semiserrata DC.	3,5
PO11	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PO11	14	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,5
PO11	15	Piptocarpha axillaris (Less.) Baker	3
PO11	16	Piptocarpha regnellii (Sch.Bip.) Cabrera	1
PO11	17	Vernonanthura discolor (Spreng.) H.Rob.	3
PO11	17	Vernonanthura discolor (Spreng.) H.Rob.	3
PO11	17	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO11	17	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO11	18	Piptocarpha axillaris (Less.) Baker	1,8
PO11	19	Vernonanthura discolor (Spreng.) H.Rob.	3
PO11	19	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO11	20	Piptocarpha axillaris (Less.) Baker	3
PO11	21	Piptocarpha axillaris (Less.) Baker	2,5
PO11	22	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	3
PO11	23	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO11	24	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO11	24	Vernonanthura discolor (Spreng.) H.Rob.	2
PO11	24	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PO11	24	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PO11	25	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PO11	26	Piptocarpha axillaris (Less.) Baker	1
PO11	27	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PO11	28	Baccharis semiserrata DC.	5
PO11	28	Baccharis semiserrata DC.	2,5
PO11	29	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO11	30	Vernonanthura discolor (Spreng.) H.Rob.	1,8

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PO11	31	Piptocarpha angustifolia Dusén ex Malme	2
PO11	32	Piptocarpha axillaris (Less.) Baker	2
PO11	32	Piptocarpha axillaris (Less.) Baker	2
PO11	32	Piptocarpha axillaris (Less.) Baker	1,5
PO11	33	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO11	34	Baccharis oblongifolia (Ruiz & Pav.) Pers.	2,5
PO11	34	Baccharis oblongifolia (Ruiz & Pav.) Pers.	2
PO11	34	Baccharis oblongifolia (Ruiz & Pav.) Pers.	2
PO11	35	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,8
PO11	36	Clethra scabra Pers.	1,8
PO11	36	Clethra scabra Pers.	1,8
PO11	37	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,5
PO11	38	Vernonanthura discolor (Spreng.) H.Rob.	1
PO11	39	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PO11	40	Piptocarpha axillaris (Less.) Baker	3,5
PO11	40	Piptocarpha axillaris (Less.) Baker	3,5
PO11	41	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PO11	42	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
PO11	43	Vernonanthura discolor (Spreng.) H.Rob.	1
PO12	1	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,8
PO12	2	Baccharis semiserrata DC.	1,8
PO12	3	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PO12	4	Vernonanthura discolor (Spreng.) H.Rob.	2
PO12	5	Vernonanthura discolor (Spreng.) H.Rob.	1
PO12	6	Piptocarpha axillaris (Less.) Baker	1,8
PO12	6	Piptocarpha axillaris (Less.) Baker	1,5
PO12	7	Piptocarpha axillaris (Less.) Baker	2
PO12	7	Piptocarpha axillaris (Less.) Baker	1,8
PO12	8	Clethra scabra Pers.	0,5
PO12	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	1
PO12	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	1
PO12	10	Vernonanthura discolor (Spreng.) H.Rob.	0,5
PO12	11	Baccharis semiserrata DC.	1,5
PO12	12	Clethra scabra Pers.	0,6
PO12	13	Myrsine umbellata Mart.	0,5
PO12	14	Baccharis semiserrata DC.	4
PO12	14	Baccharis semiserrata DC.	4
PO12	14	Baccharis semiserrata DC.	4
PO12	14	Baccharis semiserrata DC.	4
PO12	14	Baccharis semiserrata DC.	4
PO12	14	Baccharis semiserrata DC.	4
PO12	15	Baccharis semiserrata DC.	4
PO12	16	Clethra scabra Pers.	1
PO12	17	Baccharis semiserrata DC.	4
PO12	17	Baccharis semiserrata DC.	4
PO12	17	Baccharis semiserrata DC.	4
PO12	17	Baccharis semiserrata DC.	4
PO12	17	Baccharis semiserrata DC.	3
PO12	17	Baccharis semiserrata DC.	3
PO12	17	Baccharis semiserrata DC.	3

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PO12	17	Baccharis semiserrata DC.	3
PO13	1	Myrsine umbellata Mart.	1
PO13	2	Baccharis semiserrata DC.	3
PO13	3	Piptocarpha axillaris (Less.) Baker	3
PO13	3	Piptocarpha axillaris (Less.) Baker	2,5
PO13	4	Piptocarpha angustifolia Dusén ex Malme	1,7
PO13	5	Vernonanthura discolor (Spreng.) H.Rob.	1,7
PO13	6	Myrsine umbellata Mart.	1
PO14	1	Solanum mauritianum Scop.	1,8
PO14	2	Piptocarpha angustifolia Dusén ex Malme	1,8
PO14	3	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PO15	1	Baccharis semiserrata DC.	4
PO15	2	Piptocarpha angustifolia Dusén ex Malme	3,5
PM1	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PM1	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PM1	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
PM1	3	Syagrus romanzoffiana (Cham.) Glassman	1,8
PM1	4	Miconia sellowiana Naudin	1,8
PM1	5	Myrcia splendens (Sw.) DC.	0,6
PM1	6	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,6
PM1	7	Myrcia splendens (Sw.) DC.	0,8
PM1	8	Myrcia splendens (Sw.) DC.	0,5
PM1	9	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,6
PM1	10	Inga vera subsp. affinis (DC.) T.D.Penn.	0,5
PM1	11	Vernonanthura discolor (Spreng.) H.Rob.	0,5
PM1	12	Vernonanthura discolor (Spreng.) H.Rob.	0,6
PM1	13	Vernonanthura discolor (Spreng.) H.Rob.	5
PM1	14	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2
PM1	15	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2,5
PM1	16	Vernonanthura discolor (Spreng.) H.Rob.	4
PM2	1	Vernonanthura discolor (Spreng.) H.Rob.	1
PM2	2	Campomanesia reitziana D.Legrand	0,5
PM2	3	Vernonanthura discolor (Spreng.) H.Rob.	0,8
PM2	4	Clethra scabra Pers.	3
PM2	4	Clethra scabra Pers.	3
PM2	5	Vernonanthura discolor (Spreng.) H.Rob.	0,8
PM2	6	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2
PM2	7	Syagrus romanzoffiana (Cham.) Glassman	0,8
PM2	8	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM2	9	Syagrus romanzoffiana (Cham.) Glassman	0,5
PM2	10	Inga vera subsp. affinis (DC.) T.D.Penn.	0,8
PM2	11	Vernonanthura discolor (Spreng.) H.Rob.	0,8
PM2	12	Clethra scabra Pers.	3
PM3	1	Miconia tristis Spring	0,8
PM3	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM3	3	Miconia sellowiana Naudin	0,6
PM3	4	Miconia tristis Spring	0,6
PM3	5	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2,5
PM3	6	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
PM3	7	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3

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PM3	8	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
PM3	9	Solanum lacerdae Dusén	3
PM3	10	Clethra scabra Pers.	2,5
PM3	10	Clethra scabra Pers.	2,5
PM3	11	Vernonanthura discolor (Spreng.) H.Rob.	0,8
PM3	12	Vernonanthura discolor (Spreng.) H.Rob.	0,5
PM4	1	Clethra scabra Pers.	3
PM4	1	Clethra scabra Pers.	3
PM4	1	Clethra scabra Pers.	3
PM4	2	Vernonanthura discolor (Spreng.) H.Rob.	2
PM4	3	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
PM4	4	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3,5
PM4	4	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3,5
PM4	5	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2
PM4	6	Vernonanthura discolor (Spreng.) H.Rob.	2
PM4	7	Vernonanthura discolor (Spreng.) H.Rob.	2
PM4	8	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4
PM4	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PM4	10	Clethra scabra Pers.	3
PM4	11	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PM4	12	Dalbergia brasiliensis Vogel	2
PM4	13	Vernonanthura discolor (Spreng.) H.Rob.	0,8
PM4	14	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM5	1	Clethra scabra Pers.	2,5
PM5	1	Clethra scabra Pers.	2,5
PM5	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
PM5	3	Vernonanthura discolor (Spreng.) H.Rob.	2
PM5	4	Clethra scabra Pers.	3
PM5	4	Clethra scabra Pers.	3
PM5	4	Clethra scabra Pers.	3
PM5	5	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM5	6	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4
PM5	7	Leandra carassana (DC.) Cogn.	1,5
PM5	8	Miconia tristis Spring	0,6
PM5	9	Miconia tristis Spring	0,8
PM5	10	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2
PM5	11	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PM5	12	Miconia tristis Spring	0,6
PM5	13	Miconia tristis Spring	0,8
PM5	14	Miconia tristis Spring	1
PM5	15	Clethra scabra Pers.	2
PM5	16	Piptocarpha regnellii (Sch.Bip.) Cabrera	3,5
PM5	17	Nectandra oppositifolia Nees	0,6
PM5	18	Vernonanthura discolor (Spreng.) H.Rob.	1
PM5	19	Miconia tristis Spring	0,6
PM5	20	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4
PM5	21	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3,5
PM5	21	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3,5
PM5	22	Clethra scabra Pers.	1,5
PM5	23	Vernonanthura discolor (Spreng.) H.Rob.	1

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PM5	24	Vernonanthura discolor (Spreng.) H.Rob.	4
PM5	25	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PM5	26	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PM5	27	Miconia tristis Spring	4
PM5	28	Vernonanthura discolor (Spreng.) H.Rob.	2
PM5	29	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM6	1	Myrsine umbellata Mart.	4
PM6	1	Myrsine umbellata Mart.	4
PM6	1	Myrsine umbellata Mart.	4
PM6	2	Vernonanthura discolor (Spreng.) H.Rob.	0,6
PM6	3	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PM6	4	Inga vera subsp. affinis (DC.) T.D.Penn.	0,8
PM6	5	Clethra scabra Pers.	3
PM6	6	Piptocarpha regnellii (Sch.Bip.) Cabrera	5
PM6	7	Miconia tristis Spring	0,7
PM6	8	Clethra scabra Pers.	3,5
PM6	9	Vernonanthura discolor (Spreng.) H.Rob.	5
PM7	1	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM7	2	Vernonanthura discolor (Spreng.) H.Rob.	1
PM7	3	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1
PM7	4	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PM7	5	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM7	6	Miconia sellowiana Naudin	1,5
PM7	7	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,6
PM7	8	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,3
PM7	9	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
PM7	10	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,8
PM7	11	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,8
PM7	12	Vernonanthura discolor (Spreng.) H.Rob.	0,6
PM7	13	Vernonanthura discolor (Spreng.) H.Rob.	3
PM8	1	Ficus luschnathiana (Miq.) Miq.	3
PM8	2	Guatteria australis A.St.-Hil.	1,8
PM8	3	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3,5
PM8	4	Alchornea triplinervia (Spreng.) Müll.Arg.	0,8
PM8	5	Piptocarpha axillaris (Less.) Baker	2
PM8	6	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PM8	7	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3,5
PM8	8	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4
PM8	9	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM8	10	Annona emarginata (Schltdl.) H.Rainer	0,6
PM8	11	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5
PM8	12	Campomanesia guaviroba (DC.) Kiaersk.	1,5
PM8	13	Clethra scabra Pers.	4
PM8	14	Clethra scabra Pers.	3
PM8	14	Clethra scabra Pers.	3
PM8	14	Clethra scabra Pers.	3
PM8	15	Vernonanthura discolor (Spreng.) H.Rob.	0,8
PM8	16	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM8	17	Myrcia splendens (Sw.) DC.	2,5
PM8	18	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4

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PM8	19	Piptocarpha regnellii (Sch.Bip.) Cabrera	4
PM8	20	Vernonanthura discolor (Spreng.) H.Rob.	5,5
PM8	21	Piptocarpha regnellii (Sch.Bip.) Cabrera	4
PM8	22	Piptocarpha axillaris (Less.) Baker	2,5
PM8	23	Piptocarpha axillaris (Less.) Baker	2
PM8	24	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4
PM8	25	Clethra scabra Pers.	3,5
PM8	26	Miconia cabucu Hoehne	1,5
PM9	1	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,8
PM9	2	Miconia tristis Spring	0,6
PM9	3	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM9	4	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4,5
PM9	5	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1
PM9	6	Vernonanthura discolor (Spreng.) H.Rob.	2,5
PM9	7	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PM9	8	Miconia tristis Spring	0,6
PM9	9	Miconia cabucu Hoehne	1,8
PM9	10	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PM10	1	Vernonanthura discolor (Spreng.) H.Rob.	1,5
PM10	2	Clethra scabra Pers.	3
PM10	2	Clethra scabra Pers.	3
PM10	3	Clethra scabra Pers.	1
PM10	4	Clethra scabra Pers.	0,8
PM10	5	Clethra scabra Pers.	3
PM10	5	Clethra scabra Pers.	3
PM10	5	Clethra scabra Pers.	3
PM10	5	Clethra scabra Pers.	3
PM10	6	Ocotea puberula (Rich.) Nees	1,6
PM10	7	Piptocarpha axillaris (Less.) Baker	1,5
PM10	8	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PM10	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	3
PM10	10	Clethra scabra Pers.	3
PM10	10	Clethra scabra Pers.	3
PM10	11	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	6
PM10	12	Miconia sellowiana Naudin	1
PM10	13	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5
PM10	14	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
PM10	15	Piptocarpha regnellii (Sch.Bip.) Cabrera	5
PM11	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	2,5
PM11	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,9
PM11	3	Vernonanthura discolor (Spreng.) H.Rob.	3
PM11	4	Miconia sellowiana Naudin	0,7
PM11	5	Piptocarpha regnellii (Sch.Bip.) Cabrera	3,5
PM11	6	Clethra scabra Pers.	3,5
PM11	6	Clethra scabra Pers.	3,5
PM11	6	Clethra scabra Pers.	3,5
PM11	7	Clethra scabra Pers.	0,7
PM11	8	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PM11	9	Vernonanthura discolor (Spreng.) H.Rob.	0,8
PM11	10	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3

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PM11	11	Piptocarpha regnellii (Sch.Bip.) Cabrera	3,5
PM11	12	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PM11	13	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3,5
PM11	14	Vernonanthura discolor (Spreng.) H.Rob.	3,5
PM11	15	Vernonanthura discolor (Spreng.) H.Rob.	2
PM11	16	Myrsine umbellata Mart.	1
PM12	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	0,8
PM12	2	Clethra scabra Pers.	1
PM12	3	Rubus brasiliensis Mart.	2
PM12	4	Vernonanthura discolor (Spreng.) H.Rob.	3
PM12	5	Piptocarpha axillaris (Less.) Baker	1
PM12	6	Baccharis semiserrata DC.	4
PM12	6	Baccharis semiserrata DC.	4
PM12	6	Baccharis semiserrata DC.	4
PM12	6	Baccharis semiserrata DC.	4
PM12	7	Piptocarpha regnellii (Sch.Bip.) Cabrera	1,2
PM12	8	Baccharis semiserrata DC.	2,5
PM12	8	Baccharis semiserrata DC.	2,5
PM12	9	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2,5
PM12	10	Vernonanthura discolor (Spreng.) H.Rob.	3
PM12	10	Vernonanthura discolor (Spreng.) H.Rob.	3
PM12	11	Clethra scabra Pers.	2
PM12	12	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2,5
PM12	13	Alchornea triplinervia (Spreng.) Müll.Arg.	1
PM12	14	Baccharis oblongifolia (Ruiz & Pav.) Pers.	0,7
PM13	1	Piptocarpha regnellii (Sch.Bip.) Cabrera	2
PM13	2	Vernonanthura discolor (Spreng.) H.Rob.	1
PM13	3	Clethra scabra Pers.	3,5
PM13	4	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
PM13	5	Vernonanthura discolor (Spreng.) H.Rob.	3
PM13	6	Annona emarginata (Schltdl.) H.Rainer	1,5
PM13	7	Miconia tristis Spring	1
PM13	8	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2,5
PM13	9	Vernonanthura discolor (Spreng.) H.Rob.	4,5
PM13	10	Baccharis semiserrata DC.	4
PM14	1	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	1,7
PM14	1	Symphyopappus itatiayensis (Hieron.) R.M.King & H.Rob.	1,4
PM15	1	Baccharis semiserrata DC.	3,5
PM15	1	Baccharis semiserrata DC.	3,5
PM15	1	Baccharis semiserrata DC.	3,5
PM15	1	Baccharis semiserrata DC.	3
PM15	1	Baccharis semiserrata DC.	3
PM15	1	Baccharis semiserrata DC.	3
PM15	2	Miconia tristis Spring	0,5
PM15	3	Miconia tristis Spring	0,5
PM15	4	Miconia tristis Spring	0,5
PM15	5	Vernonanthura discolor (Spreng.) H.Rob.	3,5
PM15	5	Vernonanthura discolor (Spreng.) H.Rob.	2
PM15	6	Vernonanthura discolor (Spreng.) H.Rob.	1,8

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PM15	7	Piptocarpha regnellii (Sch.Bip.) Cabrera	4
PM15	7	Piptocarpha regnellii (Sch.Bip.) Cabrera	4
PM15	8	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4
PM15	9	Vernonanthura discolor (Spreng.) H.Rob.	4
PM15	10	Clethra scabra Pers.	3,5
PM15	11	Vernonanthura discolor (Spreng.) H.Rob.	2
PM15	12	Vernonanthura discolor (Spreng.) H.Rob.	5
PM15	13	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
PM15	14	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4
PM15	15	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2
R1	1	Vernonanthura discolor (Spreng.) H.Rob.	3
R1	2	Vernonanthura discolor (Spreng.) H.Rob.	1
R1	3	Myrsine umbellata Mart.	2,5
R1	4	Miconia lymanii Wurdack	2
R1	4	Miconia lymanii Wurdack	2
R1	4	Miconia lymanii Wurdack	2
R1	5	Vernonanthura discolor (Spreng.) H.Rob.	2,5
R1	6	Vernonanthura discolor (Spreng.) H.Rob.	1,5
R1	7	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,8
R1	8	Clethra scabra Pers.	1,5
R1	9	Critoniopsis quinqueflora (Less.) H.Rob.	1,8
R2	1	Vernonanthura discolor (Spreng.) H.Rob.	2
R2	2	Vernonanthura discolor (Spreng.) H.Rob.	4
R2	3	Clethra scabra Pers.	2,5
R2	3	Clethra scabra Pers.	2,5
R2	3	Clethra scabra Pers.	2,5
R2	4	Clethra scabra Pers.	2,5
R2	4	Clethra scabra Pers.	2,5
R2	5	Cedrela fissilis Vell.	1,5
R3	1	Ocotea puberula (Rich.) Nees	3
R3	2	Vernonanthura discolor (Spreng.) H.Rob.	3
R3	3	Vernonanthura discolor (Spreng.) H.Rob.	3
R3	4	Vernonanthura discolor (Spreng.) H.Rob.	3
R3	5	Clethra scabra Pers.	2,5
R3	5	Clethra scabra Pers.	2,5
R3	5	Clethra scabra Pers.	2,5
R4	1	Vernonanthura discolor (Spreng.) H.Rob.	1,8
R4	2	Vernonanthura discolor (Spreng.) H.Rob.	2
R4	3	Vernonanthura discolor (Spreng.) H.Rob.	5
R4	4	Vernonanthura discolor (Spreng.) H.Rob.	5
R4	5	Vernonanthura discolor (Spreng.) H.Rob.	3
R4	5	Vernonanthura discolor (Spreng.) H.Rob.	3,5
R4	6	Vernonanthura discolor (Spreng.) H.Rob.	2,5
R4	7	Vernonanthura discolor (Spreng.) H.Rob.	2,5
R4	8	Piptocarpha axillaris (Less.) Baker	3,5
R4	9	Piptocarpha regnellii (Sch.Bip.) Cabrera	4
R4	10	Piptocarpha axillaris (Less.) Baker	5
R5	1	Cyathea phalerata Mart.	2
R5	2	Vernonanthura discolor (Spreng.) H.Rob.	4
R5	3	Myrsine umbellata Mart.	1,6

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R5	4	Vernonanthura discolor (Spreng.) H.Rob.	0,7
R5	5	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,7
R5	6	Vernonanthura discolor (Spreng.) H.Rob.	2,5
R5	7	Vernonanthura discolor (Spreng.) H.Rob.	4
R5	8	Vernonanthura discolor (Spreng.) H.Rob.	4
R5	9	Vernonanthura discolor (Spreng.) H.Rob.	1
R5	10	Cyathea phalerata Mart.	1
R5	11	Vernonanthura discolor (Spreng.) H.Rob.	5
R6	1	Vernonanthura discolor (Spreng.) H.Rob.	4
R6	1	Vernonanthura discolor (Spreng.) H.Rob.	3
R6	1	Vernonanthura discolor (Spreng.) H.Rob.	2,5
R6	2	Piptocarpha axillaris (Less.) Baker	3
R6	2	Piptocarpha axillaris (Less.) Baker	3
R6	3	Myrsine umbellata Mart.	4,5
R6	4	Ocotea elegans Mez	1
R6	5	Vernonanthura discolor (Spreng.) H.Rob.	4
R6	6	Piptocarpha axillaris (Less.) Baker	4,5
R6	7	Piptocarpha angustifolia Dusén ex Malme	4
R6	8	Piptocarpha axillaris (Less.) Baker	4
R6	9	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,6
R6	10	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,8
R6	11	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,6
R6	12	Ocotea elegans Mez	0,6
R6	13	Piptocarpha axillaris (Less.) Baker	4
R6	14	Vernonanthura discolor (Spreng.) H.Rob.	6
R6	15	Vernonanthura discolor (Spreng.) H.Rob.	4
R6	16	Vernonanthura discolor (Spreng.) H.Rob.	3
R6	17	Piptocarpha axillaris (Less.) Baker	3
R6	18	Ocotea elegans Mez	1,5
R6	19	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5
R6	20	Piptocarpha axillaris (Less.) Baker	3
R6	21	Piptocarpha axillaris (Less.) Baker	3
R6	22	Vernonanthura discolor (Spreng.) H.Rob.	2,5
R7	1	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3,5
R7	1	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3,5
R7	3	Ocotea puberula (Rich.) Nees	1
R7	4	Ocotea puberula (Rich.) Nees	1
R8	-	-	-
R9		Solanum mauritianum Scop.	3,5
R10	1	Miconia tristis Spring	0,6
R10	2	Clethra scabra Pers.	1
R10	2	Clethra scabra Pers.	1
R10	3	Vernonanthura discolor (Spreng.) H.Rob.	1
R10	4	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,6
R10	5	Miconia tristis Spring	0,5
R10	6	Clethra scabra Pers.	1,5
R10	7	Clethra scabra Pers.	1
R10	8	Vernonanthura discolor (Spreng.) H.Rob.	1,5
R10	9	Miconia tristis Spring	0,5
R10	10	Clethra scabra Pers.	1,8

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R10	12	Clethra scabra Pers.	1,2
R10	13	Clethra scabra Pers.	0,5
R10	14	Clethra scabra Pers.	1,2
R10	15	Ocotea puberula (Rich.) Nees	1,2
R10	16	Solanum pseudoquina A.St.-Hil.	1
R10	17	Solanum pseudoquina A.St.-Hil.	0,5
R10	18	Solanum pseudoquina A.St.-Hil.	1
R10	19	Solanum pseudoquina A.St.-Hil.	1,2
R10	20	Casearia sylvestris Sw.	1,2
R10	21	Clethra scabra Pers.	2
R10	22	Solanum mauritianum Scop.	1,2
R10	23	Solanum pseudoquina A.St.-Hil.	1
R10	24	Solanum pseudoquina A.St.-Hil.	1
R10	25	Ocotea puberula (Rich.) Nees	0,7
R10	26	Casearia sylvestris Sw.	1,7
R10	27	Clethra scabra Pers.	1,8
R10	27	Clethra scabra Pers.	1,8
R10	27	Clethra scabra Pers.	1,8
R10	28	Miconia tristis Spring	0,8
R10	29	Solanum pseudoquina A.St.-Hil.	0,5
R10	30	Solanum pseudoquina A.St.-Hil.	1
R10	31	Solanum pseudoquina A.St.-Hil.	0,5
R10	32	Solanum pseudoquina A.St.-Hil.	0,6
R10	33	Solanum pseudoquina A.St.-Hil.	0,7
R10	34	Solanum pseudoquina A.St.-Hil.	0,8
R10	35	Solanum pseudoquina A.St.-Hil.	0,8
R10	36	Solanum pseudoquina A.St.-Hil.	0,7
R10	37	Solanum pseudoquina A.St.-Hil.	0,5
R10	38	Solanum pseudoquina A.St.-Hil.	0,5
R10	39	Solanum pseudoquina A.St.-Hil.	0,7
R10	40	Solanum pseudoquina A.St.-Hil.	0,7
R10	41	Solanum pseudoquina A.St.-Hil.	0,8
R10	42	Solanum pseudoquina A.St.-Hil.	0,8
R10	43	Solanum pseudoquina A.St.-Hil.	0,8
R10	44	Solanum pseudoquina A.St.-Hil.	0,8
R10	45	Campomanesia guaviroba (DC.) Kiaersk.	2
R10	46	Campomanesia guaviroba (DC.) Kiaersk.	1,8
R10	47	Campomanesia guaviroba (DC.) Kiaersk.	1,8
R10	48	Clethra scabra Pers.	1,8
R10	49	Clethra scabra Pers.	1,8
R10	50	Clethra scabra Pers.	1,6
R10	51	Clethra scabra Pers.	1,5
R10	52	Miconia tristis Spring	0,6
R11	1	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,8
R11	2	Aspidosperma tomentosum Mart.	1,5
R11	3	Aspidosperma tomentosum Mart.	1,8
R12	1	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	4
R12	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
R13	1	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,5
R13	2	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	1,8

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R13	3	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	0,9
R13	4	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	5
R13	5	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3,5
R13	6	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	2,5
R13	7	Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	3
R13	8	Miconia tristis Spring	0,8
R13	9	Clethra scabra Pers.	0,6
R13	10	Clethra scabra Pers.	0,6
R13	11	Vernonanthura discolor (Spreng.) H.Rob.	2,5
R14	1	Vernonanthura discolor (Spreng.) H.Rob.	2,5
R15	1	Vernonanthura discolor (Spreng.) H.Rob.	4
R15	2	Miconia tristis Spring	1
R15	3	Miconia tristis Spring	1

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