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Can cultural significance in plants be explained by domestication and usage spaces? A study case from a coffee producing community in Huila, Colombia

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ABSTRACT

This study was aimed at delving into the relationship between botanical species with cultural significance and both the managed environments they inhabit (Coffee plantation, Forest, Garden, Orchard, Market) and their origin (Wild, Cultivated), as established by people from *vereda* Las Delicias, Colombia. We tested the hypothesis that cultivated plants from the coffee plantations would have the highest cultural significance. One hundred and ninety-two plants were recorded by common name, however, upon taxonomic analysis, 238 botanical species were established. The most relevant spaces in terms of diversity were the coffee plantation (91 useful plants) and the garden (81 useful plants). Regarding origin, most of the plants were cultivated (151), with only 50 wild species. Likewise, there is a significantly larger cultural significance of coffee plantantion plants than there is garden plants and forest plants. Furthermore, cultivated plants have a significantly larger cultural significance than do wild plants. In conclusion, there is a diversity of useful plants within coffee plantation systems, which guarantee family livelihoods, diversify income sources, and protect the natural resources of the region. Finally, the importance of coffee (*Coffea arabica* L.) comes from its role as a customary heritage for this community, which strengthens agricultural, environmental, and cooperative processes after each generation.

Keywords: Ethnobotany; Ethnobotanical Categories; Local Knowledge; Management and Use; Coffee Cultivation.

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SIGNIFICANCE STATEMENT

The manuscript presents relevant information for the understanding of ethnobotanical practices developed by a rural community in Colombia. It provides knowledge about the species used within ethnobotanical categories and a quantified value of the cultural significance of the useful flora in its diverse managed spaces. In addition, it analyzes the relationship between culturally significant plants and managed spaces, as well as that between culturally significant plants and their domestication status. Furthermore, it tests the hypothesis that, for this community, plants that are cultivated and those within the coffee plantations are assigned higher significance values than wild plants within forests or in other managed spaces. Colombia is widely recognized as a high-quality coffee producer, however, studies that bring attention to the value of the complexity of the coffee plantation systems and the rural traditions behind them, are not numerous and quite recent. Therefore, this study provides a compelling argument for the significance of this crop, as well as the ancestral heritage that has transformed *Coffea arabica* L. production into a way of strengthening agricultural, environmental and rural processes throughout generations.

INTRODUCTION

The recognition of useful flora and the preference for certain plants by different social groups makes it possible to generate a critical starting point for the design of conservation actions within transformed areas, which could lead to greater interest and participation by local populations (Castellano 2011). Upon these scenarios, ethnobotany serves as a bridge between local knowledge and rural traditions associated to the use and management of vegetable species; the ethnobotanical heritage has an important role as an element of identity and a benchmark for local cultures (Pardo de Santayana and Gómez 2003). This knowledge continues to be a reliable and valuable source to learn about vegetation dynamics and it is the basis for the management of local resources (Wezel and Lykke 2006).

Thus, a culturally significant plant may be defined as a plant species that is desired, preferred or highly regarded in terms of affection by most members of a specific culture (Tardío and Pardo de Santayana 2008), which may also relate to ecological, cultural, and genetic factors that shape behavior and species selection according to adaptative memory and cultural affinity (da Silva et al. 2020). Moreover, the significance of a species can be explained by diverse factors such as the number of uses as per ethnobotanic category, availability, acces to the resource, or its origin (Rosero-Toro et al. 2018a). Therefore, ethnobotanists have begun to study local knowledge incorporating quantitative analyses, which make it possible to evaluate the relationship between biological and cultural diversity, as well as the relative significance of natural resources for a local population (Medeiros et al. 2011). To evaluate the cultural significance of diverse organisms (plants, animals and mushrooms) quantitatively, different indicators have been proposed. One such proposal is the Frequency of Mention, based on the premise that the more important an organism is for a community, the more likely it will be named in a free listing (García del Valle et al. 2015; Ruan-Soto 2020; Weller and Romney 1988). The elements which are mentioned most frequently are assumed to be of greater cultural significance to the studied population (Hilgert 2007; Thompson and Juan, 2006)

Over the last few decades, increased worldwide efforts have been made to recognize the cultural significance of plant species (e.g., Albuquerque et al. 2020; Cruz-Pérez et al. 2021; León-Merino et al. 2017; Mendoza et al. 2020); however, a deeper focus on agroforest systems, such as shade coffee plantations, is required. Shade coffee plantantions are deemed important refuges for biodiversity (De Beenhouwer et al. 2013) as they contain varied useful species which can be potentially commercialized (Martínez et al. 2007) and preserved. Consequently, local communities have developed preferences and classification systems, in which cultural cognitive processes are represented which encapsulate specific conceptions of nature, as well as cumulative learing, beliefs and customs that are part of specific communities and cultures (Luna-José and Rendon 2012). Luna-José and Rendon (2012) further manifest that the mentioned grouping includes life form and variety categories, as well as monotypical and polytypical names which allow the plants in an ecosystem to be classified. Furthermore, these processes permit the differentiation of wild, native, exotic, cultivated, naturalized, and adventitious (Castellano 2011; Pérez and Matiz-Guerra 2017) while also categorizing managed areas such as traditional and commercial poli-crops, monocrops, paddocks, and forests (Bautista et al. 2018), as well as gardens (Mendoza-García et al. 2011).

To Casas and Caballero (1995) Latin American rural populations base their subsistence in agriculture, particularly in terms of food, and only about 15% of ther diet is obtained through collection of wild species. This statement easily extrapolates to other anthropocentric use categories. Because of this, we might expect cultivated plants to have a greater cul-

tural significance than do wild plants, particularly because the latter need only be harvested directly from spaces such as forests, while the former impies a productive process in which nature is transformed and resource availability is managed by controlling nutrients, humidity, light, temperature, competition, and depredation (Casas and Caballero 1995).

Considering this, farmers in general have maintained and adopted diverse strategies, combining modern and traditional agricultural varieties (Estupiñán-González et al. 2010; Kehoe et al. 2017), and they have preserved the goods and services that they provide (Nesper et al. 2018; Tscharntke et al. 2011). Among these, there have been studies on the relevance of agroforestry systems for the production of wood and timber (e.g. Brandt et al. 2013; Castillo et al. 2014); medicine (e.g. Bermúdez et al. 2005; Giraldo et al. 2009), and food security (e.g. Córdoba et al. 2019; De Beenhouwer et al. 2013). However, the rural world, traditional agriculture, and agroecosystems throughout the world are being subjected to quick transformation processes and varied demands, due mainly to the development of a technified agriculture (Grab et al. 2018; Pérez-Álvarez et al. 2018), to government policies, free trade agreements, poverty, migration of rural populations to urban areas, and other factors (Altieri and Nichols 2010). In this transition, agricultural systems are affected by complex interactions between social and ecological factors (Nkurunziza 2020), which has changed the access, use, and availability of natural resources. In turn, this has transformed rural territoriThe recognition of useful flora and the preference for certain plants by different social groups makes it possible to generate a critical starting point for the design of conservation actions within transformed areas, which could lead to greater interest and participation by local populations (Castellano 2011). Upon these scenarios, ethnobotany serves as a bridge between local knowledge and rural traditions associated to the use and management of vegetable species; the ethnobotanical heritage has an important role as an element of identity and a benchmark for local cultures (Pardo de Santayana and Gómez 2003). This knowledge continues to be a reliable and valuable source to learn about vegetation dynamics and it is the basis for the management of local resources (Wezel and Lykke 2006).

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In Colombia, coffee is grown in approximately 590 municipalities (Gallego 2007). Most of the activity (around 96%) is carried out by small producers in areas under 5 ha (Echavarría et al. 2015; FNC 2020), who are recognized by their high-quality standards, production and exportation of mild-flavored coffees, an aspect that is valued in international markets (FNC 2019). Despite the status of coffee as one the main elements for the country's economy (Cerquera and Orjuela 2015). Research in traditional coffee-producing regions has been focused on recognizing economic changes, the evolution and consolidation of coffee, as well as the loss of dynamism in the coffee-production sector (Aguilar 2003; Cano 2012). Likewise, there has been in-depth research on the role of the Coffee Cultural Landscape, World Heritage since 2011, has had for several sectors, such as tourism and agriculture (Mayorga 2015), and on the analysis of sociocultural variables for coffee collectors (Parada 2017); as well as on ecosystem services and biodiversity management and conservation (Armbrecht 2009; Cepeda-Valencia et al. 2014; Chait 2015; Mancera-Santa 2019).

In Huila, research in coffee producing zones is scarce and often focused on the incidence of climate variation on the production of coffee (Pérez et al. 2016; Sánchez et al. 2017), coffee varietals (Gallego 2007), agronomic quality (Rodríguez et al. 2014), social trajectory and coffee production (Salcedo 2016), and floristic and ethnobotanic analysis (Rosero-Toro et al. 2018b). In spite of this, little is known about the culturally significant species in coffee planting communities and whether preferences favor cultivated species over wild ones, or whether preference is different between species from different managed spaces (such as orchards, forests, coffee plantantions, or others) used by coffee farmers.

The importance that management spaces have for coffee producing agriculturers is highlighted, considering that an average of 24% of the farms are dedicated to coffee cultivation, while the rest include forest land, grasslands, gardens, and other management spaces (Riveros et al. 2008). In this context, the following question was posed: How does the cultural significance of the plants used by a coffee growing community relate to the managed spaces ("coffee plantation", "forest", "garden", "orchard", "market") and their origin ("wild", "cultivated")? This study aims at knowing the relationship between culturally significant botanical species with the management spaces and their origin, testing the hypothesis that plants with the highest cultural significance will be those obtained from coffee plantation sites and of cultivated origin.es (Perfetti et al. 2013; Perfecto and Vandermeer 2015).

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MATERIAL AND METHODS

Study area

The study was carried out in the vereda (village) Las Delicias in the Acevedo municipality (Huila, Colombia), Colombia, which comprises an agroecosystem located in the biomes of a subhumid and humid pre-montane forest with an extension of 335.96 ha, it has a warm, very humid climate with temperatures oscillating annually between 12 and 24° C; it has an altitudinal range between 1000 and 2000 m.a.s.l (Figure 1). According to the 2016-2019 Acevedo Municipal Development Plan, this vereda contains 70 households. Although no updated data about the population in this area is available, there is an estimated average of 100 inhabitants. This number fluctuates due to migration to other departments like Cauca and Nariño, migrants being mainly men who work as coffee pickers, leaving women in charge of the fincas. The community vereda Las Delicias has a coffee-production-based economy, but this is combined with corn, banana, casava, sugarcane, and shade trees production, which provide additional income as well as alimentary support for the community. At the municipality level, coffee production is the most relevant activity as they are among the most prolific producers of the Huila department, with around 9054 cultivated ha and 2000 families linked to this sector (Sánchez et al. 2017).

Selection of participants

Interviewees were selected based on different conditions: residing in the area for over 10 years, dedicated to agriculture, above 18 years of age, and with time availability to participate in the project. Following these requirements, we worked with 41 people: 33 women and 8 men, between 18 and 74 years old. Considering the selection criteria, we obtained a lower participation from men, which can be due to the activities they carry out outside of coffee production. However, this makes it evident that men and women engage in an activity exchange that allows the development of links and knowledge about the flora within the territory. Lastly, the community authorized the use of all data obtained through the proposed methodologies by previous, free, and informed consent (Cano-Contreras et al. 2016).

Data collection

To gather information, qualitative and quantitative variables were considered. To delve into the management spaces and the origin of the useful plants, the ethnographic method was used through techniques like semi-structured interviews, ethnobotanical walks (Guber 2001), and participant observation (Páramo 2008). The latter was carried out throughout a year of constant coexistence with the community, in which there was participation in activities such as coffee collection, sowing of plants for both orchards and gardens, and exchange of agricultural produce. This helped strengthen communication processes, as well as active participation, while providing insight on territorial recognition, interactions between the community and agroecosystems, management strategies and species classification.

Additionally, Ethnobotanical categories recognizing the classification systems and useful species in each category were established alongside the participants. It is noteworthy that a single species may be reported in more than one category, according to the uses cited by an interviewee.

To calculate the cultural significance (CS) we used the Frequency of Mention Index, in which significance is indicated by the number of times each plant is mentioned by the interviewees (Hernández et al. 2005; Tardío and Pardo de Santayana 2008). After this, the relative values of the frequency of mention data were subjected to a non-parametric U Mann-Whitney and Kruskal-Wallis test (Zar 1999), which was carried out using the Minitab 16 software, a choice of test set which was made because the data were not normally

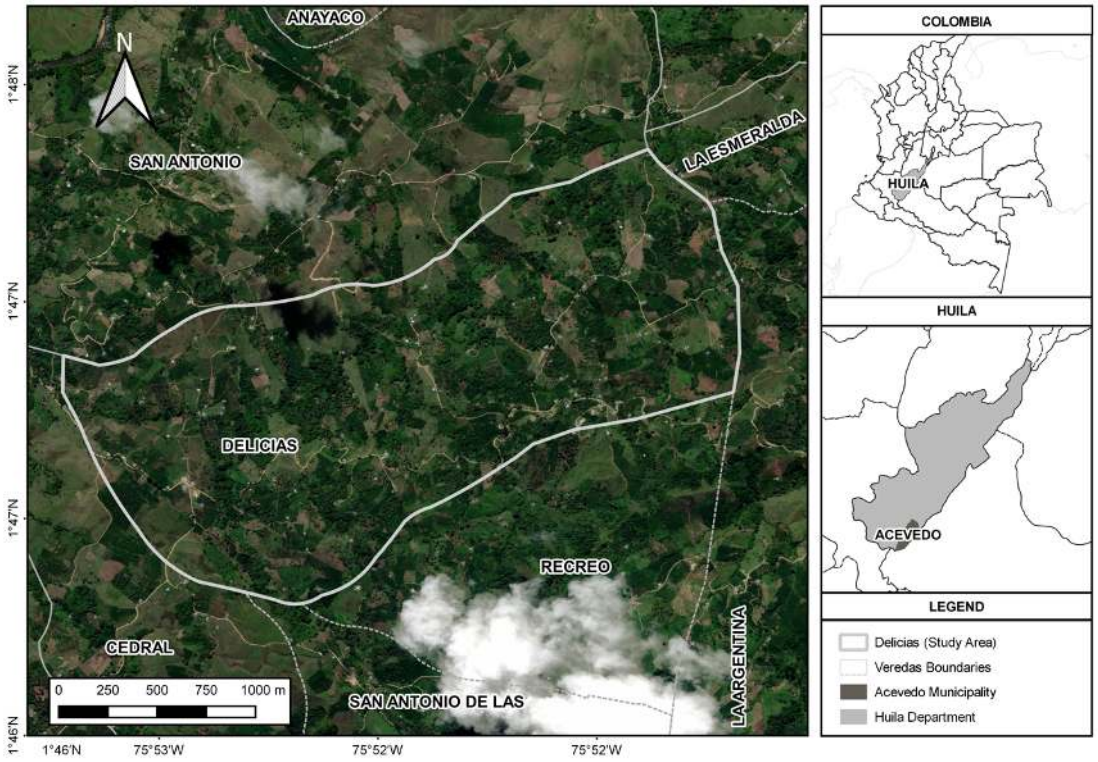

Figure 1. Location of *vereda* Las Delicias, Acevedo municipality (Huila, Colombia). Image by Trejo-Rangel (2020).

distributed. This helped determine whether significant differences exist between managed environments and the origin of useful plants. To carry out the CS analysis and the non-parametric tests, the data was extracted exclusively from interviews, while the analysis of botanical data incorporated all the species reported in both interviews and ethnobotanic walks.

Lastly, species determination was carried out using taxonomic keys and specialized databases. The TROPICOS®platform and International Plant Names Index (IPNI) were used to confirm the current nomenclature of the scientific names, and the platform *"Catálogo de plantas y líquenes de Colombia"* (Catalogue of Plants and Lichens from Colombia) was consulted (Bernal et al. 2019) to know the origin of the species and their conservation status. The collected materials were deposited in the Universidad Surcolombiana Herbarium, SURCO (Neiva, Huila).

RESULTS

The community from *vereda* Las Delicias established five managed spaces of flora according to the composition, floristic distribution and access, called "Coffee plantation", "Garden", "Orchard", "Forest" and "Market", where the plants used as basic support in farmers' households are concentrated. Additionally, it is in these spaces that the cultural tradition of the community converges, family members participate, and oral knowledge associated with plants is constructed. Because of this, speaking of managed spaces connects the ways in which coffee agro-ecosystems are perceived, community interactions with plants, and the forms of management, use and significance of useful flora. Taking into account the plants mentioned by space of use, the following was found: Coffee plantation with 91 plants (e.g. *achira, aguanoso* and *cachingo*), followed by Garden with 81 (e.g., *francesina, clavelina* and *hortensia*), Orchard with 41 (e.g. *llantén, fríjol* and *espinaca*), Market with 13 (e.g., *remolacha, pepino* and *tomate*) and Forest with 6 (e.g. *algodón, roble* and *mariguano*) (see Additional File1).

On the other hand, the community classified the flora into those that are considered "wild", that is, those that grow spontaneously in the ecosystem, and those that are "cultivated", which may be within managed spaces or can be acquired from crops external to the community. The cultural tradition, knowledge, and ecosystem management relative to each species were considered to classify useful flora. A link was established between the experience gained

through oral tradition and contact with vegetation. Likewise, the community manifested the relevance of access and availability of a given species, which points to the generation of domestication processes for some wild species and underscores the relevance of vegetable species sown in the coffee agro-ecosystems, as well as species acquired in other spaces for the indispensable benefits they provide to the community. Therefore, for the wild category 50 plants were found, among them, *guacamayo* (*Croton magdalenensis* Müll. Arg.), *guasco* (*Guatteria alta* R.E.Fr.) and *roble* (*Quercus humboldtii* Bonpl.). As far as cultivated ones, 151 plants were reported, including *aguacate* (*Persea americana* Mill.), *borrachero* (*Brugmansia suaveolens* (Willd.) Bercht. & J. Pres) and *nacedero* (*Trichanthera gigantean* (Humb. & Bonpl.) Nees). Of the reported total, nine plants are found in both categories, such as *achira* (*Canna indica* L.), *besitos* (*Impatiens hawkeri* W. Bull and *I. walleriana* Gancho. F.) and *cedro* (*Cedrela odorata* L.) (see Additional File1).

When the managed spaces were associated to the relative frequency of mention, we observed significant differences in the CS for each of these spaces ($H = 23.33; P = 0.000$). Their medians and Z vlaues indicate that this difference exists particularly between Orchards ($Z = 3.04, M = 0.2895$) and Coffee plantations ($Z = 1.56, M = 0.1579$). It became clear that plants from the coffee plantations have a higher degree of CS compared to plants from gardens and forests; this difference was significant. Meanwhile, it was not so when plants from the coffee plantation were compared with those from orchards and markets. Orchard plants were found to have a higher CS than plants from gardens and forests (Figure 2; Table 1).

When the cultivated and wild categories were compared, we found cultivated plants to have a higher cultural significance (CS) than wild plants ($U=0.0032<0.05$) as measured by their relative frequency of mention (Figure 3). The significance values are cited in table 1.

Meanwhile, the most important species according to the Frequency of Mention Index was *café* (*Coffea arabica* L.) (Relative mention frequency 1), followed by *plátano* (*Musa balbisiana* Colla) (0.95) and *naranja* (*Citrus* spp.) (0.92). The lowest reports corresponded to 29 species with a single citation, among them, *anamú* (*Petiveria alliacea* L.), *bejuco de sapo* (*Cissus sicyoides* L.) and *salvajina* (*Tillandsia usneoides* (L.) L.) (0.03) (see Additional File1).

With the semi-structured interviews, 192 plants were recorded by common name, however, considering the walk-in-the-forest interviews, 238 species were found. Fifteen of these had no local name even though they are used, while 46 of them have shared common names but are distinct taxonomic entities and may or may not be used similarly (see Additional File1). The most represented botanical families were Asteraceae (20 Genera, 23 species), Lamiaceae (11,12), and Leguminosae (8,11). The lowest representativity was shared among 35 Families which all had one genus and one species, among them are: Anacardiaceae, Bignoniaceae, Gesneriaceae, and Urticaceae (see Annex). Regarding growth habits, herbs were found to be the most widely represented (45%), followed by trees (18%) and shrubs (16%) (Table 2). According to origin, 129 plants were classified as cultivated: 58 of these are native, 34 are native and cultivated, 4 are naturalized, 5 are naturalized and adventitious, 4 are cultivated and naturalized, 4 are adventitious, and 4 are endemic (see Additional File1). Regarding the state of conservation of the flora, 41 species are classified as "under minor concern" (e.g., *C. magdalenensis*, *T. gigantea*, and *Zygia longifolia* (Willd.) Britton & Rose), 3 as "vulnerable" (*Bactris gasipaes* Kunth, *Q. humboldtii*, and *Salvia rubescens* Kunth), and 2 as "Endangered" (*Cattleya trianae* Linden & Rchb.f. and *C. odorata*). This last pair is also reported in CITES, along with *Opuntia ficus-indica* (L.) Mill. and *Mapinguari desvauxianus* (Rchb.f.) Carnevali & R.B. Singer.

With the participants help, ten ethnobotanical categories, defined below, were established: *food* (cultivated, purchased or wild species that are edible, including fruits); *fuel* (species used for timber or charcoal); *spices* (species employed to marinate or season other foods), *construction* (woody or non-woody species used to build pens, fences, supporting structures for homes or others); *economic* (species that generate income through their sale); *fodder* (species that are used as food for animals); *medicinal* (species employed in the prevention and treatment of diseases or illnesses that affect humans); *ornamental* (decorative species and those used in the decoration of indoor and outdoor spaces within households); *shade* (species used to cast shadow over coffee plants); and *others* (useful species that are not included in the categories above).

We found that the greatest representativeness by ethnobotanical category was for Medicinal plants, with 82 species mentioned, among which are: *arracacha* (*Arracacia xanthorrhiza* Bancr.), *ruda* (*Ruta graveolens* L.) and *yerbagolpe* (*Pseudelephantopus spiralis* (Less.) Cronquist). According to the origin of the medicinal plants, 55 plants were reported to be cultivated, reporting *cidra* (*Sechium edule* (Jacq.) Sw.), *fennel* (*Foeniculum vulgare* Mill.) and *maracuyá* (*Passiflora edulis* Sims); and 22 wild plants were found, finding *bejuco de sapo* (*C. sicyoides*),

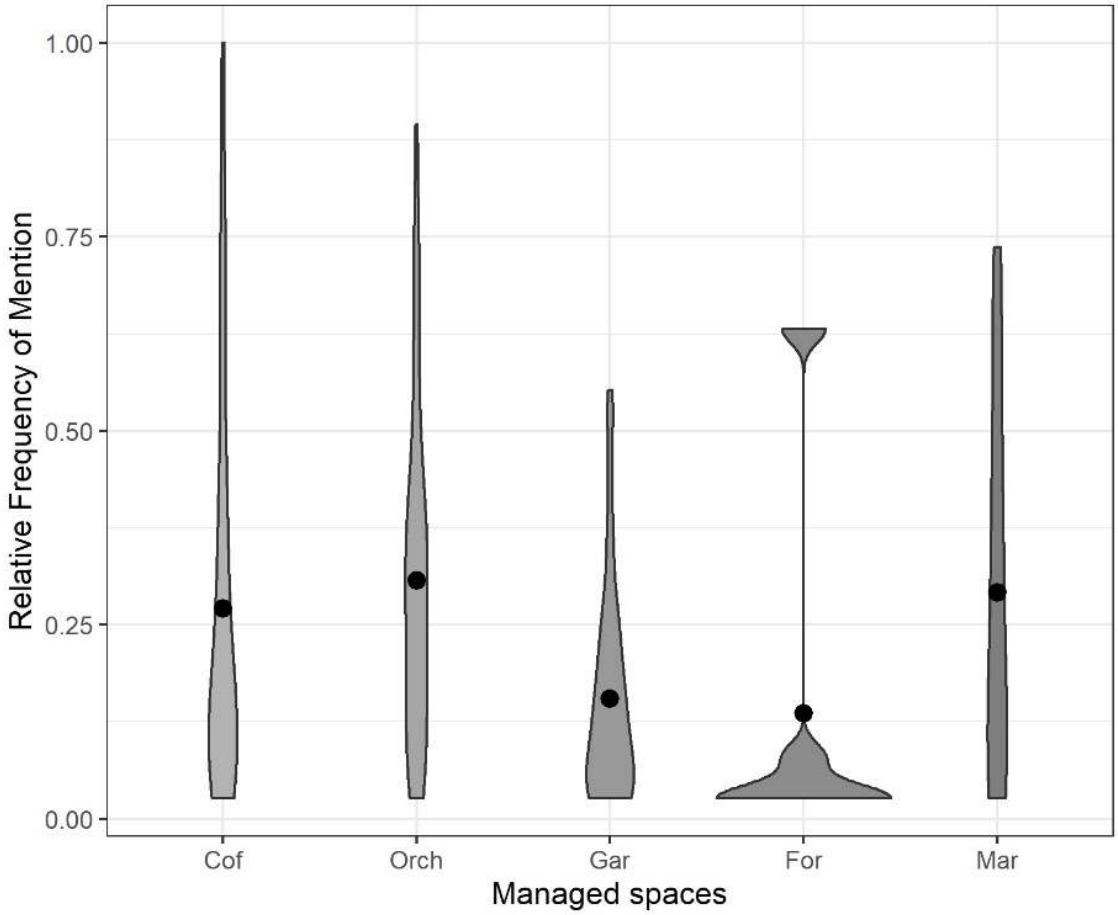

Figure 2. Cultural Singificance (CS) of the useful flora according to managed spaces: Coffee plantation (Cof), Forest (For), Garden (Gar), Orchard (Orch) and Market (Mar) in the *vereda* Las Delicias community (Acevedo, Huila). The Y axis is the Relative Frequency of Mention and the X axis are the managed spaces.

cordoncillo (*Piper aduncum* L.) and *yarumo* (*Cecropia peltata* L.).

The Ornamental category grouped 66 plants, being one of the categories with the largest number of exclusive species, that is, those reported to have a single use. Of these, only five correspond to wild plants, that is, *caleña* (*Browallia Americana* L.), *campana* (*Ipomoea indica* (Burm.) Merr.) and three orchids (*Epidendrum catillus* Rchb.f. & Warsz., *M. desvauxianus* and *Oncidium* sp.). In the case of the Food category, 56 plants were mentioned, of which five are recognized as wild (e.g., *C. indica*, *Rubus urticifolius* Poir. and *Vasconcellea pubescens* A.DC.), but these are also found in coffee plantations. A similar situation is observed for the Fuel category, with 19 useful plants, and where seven wild species with distribution within the coffee plantations are reported, such as: *yarumo* (*C. peltata*), *guasco* (*G. alta*) and *guacamayo* (*C. magdalenensis*), and a single exclusive species for this category, the *cedrillo* (*Ruagea glabra* Triana & Planch.). In addition, this category shares nine species with the Construction category, including *nacedero* (*T. gigantea*) and *votatumbo* (*Aegiphila truncate* Moldenke). On the other hand, the Shade category presented 15 useful plants, of which eight correspond to cultivated (e.g. *Pouteria caimito* (Ruiz & Pav.) Radlk, *Psidium guajava* L. and *Inga spp.*), seven are wild (e.g. *Cordia alliodora* (Ruiz & Pav.) Oken, *Guarea Guidonia* (L.) Sleumer and *Heliocarpus americanus* L.), one species is in both categories (*C. odorata*) and only one species has forest use (*Brunellia comocladifolia* Bonpl.).

For the flora of Economic use, 14 useful plants were reported, among them, the *chontaduro* (*B. gasipaes*), from which the fruit is commercialized, and the *iraca* (*Carludovica palmate* Ruiz & Pav.), from which the leaves are sold for the production of the Suaceño hat, the two species have a wild origin. On the other hand, the Spice category registered 12 plants with this use, of which only *ajo* (*Allium sativum* L.) is purchased from the markets. *Hierbabuena*

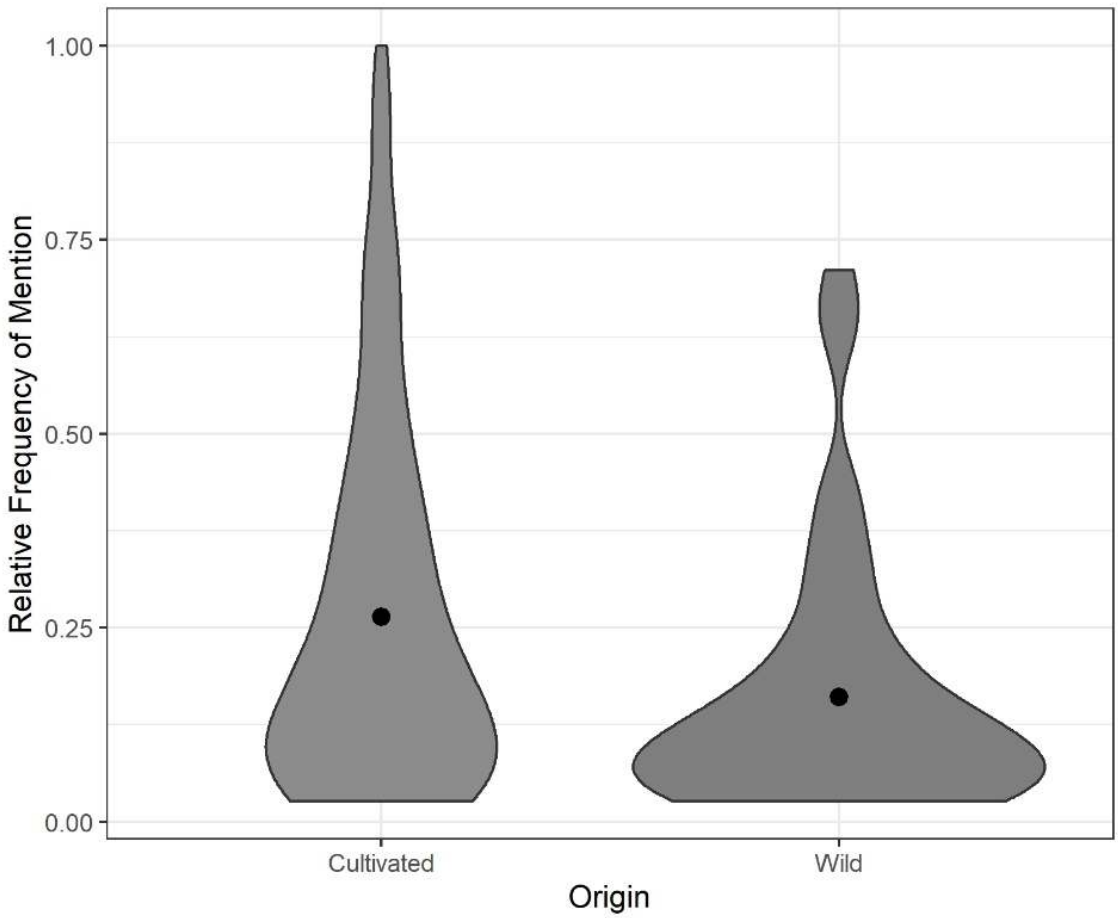

Figure 3. Relationship between the Cultural Significance (CS) of Cultivated versus Wild useful flora in the *vereda* Las Delicias community (Acevedo, Huila). The Y axis is the Relative Frequency of Mention and the X axis is the origin.

(*Mentha spicata* L.) can be found in the wild or be cultivated. Twelve plants were also reported for the Forage category, two wild: *pacunga* (*Bidens pilosa* L.) and *bore* (*Xanthosoma sagittifolium* (L.) Schott); the latter can also be found cultivated. Finally, 12 plants with other uses were reported, finding the *bijao* (*Stromanthe jacquinii* (Roem. & Schult.) H.A. Kenn. & Nicolson), from which the leaves are used to make tamales, the *escoba* (*Sida rhombifolia* L.) used for the manufacture of brooms, and the *salvajina* (*T. usneoides*) for the manufacture of Christmas decorations.

DISCUSSION

Managed spaces become natural reserves, cultural diversity conservation areas and the livelihood of rural families (Whitney et al. 2018). In turn, the variety of environments allows communities to obtain a greater number of goods and services, such as food, timber, firewood, in addition to contributing with species that provide pest control, regulation of temperature and soil moisture (Bukomeko et al. 2019). Regarding the reported managed spaces (coffee plantation, garden, orchard, forest, and market), we could observe coffee plantation species had a higher cultural significance than didplants from the gardens and forests. The cultural significance of this space may be explained by the diversity of wild and cultivated species within it, which collectively contribute to food sovereignty and rural ways of life (Altieri et al. 2012; Koohafkan and Altieri 2011). Furthermore, the sowing of various species and crop varieties stabilize long term output, promotes diversity, and optimizes economic resources (Altieri et al. 2012). The inclination or even preference to use managed spaces as the main source of resources has been previously documented from an ethnobiological point of view. Voeks (1996), for instance, described how people from the tropical rainforest in the state of Bahia, Brazil prefer managed (perturbed) areas because they are a significantly greater source of medicinal resources than are primary rainforest areas.

Table 1. Significance values between the useful flora and the managed environment for the community of *vereda* Las Delicias (Huila, Colombia).

Space	Median	Mann-Whitney
Forest Market	0.0263 0.2105	U = 0.0567 > 0.05
Garden Market	0.1316 0.2105	U = 0.0603 > 0.05
Garden Forest	0.1316 0.0263	U = 0.1028 > 0.05
Coffee plantation Orchard	0.1579 0.2895	U = 0.1224 > 0.05
Orchard Market	0.2895 0.2105	U = 0.7078 > 0.05
Coffee plantation Market	0.1579 0.2105	U = 0.7978 > 0.05
Coffee plantation Forest	0.1579 0.0263	U = 0.0206 < 0.05
Coffee plantation Garden	0.1579 0.1316	U = 0.0030 < 0.05
Orchard Garden	0.2895 0.1316	U = 0.0000 < 0.05
Orchard Forest	0.2895 0.0263	U = 0.0145 < 0.05

Table 2. Representation by growth habit of the flora used by the coffee-growing community Las Delicias (Huila, Colombia).

Habit	Total
Herbaceous	107
Tree	42
Shrub	39
Climbing herb	13
Sub-shrub	13
Bush rosette	8
Climbing shrub	5
Epiphyte	5
Palm	3
Succulent shrub	2
Hemiparasitic shrub	1

Despite there being a significant difference between managed areas (Coffee plantation and garden, coffee plantation and forest, orchard and garden, orchard and forest), these spaces are structured according to the species' access and availability, their precedence, growth habit, and cultural significance. The relevalnce of these spaces in creating opportunities for restoration and conservation, as well as improving the provision and regulation services of the agroecosystem (Leijster et al. 2021). Considering this, conservation strategies can be differentiated according to the structure and organization of the territory, for instance, a large portion of the flora used in coffee plantations and forests have a shrub or tree habit and are less readily available in orchards and gardens, because of which the use of woody species can be bolstered without affecting resource availability and meeting the agriculture's needs (Fernandes et al. 2014). Furthermore, cultural, ecological, social, and economic elements converge in areas such as orchards and gardens, generating an exclusive selection of species within (Trillo and Audisio 2018). Additionally, human-plant relationships are further reinforced with practices carried out in agro-forestal environments, since these are anthropogenic habitats relevant for the cultural services they provide to the local

population (Hart et al. 2017).

For the study area, different forms of management and use of natural resources are evident, among them, a use of wild and cultivated vegetation within the farms. In this way, the hypothesis that cultivated plants have a higher cultural significe (151 species) than do wild species was supported, since they provide the benefits of quick access and being an efficient, safe and low-cost alternative (Jaramillo et al. 2014; Rosero-Toro et al. 2018a), and they have a higher diversity and usage versatility (Hart et al. 2017). Additionally, cultivated plants have been recorded to be addressed mainly in terms of their value as food, as they provide fruits and vegetables but are also ornamental (Magwede et al. 2019), y medicinales, which promotes the use of sown species in the *vereda* Las Delicias community.

Likewise, although the number of wild plants was lower, it is known that the domestication process originated from ethnobotanical knowledge, and there has been a significant progression of locally useful wild plants towards cultivation (Angulo et al. 2012; Leakey 2019). Species such as *paico* (*Chenopodium ambrosioides* L.), *mejorana* (*Origanum majorana* L.), *poleo* (*Satureja brownie* (Sw.) Briq.) and *verbena* (*Verbena litoralis* Kunth) have already been previously described for their medicinal value and for initially growing in wild environments, but they are increasingly being incorporated in the managed environments (Angulo et al. 2012). This transition allows rural communities to conserve greater diversity within agroforestry systems, generate surpluses that can be traded or exchanged, and provide economic stability by allowing other sources of income (Acevedo-Osorio and Martínez-Collazos 2016; Cerquera and Orjuela 2015; Turbay et al. 2014). Furthermore, the preference of wild or cultivated species will dependo n the way in which local communities percieve the costs and benefits associated to the use of natural resources (Gama et al. 2018).

It was evident that coffee is the most important species by relating plants of cultural significance. Its cultivation at the national level has generated economic, social, and institutional development, and it has stabilized the country's economic growth (Cerquera and Orjuela 2015). In addition to this, the community has a cultural attachment to this crop that has been inherited for generations, throughout a constant struggle to defend their territory and their farming traditions. The importance of the coffee plant is manifested not only because of the resources it generates, but also because of the cultural richness that develops around it, converging with spaces in which families share and teach about agricultural spaces and methods. In addition to the above, it was evident that the plants with the highest frequency of mention correspond to those that grow in coffee plantations; a situation previously reported by Pascual-Mendoza et al. (2020) for a Zapotec community in the Northern Sierra of Oaxaca, Mexico. Furthermore, these authors indicated that production in coffee plantations is supplemented to satisfy the needs of their inhabitants.

We reconize that people recall relevant information for survival independently from their environment and culture, and that the ability to remember information is not exclusively linked to ancestral needs (Moura et al. 2020). Because of this, in order to understand the relationship between the cultural significance of useful flora with managed environments and origin, it is first necessary to know the social and cultural organization of each community. In this way, it was found that women fulfill very important roles by actively participating in the collection and caring of plants, as well as attention to cooking, while men are associated with soil preparation and maintenance of the crops, a situation that has been mentioned by several authors, including Krapovickas (2010), Pascual-Mendoza (2018) and Rodríguez (2013). Participation and gender equality in rural development processes generate positive impacts, among them, it significantly increases productivity results in the agricultural sector (Córdoba et al. 2019). Additionally, it creates a balance between the traditional forms of cultivation and the new techniques of agriculture, where practices of shade-grown coffee have been implemented, new varieties have been integrated, and strategies that guarantee a greater production have been adapted to manage the crop (Figure 4).

The most important ethnobotanical category by number of plants accounted for corresponds to Medicinal, which constitutes an efficient, safe and therapeutic alternative and is often the only accessible and economic source of treatments that rural communities have (Bussmann and Sharon 2016; Fonnegra et al. 2013). In addition, the main diseases or ailments reported are associated with stomach pains, headaches, respiratory problems, fever, and nerve disorders, which have been widely cited in other studies (Campos-Saldaña 2018; Gross et al. 2019). On the other hand, the cultural significance of the ornate category reflects its role of providing enjoyment for people, in some cases in configurations combining ornamental and medicinal species (Mendoza-García et al. 2011). However, research focused on these managed areas both in rural and urban communities are scarce (Salas 2010) and the existing efforts tend to be part of general ethnobotany studies (Goddard et al. 2009; León-Merino et al. 2017). This overlooks the relevance of such spaces for the conservation of endangered species, as is the case of *C. trianae*, an endemic orchid which is cultivated in Colombia. Fur-

Figure 4. Management of the coffee system based on the managed environments A) Orchard, B) Coffee plantation, C) Garden, and D) Forest within the managed areas of the coffee-growing community of the *vereda* Las Delicias (Huila, Colombia).

thermore, species that are not necessarily endangered but are in risk of becoming so unless their commerce is strictly controlled, such as *M. desvauxianus* and *O. ficus-indica*, are evident in these spaces.

Finally, although the Food category did not report the highest number of plants, it does correspond to one of the most important ones because it is the main axis of the farmer's culture in this study area. Useful plants for this category contribute to the family's support, and in turn may have other additional uses. For example, some of the plants reported are also used for construction, medicine, firewood, fodder, and shade in coffee plantations (e.g., Castillo et al. 2019; Paredes-Flores et al. 2007). In addition, they provide economic support, either by selling their surplus, exchanging with other families or by consuming them, which means they are not purchased in the markets. Ultimately, it is not only about the agricultural technique, nor the conservation of biodiversity, but also about human culture and the rationality of a way of living and deciding what to eat and how to eat it, thus guaranteeing food sovereignty and security (Moreno-Calles et al. 2016).

CONCLUSION

The exposed results contribute to the recognition of the ethnobotanical processes and the relations between the community and their territory. The cultural significance of species was proved to be related to the managed spaces they inhabit, with higher significance in coffee plantation spaces than in gardens and forests. Coffee plantations are spaces in which the most important economic and family activities are carried out within rural communities, thus becoming the stages for rural knowledge dialogues and knowledge transmission. In this way, rural traditions play a vital role in the preservation of coffee ecosystems, which guarantee family subsistence and a diversification of spaces in which vegetable resources can be managed and become sources of economic income, generating processes that simultaneously allow managmente and protection for the natural resources of the region.

On the other hand, cultivated species appear to have a higher cultural significance than the wild species reported in this study, which makes evident the relevance of deep management of plants and how this is reflected in the differentiated relevance that people assign them. However, this is not to underestimate the uses that people give wild plants, as that they are increasingly incorporated into harvesting systems, generating management and domestication processes and increasing resilience from agroecosystems, especially from shade-grown coffee systems. This opens the possibility for a diversified supply of vegetable resources originating in different managed spaces that, together, hold the economy and the social and cultural reproduction of coffee producers in regions similar to our study site. Likewise, these spaces are recognized as centers of conservation of

plant and cultural diversity, where more than 50 native species of cultural significance are housed, and there are records of more than 40 species categorized in some category of conservation.

On the other hand, the species of greatest cultural importance was coffee (*C. arabica*), due to the variety of its uses, as it is reported in the Medicinal, Food, Fuel and Economic categories. Likewise, the importance of coffee lies in the fact that it is part of the customary heritage of this community, allowing to strengthen in each generation the agricultural, environmental, and farming cooperation processes. Finally, although the farms are organized around this crop, the managed environments delimit the diversity of useful plants according to their use, access, and availability, with the aim of guaranteeing the subsistence of the households.

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DATA AVAILABILITY

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

CONTRIBUTION STATEMENT

JHRT wrote early drafts of the research design and the manuscript and did the fieldwork.
HCDG, FRS and DSF reviewed and improved the proposal and the manuscript.
All authors read and approved the final manuscript.

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Additional Files

Add File 1. Flora used by the coffee farming community vereda Las Delicias, Huila, Colombia.

Common name: Spanish (English if available!)	Scientific name	Ethnobotanical categories	Management space	Origin from an emic perspective	Origin from an etic perspective	Relative frequency of mention
Acelga (chard)	*Beta vulgaris 'cicla'* L. (Amaranthaceae)	Foo; Eco	Orch; Mar	Cultivated	Cultivated	395
Achira (purple arrowroot)	*Canna indica* L. * (Cannaceae)	Foo; Orn	Cof; Orch	Cultivated, wild	Native and cultivated	132
Achote	*Bixa orellana* L. (Bixaceae) (Lauraceae)	Spi	Cof; Gar	Cultivated	Native and cultivated	184
Aguacate (avocado)	*Persea americana* Mill. (Lauraceae)	Foo; Med	Cof;	Cultivated	Cultivated	289
Aguanoso	*Isertia laevis* (Triana) B.M. Boom (Rubiaceae)	Fue; Sha	Cof;	Wild	Native	79
Ají (pepper)	*Capsicum annuum* L.* *Capsicum frutescens* L.* (Solanaceae)	Spi; Med	Cof; Orch; Gar	Cultivated	Native and cultivated	158
Ajo (garlic)	*Allium sativum* L. (Amaryllidaceae)	Spi; Med	Mar	Cultivated	Cultivated	605
Albahaca (basil)	*Ocimum basilicum* L. (Lamiaceae)	Spi; Med	Orch	Cultivated	Cultivated	211
Algodón (cotton)	*Hasseltia* sp. (Salicaceae)	Med; Con	Cof; For	Wild	Native	26
Altamisa (peruvian ragweed)	*Ambrosia peruviana* Willd. * (Asteraceae)	Med	Cof; Gar	Cultivated, wild	Native	132
Alverja (pea)	*Pisum sativum* L. (Fabaceae)	Foo	Orch	Cultivated	Cultivated	342
Amaranto (bloodleaf)	*Iresine herbstii* Hook. (Amaranthaceae)	Med; Orn	Gar	Cultivated	Cultivated	132
Anamú (guinea henweed)	*Petiveria alliacea* L. (Petiveriaceae)	Med	Cof;	Wild	Native and cultivated	26
Ángel caído	*Begonia minor* Jacq. (Begoniaceae)	Orn	Gar	Cultivated	Cultivated	158
Apio (celery)	*Apium graveolens* L. (Apiaceae)	Foo; Med	Orch	Cultivated	Cultivated	263
Arañita (spider flower)	*Cleome spinosa* Jacq. * (Cleomaceae)	Orn	Gar	Cultivated	Native	26
Arazá	*Eugenia stipitata* McVaugh (Myrtaceae)	Food	Cof, Gar	Cultivated	Native and cultivated	26
Árbol de navidad (winter cherry; poisonous gooseberry)	*Solanum pseudocapsicum* L. (Solanaceae)	Orn	Gar	Cultivated	Native and cultivated	26
Arracacha	*Arracacia xanthorrhiza* Bancr (Apiaceae)	Foo; Med; Eco	Cof; Orch	Cultivated	Native and cultivated	368
Arroz (rice)	*Oryza sativa* L. (Poaceae)	Foo	Mar	Cultivated	Cultivated	368
Azucena (amaryllis; peruvian lilly)	*Hippeastrum* sp. Alstroemeria spp. (Alstroemeriaceae)	Orn	Gar	Cultivated	Native; Cultivated	368
Balso o Cadillo	*Heliocarpus americanus* L. (Malvaceae)	Fue; Const; Sha	Cof;	Wild	Native	158
Banano (banana)	*Musa* × *paradisiaca* L. (Musaceae)	Foo	Cof	Cultivated	Cultivated	368
Begonia (begonia, waxy begonia, gloxinia)	*Begonia* × *tuberhybrida* Voss *Begonia cucullata* Willd.(Begoniaceae) *Sinningia speciosa* (Lodd.) Hiern (Gesneriaceae)	Orn	Gar	Cultivated	Cultivated	237
Bejuco de sapo (princess vine)	*Cissus verticillata* (L.) Nicolson & C.E.Jarvis* (Vitaceae)	Med	Cof	Wild	Native	26
Besitos	*Impatiens hawkeri* W. Bull *Impatiens walleriana* Hook. f. (Balsaminaceae)	Orn	Cof; Gar	Cultivated; Wild	Cultivated and naturalized	263
Bijao	*Stromanthe jacquinii* (Roem. & Schult.) H. Kenn. & Nicolson* (Marantaceae)	Oth	Cof	Wild	Native	132

Bilibil (muskwood)	*Guarea guidonia* (L.) Sleumer * (Meliaceae)	Const; Sha	Cof	Wild	Native	53
Bore (arrowleaf elephant ear)	*Xanthosoma sagittifolium* (L.) Schott (Araceae)	Foo, Fod	Cof	Cultivated; Wild	Native and cultivated	658
Borrachero (angel's trumpet)	*Brugmansia suaveolens* (Humb. & Bonpl. ex Willd.) Bercht. & J.Presl (Solanaceae)	Med; Orn	Gar	Cultivated	Native	184
Botoncito (Bush clockvine)	*Thunbergia erecta* (Benth.) T. Anderson (Acanthaceae)	Orn	Gar	Cultivated	Cultivated	53
Cabuya	*Furcraea cabuya* Trel. (Asparagaceae)	Med; Oth	Gar	Cultivated	Native and cultivated	53
Cacao (cocoa)	*Theobroma cacao* L. (Malvaceae)	Foo, Sha	Cof	Cultivated	Native and cultivated	26
Cachingo (purple coral tree; coral bean)	*Erythrina fusca* Lour. * (Fabaceae)	Med; Const	Cof	Wild	Native	211
Cactus	*Opuntia cochenillifera* (L.) Mill. *Schlumbergera truncata* (Haw.) Moran (Cactaceae)	Orn	Gar	Cultivated	Native	105
Café (coffee)	Coffea arabica L. (Rubiaceae)	Foo; Med; Fue; Eco	Cof	Cultivated	Cultivated	1000
Caimo	*Pouteria caimito* (Ruiz & Pav.) Radlk. (Sapotaceae)	Foo; Fue; Sha	Cof	Cultivated	Native and cultivated	474
Caléndula (pot marigold)	*Calendula officinalis* L. (Asteraceae)	Med; Orn	Gar	Cultivated	Cultivated	237
Caleña (Jamaican forget-me-not)	*Browallia americana* L.* (Solanaceae)	Med; Orn	Cof	Wild	Native	53
Camarón (brazilian red cloak; golden shrimp plant)	*Megaskepasma erythrochlamys* Lindau *Pachystachys lutea* Nees (Acanthaceae)	Orn	Gar	Cultivated	Cultivated	184
Campana (morning glory)	*Ipomoea indica* (Burm.) Merr. (Convolvulaceae)	Orn	Gar	Wild	Native and cultivated	53
Campana de oro (golden trumpet)	*Allamanda cathartica* L. (Apocynaceae)	Orn	Gar	Cultivated	Native and cultivated	132
Campanita (balsam)	*Impatiens balsamina* L. (Balsaminaceae)	Orn	Gar	Cultivated	Cultivated	53
Caña (sugarcane)	*Saccharum officinarum* L. (Poaceae)	Foo; Med; Fue; Fod; Eco	Cof	Cultivated	Cultivated	526
Caña agria	*Costus guanaiensis* Rusby* (Costaceae)	Med	Cof;	Wild	Native	158
Capuchina (garden nasturtium)	*Tropaeolum majus* L. (Tropaeolaceae)	Orn	Gar	Cultivated	Cultivated and naturalized	26
Carbón (charcoal)	*Zygia longifolia* (Humb. & Bonpl. ex Willd.) Britton & Rose* (Fabaceae)	Fue; Const	Cof	Wild	Native	26
Carbonero (powderpuff tree)	*Calliandra haematocephala* Hassk. (Fabaceae)	Orn	Gar	Cultivated	Cultivated	132
Cardo (carrion flower)	*Orbea variegata* (L.) Haw (Apocynaceae)	Orn	Gar	Cultivated	Cultivated	26
Cartucho (laceleaf, arum-lilly)	*Anthurium* sp. *Zantedeschia aethiopica* (L.) Spreng. (Araceae)	Orn	Gar	Cultivated	Native; naturalized	158
Cebolla (onion)	*Allium cepa* L. *Allium fistulosum* L. (Amaryllidaceae)	Spi; Med; Eco	Orch	Cultivated	Cultivated	895
Cedrillo	*Ruagea glabra* Triana & Planch. * (Meliaceae)	Const; Sha	Cof	Wild	Native	79
Cedro (spanish cedar)	*Cedrela odorata* L.*** (Meliaceae)	Med; Const; Sha	Cof	Cultivated, wild	Native	316
Chaporuto o chachafruto (basul)	*Erythrina edulis* Triana ex Micheli* (Fabaceae)	Foo	Cof	Cultivated	Native and cultivated	79
Chirimoya (wild sugar-apple)	*Annona mucosa* Jacq (Annonaceae)	Foo	Cof	Cultivated	Native	79
Chontaduro (peach palm)	*Bactris gasipaes* Kunth** (Arecaceae)	Foo; Eco	Cof	Wild	Native and Wild	342
Cidra (citron)	*Sechium edule* (Jacq.) Sw (Cucurbitaceae)	Foo; Med; Fod	Cof, Orch	Cultivated	Cultivated	316
Cidrón (lemon verbena)	*Aloysia citrodora* Palau (Verbenaceae)	Med	Cof; Orch	Cultivated; wild	Cultivated	263
Cilantro	*Coriandrum sativum* L. (Apiaceae)	Spi; Eco	Orch	Cultivated	Cultivated	737
Cilantro cimarrón (culantro)	*Eryngium foetidum* L.* (Apiaceae)	Spi	Orch	Cultivated	Native and cultivated	132

Cinta (spider plant)	*Chlorophytum comosum* (Thunb.) Jacques (Asparagaceae)	Orn	Gar	Cultivated	Cultivated	79
Clavelina (Carnation)	*Dianthus caryophyllus* L. *Dianthus chinensis* L. (Caryophyllaceae)	Orn	Gar	Cultivated	Cultivated	263
Coca	*Erythroxylum coca* Lam. (Erythroxylaceae)	Med	Gar	Cultivated	Native and cultivated	53
Corazón herido (heart of Jesus)	*Caladium bicolor* Vent. (Araceae)	Orn	Cof	Wild	Native and cultivated	79
Cordoncillo (spiked pepper)	*Piper aduncum* L.* (Piperaceae)	Med	Cof	Wild	Native	105
Corona de cristo (Crown of thorns)	*Euphorbia* x *lomi* Rauh (Euphorbiaceae)	Orn	Gar	Cultivated	Cultivated	26
Cortejo (cape periwinkle)	*Catharanthus roseus* (L.) G. Don (Apocynaceae)	Orn	Gar	Cultivated	Cultivated	184
Cresta de gallo (plumed cockscomb)	*Celosia argentea* L. (Amaranthaceae)	Orn	Gar	Cultivated	Cultivated	53
Crisantemo (chrysanthemum)	*Chrysanthemum* spp. (Asteraceae)	Orn	Gar	Cultivated	Cultivated	105
Croto (garden croton)	*Codiaeum variegatum* (L.) Rumph. ex A. Juss. (Euphorbiaceae)	Orn	Gar	Cultivated	Cultivated	211
Curuba	*Passiflora tripartita* (Juss.) Poir. * (Passifloraceae)	Foo	Mar	Cultivated	Native and cultivated	79
Dalia (Dahlia)	*Dahlia pinnata* Cav. (Asteraceae)	Orn	Gar	Cultivated	Native	526
Descansé	*Alternanthera lanceolata* (Benth.) Schinz (Amaranthaceae)	Med	Orch	Cultivated	Native	132
Duranta (Golden dewdrop)	*Duranta repens* L.* (Verbenaceae)	Orn	Gar	Cultivated	Native	26
Escoba (arrowleaf sida)	*Sida rhombifolia* L.* (Malvaceae)	Oth	Cof	Wild	Native	132
Espinaca (spinach)	*Spinacia oleracea* L. (Amaranthaceae)	Foo	Orch	Cultivated	Cultivated	158
Eucalipto (eucalyptus)	*Eucalyptus* sp. (Myrtaceae)	Med; Fue; Con	Cof	Cultivated	Cultivated	684
Frambuesa (raspberry)	*Rubus rosifolius* Sm. (Rosaceae)	Foo	Orch	Cultivated	Naturalized and adventitious	26
Francesina	*Brunfelsia grandiflora* D. Don. (Solanaceae)	Orn	Gar	Cultivated	Native and cultivated	263
Fríjol (bean)	*Phaseolus vulgaris* L. (Fabaceae)	Foo	Cof; Orch	Cultivated	Cultivated	684
Fucsia (fuchsia)	*Fuchsia* sp. (Onagraceae)	Orn	Gar	Cultivated	Native	105
Geranio (geranium)	*Pelargonium* x *hortorum* L.H. Bailey (Geraniaceae)	Med; Orn	Gar	Cultivated	Cultivated	342
Girasol (sunflower)	*Helianthus annuus* L. (Asteraceae)	Orn; Fod	Gar	Cultivated	Cultivated	211
Gólgota (hibiscus)	*Abutilon hybridum* Hort. ex Voss *Hibiscus rosa-sinensis* L. (Malvaceae)	Med; Orn	Gar	Cultivated	Cultivated	421
Granadilla (sweet granadilla)	*Passiflora ligularis* Juss. (Passifloraceae)	Foo	Cof; Orch	Cultivated	Native and cultivated	184
Guacamayo	*Croton magdalenensis* Müll. Arg.* (Euphorbiaceae)	Fue; Con; Sha	Cof	Wild	Native	211
Guadua (guadua bamboo)	*Guadua angustifolia* Kunth* (Poaceae)	Med; Fue; Con; Eco	Cof;	Cultivated	Native	737
Guamo (ice cream vean)	*Inga densiflora* Benth.* *Inga edulis* Mart.* (Fabaceae)	Foo; Fue; Sha	Cof	Cultivated	Native and cultivated	789
Guanábana (soursop)	*Annona muricata* L. (Annonaceae)	Foo; Med; Eco	Cof	Cultivated	Native	447
Guasco	*Guatteria alta* R.E. Fr. (Annonaceae)	Fue; Con	Cof	Wild	Native (endemic)	79
Guayabo (guava)	*Psidium guajava* L. (Myrtaceae)	Med; Fue; Sha	Cof	Cultivated	Cultivated	711
Guineo (banana)	*Musa acuminata* Colla (Musaceae)	Foo; Med	Cof	Cultivated	Cultivated	105
Gusano (chenille plant)	*Acalypha hispida* Burm. f. (Euphorbiaceae)	Orn	Gar	Cultivated	Cultivated	26
Habichuela (common vean)	*Phaseolus vulgaris* 'vulgaris' L. (Fabaceae)	Foo	Orch	Cultivated	Cultivated	447
Helecho (sword fern)	*Nephrolepis exaltata* (L.) Schott (Nephrolepidaceae)	Orn	Gar	Cultivated	Native	26

Helecho peludo (yarrow)	*Achillea millefolium* L. (Asteraceae)	Orn	Gar	Wild	Cultivated	53
Higuerillo (castor vean)	*Ricinus communis* L. (Euphorbiaceae)	Fue; Oth	Cof	Cultivated	Cultivated and naturalized	105
Higuillo (mountain papaya)	*Vasconcellea pubescens* A. DC. (Caricaceae)	Foo	Cof	Wild	Native and cultivated	26
Hinojo (fennel)	*Foeniculum vulgare* Mill. (Apiaceae)	Med	Orch; Gar	Cultivated	Cultivated	79
Hoja santa (cathedral bell plant)	*Kalanchoe pinnata* (Lam.) Pers. (Crassulaceae)	Med; Orn	Gar	Cultivated	Naturalized and adventitious	79
Hortensia (mopead hydrangea)	*Hydrangea macrophylla* (Thunb.) Ser. (Hydrangeaceae)	Orn	Gar	Cultivated	Cultivated	184
Huevo de perro	*Thevetia ahouai* (L.) A. DC. (Apocynaceae)	Orn	Gar	Cultivated	Native	53
Iraca (Panama hat palm)	*Carludovica palmata* Ruiz & Pav.* (Cyclanthaceae)	Eco; Oth	Cof	Wild	Native	79
Lechero (tropical smoke bush)	*Euphorbia cotinifolia* L.* (Euphorbiaceae)	Med; Orn	Cof	Cultivated; wild	Native	79
Lechuga (lettuce)	*Lactuca sativa* L. (Asteraceae)	Foo; Med	Orch	Cultivated	Cultivated	368
Lechuga ornamental (lettuce)	*Lactuca* sp. (Asteraceae)	Orn	Gar	Cultivated	Cultivated	26
Limón (key lime)	*Citrus* x *aurantifolia* (Christm.) Swingle (Rutaceae)	Foo; Med	Cof	Cultivated	Cultivated	789
Limoncillo (lemongrass)	*Cymbopogon citratus* (DC.) Stapf (Poaceae)	Med	Orch	Cultivated	Cultivated	316
Llantén (broadleaf plantain)	*Plantago major* L. (Plantaginaceae)	Med	Orch	Wild	Naturalized	79
Lulo	*Solanum quitoense* Lam. (Solanaceae)	Foo	Cof	Cultivated	Native and cultivated	158
Maíz (maize)	*Zea mays* L.* (Poaceae)	Foo; Fod	Cof	Cultivated	Native and cultivated	605
Mandarina (tangerine)	*Citrus reticulata* Blanco (Rutaceae)	Food; Med	Cof	Cultivated	Cultivated	526
Mango (mango)	*Mangifera indica* L. (Anacardiaceae)	Foo; Med; Sha	Cof	Cultivated	Cultivated	658
Maní (peanut)	*Arachis hypogaea* L. (Fabaceae)	Foo	Mar	Cultivated	Cultivated	53
Manzana (apple)	*Malus pumila* Mill. (Rosaceae)	Foo	Mar	Cultivated	Cultivated	211
Manzanilla (chamomile)	*Matricaria recutita* L. (Asteraceae)	Med	Orch; Gar	Cultivated	Adventitious	237
Maracuyá (passion fruit)	*Passiflora edulis* Sims (Passifloraceae)	Foo; Med	Orch	Cultivated	Native and cultivated	421
Margarita (marguerite Daisy, oxeye daisy)	*Argyranthemum frutescens* (L.) Sch. Bip. *Leucanthemum vulgare* Lam. (Asteraceae)	Orn	Gar	Cultivated	Cultivated	105
Mariguano (west Indian sumac)	*Brunellia comocladifolia* Bonpl. (Brunelliaceae)	Sha	Cof; For	Wild	Native	26
Mayo (Christmas orchid)	*Cattleya trianae* Linden & Rchb. f.*** (Orchidaceae)	Orn	Cof; Gar	Cultivated	Native and cultivated (endemic)	237
Mejorana (majoram)	*Origanum majorana* L. (Lamiaceae)	Med	Cof; Orch	Cultivated	Cultivated	105
Mora (andean raspberry)	*Rubus glaucus* Benth. (Rosaceae)	Foo	Mar	Cultivated	Native and cultivated	211
Mora silvestre (wild berry)	*Rubus urticifolius* Poir. (Rosaceae)	Foo; Med	Cof	Wild	Native	105
Nacedero	*Trichanthera gigantea* (Bonpl.) Nees* (Acanthaceae)	Fue; Con; Sha	Cof	Cultivated	Native	79
Naranja (bitter orange, sweet orange and pummelo)	*Citrus* × *sinensis* (L.) Osbeck *Citrus* × *aurantium* L. *Citrus grandis* (L.) Osbeck (Rutaceae)	Foo; Fue; Eco; Med; Sha; Oth	Cof	Cultivated	Cultivated	921
Navideña (poinsettia)	*Euphorbia pulcherrima* Willd. ex Klotzsch (Euphorbiaceae)	Orn	Gar	Cultivated	Cultivated	132
Nogal (salmwood)	*Cordia alliodora* (Ruiz & Pav.) Oken (Cordiaceae)	Med; Con; Sha	Cof	Wild	Native	421
Orégano (oregano)	*Origanum vulgare* L. (Lamiaceae)	Spi; Med	Orch	Cultivated	Cultivated	526
Orquideas (orchids)	*Epidendrum catillus* Rchb. f. & Warsz. *Mapinguari desvauxianus* (Rchb. f.) Carnevali & R.B. Singer *Oncidium* sp. (Orchidaceae)	Orn	Cof, Gar, For	Wild	Native (Endemic); Native and cultivated; native	79
Pacunga (black-jack)	*Bidens pilosa* L.* (Asteraceae)	Med; Fod	Cof	Wild	Adventitious	211

Paico	*Chenopodium ambrosioides* L.* (Amaranthaceae)	Med	Caf; Hue	Sembrada	Naturalizada	421
Pajarito; Muerdago	*Oryctanthus* aff. spicatus (Jacq.) Eichler (Loranthaceae)	Med	Caf;	Silvestre	Nativa	79
Palma areca (yellow palm)	*Dypsis lutescens* (H. Wendl.) Beentje & J. Dransf. (Arecaceae)	Orn	Gar	Cultivated	Cultivated	53
Palma maicera (cornstalk dracaena, corn plant)	*Dracaena fragrans* (L.) Ker Gawl. (Asparagaceae)	Orn	Gar	Cultivated	Cultivated	26
Palma morada (palm lilly)	*Cordyline rubra* Otto & A. Dietr. (Asparagaceae)	Orn	Cof; Gar	Cultivated	Cultivated	158
Palma roja (Ti plant)	*Cordyline fruticosa* (L.) A. Chev. (Asparagaceae)	Orn	Cof; Gar	Cultivated	Cultivated	132
Papa (potato)	*Solanum tuberosum* L. *Solanum phureja* Juz. & Bukasov (Solanaceae)	Foo; Fod; Med	Orch; Mar	Cultivated	Cultivated	737
Papayo (papaya)	*Carica papaya* L.* (Caricaceae)	Foo	Cof	Cultivated	Native and cultivated	421
Paramo (asparagus fern)	*Asparagus densiflorus* (Kunth) Jessop (Asparagaceae)	Orn	Gar	Cultivated	Cultivated	53
Pasto (grass, guinea grass)	*Cenchrus* sp. *Panicum maximum* Jacq.* (Poaceae)	Fod	Cof	Cultivated	Naturalized and adventitious	237
Pepino (cucumber)	*Cucumis sativus* L. (Cucurbitaceae)	Foo	Mar	Cultivated	Cultivated	105
Perejil (parsley)	*Petroselinum crispum* (Mill.) Fuss (Apiaceae)	Spi; Med	Orch	Cultivated	Cultivated	79
Piel de sapo	*Justicia* sp. (Acanthaceae)	Orn	Gar	Cultivated	Native	26
Pino (White cedar)	*Cupressus lusitanica* Mill. (Cupressaceae)	Fue; Con; Med; Orn	Gar	Cultivated	Cultivated	500
Piña (pinapple)	*Ananas comosus* (L.) Merr. (Bromeliaceae)	Foo; Med; Oth	Cof	Cultivated	Cultivated	421
Plátano (banana)	*Musa balbisiana* Colla (Musaceae)	Foo; Fod; Eco; Med; Oth	Cof	Cultivated	Cultivated	947
Poleo	*Satureja brownei* (Sw.) Briq. * (Lamiaceae)	Spi; Med	Cof	Cultivated	Native	105
Pronto alivio (bushy matgrass)	*Lippia alba* (Mill.) N.E. Br. ex Britton & P. Wilson* (Verbenaceae)	Med	Cof; Orch	Wild	Native	342
Remolacha (beet)	*Beta vulgaris* L. (Amaranthaceae)	Foo	Mar	Cultivated	Cultivated	53
Repollo (cabbage)	*Brassica oleracea 'capitata'* L. (Brassicaceae)	Foo; Fod; Eco	Orch; Mar	Cultivated	Cultivated	368
Resucitado (wax mallow)	*Malvaviscus arboreus* Cav. (Malvaceae)	Med	Gar	Cultivated	Cultivated	26
Riñón	*Ruellia blechum* L.* *Justicia secunda* Vahl (Acanthaceae)	Med	Orch; Gar	Cultivated	Native	53
Roble (oak)	*Quercus humboldtii* Bonpl.** (Fagaceae)	Con	For	Wild	Native and cultivated	632
Romero (rosemary)	*Rosmarinus officinalis* L. (Lamiaceae)	Med	Gar	Cultivated	Cultivated	474
Roso (rose)	*Rosa* × *alba* L. *Rosa* × *damascena* Mill. Rosa sp. (Rosaceae)	Med; Orn	Gar	Cultivated	Cultivated	553
Rúchica	*Monnina fastigiata* (Bonpl.) DC. (Polygalaceae)	Med	For; Mar	Wild	Native (Endemic)	26
Ruda (common rue)	*Ruta graveolens* L. (Rutaceae)	Med	Cof; Orch	Cultivated	Cultivated	263
Sábila (aloe)	*Aloe maculata* All. *Aloe vera* (L.) Burm. f. *Aloe* sp. (Asphodelaceae)	Med	Orch; Gar	Cultivated	Cultivated	553
Salvajina (Spanish moss)	*Tillandsia usneoides* (L.) L.* (Bromeliaceae)	Oth	Cof	Wild	Native	26
Sauco (black elder)	*Sambucus nigra* L.* (Adoxaceae)	Med	Gar	Cultivated	Cultivated	263
Siete cueros (silver leafhead princess flower)	*Tibouchina heteromalla* (D. Don) Cogn. *Tibouchina urvilleana* (DC.) Cogn. (Melastomataceae)	Orn	Gar	Cultivated	Cultivated	105
Sorgo (sorghum, great Millet)	*Sorghum bicolor* (L.) Moench (Poaceae)	Fod	Cof; Orch	Cultivated	Naturalized and adventitious	53
Té (calico plant)	*Alternanthera bettzickiana* (Regel) G. Nicholson (Amaranthaceae)	Orn	Gar	Cultivated	Cultivated	132

Tomate (tomato)	*Solanum lycopersicum* L. (Solanaceae)	Foo; Med	Cof	Cultivated	Cultivated	474
Tomate Cherry (cherry tomato)	*Solanum lycopersicum 'cerasiforme'* D.M. Spooner, G.J. Anderson & R.K. Jansen (Solanaceae)	Foo	Orch; Gar	Cultivated	Cultivated	289
Tomate de árbol (tree tomato)	*Solanum betaceum* Cav. (Solanaceae)	Foo; Med	Cof; Orch	Cultivated	Cultivated	316
Tomillo (thyme)	*Thymus vulgaris* L. (Lamiaceae)	Spi; Med	Gar	Cultivated	Cultivated	368
Toronjil (melissa)	*Melissa* sp. (Lamiaceae)	Med	Cof	Cultivated	Cultivated	184
Totumo (calabash tree)	*Crescentia cujete* L.* (Bignoniaceae)	Oth	Orch; Gar	Cultivated	Native and cultivated	26
Tuna (barbary fig)	*Opuntia ficus-indica* (L.) Mill. (Cactaceae)	Foo; Orn	Gar	Cultivated	Cultivated	26
Uva (grape)	*Vitis vinifera* L. (Vitaceae)	Foo	Mar	Cultivated	Cultivated	158
Valeriana	*Scutellaria agrestis* A. St.-Hil. ex Benth. (Lamiaceae)	Med	Cof	Cultivated	Cultivated	79
Venturosa (common lantana)	*Lantana camara* L.* (Verbenaceae)	Med	Cof	Wild	Native	26
Veranera (bouganvillea; chinese hat plant)	*Bougainvillea glabra* Choisy (Nyctaginaceae) Holmskioldia sanguinea Retz. (Lamiaceae)	Orn	Gar	Cultivated	Cultivated	342
Verbena (seashore vervain)	*Verbena litoralis* Kunth.* (Verbenaceae)	Med	Cof	Wild	Native	211
Verdolaga (common purslane)	*Portulaca oleracea* L. (Portulacaceae)	Med; Orn	Gar	Cultivated	Naturalized	263
Vidrio (moss-rose purslane)	*Portulaca grandiflora* Hook. (Portulacaceae)	Orn	Gar	Cultivated	CUltivated	26
Vispero (loquat)	*Eriobotrya japonica* (Thunb.) Lindl. (Rosaceae)	Fue; Oth	Cof	Cultivated	Cultivated	79
Viuda (violet petunia; petunia)	*Petunia violacea* Lindl. *Petunia* × *hybrida* Hort. ex E. Vilm. (Solanaceae)	Orn	Gar	Cultivated	Cultivated	184
Votatumbo	*Aegiphila truncata* Moldenke (Lamiaceae)	Fue; Con; Sha	Cof	Wild	Native (endemic)	53
Yarumo (trumpet tree)	*Cecropia peltata* L.* (Urticaceae)	Med; Fue	Cof	Wild	Native	158
Yedra (geranium)	*Pelargonium* × *peltatum* (L.) L'Hér. ex Aiton (Geraniaceae)	Orn	Gar	Cultivated	Cultivated	184
Yerba de chivo (billygoat weed; chickweed)	*Ageratum conyzoides* L.* (Asteraceae)	Med	Cof	Wild	Native	132
Yerbabuena (spearmint)	*Mentha spicata* L. (Lamiaceae)	Spi; Med	Cof	Cultivated	Cultivated	711
Yerbagolpe	*Pseudelephantopus spiralis* (Less.) Cronquist (Asteraceae)	Med	Cof; Orch	Wild	Native	132
Yerbamora (american nightshade)	*Solanum americanum* Mill.* (Solanaceae)	Med	Cof	Wild	Native	105
Yuca (cassava)	*Manihot esculenta* Crantz (Euphorbiaceae)	Foo; Fod; Eco; Oth	Cof	Cultivated	Native	895
Yuca ornamental (coral plant)	*Jatropha multifida* L. (Euphorbiaceae)	Orn	Gar	Cultivated	Native	26
Zanahoria (carrot)	*Daucus carota* L. (Apiaceae)	Foo; Med	Mar	Cultivated	Cultivated	632
Zapallo (squash)	*Cucurbita maxima* Duchesne (Cucurbitaceae)	Foo	Cof; Orch	Cultivated	Cultivated	342
Zapatico (peruvian zinnia)	*Zinnia peruviana* (L.) L. (Asteraceae)	Orn	Gar	Cultivated	Native and cultivated	105
Zarzaparrilla (prickly ivy)	*Smilax* sp. (Smilacaceae)	Med	For	Wild	Native	26
S/N	*Abutilon megapotamicum* (A. Spreng.) A. St.-Hil. & Naudin (Malvaceae)	Orn	Gar	Cultivated	Cultivated	-
S/N	*Artemisia hololeuca* M. Bieb. Ex Besser (Asteraceae)	Med; Orn	Gar	Cultivated	Cultivated	-
S/N	*Aster* sp. (Asteraceae)	Orn	Gar	Cultivated	Cultivated	-
S/N	*Centropogon cornutus* (L.) Druce (Campanulaceae)	Orn	Gar	Cultivated; Wild	Native	-

S/N	*Dussia atropurpurea* N. Zamora, R.T. Penn. & C.H. Stirt. (Fabaceae)	Sha	Cof	Wild	Native	-
S/N	*Emilia sonchifolia* (L.) DC. (Asteraceae)	Fod	Cof	Wild	Adventitious	-
S/N	*Gardenia jasminoides* J. Ellis (Rubiaceae)	Orn	Gar	Cultivated	Cultivated	-
S/N	*Gazania* sp. (Asteraceae)	Orn	Gar	Cultivated	Cultivated	-
S/N	*Gomphrena globosa* L. (Amaranthaceae)	Orn	Gar	Cultivated	Cultivated	-
S/N	*Justicia* sp. (Acanthaceae)	Orn	Gar	Cultivated	Native	-
S/N	*Kalanchoe blossfeldiana* Poelln. (Crassulaceae)	Orn	Gar	Cultivated	Cultivated	-
S/N	*Salvia rubescens* Kunth** (Lamiaceae)	Med	Gar	Cultivated	Native	-
S/N	*Sonchus* sp. (Asteraceae)	Med	Cof; Orch	Wild	Adventitious	-
S/N	*Symphyotrichum* sp. (Asteraceae)	Orn	Gar	Cultivated	Cultivated	-
S/N	*Torenia fournieri* Linden ex E. Fourn. (Linderniaceae)	Orn	Gar	Cultivated	Cultivated	-

Ethnobotanical categories: Food (Foo); Spices (Spi); Medicinal (Med); Ornamental (Orn); Fuel (Fue); Fodder (Fod); Construction (Con); Economic (Eco); Shade (Sha); Other (Otr).
Management space: Coffee plantation (Cof); Forest (For); Garden (Gar); Orchard (Orch); Market (Mar).
Conservation status: *Minor concern, **Vulnerable, ***Endangered.
! **English if available:** All common names in English refer to the vernacular ways to call the scientific species or genera that are cited.