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The importance of *botellas* and other plant mixtures in Dominican traditional medicine

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Abstract

Ethnopharmacological relevance—Plant mixtures are understudied in ethnobotanical research

Aim of the study—To investigate the importance of plant mixtures (remedies consisting of at least two plants) in Dominican traditional medicine.

Materials and Methods—A Spanish language questionnaire was administered to 174 Dominicans living in New York City (NYC) and 145 Dominicans living in the Dominican Republic (DR), including lay persons (who self-medicate with plants) and specialists (traditional healers). Plants were identified through specimens purchased in NYC *botánica* shops and Latino grocery shops, and from voucher collections.

Results—The percentage of mixtures as compared to single plants in plant use reports varied between 32 to 41%, depending on the geographic location (NYC or DR) and participant status (lay person or specialist). Respiratory conditions, reproductive health and genitourinary conditions were the main categories for which Dominicans use plant mixtures. Lay persons reported significantly more mixtures prepared as teas, mainly used in NYC to treat respiratory conditions. Specialists mentioned significantly more *botellas* (bottled herbal mixtures), used most frequently in the DR to treat reproductive health and genitourinary conditions. Cluster analysis demonstrated that different plant species are used to treat respiratory conditions as compared to reproductive health and genitourinary conditions. Interview participants believed that combining plants in mixtures increases their potency and versatility as medicines.

Conclusions—The present study demonstrates the importance and complexity of plant mixtures in Dominican traditional medicine and the variation in its practices influenced by migration from the DR to NYC, shedding new light on the foundations of a particular ethnomedical system.

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This paper is dedicated to the memory of Daisy Castillo (†), respected colleague and former Director of the Botany Department of the *Jardín Botánico Nacional Dr. Rafael Ma. Moscoso*, Santo Domingo, Dominican Republic

Keywords

Ethnobotany; ethnomedicine; plant mixtures, herbal remedies; Dominican Republic; migrants; New York City; Caribbean; *botella*; cultural keystone practice

1. Introduction

Traditional medicine in the Dominican Republic is a reflection of the cultural history of the island and the diverse ethnic origin of its inhabitants (Bonnelly de Calventi et al., 1985). It represents a syncretic blending of Taino indigenous, African, and European traditions that includes elements of Catholicism, African tribal practices and indigenous heritage (Babington et al., 1999). It operates with concepts such as the hot-cold classification of illnesses and plant remedies, the humoral functioning of the body, the distinction between spiritual versus physical disease etiologies and the use of plants, psalms, saints, traditional healers and midwives for maintaining health and well-being, and curing illness. It is a holistic medicine that considers the patient in relation to a multitude of factors, including the patient's personal history, status within the community, and the natural, social and spiritual environment. Concepts such as balance, stability and steadiness are central to a person's health. Menstruating and pregnant women, young children and adolescents who are going through physical development are seen as weak (*débil*) and in danger of getting sick. A healthy body is one that is “balanced, clean and sweet” (*balanceado, limpio y dulce*). In order to restore a body that is out of balance or to frighten off evil (*espantar el mal*) there exist plants with hot, cold, sour, bitter, salty, sweet, sticky or slimy properties (Brendbekken, 1998).

The use of plants for health care is a cultural keystone practice in the Dominican Republic (DR). This is a traditional skill or practice that is vital to sustaining a culture and plays a key role in defining cultural identity (Brosi et al., 2007). Medicinal plants are used for self-medication by lay persons or for healing patients by specialist healers (called *curanderos* or *curiosos*) and continue to play an important role on the island today (Robineau 1986; Germosén-Robineau 1991; 1995; 1997; 2005; Polanco et al., 1998; Peguero et al., 2001; Peguero 2002) as well as abroad where the practice remains salient even after Dominicans migrate to the United States (Allen et al., 2000; Balick et al., 2000; Ososki et al., 2002; 2007; Reiff et al., 2003; Fugh-Berman et al., 2004; Vandebroek et al., 2007).

One popular Dominican herbal preparation is known as the *botella*, a bottled herbal mixture that consists of a combination of plant parts or exudates from different plant species, culinary spices and frequently also non-plant ingredients. Other types of traditional Dominican mixtures that combine plants in formulas and recipes of varying complexities have also been reported, including teas, *bebedizos* (medicinal brews or concoctions) and aromatic baths (*baños*) (Avila Suero, 1988; Brendbekken, 1998; Ososki, 2004).

The use of traditional plant mixtures, formulas or formulations has been described in detail for Cuba (Hernández Cano and Volpato, 2004), including the Haitian diaspora in Cuba (Volpato et al., 2009a; 2009b), and is mentioned in studies about herbal medicine use in Martinique and Trinidad (Longuefosse and Nossin, 1996; Clement et al., 2005) as well as in anthropological, ethnobotanical and popular literature about the DR, Puerto Rico or the Dominican community in New York City (Avila Suero, 1988; Brendbekken, 1998; Benedetti, 2001; Ososki, 2004; Ososki et al., 2002). However, no detailed information exists in the published literature about the prevalence of these mixtures versus single-plant remedies in the ethnomedicinal traditions of Caribbean cultures or their migrant communities.

Here, we compare the proportion of mixtures in plant use reports from lay persons and plant specialists in the DR with those from Dominicans who migrated to New York City (NYC). First, we analyze the prevalence of multi-plant formulations versus single-plant remedies in our data and describe the different types of plant mixtures that exist, with a special emphasis on *botellas*. Then we review the health conditions that are commonly treated with mixtures, and the plant species commonly found in those mixtures. Second, a cluster analysis, applied to a matrix of health conditions and their corresponding plant mixtures used as remedies, is conducted to investigate the ethnoclassification of health conditions. We also draw upon qualitative data from interviews with study participants to explain the beliefs associated with the use of plant mixtures in Dominican traditional medicine. The hypotheses tested in this paper are: (1) plant mixtures are reported more often by plant specialists (traditional healers) than plant generalists (lay persons who self-medicate with plants); (2) the prevalence of using mixtures versus single-plant herbal remedies depends on the type of health condition; and (3) related health conditions are treated with similar combinations of plants.

2. Material and methods

2.1. Survey participants

The present study is part of a larger survey of Dominican ethnomedicine that was conducted in NYC and the DR in 2005-2006 (NIH grant # R21 AT001889; PI Michael J. Balick). Institutional Review Board (IRB) approval for this study was granted by the City University of New York (IRB# 04-06-0599). Figure 1 presents a map of the study areas. Fieldwork in New York took place during the summer of 2005 in Washington Heights and the Bronx, neighborhoods where most Dominicans reside (figure 1A). Fieldwork in the DR was conducted from February to May 2006 in four provinces: (1) Distrito Nacional (Santo Domingo), (2) San Pedro de Macorís, (3) Santiago and (4) La Vega (figure 1B). The provinces chosen in the DR matched the provinces where most participants originated from in the NYC study. Participants were recruited through convenience and snowball sampling methods. Inclusion criteria were: (1) age 18 or older; (2) born in the DR; and (3) self-reported familiarity with or knowledge of at least a few medicinal plants. The study sought to interview lay persons (who use medicinal plants for self-care but who do not identify themselves as plant specialists, or are not identified as such by others) and plant specialists (people who are recognized for their extensive plant knowledge and who treat others with medicinal plants).

2.2. The questionnaire and interviewing

After obtaining prior informed consent, a questionnaire was administered in Spanish, with the researcher asking questions and recording the answers on a questionnaire form. Permission was sought from participants to tape record the interview as well. In total, 174 Dominican participants (165 lay persons, 9 specialists; 110 women, 64 men) were interviewed in NYC and 145 participants (128 lay persons, 17 specialists; 87 women, 58 men) in the DR. The questionnaire was multi-faceted and included both quantitative and qualitative elements. The main topic gauged participants' knowledge of plants to treat thirty common health conditions (Vandebroek et al., 2007). These conditions were mentioned one at a time and each participant was asked to name known medicinal plants, plant part(s) used, preparation, mode of administration, and the location where the herbal remedy was used (NYC, DR, or both).

2.3. Plant collection and identification

Common Spanish plant names mentioned by participants during interviews were linked with scientific plant names through the collection and identification of plant material. In NYC, fresh and dry plants (often consisting of plant parts only, or whole plant material sold in pieces) were purchased in local *botánica* stores and groceries that sell vegetables and fruits (*fruterías*) (reference collection numbers R-IV-01 to 102), and voucher collections were made of urban

weedy species (IV170-177; 443-504; 536-537). In the DR, vouchers (IV204– 442) were collected in the field together with local participants who knew the species by their common names. NYC reference and voucher collections are deposited in NYBG and DR voucher collections in the herbaria of Santo Domingo (JBSD) and NYBG. Plants were identified by the authors with the keys of the *Flora de la Española* (Liogier, 2000) and by comparison with herbarium specimens.

2.4. Data analysis

Interview data were entered into separate Microsoft Access databases for NYC and the DR and extracted for further analysis in Microsoft Excel. The unit of data analysis was a plant use report (also referred to as a use report). This is a description of a particular herbal remedy used to treat a given health condition by an interview participant. An herbal remedy can be composed of only one plant species or several plants combined together as a mixture that can also include non-plant ingredients. For the purpose of this paper, we define a mixture as any herbal remedy that consists of a minimum of two plant species.

Statistical analysis (z-test and Chi-square tests for proportions; Kruskal-Wallis ANOVA on Ranks followed by Dunn's Test for all pairwise multiple comparisons for average number of plants in mixtures) of plant use reports related to herbal mixtures was performed with Sigmastat (Jandel Scientific) and NTSYSpc (cluster analysis). The goal of cluster analysis is to group objects together based on their similarity with regard to the data collected. In the present study, data represented presence/absence data about plants used in mixtures to treat health conditions. Data were organized in an Excel spreadsheet that contained plant species as rows and individual health conditions as columns. Individual cells contained numerical values “1” (plant present) or “0” (plant absent). The excel spreadsheet was imported into NTSYSpc (version 2.10L) and a (dis)similarity matrix was produced using the Simple Matching coefficient that measures the degree of similarity/dissimilarity between the data for all pairs of health conditions. Next, a dendrogram (tree) demonstrating relationships between individual health conditions was generated with the UPGMA–SAHN (Unweighted Pair Group Method with Arithmetic mean–Sequential Agglomerative Hierarchical Nested) cluster analysis method. The degree of association is strong between health conditions that are connected with a short distance on the X-axis. A cluster analysis will always yield clusters, therefore it is necessary to demonstrate how well the analysis represents the original (dis)similarity matrix. To this end, the tree matrix is transformed into a matrix of ultrametric distances and the latter matrix is statistically compared with the original (dis)similarity matrix. The resulting correlation coefficient “r” between both matrices (the normalized Mantel statistic Z) can be used as a measure for the goodness of fit of the cluster analysis. The degree of fit can be interpreted subjectively as follows: $0.9 \leq r$: very good fit; $0.8 \leq r < 0.9$: good fit; $0.7 \leq r < 0.8$: poor fit; and $r < 0.7$: very poor fit.

3. Results

3.1. Prevalence of mixtures in plant use reports

In NYC, 32% of all plant use reports from lay persons (1,191 of 3,729) were mixtures composed of two or more plants. The proportion of mixtures in plant use reports from NYC specialists (37%; 140 of 375 use reports) was significantly higher ($z=2.072$; $P=0.038$). In the DR, specialists also reported significantly more mixtures than their lay peers (41% or 254 of 613 use reports versus 36% or 944 of 2610 use reports) ($z=2.351$; $P=0.019$). A transnational comparison of plant use reports reveals that lay persons in the DR mentioned significantly more mixtures than lay persons in NYC ($z=3.538$; $P=<0.001$), whereas a comparison between specialists in both study sites did not detect any significant difference. On average (± standard deviation), mixtures from specialists in the DR and NYC contained 4.9±5.3 and 3.8±2.1 plants,

respectively, which is significantly higher than the number of plants reported by lay persons in the DR (3.0±1.4) and NYC (2.8±1.2) (Q= 5.82 for NYC specialists versus NYC lay persons; whereas Q= 4.18 for DR specialists versus DR lay persons; both $p<0.05$). There does not exist a transnational difference between specialists (Q=1.22; ns) or lay persons (Q= 2.20; ns).

Figure 2 depicts the percentage of mixtures according to the number of plants they contain. More than 75% of all mixtures reported by lay persons in NYC and the DR contain only two or three different plant species. In comparison with NYC lay persons, the percentage of use reports about mixtures that contain four or five plants is considerably higher among specialists in NYC (32% versus 18%). DR specialists are the ones who most diversify their mixtures with plants species. In this participant group, twenty-four percent of all mixtures contained six or more plants. The maximum number of plant species per mixture recorded from specialists in the DR was 32 and from NYC specialists 13. Lay people in the DR and NYC reported a maximum of 10 and 11 species in mixtures, respectively. A Chi-square analysis reveals significant differences in the proportional distribution of the number of plant species reported in mixtures by the following groups: (1) lay persons versus specialists in NYC (Chi-square=60.6; $P<0.001$); (2) lay persons versus specialists in the DR (Chi-square=84.0; $P<0.001$); and (3) specialists in NYC versus specialists in the DR (Chi-square=14.7; $P<0.001$).

3.2. Which illnesses are commonly treated with plant mixtures?

Table 1A and 1B list health conditions according to the prevalence of mixtures in plant use reports (expressed as the percentage of the total number of plant use reports). Reproductive health conditions such as infertility, sexually transmitted diseases and labor, as well as respiratory infections such as flu and bronchitis were high ranking health conditions for all four sample groups (lay persons as well as specialists in NYC and the DR). On the other end of the spectrum are skin and musculoskeletal problems such as burns, wounds, trauma, sprains, boils and fungal infections that are usually treated with single plant remedies by all four groups. The proportion of mixtures is relatively low for diabetes, cholesterol, hypotension and hypertension in lay persons and specialists living in NYC and the DR.

Table 2 presents a matrix ranking of tables 1A and B and lists the top 15 health conditions treated with mixtures in the DR and NYC. Infertility obtains the highest cumulative ranking score (SUM) for all sample groups. Birth control receives the lowest scores in lay persons from both study sites. Impotence scores low in lay persons in both NYC and the DR, but ranks high in DR specialists. In general, table 2 demonstrates a trend towards a higher emphasis on mixtures for respiratory conditions in NYC versus more mixtures for reproductive health and genitourinary conditions in the DR, especially in reports from specialists.

3.3. Plant parts used

When considering individual plant species in a mixture, multiple plant parts are used for many species, depending on the health condition being treated, or according to the individual who uses that species. One example is the application of coconut (*Cocos nucifera* L.) oil to treat burns, whereas the milk is taken internally for asthma, kidney problems and common cold. The shell of the coconut and coconut water are taken internally for kidney problems and the root is used to treat infertility and sexually transmitted diseases. Another example is bitter orange (*Citrus aurantium* L.). The fruit mass of this species is applied for sinusitis for which the leaves are also drunk as a tea. The juice of the fruit is taken orally for diabetes and to regulate blood pressure; the leaves are boiled in a tea for a variety of conditions, including diabetes, stomachache, headache, labor pain, flu, common cold, and bronchitis; the leaves are also applied for skin boils. The observation that various plant parts can be used to treat the same health condition further adds to the complexity of plant mixtures. Due to the high number of plant species in some recipes and in order not to hinder participants during the process of

recalling those recipes, information on individual plant parts could not always be systematically recorded which did not allow for a quantitative analysis of data about plant parts.

3.4. Types of plant mixtures

3.4.1. Overview of plant mixtures in Dominican ethnomedicine—Table 3 lists the different types of mixtures reported by participants when they described the herbal remedies used for particular health conditions, including the terms that they used for each type of preparation. The table also provides an overview of the relative frequency of these mixtures in use reports. The names either refer to the end-product (tea, *botella*, syrup, juice, blended drink, medicinal brew or tisane) or the form in which the remedies are administered (as a drink, body wash, inhalation, bandage or gargle).

A popular method of preparing a mixture involves boiling plant ingredients together in water (i.e. a decoction), a practice commonly referred to as making a tea (figure 3). A use report was categorized under "*tomar*" (to drink) if no further details were mentioned during interviews. Often this referred to either a tea preparation, a juice or a syrup, which leads to some degree of overlap with other categories. A syrup consists of different leafy and bulbous vegetables or other plants that are sliced and mixed together with lemon/lime juice and/or honey. A juice is obtained by squeezing fresh vegetables or pressing fruits. A blended drink is made by processing plants in a blender. A bandage consists of plant parts that are usually heated and applied topically to the affected area; they are often combined with over-the-counter aromatic balms and/or oils. Certain plants are also rubbed directly onto the skin.

Lay persons reported significantly more tea preparations for mixtures than specialists ($z=3.42$ and 3.33; $p<0.001$ for NYC and the DR, respectively). On the other hand, use reports about mixtures from specialists in NYC and the DR contained a significantly higher proportion of *botellas* (bottled herbal mixtures) than those from lay persons ($z=6.93$ and 6.62; $P<0.001$ for NYC and the DR, respectively).

3.4.2. Description and beliefs about *botella*s according to study participants— The *botella*, translated literally as "bottle", is a traditional Dominican preparation typically stored in a plastic or glass bottle that combines different plant species and any or several of the following non-plant ingredients: honey, molasses, condensed milk, calcium, iron, red wine, animal oils, animal body parts, schnapps (*aguardiente*), malt and/or gin. Sometimes, albeit infrequently, the *botella* is called *pote* or *galón*. All these names refer to the receptacle in which the herbal mixture is stored and which has also become the popular name for the complex herbal preparation that it contains.

The *botella* is intimately linked with Dominican culture and its use is considered part of "being Dominican". This is especially true for one type of *botella*, the popular *botella mamajuana* known by every Dominican living on the island and abroad, as one participant explained:

> "Over there [in the Dominican Republic] there are a lot of people who know many varieties of plants that serve for different purposes [illnesses]. A lot of roots of plants also, I mean, we ourselves, Dominicans, prepare a *botella*, I do not know if you have heard about [it]? It is called *mamajuana*, [an herbal mixture that] consists of different roots that are combined with alcohol and [it] is taken as a little shot in the morning.

> This helps to cleanse the kidneys [and] different parts of the body"[1] (participant G-2005-006).

Mamajuana contains crude plant parts that need to soak in alcohol such as rum, wine and/or gin for a certain length of time before usage. The penis of a sea turtle (*miembro de carey*), or other sea creatures such as raw octopus (*pulpo*) may also be added to the mixture because it symbolizes sexual vigor (figure 4). According to participants, the male turtle stays on top of the female for more than 24 hours during mating. *Mamajuana* can be drunk merely as an alcoholic beverage, or for its presumed medicinal qualities that include libido enhancement, treatment of sexually transmitted diseases and kidney problems.

Botellas can vary considerably in composition and preparation and are used for a wide variety of ailments, including arthritis, asthma/chest congestion, back pain, cholesterol, common cold, cough, cysts in the female reproductive system, gonorrhea, hepatitis, infertility, impotence, kidney stones and other kidney problems, labor and puerperium, *padrejón* (a gastrointestinal complaint), syphilis, and vaginal infections. Based on our data, there exist at least four different subtypes of *botellas* that are used to treat different kinds of health conditions: (1) a mixture of crude woody plant parts steeped in alcohol (often referred to as *botella mamajuana*); (2) a decoction of several plants flavored with spices (sometimes interchangeably named *bebedizo*); (3) a mixture of several oils of animal and plant origin (sometimes also called *aceites*); (4) a juice mixture derived from adding honey to crude vegetables, fruits and leaves (sometimes referred to as *jarabe* or syrup).

Frequently, Dominicans describe the first two types of *botellas* as concoctions of roots, but they can also contain bark (and twigs, leaves or flowers in the case of decoctions) of different species as well as culinary spices and non-plant ingredients. The difference between these types of *botellas* is in their preparation: an alcohol tincture of crude plant parts (type 1) versus a concentrated herbal decoction, boiled in water for an extended period of time (type 2). Both are used to treat similar afflictions, namely reproductive health conditions and kidney problems. For respiratory conditions such as flu, common cold, asthma/chest congestion and bronchitis, a third and fourth type of *botella* exists: one that is exclusively based on oils of animal and vegetal origin (type 3) and one that contains raw vegetables, honey and sometimes also vegetal and animal oils (type 4). The illness-specificity of these *botellas* is explained by the following quote:

> "[For] asthma and chest congestion a *botella* of oils (from shark, snake) [is prepared].... For impotence [we use] a *botella* of roots[2]" (participant G-2005-60).

Whereas *botellas* based on oils and syrups of raw vegetables for respiratory conditions are generally well-known and often prepared by lay persons, participants repeatedly stated that tinctures and decoctions of roots belong to the domain of specialists who are referred to by lay persons as "someone who prepares *botellas*" or "someone who knows (*él que sabe*)":

> "I know a man who makes *botellas* to cure all kinds of illnesses that exist, that have existed and that will exist, and this person is not called a healer (*curandero*), no, we [Dominicans] call him the man who makes remedies with medicinal plants that are roots. A man who makes remedies for all illnesses and he is known like that. That is to say that is his [business] card that says that remedies are made for all the problems of the body with medicinal plants and roots[3]" (participant G-2005-003).

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[1]Allá [en la República Dominicana] hay mucha gente que conoce muchas variedades de plantas que sirven para diferentes propósitos. Eh, muchas raíces también de plantas, o sea, nosotros mismos los Dominicanos preparamos una botella que no sé si Usted lo ha escuchado? Que se llama mamajuana, que es de diferentes raíces que supuestamente las ligan con alcohol y se dan un traguito en la mañana así. Eso le ayuda a que le limpien los riñones [y] diferentes partes del cuerpo"(participant G-2005-006).
[2]"[Para el] asma y pecho apretado [se prepara] una botella de aceites [de] tiburón, [de] culebra... [Para la] impotencia [se usa una] botella de raíces" (participant G-2005-60).

> "My mother made me tea for flu, but not for other things. I had a pain and for this they took me to someone who knows and who prepares *botellas*[4]" (participant DR-G-2006-49).

> "The things of men... they never let it be that you know anything of what they are doing. And I never knew much about this, but it is believed that the healer prepared *botellas* to cleanse those organs... they added something to the *botella*... something for the men to cleanse them, to expel from them the infections of gonorrhea and all that. They cured them of those. Yes... but I don't remember what they put [in the*botella*][5]" (participant G-2005-005).

This last quote illustrates the popular Dominican belief in the ability of a *botella* to cleanse the body and expel illness. *Botellas* are believed to "force out the flu", be a "purgative that sends someone to the bathroom", "pull out the infection", "cleanse the kidneys, the system", and "expel phlegm from the body". As one participant explained, plants combined in a mixture are considered stronger than individual plants:

> "Each plant has its own healing power, in combination the healing power is stronger[6]" (participant C-2006-005).

The combination of different plants also provides more of a guarantee that one of the plants will be able to treat a particular illness:

> "Different plants [work] for the same thing [condition]. If one does not work, the other does[7]" (participant G-2009-01).

Depending on the plants that are added, a *botella* is also viewed as a panacea that can cure many illnesses. Two of the authors assisted in the preparation of a *botella* that is claimed to "cure 51 illnesses". This *botella* consisted of 29 plants. During the preparation, participant DR-G-2006-65 explained the therapeutic use of each individual plant. The final mixture served to treat a wide range of conditions, including allergy, anemia, bloating, blood circulation, cancer, cholesterol, flu, impotence, inflammation, kidney stones, prostate problems, and sexually transmitted diseases. Each plant that was added to the *botella* serves a particular purpose and is used to treat a specific disease, such as the use of maravelí (*Securidaca virgata* Sw.) for syphilis.

In summary, we encountered the following Dominican beliefs about combining plants in mixtures: (1) each individual species acts on a particular illness (hence statements such as "this *botella* can cure 51 illnesses"); (2) plants act jointly on the same illness (synergy); (3) the presence of several plants in the same remedy increases the likelihood that at least one of them is effective in curing a particular illness.

3.4.3. The use of *botellas* versus teas of plant mixtures for: (1) respiratory conditions; and (2) reproductive health and genitourinary conditions—To verify the common belief that *botellas* prepared for the treatment of reproductive health and genitourinary conditions are the domain of specialists, we calculated the percentage of

[3]"Yo conozco un señor que hace botellas para curar todos los tipos de enfermedades que hay, que ha habido y por haber, y esa persona no se llama curandero, sino, nosotros le llamamos el señor que hace remedios por medio de plantas medicinales por raíces. Un señor que hace remedios para todas las enfermedades y ya uno lo conoce así. Es decir es una tarjetita que dice que se hacen remedios para todos los problemas del cuerpo con plantas medicinales y raíces" (participant G-2005-003).
[4]"Yo tenia un dolor y por eso me llevaron a alguien que sabe y que prepara botellas" (participant DRG-2006-49).
[5]"Las cosas de los hombres... ellos nunca dejaban como que uno averiguará nada de lo que están haciendo. Y yo nunca supe mucho sobre eso, pero creen que sí el curandero preparaba botella para limpiar esos órganos.... le echaban a la botella... algo para los hombres para limpiarles, sacarles las infecciones de la gonorrea y todo eso. Lo curaban eso. Si... pero yo no me acuerdo que era lo que le ponían" (participant G-2005-005).
[6]"Cada planta tiene su propio poder curativo, en combinación el poder curativo es mas fuerte" (participant C-2006-005).
[7]Diversas plantas [trabajan] para la misma cosa. Si no trabaja la una, trabaja la otra" (participant G-2009-01).

botellas for respiratory versus reproductive health and genitourinary conditions in use reports from lay persons and specialists in NYC and the DR (figure 5).

Figure 5 shows that the ratio of using *botellas* for respiratory conditions (asthma/chest congestion, bronchitis, common cold, flu, cough and sinusitis) versus reproductive health and genitourinary conditions (infertility, kidney problems, labor/puerperium, menstrual problems, sexually transmitted diseases, and vaginal infections) is almost the same in NYC lay persons and specialists. In comparison, DR lay persons used slightly more *botellas* for reproductive health and genitourinary conditions (than for respiratory conditions), whereas DR specialists almost exclusively used *botellas* for the first group of conditions. DR specialists reported significantly more *botella* preparations than lay persons for reproductive health and genitourinary conditions ($z=3.84$; $P<0.001$) and comparatively fewer *botella* preparations for respiratory conditions ($z=3.83$; $P<0.001$). In NYC, there were no significant differences between specialists and lay persons. NYC specialists mentioned more *botella* preparations for respiratory conditions than DR specialists ($z=3.55$; $p<0.001$), whereas the latter mentioned significantly more *botella* preparations for reproductive health and genitourinary conditions ($z=3.52$; $p<0.001$). Hence, *botellas* for reproductive health and genitourinary conditions seem to be the exclusive domain of specialists in the DR, but this association was not as pronounced among specialists in NYC.

Since lay persons reported significantly more plant mixtures that are prepared as teas than specialists (table 3), the use of tea mixtures for respiratory conditions versus reproductive health and genitourinary conditions was also compared and is depicted in figure 6. Significant differences were noted between NYC lay persons and NYC specialists (Chi-square: 5.5; $P=0.019$). Transnational differences are also observed between lay persons (Chi-square: 11.2; $P<0.001$), but not between specialists, in NYC and the DR. Almost half of all tea mixtures mentioned by lay persons in NYC (48%) are used to treat respiratory conditions, which is more than twice as much as compared to reproductive health and genitourinary conditions in this sample group.

3.5. Which plants are used in Dominican mixtures?

Appendix A lists plants in mixtures for the top 10 health conditions from table 2 that are mentioned at least twice by one of the four participants groups (NYC lay persons and specialists, DR lay persons and specialists). Table 4 presents a ranking of plants from Appendix A according to their cumulative score for reproductive health and genitourinary conditions versus respiratory conditions. A comparison shows that different species are used for these two groups of health conditions; only nine species overlap (table 4). For reproductive health and genitourinary conditions, sixty-one percent of the species listed in table 4 grow wild in the DR, whereas only twenty-four percent of those used for respiratory conditions occur in the wild; this is significantly lower according to a z-test for proportions ($z=2.74$; $P=0.006$). Hence, in mixtures for respiratory conditions, often well-known cultivated (and commercially available) plant species are used.

The roots of *guaucí* (minnieroot, *Ruellia tuberosa* L.), *juana la blanca* (*Spermacoce assurgens* Ruiz & Pav.) and *coco* (coconut, *Cocos nucifera* L.) are most frequently reported in mixtures for genitourinary disorders, whereas the fruits and leaves of *limón* (*Citrus aurantifolia* Swingle and *Citrus limon* (L.) Burm.f.), *canela* (cinnamon, *Cinnamomum verum* J.Presl) and the bulb of *cebollín* (shallot, *Allium cepa* L. var. *aggregatum* G. Don) are often used in mixtures for respiratory conditions. In the latter group, teas are typically prepared from the leaves of species with edible fruits, including *naranja agria* (bitter orange, *Citrus aurantium* L.), *cereza* (acerola cherry, *Malpighia emarginata* DC. and other *Malpighia* species), *guanábana* (soursop, *Annona muricata* L.) and *naranja dulce* (orange, *Citrus sinensis* Osbeck), whereas leafy and bulbous vegetables are often used to prepare syrups.

3.6. Cluster analysis of health conditions based upon the plant species combined in mixtures to treat these conditions

Cluster analysis of the ten highest ranking conditions listed in table 2 resulted in two clusters: (1) a cluster of reproductive health and genitourinary conditions; and (2) a cluster of conditions that are related to the respiratory system. According to figure 7, the same two groups of clusters are encountered in data from three participant groups (NYC lay persons, DR lay persons and DR specialists). This shows that plants are not just randomly used in mixtures. Instead, specific plants are systematically chosen depending on the type of health condition, whereby closely related conditions are treated with similar combinations of plants.

There exist between-group differences in the clustering of individual conditions within reproductive and genitourinary health. Plant combinations to treat infertility and labor tend to be similar in DR lay persons, whereas labor clusters first with vaginal infections in NYC lay persons. Vaginal infections, on the other hand, cluster with sexually transmitted diseases in DR specialists. DR lay persons use many of the same plants in mixtures to treat vaginal infections and menstrual problems. DR specialists use distinctive plant mixtures for labor. As a result, labor is the last to join the cluster of reproductive and genitourinary health in this group.

4. Discussion

The present results illustrate the rich complexity of Dominican ethnomedicine. To the best of our knowledge, there exists no published literature that compares the prevalence of mixtures versus single plant remedies in other Caribbean ethnomedical systems. In their study in Cuba, Hernández Cano and Volpato (2004) looked at the number of plants that were used in herbal mixtures. About 65% of Cuban plant mixtures were composed of two or three different plants, 22% percent of four or five plants, and 13% of six to nineteen plants. These results fall within the range of percentages found in our study, depending on the location (NYC versus the DR) and the degree of specialization of participants (lay persons versus specialist healers). Ososki et al. (2002) found in their study with Dominican healers in NYC that mixtures could vary from 2 to 20 plant ingredients. In the Dominican Republic, Ososki (2004) reported that mixtures could contain as many as 55 plants and specialists reported a greater number of plants per mixture than generalists. Our data show that healers in NYC diversify their mixtures less than their peers in the DR. This may be due, in part, to the fact that fewer plants are available to them in NYC as compared to their home country. Even though in NYC there are hundreds of *botánicas* (community-based shops that sell items for spiritual, religious and physical healing, including herbal remedies acquired from within the United States, the Caribbean, South America or elsewhere) (Balick et al, 2000; Gomez-Beloz and Chavez, 2001; Viladrich, 2006; Anderson, 2008), the plant material that can be found in these shops represents only a fraction of the total plant diversity in the DR because of immigration restrictions, temporal and spatial availability of plant species, difficulties in plant storage, and transportation among other factors (Ososki et al., 2002). As a consequence of lower plant availability, NYC healers may be in danger of losing some of their cultural knowledge about these complex formulations. Hodges and Bennett (2006) address another issue that may affect knowledge of medicinal plants. Many Hispanic *botánicas* in Florida rely heavily on the same popular reference works on remedies. This leads to convergence of urban pharmacopoeias, less experimentation with plants, and less variation in knowledge. Loss of knowledge is likely to happen more easily with plants that are known exclusively to a small group of specialists as compared to common plants that are widely available and known by everybody, including lay persons. Interestingly, our data show that the number of plants in mixtures reported by lay persons in NYC is comparable to their lay peers in the DR. This may indicate that, in the lay persons group of first generation immigrants, there is as yet no measurable loss of knowledge

Types of plant mixtures: *botellas* by plant specialists versus teas by lay persons

Our data demonstrate an interesting dichotomy between specialists and lay persons: whereas the former mentioned significantly more *botella* mixtures, lay persons reported more mixtures that are prepared as teas. In particular, our results suggest that specialists in the DR are the main knowledge holders of a subtype of *botella* that is strongly embedded in Dominican culture and that consists of an alcohol tincture of roots predominantly used to treat reproductive health and genitourinary conditions. Also, specialists showed a transnational shift from using *botellas* for reproductive health and genitourinary conditions in the DR towards using *botellas* for respiratory conditions in NYC. One possible explanation for this is that the morbidity pattern of Dominican patients in NYC is different than that of patients in the DR. As a consequence, NYC specialists could have simply adapted their knowledge base in response to a clientele that requests remedies for other types of health conditions.

In an anthropological study in the Dominican countryside (Brendbekken, 1998), *botellas* are described as “remedies of multiple content” that are normally prepared by experts. The author mentions *botellas* for men to treat sexually transmitted diseases, *botellas* for women to treat problems of the female reproductive organs, and purgative *botellas* for both sexes. In our study, we identified at least four different subtypes of *botellas* that are used to treat genitourinary and respiratory conditions, respectively. Hernández Cano and Volpato (2004) report on the use of herbal mixtures in Cuba, including *botellas* more commonly referred to as *galones*. The authors describe a Cuban *botella* or *galón* as a decoction of plant parts (usually roots) often including plant oils, animal products, over-the-counter medicines, or alcohol. They are mainly used to treat respiratory and sexually transmitted diseases. Cuban participants interviewed in this study were individuals knowledgeable about plants and most of them were traditional healers. In Puerto Rico, a healer reported a recipe for a *botella* or *galón* used to treat “spots on the lungs”. It consisted of the fresh juice of several plants, plant oils, syrup from the pharmacy, honey and alcohol. The mixture was not boiled but left in the fridge for a few days to form a syrup (Benedetti, 1998). Even though these literature sources and our own results underscore the great variability of plant mixtures, a considerable degree of similarity exists among different Caribbean countries in the use of *botellas* composed of woody plant parts and roots to treat reproductive health and genitourinary conditions and *botellas* with juice from fresh plant parts, or teas, for respiratory conditions (Benedetti, 2001; Hernández Cano and Volpato, 2004; Clement et al., 2005).

The predominant use of tea mixtures by lay persons, especially in NYC, to treat respiratory conditions such as the flu, common cold, cough, asthma, and bronchitis may reflect general knowledge of common cultivated (and commercially available) plants known within the family unit (so called “home” remedies) to treat conditions for which often, at least at first, no specialized health care is sought. In Trinidad, patients with asthma prepared teas of mixtures of herbs for symptomatic relief (Clement et al., 2005). The use of tea mixtures in the form of commonly known home remedies to treat minor illnesses versus root mixtures of wild plants in *botellas* used by specialists to treat life threatening sexually transmitted diseases (such as gonorrhea and syphilis) has also been observed in Cuba. “Root medicine”, i.e. the predominant use of plant roots for medicine, is believed to have an African origin, and African “root doctors” consider roots to be the strongest parts of the plant (Hernández Cano and Volpato, 2004). Hence, these powerful root medicines have a cultural history of being preferentially used by specialists to treat serious health conditions that are outside the therapeutic realm of the family unit.

The prevalence of mixtures versus single-plant herbal remedies depends on the type of health condition

Our results clearly show that not all health conditions are treated with mixtures. One of the questions this raises is why people use mixtures for certain conditions such as infertility, sexually transmitted diseases, flu, and bronchitis, to name a few, but not for other conditions such as those related to the skin and skeleton (wounds, trauma, burns, boils and fungal skin problems, and sprains)? It is plausible that the infectious nature and/or perceived seriousness of the conditions treated with mixtures plays a role in the choice of mixtures instead of single-plant remedies. According to Brendbekken (1998), rural people in the DR state that the "more complex" a health problem, the more plants are combined to assure that there will be substances present in the remedy to alleviate the health condition. The mode of administration could play a role as well because conditions treated with mixtures are often taken internally, whereas skin conditions and sprains are usually treated with topical administration of single plant remedies. Some of the popular Dominican beliefs we recorded in our study as to why plants are combined in mixtures have been discussed in the literature as well. Other explanations for mixtures found in the literature include balancing the bitter taste of individual plants and reducing the toxicity of certain species (Longuefosse and Nossin, 1996; Brendbekken, 1998; García et al., 2000; Hernández Cano and Volpato, 2004).

A limitation of this study is that it focuses on a set of thirty pre-selected health conditions that may or may not reflect the range of health conditions for which Dominican lay persons and specialists use herbal mixtures. The rationale for selecting these health conditions was two-fold. They are either considered prevalent in the Dominican community in New York City or the Dominican Republic, and/or inflammation is a component of their pathophysiology. A subset of culturally important plants from our study has undergone anti-inflammatory testing to investigate whether there exists a pharmacological evidence base for their use as traditional medicines. These results will be reported elsewhere.

Related health conditions are treated with similar combinations of plants

In spite of the variation in plant knowledge that exists in ethnobotanical data, we found that Dominicans' ethnoclassification of health conditions based on the use of plant mixtures corresponds fairly well with the biomedical taxonomy of these conditions. Two limitations of the current analysis were that only plants used in mixtures were taken into account and that the analysis was limited to ten health conditions that were frequently treated with mixtures. Including single plant remedies and more health conditions is likely to yield a more comprehensive insight into the "emic" (Dominican) classification of health conditions. Further research has to elucidate the reasons behind the transnational and lay-versus-specialist related differences that were observed in the clustering of health conditions within the category of reproductive and genitourinary health. One of the clusters that groups labor, menstrual problems, infertility, sexually transmitted diseases and vaginal infections closely together may be related to the use of plants with the purpose to "cleanse the blood" (*limpiar la sangre*), a concept that is popular in Dominican ethnomedicine. Likewise, plants used to treat kidney problems may have been selected by local people based on their diuretic properties, whereas plants for asthma, bronchitis and other respiratory conditions may be preferred because of their ability to expel phlegm ("*botar flema*") and/or restore the hot-cold balance of the body (Brendbekken, 1998).

Conclusions

The present study demonstrates the importance, complexity and variability of plant mixtures in Dominican ethnomedicine. Their form of preparation and plant composition varies according to who prepares them (lay person or specialist), the geographic location where they

are used (NYC or DR) and the health conditions they are used for, whereby similar combinations of plants are used to treat related conditions. These results provide a better insight into the foundations of a particular ethnomedical system, and demonstrate the usefulness of ethnobotanical data in comparing the local (ethno) classification of diseases with the biomedical system. Results like these are of high relevance to ethnopharmacological follow-up studies because they can inform those studies that focusing solely on individual plants may have little relevance for those health conditions that are preferentially treated with mixtures by local people.

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Appendix

Appendix A

Plants used in mixtures to treat ten health conditions. Listed plants are reported at least twice by one of the four sample groups (Dominican lay people and specialists in New York City and the Dominican Republic). Ten conditions (infertility, sexually transmitted diseases, flu, bronchitis, common cold, labor, menstrual problems, vaginal infections, asthma/chest congestion and kidney problems) were selected based on the prevalence of plant mixtures (see table 2). Numerical data represent the number of times each species was mentioned in use-reports of mixtures. Abbreviations: NYC=New York City; DR=Dominican Republic. Voucher number abbreviation: IV=voucher collection of the first author; R-IV=reference collection of purchased plant parts from botanicas, supermarkets, and markets. *Abbreviations of plant parts refer to the most frequently reported part(s): ae=aerial parts, ba=bark, bu=bulb, en=entire plant, ex=exudate, fl=flowers, fr=fruits, le=leaves, ro=roots, se=seeds, sh=shoots, si=silk (corn silk), st=stem, un=unspecified, wo=wood.

Scientific name (family, voucher numbers)	Common name (plant part used*)	Lay people NYC	Lay people DR	Specialists NYC	Specialists DR	SUM
Infertility						
Ruellia tuberosa L. (Acanthaceae, IV233, 370, R-IV-75)	guaucí (ro)	5	6	4	6	**21**
Illicium verum Hook. f. (Illiciaceae, R-IV-45)	anís de estrella (fr)	3	5	1	8	**17**
Lavandula officinalis Chaix (Lamiaceae, R-IV-14,88)	algucema (fl)	2	3	3	8	**16**
Spermacoce assurgens Ruiz & Pav. (Rubiaceae, IV201, 276, 341, R-IV-42)	juana la blanca (ro)	5	3	3	4	**15**
Agave antillarum Descourt. (Agavaceae, IV419, R-IV-74), *Agave* sp. (R-IV-71)	maguey (ro, le)	3	5	3	4	**15**
Cocos nucifera L. (Arecaceae)	coco (ro)	6	2	2	4	**14**

Scientific name (family, voucher numbers)	Common name (plant part used*)	Lay people NYC	Lay people DR	Specialists NYC	Specialists DR	SUM
Matricaria recutita L. (Asteraceae, IV224, R-IV-39)	manzanilla (fl)	2	3	--	9	**14**
Securidaca virgata Sw. (Polygalaceae, IV389, R-IV-76)	maravelí (ro)	2	3	3	3	**11**
Pimpinella anisum L. (Apiaceae, R-IV-62)	anís (se)	2	2	--	5	**9**
Senna italica Mill. (Fabaceae, R-IV-56)	sen (le)	1	--	1	7	**9**
Crescentia cujete L. (Bignoniaceae)	higüero (fr)	6	2	--	--	**8**
Kalanchoe gastonis-bonnieri Raym.-Hamet & H. Perrier (Crassulaceae, IV327)	mala madre (ro, le)	2	2	1	3	**8**
Cinnamomum verum J. Presl (Lauraceae, R-IV-69), *Cinnamomum* sp.	canela (ba)	4	1	--	2	**7**
Pimenta haitiensis (Urb.) Landrum (Myrtaceae, R-IV-01, 87)	canelilla (le)	--	3	--	4	**7**
Gossypium hirsutum L. (Malvaceae, IV215, R-IV84-a,b)	algodón morado (le)	1	3	--	2	**6**
Petiveria alliacea L. (Phytolaccaceae, IV 207, R-IV-36, 37)	anamú (ro)	1	--	4	1	**6**
Cassia fistula L. (Fabaceae, IV386, R-IV-85)	cañafistula (fr)	2	--	1	3	**6**
Smilax domingensis Willd. (Smilacaceae, IV381)	bejuco de riñon (ro)	--	2	--	3	**5**
Yucca aloifolia L. (Agavaceae, IV257)	jericó/apararayo (st)	--	1	--	4	**5**
Plantago major L. (Plantaginaceae, IV 244, 371, R-IV-47)	llantén (le)	--	3	--	2	**5**
Beta vulgaris L. (Chenopodiaceae)	remolacha (ro)	3	1	--	1	**5**
Tilia sp. (Malvaceae, R-IV-59)	tilo (fl)	1	2	--	2	**5**
Opuntia ficus-indica (L.) Mill. (Cactaceae, IV500), *Opuntia* sp. (IV223)	tuna de españa (un)	1	2	--	2	**5**
Valeriana officinalis L. (Valerianaceae, R-IV-10, 78)	valeriana (ro)	--	1	2	2	**5**
Cuminum cyminum L. (Apiaceae, R-IV-28)	anís comino (se)	--	1	--	3	**4**
Pothomorphe peltata (L.) Miq. (Piperaceae, IV 334, 396, 412)	broquelejo (un)	--	1	--	3	**4**
Zea mays L. (Poaceae, R-IV-49)	maíz (si)	2	--	1	1	**4**
Roystonea cf. *hispaniolana* L.H.Bailey (Arecaceae, R-IV-97), *Roystonea* sp.	palma (un)	1	--	--	3	**4**

Scientific name (family, voucher numbers)	Common name (plant part used*)	Lay people NYC	Lay people DR	Specialists NYC	Specialists DR	SUM
Catalpa longissima Sims (Bignoniaceae, IV317, R-IV-83)	roble (ba)	3	--	1	--	**4**
Aloe vera (L.) Burm. f. (Asphodelaceae, IV234)	sábila (ro)	1	2	--	1	**4**
Chiococca alba Hitchc. (Rubiaceae, IV388)	timacle (ro)	--	2	--	2	**4**
Doyerea emetocathartica Grosourdy (Cucurbitaceae, R-IV-32)	batata zamdumbia (ro)	1	2	--	--	**3**
Cissus verticillata (L.) Nicolson & C.E.Jarvis (Vitaceae, IV258, 272, 316, R-IV-99)	bejuco caro (un)	--	2	1	--	**3**
Paullinia pinnata L. (Sapindaceae, IV 312, 315)	bejuco de costilla (un)	--	2	--	1	**3**
Bixa orellana L. (Bixaceae, IV395, R-IV-15, 40, 41)	bija (se)	1	--	2	--	**3**
Xanthium strumarium L. (Asteraceae, IV302)	cadillo de gato (ro)	--	--	--	3	**3**
Pinus occidentalis Sw. (Pinaceae, R-IV-46)	cuaba (wo)	3	--	--	--	**3**
Myristica fragrans Houtt. (Myristicaceae)	nuez moscada (se)	--	--	--	3	**3**
Allophylus racemosus Sw. (Sapindaceae, IV382)	parilla (un)	--	1	--	2	**3**
--	quina (ba)	2	--	1	--	**3**
Stachytarpheta jamaicensis (L.) Vahl (Verbenaceae, IV243, R-IV-16)	verbena (un)	1	2	--	--	**3**
Persea americana Mill. (Lauraceae, IV446, R-IV-60)	aguacate (ba, se)	2	--	--	--	**2**
Syzygium aromaticum (L.) Merr. & L.M. Perry (Myrtaceae, R-IV-94)	clavo (fl)	2	--	--	--	**2**
Momordica charantia L. (Cucurbitaceae, IV266, R-IV-18, 34, 51)	cun de amor (ro)	2	--	--	--	**2**
Guazuma tomentosa Kunth (Malvaceae, IV387)	guácima (ba)	--	--	2	--	**2**
--	penda (un)	--	--	--	2	**2**
Sexually transmitted diseases						
Ruellia tuberosa L. (Acanthaceae, IV233, 370, R-IV-75)	guaucí (ro)	4	7	1	5	**17**
Agave antillarum Descourt. (Agavaceae, IV419, R-IV-74), *Agave* sp. (R-IV-71)	maguey (ro)	4	2	3	2	**11**
Spermacoce assurgens Ruiz & Pav. (Rubiaceae, IV201, 276, 341, R-IV-42)	juana la blanca (le, ro)	3	3	1	3	**10**
Cocos nucifera L. (Arecaceae)	coco (ro)	2	4	--	2	**8**

Scientific name (family, voucher numbers)	Common name (plant part used*)	Lay people NYC	Lay people DR	Specialists NYC	Specialists DR	SUM
Petiveria alliacea L. (Phytolaccaceae, IV 207, R-IV-36, 37)	anamú (ro, le)	2	3	2	--	**7**
Securidaca virgata Sw. (Polygalaceae, IV389, R-IV-76)	maravelí (ro)	1	3	1	2	**7**
Senna italica Mill. (Fabaceae, R-IV-56)	sen (le)	--	1	--	5	**6**
Lavandula officinalis Chaix (Lamiaceae, R-IV-14,88)	algucema (fl)	--	--	1	4	**5**
Pimpinella anisum L. (Apiaceae, R-IV-62)	anís (se)	--	1	1	3	**5**
Yucca aloifolia L. (Agavaceae, IV257)	jericó/apararayo (st)	--	3	--	2	**5**
Roystonea cf. *hispaniolana* L.H.Bailey (Arecaceae, R-IV-97), *Roystonea* sp.	palma (oil, ro)	2	2	--	1	**5**
Illicium verum Hook. f. (Illiciaceae, R-IV-45)	anís de estrella (fr)	--	--	1	3	**4**
Matricaria recutita L. (Asteraceae, IV224, R-IV-39)	manzanilla (fl)	--	--	1	3	**4**
Aloe vera (L.) Burm. f. (Asphodelaceae, IV234)	sábila (le, ro)	1	1	--	2	**4**
Cissus verticillata (L.) Nicolson & C.E.Jarvis (Vitaceae, IV258, 272, 316, R-IV-99)	bejuco caro (un)	--	2	1	--	**3**
Cassia fistula L. (Fabaceae, IV386, R-IV-85)	cañafistula (fr)	--	2	--	1	**3**
Pimenta haitiensis (Urb.) Landrum (Myrtaceae, R-IV-01, 87)	canelilla (le)	--	--	--	3	**3**
--	pega palo (ro)	1	2	--	--	**3**
Urera baccifera (L.) Gaudich. ex Wedd. (Urticaceae, IV352)	pingamosa (ro)	2	1	--	--	**3**
Opuntia ficus-indica (L.) Mill. (Cactaceae, IV500), *Opuntia* sp. (IV223)	tuna de españa (un)	--	--	2	1	**3**
Pavonia spinifex (L.) Cav. (Malvaceae, IV429)	cadillo de tres pies (ro)	--	2	--	--	**2**
Xanthium strumarium L. (Asteraceae, IV302)	cadillo de gato (ro)	--	--	--	2	**2**
Eucalyptus sp. (Myrtaceae, IV294)	eucalipto (un)	2	--	--	--	**2**
Crescentia cujete L. (Bignoniaceae)	higüero (fr)	2	--	--	--	**2**
Agave sp. (Agavaceae)	maguey blanco (un)	--	--	--	2	**2**
Morinda citrifolia L. (Rubiaceae, IV374)	noni (fr, le)	--	--	--	2	**2**
Tetragastris balsamifera Kuntze (Burseraceae, IV391)	amacey (ex)	--	--	--	2	**2**
Flu						

Scientific name (family, voucher numbers)	Common name (plant part used*)	Lay people NYC	Lay people DR	Specialists NYC	Specialists DR	SUM
Citrus aurantifolia (Christm.) Swingle (Rutaceae, IV288) and *Citrus limon* (Rutaceae)	limón (fr, le)	77	60	2	2	**141**
Cinnamomum verum J. Presl (Lauraceae, R-IV-69), *Cinnamomum* sp.	canela (ba)	70	50	3	4	**127**
Citrus aurantium L. (Rutaceae, IV284)	naranja agria (le)	55	38	2	6	**101**
Cymbopogon citratus Stapf (Poaceae, IV375, 417, R-IV-98)	limoncillo (le)	53	31	4	7	**95**
Allium cepa L. (Alliaceae)	cebolla (bu)	30	25	4	4	**63**
Annona muricata L. (Annonaceae, IV399)	guanábana (le)	35	20	--	3	**58**
Aloe vera (L.) Burm. f. (Asphodelaceae, IV234)	sábila (le)	16	19	4	1	**40**
Allium cepa L. var. *aggregatum* G. Don (Alliaceae, R-IV-92)	cebollín (bu)	21	11	2	2	**36**
Raphanus sativus L. (Brassicaceae, IV230)	rábano (ro)	19	14	2	--	**35**
Nasturtium officinale R.Br. (Brassicaceae)	berro (ae)	21	8	4	1	**34**
Zingiber officinale Roscoe (Zingiberaceae, R-IV-93)	jengibre (ro)	22	8	3	1	**34**
Malus domestica Borkh. (Rosaceae)	manzana (fr)	27	1	1	--	**29**
Malpighia emarginata (Malpighiaceae, IV208, 213, 421)	cereza (le, fr)	4	21	--	2	**27**
Ricinus communis L. (Euphorbiaceae, IV365)	higuereta (se)	17	5	1	1	**24**
Eucalyptus sp. (Myrtaceae, IV294)	eucalipto (le)	6	9	1	3	**19**
Petiveria alliacea L. (Phytolaccaceae, IV 207, R-IV-36, 37)	anamú (ro, ae)	3	9	2	1	**15**
Acacia macracantha Humb. & Bonpl. ex Willd. (Fabaceae, IV286)	aroma (ba)	4	11	--	--	**15**
Passiflora edulis Sims (Passifloraceae, IV311)	chinola (fr)	3	10	--	--	**13**
Alpinia zerumbet (Pers.) B.L.Burtt & R.M.Sm. (Zingiberaceae, IV242, 279)	dragón (le)	3	7	--	3	**13**
Pimpinella anisum L. (Apiaceae, R-IV-62)	anís (se)	10	1	--	1	**12**
Mentha sp. (Lamiaceae, IV212)	menta (le)	7	3	2	--	**12**
Citrus sinensis Osbeck (Rutaceae)	naranja dulce (le)	6	4	2	--	**12**
Illicium verum Hook. f. (Illiciaceae, R-IV-45)	anís de estrella (fr)	7	2	--	1	**10**

Scientific name (family, voucher numbers)	Common name (plant part used*)	Lay people NYC	Lay people DR	Specialists NYC	Specialists DR	SUM
Bunchosia glandulosa DC. (Malpighiaceae, IV239, 398, R-IV-54)	cabra (le)	4	5	--	1	**10**
Syzygium aromaticum (L.) Merr. & L.M. Perry (Myrtaceae, R-IV-94)	clavo (fl)	8	2	--	--	**10**
Solanum americanum Mill. (Solanaceae, IV353, 422) and *Solanum nigrum* L. (IV170, 177)	morita (le)	--	8	--	1	**9**
Matricaria recutita L. (Asteraceae, IV224, R-IV-39)	manzanilla (fl)	5	2	--	1	**8**
Coffea arabica L. (Rubiaceae, IV275)	café (le)	3	3	--	1	**7**
Pimenta haitiensis (Urb.) Landrum (Myrtaceae, R-IV-01, 87)	canelilla (le)	2	3	2	--	**7**
Mentha sp. (Lamiaceae, IV226, 322, 350, 536)	hierba buena (ae)	4	1	--	2	**7**
Allium sativum L. (Alliaceae)	ajo (bu)	2	3	1	--	**6**
Apium graveolens L. (Apiaceae)	apio (st)	4	1	1	--	**6**
Genipa americana L. (Rubiaceae)	jagua (fr)	3	2	1	--	**6**
Mangifera indica L. (Anacardiaceae, R-IV-90)	mango (le)	3	2	--	1	**6**
Psidium guajava L. (Myrtaceae, IV287, R-IV-53)	guayaba (le, sh)	--	4	--	1	**5**
Hibiscus rosa-sinensis L. (Malvaceae, IV 344)	sangre de cristo (fl, le)	--	4	--	1	**5**
Tilia sp. (Malvaceae, R-IV-50)	tilo (fl)	4	1	--	--	**5**
Ipomoea batatas (L.) Lam. (Convolvulaceae, IV437)	batata (le)	--	4	--	--	**4**
Saccharum officinarum L. (Poaceae)	caña (st)	--	4	--	--	**4**
--	cedro (un)	--	3	1	--	**4**
Pinus occidentalis Sw. (Pinaceae, R-IV-46)	cuaba (wo)	1	3	--	--	**4**
Agave antillarum Descourt. (Agavaceae, IV419, R-IV-74), *Agave* sp. (R-IV-71)	maguey (le)	1	1	2	--	**4**
Pimenta dioica (L.) Merr. (Myrtaceae, R-IV-43)	malagueta (fr)	3	1	--	--	**4**
--	ozua (un)	2	2	--	--	**4**
Peperomia pellucida Kunth (Piperaceae, IV321, 426)	siempre fresca (ae)	--	3	--	1	**4**
Spermacoce assurgens Ruiz & Pav. (Rubiaceae, IV201, 276, 341, R-IV-42)	juana la blanca (un)	--	3	--	--	**3**
Daucus carota L. (Apiaceae)	zanahoria (ro)	2	1	--	--	**3**
Sesamum indicum L. (Pedaliaceae)	ajonjolí (se)	2	--	--	--	**2**

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Ocimum sp. (Lamiaceae)	albahaca (un)	2	--	--	--	**2**
Senna occidentalis (L.) Link (Fabaceae, IV402)	bruca prieta (fl)	--	2	--	--	**2**
Tagetes erecta L. (IV173), *Tagetes patula* L. (Asteraceae, IV378)	clavel de muerto (un)	--	--	--	2	**2**
Senna alata (L.) Roxb. (Fabaceae, IV430)	guajabo (un)	2	--	--	--	**2**
Moringa oleifera Lam. (Moringaceae, R-IV-17)	libertad (fl)	--	2	--	--	**2**
--	ñongo (un)	--	2	--	--	**2**
Plectranthus amboinicus (Lour.) Spreng. (Lamiaceae, IV292)	orégano poleo (ae)	--	--	--	2	**2**
Lippia scaberrima Sond. (Verbenaceae, IV278, 300, 328)	orozul (ae)	--	2	--	--	**2**
Beta vulgaris L. (Amaranthaceae)	remolacha (ro)	2	--	--	--	**2**
Anredera leptostachys (Moq.) Steenis (Basellaceae, IV368)	suelda con suelda (un)	--	2	--	--	**2**
Jatropha gossypiifolia L. (Euphorbiaceae, IV264, 442, R-IV-52)	túa túa (le)	2	--	--	--	**2**
Merremia dissecta Hallier f. (Convolvulaceae, IV 326, 407)	viní viní (le)	--	2	--	--	**2**
Bronchitis						
Allium cepa L. var. *aggregatum* G. Don (Alliaceae, R-IV-92)	cebollín (bu)	22	10	3	5	**40**
Aloe vera (L.) Burm. f. (Asphodelaceae, IV234)	sábila (le)	18	10	4	1	**33**
Allium cepa L. (Alliaceae)	cebolla (bu)	14	11	1	3	**29**
Nasturtium officinale R.Br. (Brassicaceae)	berro (ae)	15	8	2	1	**26**
Raphanus sativus L. (Brassicaceae, IV230)	rábano (ro)	17	8	1	--	**26**
Citrus aurantifolia (Christm.) Swingle (Rutaceae, IV288) and *Citrus limon* (Rutaceae)	limón (fr, le)	15	8	1	1	**25**
Ricinus communis L. (Euphorbiaceae, IV365)	higuereta (se)	15	3	2	2	**22**
Bunchosia glandulosa DC. (Malpighiaceae, IV239, 398, R-IV-54)	cabra (le)	10	8	--	3	**21**
Sesamum indicum L. (Pedaliaceae)	ajonjolí (se)	5	3	1	2	**11**
Cinnamomum verum J. Presl (Lauraceae, R-IV-69), *Cinnamomum* sp.	canela (ba)	5	6	--	--	**11**
Cocos nucifera L. (Arecaceae)	coco (fr)	3	4	1	3	**11**

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Merremia dissecta Hallier f. (Convolvulaceae, IV 326, 407)	viní viní (le)	3	5	--	3	**11**
Annona muricata L. (Annonaceae, IV399)	guanábana (le)	6	2	--	2	**10**
Citrus aurantium L. (Rutaceae, IV 284)	naranja agria (le, fr)	6	4	--	--	**10**
Cymbopogon citratus Stapf (Poaceae, IV375, 417, R-IV-98)	limoncillo (le)	3	6	--	--	**9**
Petiveria alliacea L. (Phytolaccaceae, IV 207, R-IV-36, 37)	anamú (ro)	5	1	--	1	**7**
Apium graveolens L. (Apiaceae)	apio (st)	4	--	--	1	**5**
Eucalyptus sp. (Myrtaceae, IV294)	eucalipto (le)	1	1	2	1	**5**
Allium sativum L. (Alliaceae)	ajo (bu)	4	--	--	--	**4**
Bidens cynapiifolia Kunth (Asteraceae, IV346)	acetilla (fl, le)	--	1	--	2	**3**
Malpighia emarginata (Malpighiaceae, IV208, 213, 421)	cereza (le)	--	2	--	1	**3**
Zingiber officinale Roscoe (Zingiberaceae, R-IV-93)	jengibre (ro)	2	--	--	1	**3**
Agave antillarum Descourt. (Agavaceae, IV419, R-IV-74), *Agave* sp. (R-IV-71)	maguey (un)	2	--	1	--	**3**
Matricaria recutita L. (Asteraceae, IV224, R-IV-39)	manzanilla (fl)	2	1	--	--	**3**
Jatropha gossypiifolia L. (Euphorbiaceae, IV264, 442, R-IV-52)	túa túa (ex, le)	1	2	--	--	**3**
Pimpinella anisum L. (Apiaceae, R-IV-62)	anís (se)	2	--	--	--	**2**
Moringa oleifera Lam. (Moringaceae, R-IV-17)	libertad (se)	--	2	--	--	**2**
Plantago major L. (Plantaginaceae, IV244, 371, R-IV-47)	llantén (un)	--	--	--	2	**2**
Mentha sp. (Lamiaceae, IV212)	menta (le)	--	2	--	--	**2**
--	puerro (un)	--	2	--	--	**2**
Daucus carota L. (Apiaceae)	zanahoria (ro)	2	--	--	--	**2**
Common cold						
Citrus aurantifolia (Christm.) Swingle (Rutaceae, IV288) and *Citrus limon* (Rutaceae)	limón (fr, le)	33	23	1	1	**58**
Cinnamomum verum J. Presl (Lauraceae, R-IV-69), *Cinnamomum* sp.	canela (ba)	26	12	2	2	**42**
Allium cepa L. (Alliaceae)	cebolla (bu)	20	15	1	1	**37**

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Allium cepa L. var. *aggregatum* G. Don (Alliaceae, R-IV-92)	cebollín (bu)	20	11	2	1	**34**
Cymbopogon citratus Stapf (Poaceae, IV375, 417, R-IV-98)	limoncillo (le)	19	13	1	1	**34**
Citrus aurantium L. (Rutaceae, IV 284)	naranja agria (le, fr)	18	13	2	1	**34**
Aloe vera (L.) Burm. f. (Asphodelaceae, IV234)	sábila (le)	14	14	5	1	**34**
Ricinus communis L. (Euphorbiaceae, IV365)	higuereta (se)	16	9	3	1	**29**
Nasturtium officinale R.Br. (Brassicaceae)	berro (ae)	15	8	2	1	**26**
Raphanus sativus L. (Brassicaceae, IV230)	rábano (ro)	11	11	1	--	**23**
Annona muricata L. (Annonaceae, IV399)	guanábana (le)	10	6	--	1	**17**
Malus domestica Borkh. (Rosaceae)	manzana (fr)	13	--	--	--	**13**
Zingiber officinale Roscoe (Zingiberaceae, R-IV-93)	jengibre (ro)	10	2	--	--	**12**
Petiveria alliacea L. (Phytolaccaceae, IV 207, R-IV-36, 37)	anamú (ro)	3	6	1	1	**11**
Eucalyptus sp. (Myrtaceae, IV294)	eucalipto (le)	3	2	2	2	**9**
Acacia macracantha Humb. & Bonpl. ex Willd. (Fabaceae, IV286)	aroma (ba)	2	6	--	--	**8**
Cocos nucifera L. (Arecaceae)	coco (fr)	4	3	1	--	**8**
Malpighia emarginata (Malpighiaceae, IV208, 213, 421)	cereza (le)	2	5	--	--	**7**
Bunchosia glandulosa DC. (Malpighiaceae, IV239, 398, R-IV-54)	cabra (le)	2	3	--	1	**6**
Coffea arabica L. (Rubiaceae, IV275)	café (un)	2	3	--	1	**6**
Passiflora edulis Sims (Passifloraceae, IV311)	chinola (fr)	--	5	--	1	**6**
Alpinia zerumbet (Pers.) B.L.Burtt & R.M.Sm. (Zingiberaceae, IV242, 279)	dragón (le)	2	3	--	1	**6**
Allium sativum L. (Alliaceae)	ajo (bu)	3	2	--	--	**5**
Syzygium aromaticum (L.) Merr. & L.M. Perry (Myrtaceae, R-IV-94)	clavo (fl)	3	2	--	--	**5**
Matricaria recutita L. (Asteraceae, IV224, R-IV-39)	manzanilla (fl)	2	2	--	1	**5**
Mentha sp. (Lamiaceae, IV212)	menta (le)	2	3	--	--	**5**
--	cedro (un)	--	2	1	--	**3**

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Solanum americanum Mill. (Solanaceae, IV353, 422) and *Solanum nigrum* L. (IV170, 177)	morita (le)	--	3	--	--	**3**
Myristica fragrans Houtt. (Myristicaceae)	nuez moscada (se)	1	2	--	--	**3**
--	saúco (un)	3	--	--	--	**3**
Pimpinella anisum L. (Apiaceae, R-IV-62)	anís (se)	2	--	--	--	**2**
Saccharum officinarum L. (Poaceae)	caña (st)	--	2	--	--	**2**
Zingiber zerumbet (L.) Sm. (Zingiberaceae, IV349, 360)	jengibre amargo (ro)	--	2	--	--	**2**
Beta vulgaris L. (Amaranthaceae)	remolacha (ro)	2	--	--	--	**2**
Hibiscus rosa-sinensis L. (Malvaceae, IV 344)	sangre de cristo (fl)	--	2	--	--	**2**
Labor						
Matricaria recutita L. (Asteraceae, IV224, R-IV-39)	manzanilla (fl)	8	8	1	6	**23**
Illicium verum Hook. f. (Illiciaceae, R-IV-45)	anís de estrella (fr)	7	7	2	5	**21**
Crescentia cujete L. (Bignoniaceae)	higüero (fr)	5	9	--	1	**15**
Lavandula officinalis Chaix (Lamiaceae, R-IV-14,88)	algucema (fl)	4	5	1	4	**14**
Ruellia tuberosa L. (Acanthaceae, IV233, 370, R-IV-75)	guaucí (ro)	3	5	3	2	**13**
Ricinus communis L. (Euphorbiaceae, IV365)	higuereta (se)	3	7	--	3	**13**
Cinnamomum verum J. Presl (Lauraceae, R-IV-69), *Cinnamomum* sp.	canela (ba)	2	7	--	1	**10**
Pimpinella anisum L. (Apiaceae, R-IV-62)	anís (se)	4	3	--	2	**9**
Cocos nucifera L. (Arecaceae)	coco (un)	2	2	1	2	**7**
Petiveria alliacea L. (Phytolaccaceae, IV 207, R-IV-36, 37)	anamú (ro)	3	1	2	--	**6**
Zingiber officinale Roscoe (Zingiberaceae, R-IV-93)	jengibre (ro)	2	2	1	1	**6**
Agave antillarum Descourt. (Agavaceae, IV419, R-IV-74), *Agave* sp. (R-IV-71)	maguey (le, ro)	1	2	1	2	**6**
Kalanchoe gastonis-bonnieri Raym.-Hamet & H. Perrier (Crassulaceae, IV327)	mala madre (ro, le)	2	3	1	--	**6**
Senna italica Mill. (Fabaceae, R-IV-56)	sen (le)	1	--	--	5	**6**
Spermacoce assurgens Ruiz & Pav. (Rubiaceae, IV201, 276, 341, R-IV-42)	juana la blanca (un)	1	3	--	1	**5**

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Citrus aurantium L. (Rutaceae, IV 284)	naranja agria (le)	2	2	--	1	**5**
Bixa orellana L. (Bixaceae, IV395, R-IV-15, 40, 41)	bija (ro, ba)	3	--	1	--	**4**
Plantago major L. (Plantaginaceae, IV244, 371, R-IV-47)	llantén (le, en)	--	2	1	1	**4**
Pimenta dioica (L.) Merr. (Myrtaceae, R-IV-43)	malagueta (fr)	2	1	--	1	**4**
Myristica fragrans Houtt. (Myristicaceae)	nuez moscada (se)	--	3	--	1	**4**
Pothomorphe peltata (L.) Miq. (Piperaceae, IV 334, 396, 412)	broquelejo (un)	--	1	--	2	**3**
Argemone mexicana L. (Papaveraceae, IV282, R-IV-57, 96)	cardo santo (un)	--	2	1	--	**3**
Mentha sp. (Lamiaceae, IV226, 322, 350, 536)	hierba buena (le)	2	1	--	--	**3**
--	nigua (ro)	--	2	--	1	**3**
--	penda (un)	--	1	--	2	**3**
Tilia sp. (Malvaceae, R-IV-50)	tilo (fl)	--	1	--	2	**3**
Cuminum cyminum L. (Apiaceae, R-IV-28)	anís comino (se)	--	--	--	2	**2**
Syzygium aromaticum (L.) Merr. & L.M. Perry (Myrtaceae, R-IV-94)	clavo (fl)	--	2	--	--	**2**
Pinus occidentalis Sw. (Pinaceae, R-IV-46)	cuaba (wo)	2	--	--	--	**2**
Yucca aloifolia L. (Agavaceae, IV257)	jericó/apararayo (un)	--	--	--	2	**2**
Securidaca virgata Sw. (Polygalaceae, IV389, R-IV-76)	maravelí (un)	--	--	--	2	**2**
Menstrual problems						
Cinnamomum verum J. Presl (Lauraceae, R-IV-69), *Cinnamomum* sp.	canela (ba)	12	7	1	3	**23**
Matricaria recutita L. (Asteraceae, IV224, R-IV-39)	manzanilla (fl)	10	5	1	7	**23**
Illicium verum Hook. f. (Illiciaceae, R-IV-45)	anís de estrella (fr)	5	1	1	4	**11**
Spermacoce assurgens Ruiz & Pav. (Rubiaceae, IV201, 276, 341, R-IV-42)	juana la blanca (le, ro)	1	4	2	4	**11**
Ruellia tuberosa L. (Acanthaceae, IV233, 370, R-IV-75)	guaucí (ro)	--	3	2	5	**10**
Plantago major L. (Plantaginaceae, IV244, 371, R-IV-47)	llantén (en, le)	3	3	--	3	**9**
Lavandula officinalis Chaix (Lamiaceae, R-IV-14,88)	algucema (fl)	--	--	1	6	**7**

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Citrus aurantium L. (Rutaceae, IV 284)	naranja agria (le, fr)	2	4	1	--	**7**
Pimpinella anisum L. (Apiaceae, R-IV-62)	anís (se)	1	1	--	4	**6**
Cocos nucifera L. (Arecaceae)	coco (fr)	1	1	--	4	**6**
Mentha sp. (Lamiaceae, IV226, 322, 350, 536)	hierba buena (un)	4	1	--	1	**6**
Kalanchoe gastonis-bonnieri Raym.-Hamet & H. Perrier (Crassulaceae, IV327)	mala madre (un)	1	2	1	2	**6**
Opuntia ficus-indica (L.) Mill. (Cactaceae, IV500), *Opuntia* sp. (IV223)	tuna de españa (le, fr)	2	2	--	2	**6**
Ambrosia artemisiifolia L. (Asteraceae, IV 225, 347, 415, R-IV-91)	altamisa (ae, le)	1	4	--	--	**5**
Gossypium hirsutum L. (Malvaceae, IV215, R-IV84-a,b)	algodón morado (un)	--	1	--	3	**4**
Agave antillarum Descourt. (Agavaceae, IV419, R-IV-74), *Agave* sp. (R-IV-71)	maguey (ro)	--	--	1	3	**4**
Securidaca virgata Sw. (Polygalaceae, IV389, R-IV-76)	maravelí (un)	--	--	1	3	**4**
Aloe vera (L.) Burm. f. (Asphodelaceae, IV234)	sábila (le)	2	1	--	1	**4**
Tilia sp. (Malvaceae, R-IV-50)	tilo (fl)	1	--	1	2	**4**
Persea americana Mill. (Lauraceae, IV446, R-IV-60)	aguacate (le, ba)	--	2	--	1	**3**
Capsicum sp. (Solanaceae)	ají (fr, le)	2	1	--	--	**3**
Capsicum sp. (Solanaceae)	ají pimiento (un)	1	2	--	--	**3**
Xanthium strumarium L. (Asteraceae, IV302)	cadillo de gato (un)	--	--	--	3	**3**
Pimenta haitiensis (Urb.) Landrum (Myrtaceae, R-IV-01, 87)	canelilla (le)	--	--	--	3	**3**
Myristica fragrans Houtt. (Myristicaceae)	nuez moscada (se)	--	--	--	3	**3**
Plectranthus amboinicus (Lour.) Spreng. (Lamiaceae, IV292)	orégano poleo (ae)	1	2	--	--	**3**
Roystonea cf. *hispaniolana* L.H.Bailey (Arecaceae, R-IV-97), *Roystonea* sp.	palma (ro)	--	--	--	3	**3**
--	penda (le)	--	1	--	2	**3**
Senna italica Mill. (Fabaceae, R-IV-56)	sen (le)	--	--	--	3	**3**
Chenopodium ambrosioides L. (Chenopodiaceae, IV171, 299, R-IV-86)	apasote (le)	--	2	--	--	**2**
Pothomorphe peltata (L.) Miq. (Piperaceae, IV 334, 396, 412)	broquelejo (un)	--	--	--	2	**2**

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Cassia fistula L. (Fabaceae, IV386, R-IV-85)	cañafistula (un)	--	--	--	2	**2**
Passiflora edulis Sims (Passifloraceae, IV311)	chinola (le)	--	2	--	--	**2**
Annona muricata L. (Annonaceae, IV399)	guanábana (le)	2	--	--	--	**2**
Psidium guajava L. (Myrtaceae, IV287, R-IV-53)	guayaba (un)	--	2	--	--	**2**
Zingiber zerumbet (L.) Sm. (Zingiberaceae, IV349, 360)	jengibre amargo (ro)	--	2	--	--	**2**
Lactuca sativa L. (Asteraceae)	lechuga (le)	--	2	--	--	**2**
Cymbopogon citratus Stapf (Poaceae, IV375, 417, R-IV-98)	limoncillo (le)	2	--	--	--	**2**
Lippia micromera Schauer (Verbenaceae, IV204, 227, R-IV-05, 72)	orégano (le)	--	2	--	--	**2**
Vaginal Infections						
Spermacoce assurgens Ruiz & Pav. (Rubiaceae, IV201, 276, 341, R-IV-42)	juana la blanca (le, fl, en, ro)	6	17	4	4	**31**
Ruellia tuberosa L. (Acanthaceae, IV233, 370, R-IV-75)	guaucí (ro)	2	13	4	6	**25**
Opuntia ficus-indica (L.) Mill. (Cactaceae, IV500), *Opuntia* sp. (IV223)	tuna de españa (le)	2	15	--	2	**19**
Argemone mexicana L. (Papaveraceae, IV282, R-IV-57, 96)	cardo santo (le, ro)	8	6	--	1	**15**
Gossypium hirsutum L. (Malvaceae, IV215, R-IV84-a,b)	algodón morado (le)	4	9	--	--	**13**
Kalanchoe gastonis-bonnieri Raym.-Hamet & H. Perrier (Crassulaceae, IV327)	mala madre (le)	4	7	--	2	**13**
Plantago major L. (Plantaginaceae, IV244, 371, R-IV-47)	llantén (le)	2	5	1	1	**9**
Zea mays L. (Poaceae, R-IV-49)	maíz (si)	4	3	--	1	**8**
Lavandula officinalis Chaix (Lamiaceae, R-IV-14,88)	algucema (fl)	--	1	1	5	**7**
Agave antillarum Descourt. (Agavaceae, IV419, R-IV-74), Agave sp. (Agavaceae, R-IV-71)	maguey (le, ro)	2	4	--	1	**7**
Matricaria recutita L. (Asteraceae, IV224, R-IV-39)	manzanilla (fl)	1	1	--	4	**6**
Ocimum sp. (Lamiaceae, R-IV-65)	albahaca morada (sh)	--	3	--	2	**5**
Pimpinella anisum L. (Apiaceae, R-IV-62)	anís (se)	1	--	--	4	**5**

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Illicium verum Hook. f. (Illiciaceae, R-IV-45)	anís de estrella (fr)	1	--	--	4	**5**
Caesalpinia coriaria (Jacq.) Willd (Fabaceae, R-IV-08, 44)	guatapanál (fr)	3	--	1	1	**5**
Securidaca virgata Sw. (Polygalaceae, IV389, R-IV-76)	maravelí (un)	--	1	1	3	**5**
Aloe vera (L.) Burm. f. (Asphodelaceae, IV234)	sábila (le)	2	2	--	1	**5**
Bixa orellana L. (Bixaceae, IV395, R-IV-15, 40, 41)	bija (se)	3	--	1	--	**4**
Cinnamomum verum J. Presl (Lauraceae, R-IV-69), *Cinnamomum* sp.	canela (ba)	1	2	--	1	**4**
Yucca aloifolia L. (Agavaceae, IV257)	jericó/apararayo (st)	--	3	--	1	**4**
Jatropha curcas L. (Euphorbiaceae, IV324, 434, R-IV-48)	piñon (un)	1	3	--	--	**4**
Peperomia pellucida Kunth (Piperaceae, IV321, 426)	siempre fresca (ae)	1	3	--	--	**4**
Xanthium strumarium L. (Asteraceae, IV302)	cadillo de gato (un)	--	1	--	2	**3**
Pimenta haitiensis (Urb.) Landrum (Myrtaceae, R-IV-01, 87)	canelilla (le)	--	--	--	3	**3**
Cocos nucifera L. (Arecaceae)	coco (fr)	--	2	--	1	**3**
Lippia micromera Schauer (Verbenaceae, IV204, 227, R-IV-05, 72)	orégano (le)	1	2	--	--	**3**
Plectranthus amboinicus (Lour.) Spreng. (Lamiaceae, IV292)	orégano poleo (ae)	1	2	--	--	**3**
Valeriana officinalis L. (Valerianaceae, R-IV-10, 78)	valeriana (ro)	--	--	2	1	**3**
Pavonia spinifex (L.) Cav. (Malvaceae, IV429)	cadillo de tres pies (ro)	--	2	--	--	**2**
Ricinus communis L. (Euphorbiaceae, IV365)	higuereta (se)	--	2	--	--	**2**
Myristica fragrans Houtt. (Myristicaceae)	nuez moscada (se)	--	--	--	2	**2**
Stachytarpheta jamaicensis (L.) Vahl (Verbenaceae, IV243, R-IV-16)	verbena (un)	2	--	--	--	**2**
Asthma/Chest congestion						
Allium cepa L. var. *aggregatum* G. Don (Alliaceae, R-IV-92)	cebollín (bu)	28	18	6	1	**53**
Aloe vera (L.) Burm. f. (Asphodelaceae, IV234)	sábila (le)	29	7	8	--	**44**
Ricinus communis L. (Euphorbiaceae, IV365)	higuereta (se)	29	8	4	2	**43**

Scientific name (family, voucher numbers)	Common name (plant part used*)	Lay people NYC	Lay people DR	Specialists NYC	Specialists DR	SUM
Nasturtium officinale R.Br. (Brassicaceae)	berro (ae)	22	7	5	--	**34**
Allium cepa L. (Alliaceae)	cebolla (bu)	13	7	5	4	**29**
Raphanus sativus L. (Brassicaceae, IV230)	rábano (ro)	19	8	2	--	**29**
Citrus aurantifolia (Christm.) Swingle (Rutaceae, IV288) and *Citrus limon* (Rutaceae)	limón (fr)	20	4	3	--	**27**
Cocos nucifera L. (Arecaceae)	coco (fr)	11	8	--	4	**23**
Bunchosia glandulosa DC. (Malpighiaceae, IV239, 398, R-IV-54)	cabra (le)	4	12	1	2	**19**
Allium sativum L. (Alliaceae)	ajo (bu)	7	2	1	2	**12**
Cinnamomum verum J. Presl (Lauraceae, R-IV-69), *Cinnamomum* sp.	canela (ba)	7	4	--	1	**12**
Sesamum indicum L. (Pedaliaceae)	ajonjolí (se)	5	1	2	2	**10**
Cymbopogon citratus Stapf (Poaceae, IV375, 417, R-IV-98)	limoncillo (le)	5	5	--	--	**10**
Petiveria alliacea L. (Phytolaccaceae, IV 207, R-IV-36, 37)	anamú (ro, le)	6	1	1	1	**9**
Merremia dissecta Hallier f. (Convolvulaceae, IV 326, 407)	viní viní (le)	1	8	--	--	**9**
Annona muricata L. (Annonaceae, IV399)	guanábana (fr, le)	2	4	--	1	**7**
Pouteria sapota (Jacq.) H.E. Moore & Stearn (Sapotaceae)	sapote (se)	2	3	--	--	**5**
Coffea arabica L. (Rubiaceae, IV275)	café (se)	3	1	--	--	**4**
Malpighia emarginata (Malpighiaceae, IV208, 213, 421)	cereza (le, fr)	--	4	--	--	**4**
Citrus aurantium L. (Rutaceae, IV 284)	naranja agria (fr, se)	3	1	--	--	**4**
Plectranthus amboinicus (Lour.) Spreng. (Lamiaceae, IV292)	orégano poleo (le)	--	3	--	1	**4**
Malus domestica Borkh. (Rosaceae)	manzana (fr)	3	--	--	--	**3**
Solanum americanum Mill. (Solanaceae, IV353, 422) and *Solanum nigrum* L. (IV170, 177)	morita (le)	--	3	--	--	**3**
Peperomia pellucida Kunth (Piperaceae, IV321, 426)	siempre fresca (le)	--	3	--	--	**3**
Chenopodium ambrosioides L. (Chenopodiaceae, IV171, 299, R-IV-86)	apasote (le)	2	--	--	--	**2**
Cissus verticillata (L.) Nicolson & C.E.Jarvis	bejuco caro (un)	2	--	--	--	**2**

Scientific name (family, voucher numbers)	Common name (plant part used*)	Lay people NYC	Lay people DR	Specialists NYC	Specialists DR	SUM
(Vitaceae, IV258, 272, 316, R-IV-99)						
Crescentia cujete L. (Bignoniaceae)	higüero (un)	2	--	--	--	**2**
Spermacoce assurgens Ruiz & Pav. (Rubiaceae, IV201, 276, 341, R-IV-42)	juana la blanca (un)	--	2	--	--	**2**
Pimenta dioica (L.) Merr. (Myrtaceae, R-IV-43)	malagueta (fr)	2	--	--	--	**2**
Lippia micromera Schauer (Verbenaceae, IV204, 227, R-IV-05, 72)	orégano (le)	--	2	--	--	**2**
--	puerro (un)	--	2	--	--	**2**
Ruta chalepensis L. (Rutaceae, IV445, R-IV-06, 50)	ruda (le)	2	--	--	--	**2**
Opuntia ficus-indica (L.) Mill. (Cactaceae, IV500), *Opuntia* sp. (IV223)	tuna de españa (un)	--	2	--	--	**2**
Kidney problems						
Cocos nucifera L. (Arecaceae)	coco (fr, ro)	12	19	3	3	**37**
Cinnamomum verum J. Presl (Lauraceae, R-IV-69), *Cinnamomum* sp.	canela (ba)	8	13	--	4	**25**
Ruellia tuberosa L. (Acanthaceae, IV233, 370, R-IV-75)	guaucí (ro)	4	14	--	6	**24**
Spermacoce assurgens Ruiz & Pav. (Rubiaceae, IV201, 276, 341, R-IV-42)	juana la blanca (en)	7	12	--	3	**22**
Zea mays L. (Poaceae, R-IV-49)	maíz (si)	12	6	--	1	**19**
Equisetum cf. *giganteum* (Equisetaceae, R-IV-55)	cola de caballo (ae)	9	3	2	--	**14**
Yucca aloifolia L. (Agavaceae, IV257)	jericó/apararayo (st, ro)	2	10	--	1	**13**
Opuntia ficus-indica (L.) Mill. (Cactaceae, IV500), *Opuntia* sp. (IV223)	tuna de españa (le)	3	5	1	4	**13**
Agave antillarum Descourt. (Agavaceae, IV419, R-IV-74), *Agave* sp. (R-IV-71)	maguey (le, ro)	3	5	1	1	**10**
Thespesia populnea Sol. ex Corrêa (Malvaceae, IV329)	álamo (le)	2	4	--	1	**7**
Allium cepa L. (Alliaceae)	cebolla (bu)	2	4	1	--	**7**
Citrus aurantifolia (Christm.) Swingle (Rutaceae, IV288) and *Citrus limon* (Rutaceae)	limón (fr)	3	3	--	1	**7**
Petiveria alliacea L. (Phytolaccaceae, IV 207, R-IV-36, 37)	anamú (ro, le, en)	4	2	--	--	**6**
Allium sativum L. (Alliaceae)	ajo (bu)	3	1	--	1	**5**
Xanthium strumarium L. (Asteraceae, IV302)	cadillo de gato (ro)	2	2	--	1	**5**

Scientific name (family, voucher numbers)	Common name (plant part used*)	Lay people NYC	Lay people DR	Specialists NYC	Specialists DR	SUM
Pavonia spinifex (L.) Cav. (Malvaceae, IV429)	cadillo de tres pies (ro)	2	3	--	--	**5**
Cyperus rotundus L. (Cyperaceae, IV323)	junquillo (en)	3	1	--	1	**5**
Smilax domingensis Willd. (Smilacaceae, IV381)	bejuco de riñon (ro)	--	3	--	1	**4**
Plantago major L. (Plantaginaceae, IV244, 371, R-IV-47)	llantén (le, ro)	1	2	--	1	**4**
Mangifera indica L. (Anacardiaceae, R-IV-90)	mango (fr, ba, le)	2	--	--	2	**4**
Caesalpinia brasiliensis (R-IV-58)	palo de brasil (ro, ba)	3	--	1	--	**4**
Urera baccifera (L.) Gaudich. (Urticaceae, IV352)	pingamosa (ro)	--	4	--	--	**4**
Pimpinella anisum L. (Apiaceae, R-IV-62)	anís (se)	1	--	--	2	**3**
Illicium verum Hook. f. (Illiciaceae, R-IV-45)	anís de estrella (fr)	1	--	--	2	**3**
Coffea arabica L. (Rubiaceae, IV275)	café (le)	--	2	--	1	**3**
Cassia fistula L. (Fabaceae, IV386, R-IV-85)	cañafistula (un)	2	--	--	1	**3**
Matricaria recutita L. (Asteraceae, IV224, R-IV-39)	manzanilla (fl)	--	1	--	2	**3**
Lavandula officinalis Chaix (Lamiaceae, R-IV-14,88)	algucema (fl)	--	--	--	2	**2**
Chenopodium ambrosioides L. (Chenopodiaceae, IV171, 299, R-IV-86)	apasote (un)	2	--	--	--	**2**
Apium graveolens L. (Apiaceae)	apio (st)	2	--	--	--	**2**
--	bejuco de burro (un)	2	--	--	--	**2**
Vaccinium macrocarpon Ait. (Ericaceae)	cranberry (fr)	2	--	--	--	**2**
Cassytha filiformis L. (Lauraceae, IV380)	fideo (le)	--	2	--	--	**2**
Passiflora sp. (Passifloraceae, R-IV-79)	granadillo (le)	--	2	--	--	**2**
Piper aduncum L. (Piperaceae, IV273)	guayuyo (ro, le)	--	2	--	--	**2**
Chamaesyce hirta (L.) Millsp. (IV261, 309)	marcasá (un)	--	2	--	--	**2**
Melocactus lemairei Lem. (Cactaceae, R-IV-100)	melon de breña (un)	--	2	--	--	**2**
Morinda citrifolia L. (Rubiaceae, IV374)	noni (fr, ro, le)	2	--	--	--	**2**
Olea europaea L. (Oleaceae)	oliva (fr)	2	--	--	--	**2**
Catalpa longissima Sims (Bignoniaceae, IV317, R-IV-83)	roble (ba)	2	--	--	--	**2**

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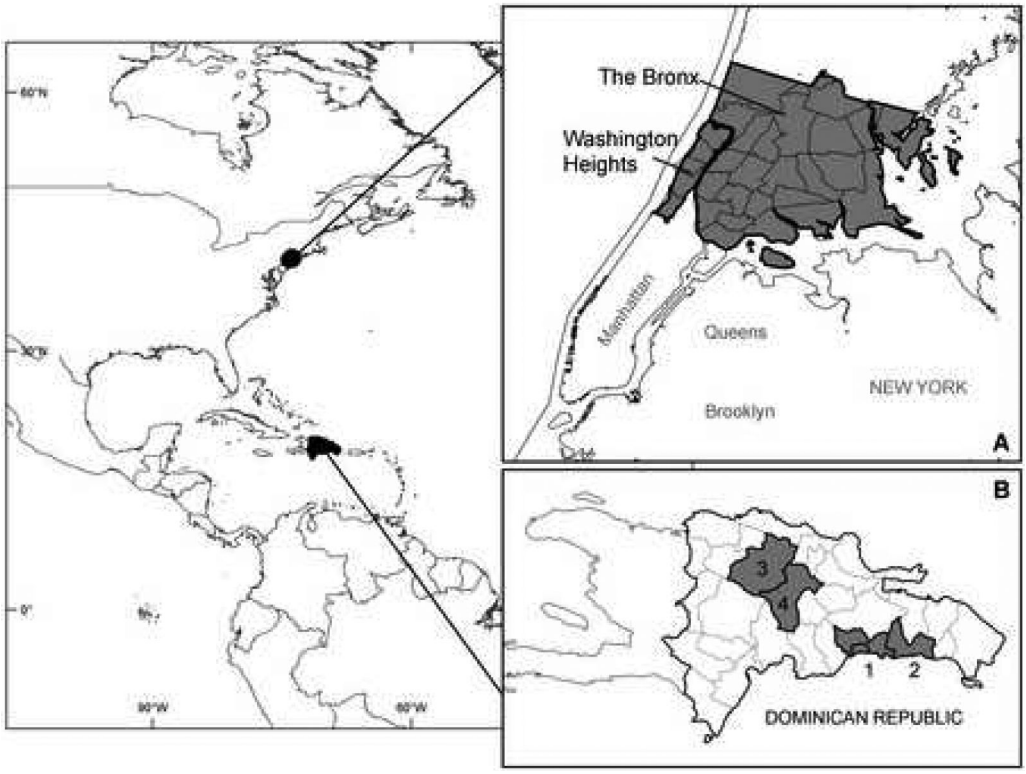


Figure 1.
Map of the study areas. Interviews were conducted with 174 Dominicans in the neighborhoods of Washington Heights and the Bronx in New York City (figure 1A) and with 145 Dominicans in four provinces in the Dominican Republic: (1) Distrito Nacional (Santo Domingo), (2) San Pedro de Macorís, (3) Santiago and (4) La Vega (figure 1B).

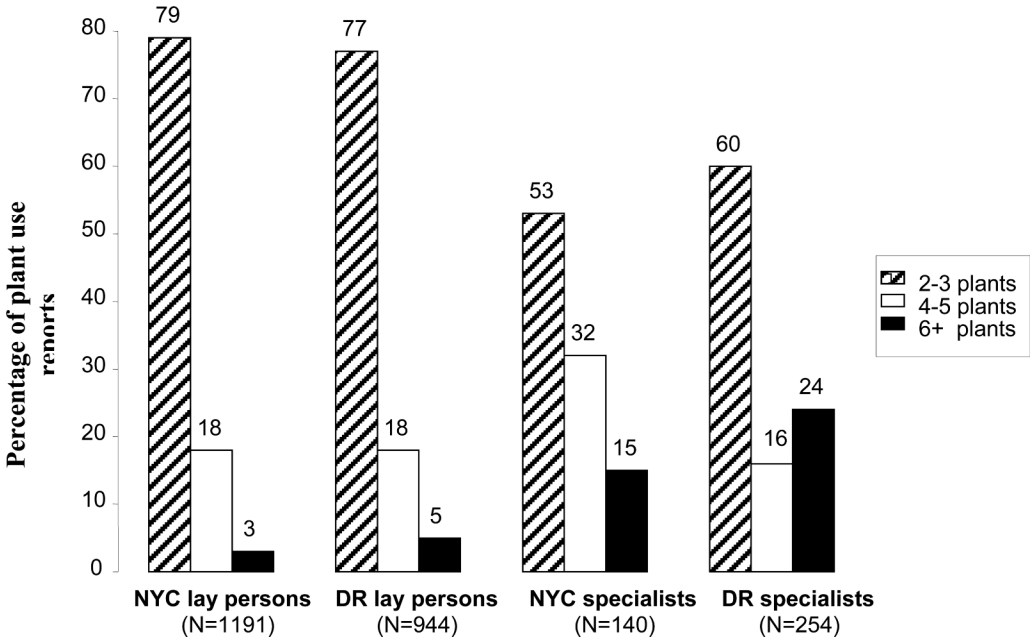


Figure 2.

Percentage of mixtures that are composed of two or three plants, four or five plants, or more than six plants (N=sample size, total number of plant use reports with mixtures).

Figure 3.
A tea mixture is prepared by boiling different plant species together in water (a decoction).

Figure 4.
A *botella mamajuana* containing bark and other parts from different plant species and octopus.

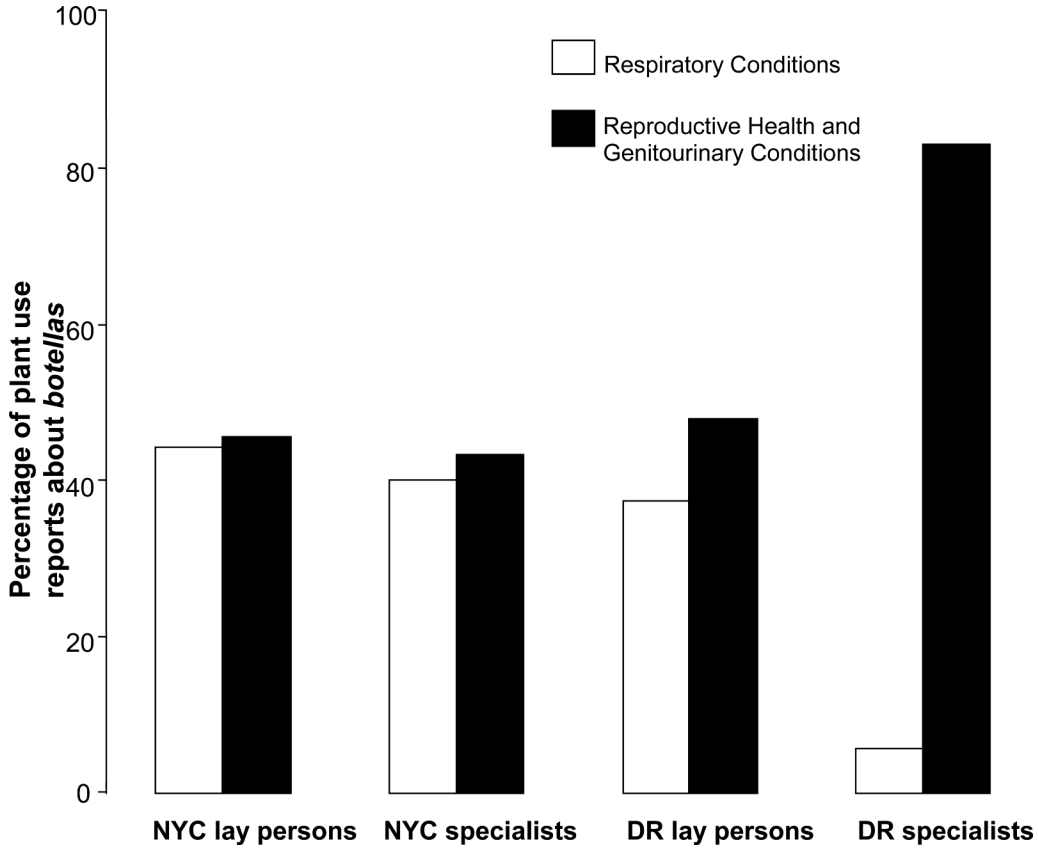


Figure 5.
Use of *botellas* for respiratory versus reproductive health and genitourinary conditions.

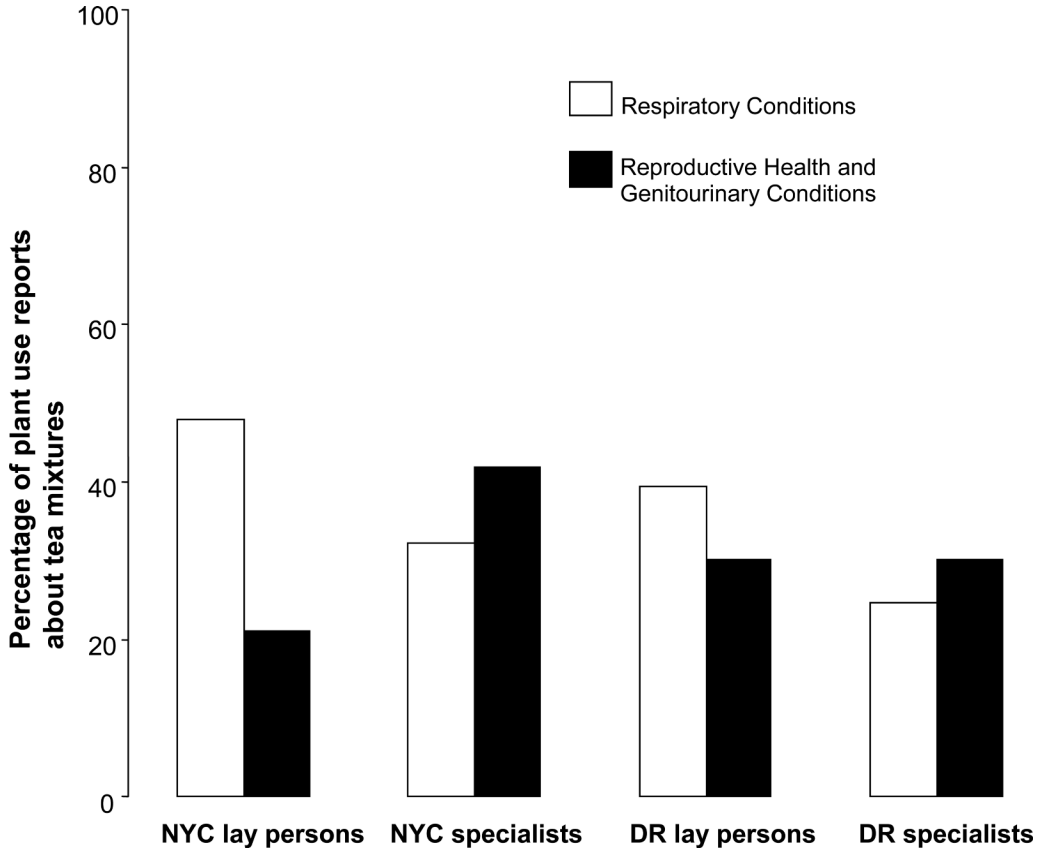
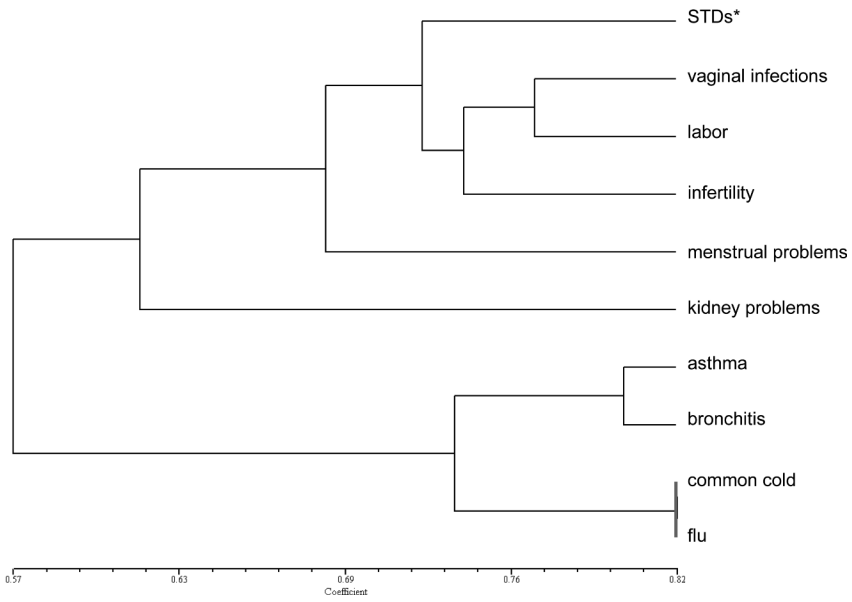


Figure 6.
Use of tea mixtures for respiratory versus reproductive health and genitourinary conditions.

A



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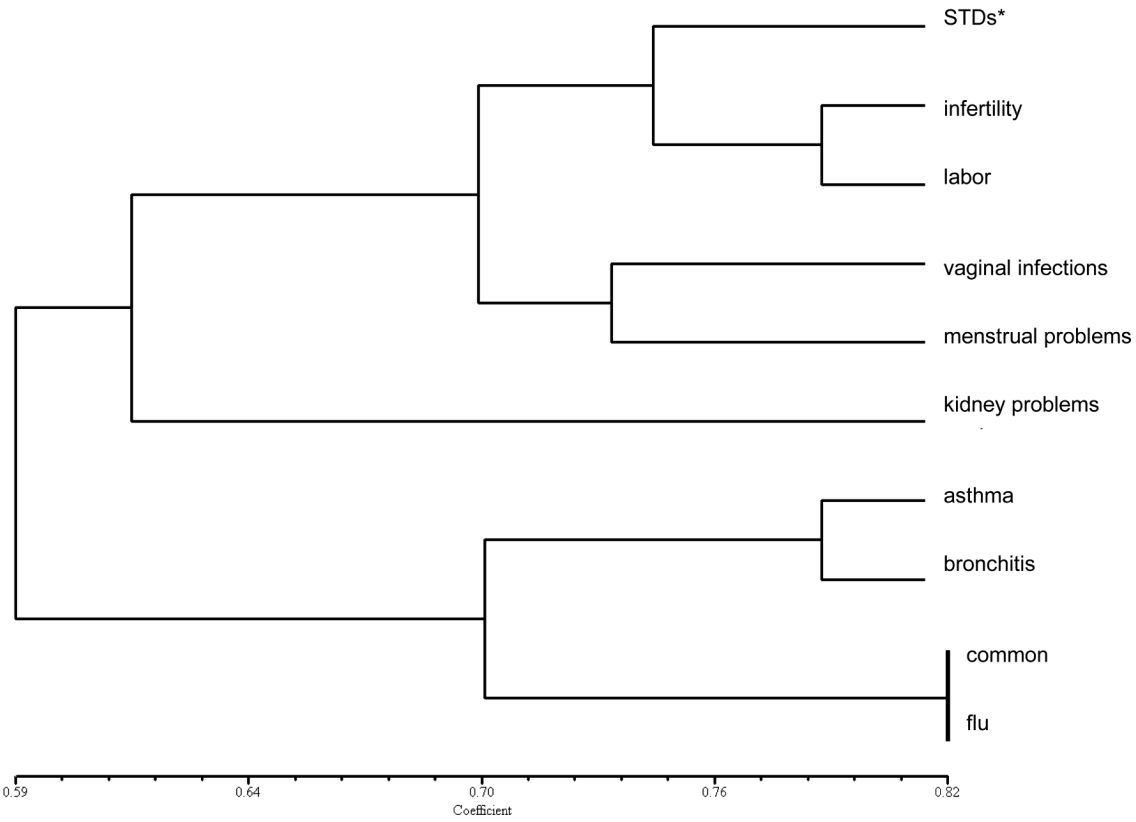

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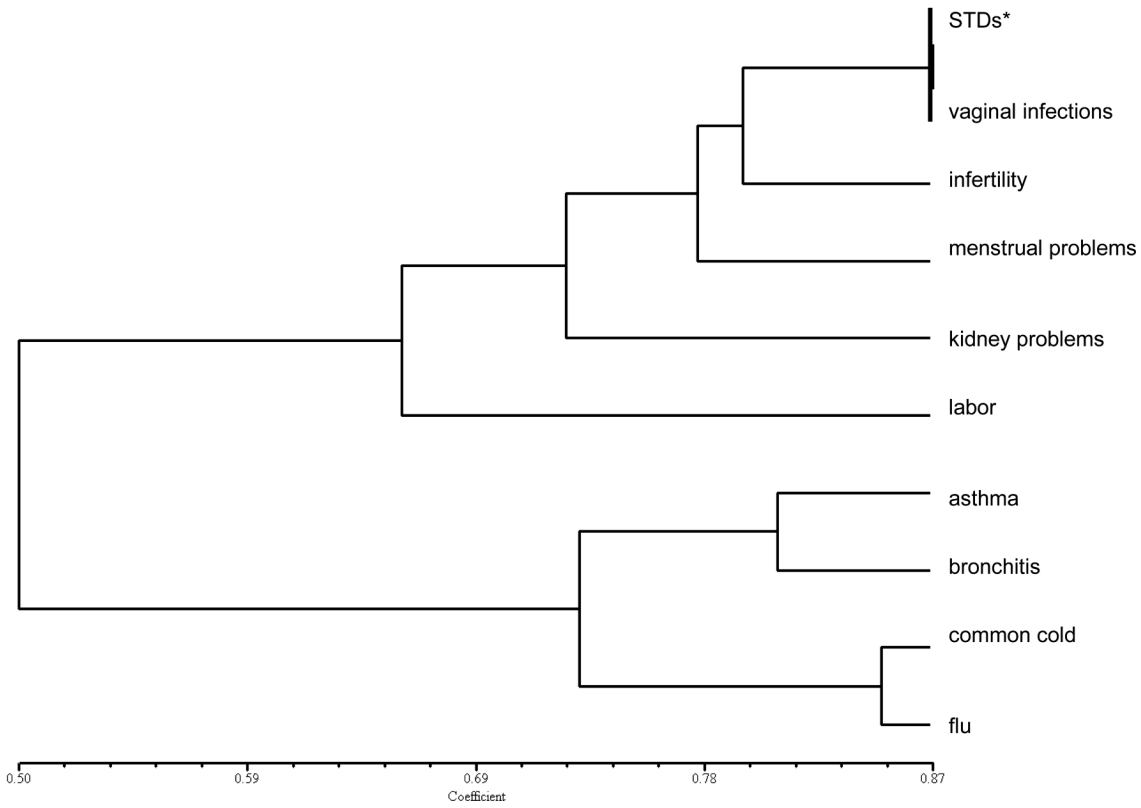

Figure 7.

Cluster analysis of plant-illness data based upon presence/absence of plant species used to treat these health conditions (figure 7A: NYC lay persons; figure 7B: DR lay persons; figure 7C: DR specialists). Data from NYC specialists are omitted because the tree showed a poor correlation with the original similarity/dissimilarity matrix (r=0.73; normalized mantel statistic Z). Matrix correlations for NYC lay persons: r=0.88 (good fit); DR lay persons: r=0.86 (good fit); DR specialists: r=0.94 (very good fit). *STDs: sexually transmitted diseases.

Table 1A

Percentage of mixtures in plant use reports according to specific health conditions (ratio of use reports with mixtures versus all use reports per health condition). Data from lay persons (who self-medicate with medicinal plants) in New York City (NYC) and the Dominican Republic (DR).

Health condition	Percentage of mixtures in NYC - lay	Percentage of mixtures in DR - lay	Total number of use reports in NYC - lay	Total number of use reports in DR – lay
Infertility	67	75	43	24
Flu	66	72	284	198
Sexually transmitted diseases	64	84	25	19
Common cold	62	63	144	104
Bronchitis	54	59	128	71
Asthma/chest congestion	47	39	188	128
Labor/puerperium	47	52	53	44
Menstruation	41	40	73	70
Cough	41	54	135	85
Vaginal infections	38	49	71	80
Sinusitis	38	36	128	83
Diarrhea	38	43	158	157
Impotence	32	30	19	20
Arthritis	26	26	102	61
Cholesterol	24	36	135	44
Kidney problems	24	39	204	160
Diabetes	20	20	208	154
Back pain	18	23	33	26
Hypotension	18	25	28	24
Birth control	16	28	32	32
Hypertension	14	18	122	77
Boils	13	9	115	119
Burns	13	11	141	84
Fungal skin infections	12	11	103	117
Trauma	10	5	39	57
Shingles	9	33	32	24
Wounds	8	8	103	96
Sprains	7	25	44	53

Table 1B

Percentage of mixtures in plant use reports according to specific health conditions (ratio of use reports with mixtures versus all use reports per health condition). Data from plant specialists (traditional healers who use plants to treat others) in New York City (NYC) and the Dominican Republic (DR).

Health condition	Percentage of mixtures in NYC - specialists	Percentage of mixtures in DR - specialists	Total # of use reports in NYC - specialists	Total # of use reports in DR - specialists
Flu	93	54	15	35
Infertility	89	87	9	15
Sexually transmitted diseases	83	56	6	18
Common cold	80	47	10	19
Sinusitis	77	41	13	17
Asthma/chest congestion	75	48	16	29
Bronchitis	70	71	10	17
Labor/puerperium	60	65	10	17
Menstruation	56	84	9	19
Vaginal infections	50	71	10	14
Birth control	43	50	7	4
Kidney problems	43	67	14	24
Arthritis	40	46	10	13
Cough	36	38	11	16
Diarrhea	36	41	14	22
Cholesterol	31	13	13	8
Shingles	25	0	12	7
Impotence	25	56	8	9
Diabetes	20	25	20	32
Hypertension	20	21	10	19
Fungal skin infections	12	12	17	25
Back pain	10	42	10	12
Boils	8	5	12	20
Burns	8	32	13	22
Hypotension	0	33	4	12
Sprains	0	15	7	13
Trauma	0	7	12	15
Wounds	0	15	11	20

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Table 2

Matrix ranking of health conditions according to the percentage of mixtures in plant use reports to treat individual health conditions*.

Final Rank #	Health condition	NYC lay persons	DR lay persons	NYC specialists	DR specialists	SUM
1	Infertility	15	14	14	15	**58**
2	Sexually transmitted diseases	13	15	13	8.5	**49.5**
3	Flu	14	13	15	7	**49**
4	Bronchitis	11	11	9	12.5	**43.5**
5	Common cold	12	12	12	4	**40**
6	Labor	9.5	9	8	10	**36.5**
7	Menstruation	7.5	6	7	14	**34.5**
8	Vaginal infections	5	8	6	12.5	**31.5**
9	Asthma/Chest congestion	9.5	4.5	10	5	**29**
10	Kidney problems	2	4.5	4.5	11	**22**
11	Sinusitis	5	3	11	2.5	**21.5**
12	Cough	7.5	10	2.5	1	**21**
13	Diarrhea	5	7	2.5	2.5	**17**
14	Impotence	3	2	1	8.5	**14.5**
15	Birth control	1	1	4.5	6	**12.5**

*Only fifteen health conditions were selected that were treated with a high percentage of mixtures by either lay persons and/or specialists in New York City (NY C) and the Dominican Republic (DR). The scores of “15” and “1” were given to the conditions with the highest and lowest percentage of mixtures, respectively (according to their percentages in table 1A and 1B). If two or more conditions had the same percentage, then a medium score was attributed to each of the conditions. The highest rank (#1) corresponds with the health condition that has the highest cumulative number of individual scores (SUM). Conditions are ranked in descending order of their cumulative score.

Table 3

Types of plant mixtures reported by participants and corresponding percentage of plant use reports (total number of use reports containing mixtures is 1191 for NYC lay persons, 140 for NYC specialists, 254 for DR specialists and 944 for DR lay persons).

	NYC lay persons	DR lay persons	NYC specialists	DR specialists
Tea (*té*)	37	55	22	43
Drink (*tomar*)	33	10	19	6
Bandage/direct application/massage (*venda/aplicar/friccionar*)	9	8	8	8
Botella/pote/galón (bottled mixture)	6	8	23	23
Zumo/jugo (juice)	4	6	1	6
Unspecified	3	2	3	1
Jarabe (syrup)	2	1	2	1
Licuado (blended drink)	2	2	11	2
Bebedizo (medicinal brew)	1	1	3	4
Baño/lavado (body wash)	1	1	1	5
Vapor (inhalation)	0	1	1	0
Tisana (tisane)	0	0	0	1
Gárgara (gargle)	0	0	1	0

Table 4

Plants from Appendix A were divided into two groups: (1) reproductive health and genitourinary conditions (infertility, labor, sexually transmitted diseases, menstrual problems, vaginal infections, kidney problems) and 2) respiratory conditions (flu, common cold, bronchitis, asthma/chest congestion). Scores from Appendix A were summed over these groups to calculate a total score number. Only species with a score equal to or greater than 10 are listed. Overlapping species are underlined. Voucher numbers are listed in Appendix A.

Reproductive health and genitourinary conditions			**Respiratory conditions**		
Score #	**Local name (status*)**	**Scientific name (plant part used**)**	**Score #**	**Local name (status*)**	**Scientific name**
110	guaucí (w)	*Ruellia tuberosa* (root)	251	limón (c)	*Citrus aurantifolia Citrus limon* (leaf, fruit)
94	juana la blanca (w)	*Spermacoce assurgens* (root, entire plant, leaf)	192	canela (s)	*Cinnamomum verum* (bark)
75	coco (w)	*Cocos nucifera* (fruit, root)	163	cebollín (c)	*Allium cepa* var. *aggregatum* (bulb)
73	manzanilla (c)	*Matricaria recutita* (flower)	158	cebolla (c)	*Allium cepa* (bulb)
69	canela (s)	*Cinnamomum verum* (bark)	151	sábila (c)	*Aloe vera* (leaf)
61	anís de estrella (s)	*Illicium verum* (fruit)	149	naranja agria (c)	*Citrus aurantium* (leaf, fruit)
53	maguey (w)	*Agave antillarum* (root, leaf)	148	limoncillo (c)	*Cymbopogon citratus* (leaf)
51	algucema/alhucema (s)	*Lavandula angustifolia* (flower)	120	berro (c)	*Nasturtium officinale* (aerial part)
46	tuna de españa (c)	*Opuntia ficus-indica* (leaf)	118	higuereta (w, s)	*Ricinus communis* (seed)
37	anís (s)	*Pimpinella anisum* (seed)	113	rábano (c)	*Raphanus sativus* (root)
33	mala madre (w)	*Kalanchoe gastonis-bonnieri* (root, leaf)	92	guanábana (c)	*Annona muricata* (leaf)
31	llantén (w)	*Plantago major* (leaf, entire plant)	56	cabra (w)	*Bunchosia glandulosa* (leaf)
31	maíz (c)	*Zea mays* (corn silk)	49	jengibre (c)	*Zingiber officinale* (root)
29	jericó/apararayo (w)	*Yucca aloifolia* (stem, root)	45	manzana (c)	*Malus domestica* (fruit)
29	maravelí (w)	*Securidaca virgata* (root)	42	anamú (w)	*Petiveria alliacea* (root)
25	anamú (w)	*Petiveria alliacea* (root)	42	coco (w)	*Cocos nucifera* (fruit)
25	higüero (w)	*Crescentia cujete* (fruit)	41	cereza (c)	*Malpighia emarginata* (leaf, fruit)
24	sén (s)	*Senna italica* (leaf)	33	eucalipto (c)	*Eucalyptus* spp. (leaf)
23	algodón morado (w)	*Gossypium hirsutum* (leaf)	27	ajo (c)	*Allium sativum* (bulb)
18	cardo santo (w)	*Argemone mexicana* (leaf, root)	23	ajonjolí (c)	*Sesamum indicum* (seed)
17	sábila (c)	*Aloe vera* (leaf)	23	aroma (w)	*Acacia macracantha* (bark)
16	cadillo de gato (w)	*Xanthium strumarium* (root)	22	viní viní (w)	*Merremia dissecta* (aerial part)
16	canelilla (w)	*Pimenta haitiensis* (leaf)	19	chinola (c)	*Passiflora edulis* (fruit)
15	higuereta (w, s)	*Ricinus communis* (seed)	19	dragón (w)	*Alpinia zerumbet* (leaf)
14	cañafistula (w)	*Cassia fistula* (fruit)	19	menta (c)	*Mentha* spp. (aerial part)

Reproductive health and genitourinary conditions			Respiratory conditions		
Score #	**Local name (status*)**	**Scientific name (plant part used**)**	**Score #**	**Local name (status*)**	**Scientific name**
14	cola de caballo (w)	*Equisetum giganteum* (stem)	17	café (c)	*Coffea arabica* (seed, leaf)
12	naranja agria (c)	*Citrus aurantium* (leaf)	16	anís (s)	*Pimpinella anisum* (seed)
12	nuez moscada (s)	*Myristica fragrans* (seed)	16	manzanilla (c)	*Matricaria recutita* (flower)
12	palma (w)	*Roystonea* cf. *hispaniolana* (root, crown shaft, fruit)	15	clavo (s)	*Syzygium aromaticum* (flower)
12	tilo (s)	*Tilia* spp. (flower)	15	morita/hierba mora (w)	*Solanum americanum, Solanum nigrum* (aerial part)
11	bija (w)	*Bixa orellana* (seed)	12	naranja dulce/china (c)	*Citrus sinensis* (leaf)
			11	apio (c)	*Apium graveolens* (stem)
			10	anís de estrella (s)	*Illicium verum* (fruit)

* status represents whether the species is (w) wild, (c) cultivated or (s) sold in markets and supermarkets. Higuereta (*Ricinus communis* L., Euphorbiaceae) is also listed as sold because the processed oil is widely commercially available.

** Plant parts listed include only those that were mentioned frequently by participants and do not necessarily represent all the parts that have been documented for each species.