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Plants Used as Food and Medicine by Polish Migrants in Misiones, Argentina

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In this article we discuss the importance of food plants, both introduced and native, in the pharmacopoeia of the Polish community in Misiones, Argentina. Food species constitute a relevant portion of all botanicals used by Polish settlers in home therapies (41%), while introduced food species prevail among the continued herbal remedies used by the study group. We explain this pattern of use by food plant availability, their versatility as reflected in the number of medicinal applications, and also their importance in cross–cultural relations. Finally, we conclude that several food plants used by Polish migrants (e.g., Allium sativum, Mentha xpiperita, and Camellia sinensis) may have served to "strengthen" migrants' identity within the host country.

KEYWORDS Atlantic Forest, cross-cultural ethnobotany, edible plants used in home phytotherapy, food medicines, Polish diaspora

Since the nineties, scholars have focused on the adaptive processes of migrant communities by addressing their changing dietary habits, their implications for health, and the challenges posed to traditional folk pharmacopoeias (e.g., Balick et al. 2000; Ceuterick et al. 2008; Pieroni et al. 2007; Pirker et al. 2012; Sandhu and Heinrich 2005; Van Andel and Westers 2010; Vandebroek et al. 2010). Most of this type of research has been conducted in European and North American urban spaces (Pieroni and

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Vandebroek 2007). Contrary to this trend, this article addresses the importance of food plants in the phytotherapy of European peasants who settled in the subtropical forest of Misiones in Argentina in the late 1930s.

We assumed that the continuity of Polish folk medicine among Polish migrants and their descendants in Misiones could be observed firstly in health practices such as faith healing, bone setting and midwifery that require limited and not specific organic material; secondly, in the use of animal products from farms (milk, sour milk, butter, lard, eggs and honey); and thirdly, in the medicinal use of introduced food plants. By introduced food plants we understand botanical species that Polish migrants brought along or recognized in Misiones, which were known from their country of origin (or Europe, in a wider sense).

In this article we aim to test the third part of the aforementioned hypothesis, as previous findings have confirmed the continuation of faith healing, bone setting and midwifery in the Polish migrant group (Kujawska 2008, 2010, 2013), as well as the widespread employment of honey and other animal products derived from farm livestock (Kujawska, Zamudio, and Hilgert 2012; Zamudio, Kujawska, and Hilgert 2010).

Phytotherapy, along with faith healing formed the base of folk medicine in Poland (Libera 1995; Paluch 1984). Plants used in the folk pharmacopoeia were mainly native species grown in the wild (Paluch 1991). Polish peasants used to forage not only for medicine but also for food plants, as more than 150 species (5.5% of the Polish flora) were used, on a daily basis (especially fruits), and in times of food shortage (especially wild leafy vegetables) (Łuczaj 2011; Łuczaj and Szymański 2007). It is probable that Polish peasants, who migrated to Argentina in the late 1930s, have retained the habit of foraging both for medicinal and wild edible plants and have kept the memory of many of wild edible plants known from their homeland alive.

The main question raised in this work is whether food plants play a crucial role in the domestic provision of healthcare within the Polish community, and if so to attempt to explain why. Moreover, we wanted to assess whether introduced or native food plants prevail in the folk medical practices of the Polish diaspora, and to find reasons for an eventual prevalence.

By the 1600s all of the important Old World food crops had already been introduced to the Americas. Thus, they have also been available as medicinal resources for Indigenous, Mestizo and European migrants for the last 400 years (Crosby 1972). Bennett and Prance (2000) argue that introduced plants are vital resources for people from northern South America, and a great number of them are employed medicinally (Prance and Plana 1998). Indigenous and Mestizo populations from that region employ at least 216 introduced plant species as medicines. Most of these plants were introduced as food plants (88 spp.) or ornamentals (67 spp.). Nearly 80% of the plants are of European, Mediterranean or Asian origin (Bennett and Prance 2000). No such analyses have been made for the southern cone of South

America, but we presume that similar patterns may be observed there, given the multicultural character of Brazil and Argentina, where representatives of most European countries have migrated. This must have had an impact on the use of food and medicinal species from the Old World, and on the further transfer of useful plants from the places of origin of the migrants.

This study may therefore contribute to the generation of new knowledge about the potential role of introduced and local food species in the folk pharmacopeia of European migrants and their descendants in South America. Since, however, there is presently a lack of similar studies focusing on food plant uses among other ethnic groups living in Misiones, cross-cultural comparison is not possible.

MATERIAL AND METHODS

Study Area and Its Inhabitants

Misiones is one of the smallest and greenest provinces in Argentina. It is a part of the Atlantic Forest of the Upper Parana ecoregion and stands out for its great biological diversity (Placi and Di Bitetti 2006). Another outstanding feature of Misiones is its multi-cultural character (Bartolomé 1982). This multiethnic legacy has resulted in a rich folk pharmacopoeia of Mbya Guaraní indigenous communities, Mestizos (called *Criollos*), and European migrants. More than 10% of the province flora (3000 vascular plant species altogether) is applied in local medicine (Amat and Yajia 1991, 1998; Keller 2008; Keller and Romero 2006; Kujawska and Hilgert 2014; Moreau 2006).

Immigrants have been coming to Misiones from nearly all European and a few Asian countries, as well as from the neighboring Paraguay and Brazil, since the end of the 19th century. The study group of Polish migrants arrived in the northwestern part of Misiones between 1936–1638 (Kujawska 2008, 2010; Stemplowski 2011). This was an organized migration to two rural settlements: Wanda and Lanusse, 36 km away from each other. Polish migrants brought along tools for the cultivation of cereals and potatoes, but the soil was not appropriate for temperate climate annual crops, therefore they started to grow tobacco, tung (*Vernicia fordii* (Hemsl.) Airy Shaw), tea, citrus, and *yerba maté* (*Ilex paraguaryensis* A. St.-Hil.) as cash crops, and cassava as their staple. Polish settlers complemented farming with livestock raising and timber extraction (Kujawska 2008, 2010).

Study Participants

The present study is part of a larger piece of research on Polish migrants' ethnomedicine. Fieldwork took place in 2007, 2009, and 2011 (8 months in the field) and was conducted by the first author. Altogether, 94 persons of Polish origin and their descendants were interviewed (69 from Wanda and 25 from Lanusse): 62 women and 32 men, aged between 28 and 92.

There is no official information about the number of Polish families living in Wanda and Lanusse. According to the unofficial estimation of the Polish Association in Wanda, approximately 250 families, including mixed couples, live in Wanda town and 16 families in Lanusse village.

Wanda and Lanusse were established as rural colonies, nevertheless Wanda managed to develop into a municipal town in the late 1950s, while Lanusse has conserved its rural and isolated character. Still, the great majority of the Wanda's inhabitants have access to home gardens and the semi-rural environment on the town's outskirts.

Interviewing Methods

The data presented in this article were gathered via a triple methodological strategy involving semi-structured, in-depth, and free listing interviews. The first author inquired about therapeutic strategies put in place for 34 previously selected common illnesses and syndromes. Additional free list interviews were performed on botanical species used in home medicine by representatives of the Polish community. As a result of these two questionnaires, a list of 129 folk plant taxa was obtained (Kujawska and Hilgert 2014). That list, complemented with dried plant material, was shown to 14 participants, who were eager to take part in a long, in-depth interview. We used multiple questionnaires in order to triangulate information and improve our understanding of medicinal concepts and the employment of plant remedies in complementary medicine. Additionally, we conducted several unstructured biographical interviews with Polish migrants as well as interviews with physicians working in the area, to better understand the health-seeking behaviors of the representatives of the Polish community.

Plant Collection and Identification

We collected botanical material together with the informants. With the exception of some common cultivars, all fertile specimens were stored in Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" in Buenos Aires and in Herbario CTES of the Instituto de Botánica del Nordeste, Corrientes, Argentina. Plant and author names were verified using the Tropicos database (http://www.tropicos.org/).

Data Analysis

The unit of analysis was a plant use report. This a study participant's description of use of a plant part or parts of a particular taxon to treat a given health condition. The medicinal uses are provided along with the number of citations by informants. As herbal remedies were the main concern of this study, the analysis does not include the frequency of mentions with respect to culinary uses.

Only the plant use reports that had at least two citations by interviewees were taken into consideration in the analysis. The only exceptions were single use reports that were supported with references from Polish or Argentinean ethnomedical and ethnobotanical literature. These single reports suggest a continuity of Polish pharmacopoeia (within the process of abandonment) or new uses, adopted from the neighboring ethnic group yet not popularized in the Polish community, which therefore cannot be classified as artifacts (Heinrich et al. 2009).

The recorded data were compared with both Polish ethnobotanical and ethnomedical literature, which documents the medicinal uses of plants from the first half of the 20th century and provides reliable botanical names (Paluch 1984; Spittal 1938; Udziela 1931), and the available ethnobotanical literature from Misiones (Amat and Yajía 1991, 1998; Keller and Romero 2006; Moreau 2006). For an additional review, we consulted ethnobotanical publications from Paraguay (Cadogan 1957; Pérez Maricevich 1972; Soria and Basualdo 2005) and southern Brazil from the Atlantic Forest ecoregion (Begossi, Hanazaki, and Tamashiro 2002).

RESULTS

Characteristics of Food Plants Used as Medicine

There were 47 botanical taxa and 6 plant products (53 botanicals altogether) used for both food and medicine by Polish inhabitants of northern Misiones. Of these species, 15 are local and native to the region, while 38 are introduced taxa, although not all of them were known to Polish migrants from their country of origin. They belong to 28 botanical families, of which Myrtaceae (7) and Rutaceae (6) are the most frequent (table 1). The total herbal pharmacopoeia of Polish migrants accounts for 129 botanical species; and food plants, along industrially processed plant products, constitute 41% of all plants used in phytotherapy by the Polish group (Kujawska and Hilgert 2014). However, when we take into account only legacy plants, the relevance of food species increases. Polish migrants have continued to use 22[1] medicinal species, which they brought along or re-discovered in northern Misiones. Of the legacy plants, 15 (68%) employed in home phytotherapy by Polish migrants and their descendants are actually food plants. These include: *Allium cepa* L., *Allium sativum* L., *Anethum graveolens* L., *Brassica oleracea*

[1] In the paper by Kujawska and Hilgert (2014) we stated that there were 19 legacy plants whose use had been documented among Polish migrants and their descendants in Misiones, because we took into account only species cited by at least two study participants. In this study we also took into account a few species mentioned by single individuals: *Daucus carota, Prunus domestica* and *Coffea arabica* because they were supported by ethnobotanical references from Poland and Argentina (more explanations in the Method section).

TABLE 1 Plants Used as Medicine and Food by Polish Settlers in Misiones, Argentina

Species Latin name, botanical family, local name	Plant origin	Plant part(s) used as medicine	Medicinal use	Number of citations	References for medicinal uses	Plant part(s) used as food	Food use
Allium cepa L. Amaryllidaceae, cebolla	introduced	bulbs	boils, ulcers, catarrh, bronchitis, flu, festering wounds	24	Pl.: Udziela 1931, Spittal 1938, Paluch 1984	bulbs	vegetable
Allium sativum L. Amaryllidaceae, ajo	introduced	bulbs	intestinal parasites, toothache, common cold, flu, bronchitis, otitis, viper and snake bite, contaminated blood*, blood too thick*, high blood pressure, tinea pedis*, pimples*, prophylactics	64	Pl.: Udziela 1931, Spittal 1938, Paluch 1984; Arg: Amat and Yajía 1991, 1998, Keller and Romero 2006	bulbs	condiment
Allophylus edulis (A.St.-Hil., Cambess.& A.Juss.) Hieron. ex. Niederl. Sapindaceae, cocú	local	leaves and stems	slow digestion, stomach and liver refreshing (humoral medicine), stomach cooling* (humoral medicine), liver pains, hepatitis, liquid retention in organism (diuretic), *empacho**	57	Arg: Amat and Yajía 1991, 1998, Keller and Romero 2006; Par: Pérez Maricevich 1972, Soria and Basualdo 2005	fruits	snack fruit
Anethum graveolens L. Apiaceae, eneldo	introduced	inflorescences, infructes-cences	flatulence, constipation	4	Pl.: Paluch 1984, Arg: Amat and Yajía 1998, Keller and Romero 2006; Par: Soria and Basualdo 2005	infructescences	condiment (for lacto-fermented cucumbers)
Brassica oleracea L. Brassicaceae, repollo	introduced	leaves	boils	2	Pl.: Spittal 1938, Paluch 1984	leaves	vegetable (consumed raw, lacto fermented, cooked)
Campomanesia guazumifolia (Cambess.) O. Berg Myrtaceae, sietecapotes	local	leaves	diarrhea	2	Arg.: Moreau 2006	fruits	snack fruit

Campomanesia xanthocarpa Mart. ex. O. Berg Myrtaceae, guavirá	local	leaves	diarrhea	3	Arg.: Amat and Yajía 1998	fruits	snack fruit
Carica papaya L. Caricaceae, mammon	introduced	flowers, seeds, exudates, fruits	intestinal parasites, cough, bronchitis, constipation*, prophylactics*	22	Arg.: Keller and Romero 2006	fruits	dessert fruit, meat softener
Celtis iguanaea (Jacq.) Sarg. Cannabaceae, tala	local	leaves	cough*	2		fruits	snack fruit
Citrus aurantium L. Rutaceae, apepú	introduced	fruits, leaves	flu,cold, chest congestion, prevents respiratory illnesses, hot remedy (humoral medicine), frialdad ("coldness")	25	Arg.: Amat and Yajía 1998, Keller and Romero 2006; Par.: Cadogan 1957	fruits	juice, used in *tereré*, lemonade, salads
Citrus limettioides Tanaka Rutaceae, lima, lima dulce	introduced	leaves, fruits	flu, cold*, bronchitis*, agitation*, nervous tension*, high blood pressure*	14	Arg.: Keller and Romero 2006	fruits	dessert fruit
Citrus limon (L.) Osbeck Rutaceae, limón	introduced	fruit juice, leaves	bronchitis, flu, cold, cough, sore throat, high blood pressure, contaminated blood* (humoral medicine), slow digestion	31	Pl.: Spittal 1938, Paluch 1984; Arg.: Amat and Yajía 1998, Keller and Romero 2006	fruits	juice, used in tea, lemonade and salad
Citrus paradisi Macfad. Rutaceae, pomelo	introduced	fruits, leaves	cold, flu, fever, high blood pressure*	24	Arg.: Keller and Romero 2006	fruits	dessert fruit
Citrus reticulata Blanco Rutaceae, mandarina	introduced	leaves	agitation*, nervous tension*, insomnia*, depression*, cold, flu	39	Arg.: Keller and Romero 2006	fruits	dessert fruit
Citrus sinensis (L.) Osbeck Rutaceae, naranja	introduced	leaves, fruits	agitation, nervous tension, insomnia*, depression*, cold, flu, fever (sweating stimulation), cough, bronchitis, slow digestion and constipation* (children),	109	Arg.: Amat and Yajía 1998, Keller and Romero 2006; Br.: Begossi et al. 2002	fruits	dessert fruit, juice
Coronopus didymus (L.) Sm. Brassicaceae, mintruz	local	entire plant	sprains, bruise, rheumatic pains*	21	Arg.: Keller and Romero	aerial parts	green vegetable

(*Continued*)

TABLE 1 (Continued)

Species Latin name, botanical family, local name	Plant origin	Plant part(s) used as medicine	Medicinal use	Number of citations	References for medicinal uses	Plant part(s) used as food	Food use
Crocus sativus L. Iridaceae, azafrán	introduced	flowers (stamen)	hepatitis	3	Arg.: Moreau 2006	flowers (stamen)	spice
Cucurbita maxima Duchesne, *Cucurbita pepo* L. Cucurbitaceae, zapallo	introduced	seeds	intestinal parasites	5	Pl.: Spittal 1938, Paluch 1984; Arg.: Amat and Yajía 1998, Keller and Romero 2006	fruits	vegetable
Daucus carota L. Apiaceae, zanahoria	introduced	roots	hepatitis	1	Pl.: Spittal 1938	roots	vegetable
Eugenia caryophyllus (Spreng.) Bullock & S.G.. Harrison Myrtaceae, clavo de olor	introduced	flower buds	toothache	2	Pl.: Spittal 1938	flower buds	spice
Eugenia pyriformis Cambess. Myrtaceae, uva jay	local	leaves, bark	high level of cholesterol, high levels of uric acid, diarrhea	7	Arg.: Keller and Romero 2006, Moreau 2006	fruits	snack fruit
Eugenia uniflora L. Myrtaceae, pitanga	local	leaves	high blood pressure, instable blood pressure*, diabetes, high level of cholesterol*	24	Arg.: Amat and Yajía 1998, Keller and Romero 2006, Moreau 2006; Par: Soria and Basualdo 2005	fruits	snack fruit
Ficus carica L. Moraceae, higo	introduced	leaves	high blood pressure	2	Arg.: Keller and Romero 2006	fruits	dessert fruit
Hypochaeris chillensis (Kunth) Britton Asteraceae, achicoria silvestre	local	roots, leaves	cold sore* (*fiebre del estómago*), prophylactic	7	Arg.: Keller and Romero 2006 (for anaemia)	leaves	green vegetable

Ilex paraguariensis St. Hil., Aquifoliaceae, *yerba maté*	local	leaves, stem	nervous tension*, agitation*, depression, high blood pressure*, contaminated blood*	16	Arg.: Keller and Romero 2006 (as stimulant)	leaves, stem	recreate drink - maté
Ipomoea batatas (L.) Lam. Convolvulaceae, batata	introduced	leaves	toothache, tinea pedis	6	Arg.: Keller and Romero 2006; Par.: Cadogan 1957	tubers	tuber vegetable
Linum usitatissimum L. Linaceae, lino	introduced	seeds	Constipation	2	Pl.: Spittal 1938	seeds	oil
Mentha spicata L., *Mentha* x *piperita* L. Lamiaceae, menta	introduced	leaves	slow digestion, flatulence, stomach ache, abdominal pain, gastric hyperacidity*, high level of cholesterol*, intestinal parasites, menstrual pains, cold sore*, cold, agitation, nervous tension, insomnia related to *fright** (children), diarrhea (children)	58	*Mentha* x *piperita* L: Pl.: Udziela 1931, Spittal 1938, Paluch 1984; Arg.: Amat and Yajía 1998, Keller and Romero 2006; Par.: Soria and Basualdo 2005; Br.: Begossi et al. 2002 *Mentha spicata* L.: Arg.: Amat and Yajía 1991, 1998, Keller and Romero 2006; Br.: Begossi et al. 2002	leaves	herb (also put in *maté*and *tereré*)
Origanum vulgare L. Lamiaceae, orégano	introduced	leaves	flatulence, *empacho**, menstrual pains	11	Arg.: Amat and Yajía 1998, Keller and Romero 2006	leaves	herb
Oryza sativa L. Poaceae, arroz	introduced	grains	diarrhea*	4		grains	staple food
Passiflora alata Curtis Passifloraceae, maracuyá, pasionaria	local	leaves	agitation, nervous tension, high blood pressure	7	Arg.: Amat and Yajía 1998, Keller and Romero 2006	fruits	dessert fruit
Persea americana Mill. Lauraceae, palta	introduced	leaves, seeds	liver pain	3	Arg.: Keller and Romero 2006	fruits	vegetable (consumed raw in salads)
Petroselinum crispum (Mill.) Fuss Apiaceae, perejíl	introduced	roots, leaves, stems	fluid retention in the body, kidney infections	12	Pl.: Spittal 1938, Paluch 1984; Arg.: Keller and Romero 2006	leaves	herb
Piper nigrum L. Piperaceae, pimienta	introduced	seeds	intestinal parasites	2	Pl.: Spittal 1938	seeds	spice

(*Continued*)

TABLE 1 (Continued)

Species Latin name, botanical family, local name	Plant origin	Plant part(s) used as medicine	Medicinal use	Number of citations	References for medicinal uses	Plant part(s) used as food	Food use
Plantago australis Lam. Plantaginaceae, llantén	local	leaves, roots	wounds, cold sore*	4	Arg.: Keller and Romero 2006	leaves	raw, in salads
Plinia trunciflora (O. Berg) Kausel Myrtaceae, yaboticaba	local	fruits (epicarp)	diarrhea	4	Arg.: Amat and Yajía 1998, Keller and Romero 2006	fruits	snack fruit
Prunus domestica L. Rosaceae, ciruela	introduced	fruits	obesity	1	Pl.: Paluch 1984	fruits	dessert fruit
Psidium guajava L. Myrtaceae, guayaba	local	leaves	diarrhea, toothache*	9	Arg.: Amat and Yajía 1991, Keller and Romero 2006, Moreau 2006; Par.: Cadogan 1957; Br.: Begossi et al. 2002	fruits	dessert fruit
Punica granatum L. Lythraceae, granada	introduced	fruits (epicarp)	diarrhea	15	Arg.: Amat and Yajía 1991, 1998, Keller and Romero 2006; Par.: Cadogan 1957	fruits	dessert fruit
Rollinia salicifolia Schltdl. Annonaceae, aratikú	local	leaves	sore throat*	1	Arg. Amat and Yajía 1998 (*Rollinia emarginata*)	fruits	snack fruit
Rosmarinus officinalis L. Lamiaceae, romero	introduced	leaves and stems	gastrointestinal problems, poor memory*, heart problems	14	Arg.: Amat and Yajía 1998, Keller and Romero 2006; Par.: Pérez Maricevich 1972	leaves	herb
Sechium edule (Jacq.) Sw. Cucurbitaceae, chuchu, xuxu	introduced	leaves	high blood pressure	9	Arg.: Keller and Romero	fruits	vegetable (consumed raw in salads)
Solanum sect. *Melongena* (Mill) Dunal Solanaceae, berengena	introduced	fruits	high level of cholesterol*	2		fruits	vegetable
Solanum tuberosum L. Solanaceae, papa	introduced	tubers	headache	2	Pl.: Paluch 1984	tubers	tuber vegetable
Solanum sisymbriifolium Lam. Solanaceae espina colorada, jua	local	roots	contaminated blood (blood cleansing)*	3	Arg.: Keller and Romero 2006 (for kidney infection)	fruits	raw, as snack fruit

Sonchus oleraceus L. Asteraceae, cerraja	introduced	leaves	strengthens the blood, liver*	2		leaves	raw, in salad
Zea mays L. Poaceae, choclo, maíz	introduced	flowers (styles)	kidney problems	3	Arg.: Amat and Yajía 1998	kernel	vegetable
Plant Products							
Camellia sinensis (L.) Kuntze Theaceae, té negro	introduced	leaves	cold, flu, bronchitis, cough, catarrh, slow digestion, sore throat, conjunctivitis, diarrhea, *empacho**	67	Pl.: Paluch 1984; Arg.: Amat and Yajía 1998	leaves	tea
Coffea arabica L. Rubiaceae, café	introduced	seeds	gastrointestinal problems	1	Pl.: Paluch 1984	seeds	coffee
Malus domestica Borkh. Rosaceae, vinagre de manzana	introduced	vinegar (fruit)	fever*, headache*, wasp sting*	6		vinegar (fruit)	condiment
Saccharum officinarum L. Poaceae, caña, alcohol, azúcar	introduced	alcoholic distilate	wounds, toothache, external parasites, menstural pain*	23	Pl.: Spittal 1938, Paluch 1984	sugar	wide application as a sweetener
		sugar	bleeding from the wound, gastric hyperacidity*	5			
Vitis cf *vinifera* L. Vitaceae, vino tinto	introduced	fruits	respiratory illnesses*, flu*, cold*	15		fruits	recreat drink
Zea mays L., *Helianthus annuus* L., *Glycine max* (L.) Merr., aceite vegetal	introduced	seed oil	otitis	4	Pl.: Spittal 1938	seed oil	condiment, frying

Note. Single-use reports considered in the analysis are supported by Polish or Argentinean literature. Pl. = Polish; Arg. = Argentinean; Par. = Paraguayan; Br. = Brazilian (written sources, references).

*Indicates medicinal uses that have not been confirmed by any of the ethnographic and ethnobotanical references.

L., *Citrus limon* (L.) Osbeck, *Cucurbita* spp., *Daucus carota* L., *Linum usitatissimum* L., *Mentha* x*piperita* L., *Petroselinum crispum* (Mill.) Fuss, *Piper nigrum* L., *Prunus domestica* L., *Solanum tuberosum* L., and plant products: *Camellia sinensis* (L.) Kuntze, *Coffea arabica* L.

The great majority of plants analyzed here are food resources par excellence, whose medicinal use is secondary. Nonetheless, a few species are gathered or cultivated primarily for their medicinal properties, these include: *Allophylus edulis* (A.St.-Hil., Cambess.&A.Juss.) Hieron. ex. Niederl., *Citrus aurantium* L., *Coronopus didymus* (L.) Sm., *Eugenia pyriformis* Cambess., *Mentha spicata* L., *Mentha* x*piperita* L., *Plantago australis* Lam., *Solanum sisymbriifolium* Lam., and *Sonchus oleraceus* L.

From the discussed flora, 41 species grow in the area inhabited by Polish settlers. Introduced cultivated species predominate in this group (24), followed by native non-cultivated (13) plants (for the status of all plant species, see figure 1). The primary source for obtaining food plants used in the function of medicines are home gardens (23) and farmlands (3). Native non-cultivated botanicals come from second growth forest, forest fallows (10) and ruderal zones (5) (figure 2). Food plants used as medicines do not strain the household budget, as only 12 taxa (23%) are purchased in shops and markets. Cultivating one's own food and medicinal plants is perceived as a form of thrift and resourcefulness. This fact was often stressed during biographical interviews and informal talks, and was also confirmed by local doctors who have worked in the area since the 1960s. They explained why Polish settlers were reluctant to spend money on physicians and medicaments, while at the same time being eager to invest their surplus in farmland, a piece of forest and pasture.

Ailments Treated with Food Plants

Polish settlers employ food plants to treat diverse health conditions (table 1); principally digestive tract disorders (26%) and respiratory illnesses (25%), but

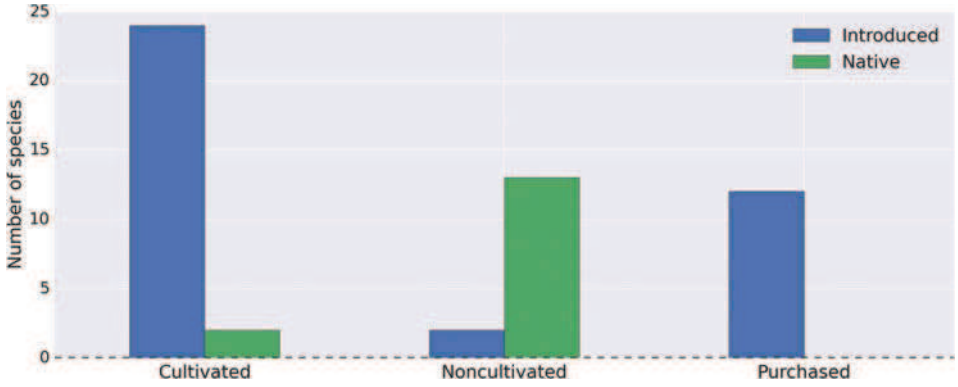

FIGURE 1 Plant species status.

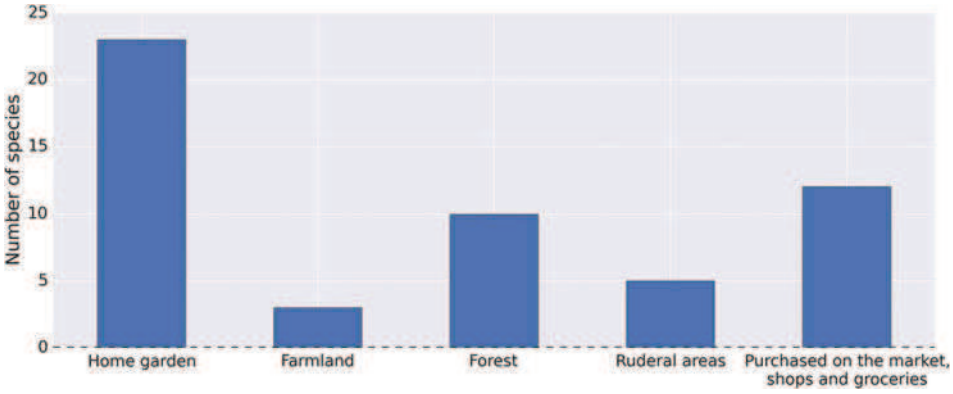

FIGURE 2 Places of obtaining of food species used in home phytotherapy by the Polish community in Misiones.

also circulatory problems (13%), skin ailments (10%) and psychological problems (10%). All the plant species discussed here are home remedies, which are employed to treat mainly minor ailments and illnesses traditionally cured at home such as flu, the common cold, slow digestion, diarrhea, wounds, and agitation.

Among chronic conditions, high blood pressure produced the largest list of plant remedies. Nine different species are used to deal with hypertension, of these only garlic (*Allium sativum* L). and lemon (*Citrus limon* (L.) Osbeck) were known from the country of origin, and garlic, exclusively, had been traditionally applied to treat hypertension.

Nine different species are used to treat ailments belonging to the sphere of humoral medicine – remnants of Hippocratic concepts embedded in folk medicine. Four of these species are used to treat contaminated blood, also referred to as thick or bad blood (*demasiado espesa* o *fea sangre*): garlic (*Allium sativum* L.), lemon (*Citrus limon* (L.) Osbeck), *yerba maté* (*Ilex paraguariensis* St. Hil.), *espina colorada* (*Solanum sisymbriifolium* Lam.). Four species are applied as cold remedies: *cocú* (*Allophylus edulis* (A.St.-Hil., Cambess.& A.Juss.) Hieron. ex. Niederl.), *achicoria silvestre* (*Hypochaeris chillensis* (Kunth) Britton), mint (*Mentha spicata* L.), plantain (*Plantago australis* Lam.). Among them, *Allophylus edulis* is used for stomach cooling, and the remaining ones for cold sore (*Herpes labialis*)— in Spanish known as *fiebre del estómago*—stomach fever. The Spanish appellative evokes the etiology of the ailment, while the English—an effect, which is a kind of sore on a lip. All these species are used to cool down stomach which has been overheated due to the ingestion of hot food or alcohol. Only one species is used as a hot remedy—bitter orange (*Citrus aurantium* L.). It is applied to incur sweating during the treatment of respiratory illnesses, and also against "coldness"—in Spanish called *frialdad*. This designation also refers to the etiology. "Coldness" normally affects women who walk barefoot or spend too much time in cold water (e.g., while washing clothes in a river). As a

result, they suffer from pains before and during menstruation. *Citrus aurantium* L. is used as a remedy to counteract *frialdad* by heating up the body. Cold remedies are prepared as macerates in water and hot ones as infusions or decoctions.

Food Plants Used as Food Medicines

The majority of the described botanical taxa are applied as proper medicines, outside the food context. Different plant parts are usually chosen for treatments rather than for culinary use. For example, in the case of native fruit trees from the Myrtaceae, Cannabaceae, Sapindaceae, and Annonaceae families, leaves are used as medicine in infusions, decoctions, macerate in water etc., while the fruits are consumed as snacks. The leaves, especially, of trees from the Myrtaceae family are perceived as astringent agents and used as a remedy for diarrhea. In the case of taxa for which the same plant part is chosen for eating and for healing, such as *mentruz* (*Coronopus didymus* (L.) Sm.), potato (*Solanum tuberosum* L.)—medicinal use is via external administration. Alternatively, the same edible plant parts are applied in the form of infusions for treatments and as condiments for consumption purposes, such as oregano (*Origanum vulgare* L.), rosemary (*Rosmarinus officinalis* L.), and parsley (*Petroselinum crispum* (Mill.) Fuss).

Nevertheless, in the group of food plants used as medicines by Poles in Misiones there are a considerable number of taxa that can be categorized as *food medicines* (Pieroni and Price 2006). Altogether, 19 species were classified as medicines ingested in the food context. They include: onion (*Allium cepa* L.), garlic (*Allium sativum* L.), papaya (*Carica papaya* L.), sweet lime (*Citrus limettioides* Tanaka), lemon (*Citrus limon* (L.) Osbeck), grapefruit (*Citrus paradisi* Macfad.), orange (*Citrus sinensis* (L.) Osbeck), carrot (*Daucus carota* L.), rice (*Oryza sativa* L.), *yaboticaba (Plinia trunciflora* (O. Berg)) Kausel, plum (*Prunus domestica* L.), pomegranate (*Punica grantatum* L.), aubergine (*Solanum* sect. *Melongena* (Mill) Dunal), sow thistle (*Sonchus oleraceus* L.), and five plant products: tea (*Camellia sinensis* (L.) Kuntze), coffee (*Coffea arabica* L.), *yerba maté* (*Ilex paraguariensis* A. St.-Hil), sugar (*Saccharum officinarum* L.), and grape vine (*Vitis* cf. *vinifera* L.). In the case of food medicines, the edible part is always applied for healing purposes. Sometimes the difference between treatment and food ingestion is a matter of quantity (e.g., garlic is ingested in a greater quantity for expelling internal parasites than in the food context).

Plant Part Used, Modes of Preparation, and Administration

More plant parts are used as medicine than for culinary purposes. However, in both categories leaves and fruits are most often employed: in culinary use, fruits account for 50% and leaves for 21% of all uses. The medicinal category

TABLE 2 Forms of Administration of Herbal Remedies (1,576)

Forms of preparation and application		Forms of preparation and application	
Internal application	No. of uses	External application	No. of uses
Infusion	439	Poultice	59
Decoction	229	Wash, lavage, bath	38
In *maté*	147	Compress	28
In *tereré*	114	Lubrication	26
Syrup	112	Gargle	6
Juice	100	Inhalation	2
Soaked in water	91		
Mixture	87		
Ingested raw	67		
Baked	12		
Chewed	9		
Cooked	8		
Macerate in alcohol	9		

displays inverse proportions, as leaves account for 57% and fruits for 23% of all uses. Other plant parts used as medicines are stems, seeds, flowers, roots, and inedible parts like bark (table 1).

Multiple plant parts of one species are very rarely applied in the home phytotherapy of Polish settlers. An exceptional case is papaya (*Carica papaya* L.), whose flowers are used to treat coughs, seeds and exudates to treat internal parasites, and fruits treat catarrh and constipation. Citrus species also stand out for their versatility in plant parts used. Both fruits and leaves are applied in home therapies, but for different ailments: fruits are mainly used for respiratory system disorders, while leaves are prepared, as infusions, for agitation, nervous tension and insomnia.

The internal use of plant medicines (90%) prevails remarkably over the external (10%) (table 2). Although the study participants mentioned many different forms of preparation, traditional forms of medicinal intake prevail: herbal infusion (28%) and decoction (14%). A popular method of intake is their incorporation in recreational drinks such as *maté* and *tereré* (a cold version of *maté* drink). Nine percent of herbal medicines are taken with *maté* and 7% together with *tereré*. The remedies, soaked in water, are primarily used to treat liver disorders, kidney problems and high blood pressure.

The prevalence of use of herbal remedies composed of only one ingredient is observed among Polish settlers. Only 24[2] different mixtures were registered (table 3). Most of these mixtures consist of only two or three ingredients, and contain a limited number of secondary components. These

[2] The discrepancy between the number of different mixtures (table 3) and the total number of mixtures employed (87)— presented in table 2 stems from the fact that the same mixtures are used to treat several different ailments.

TABLE 3 Complex Remedies Used by the Polish Community in Misiones

Main ingredient	Other ingredients	Number of ingredients	Medicinal use
Allium cepa L. (cebolla)	bee honey (*Apis mellifera*)	2	boils (external use); flu, cough (internal use)
Allium cepa L. (cebolla)	sugar (*Saccharum officinarum*)	2	catarrh, cough, chest congestion
Allium cepa L. (cebolla)	lemon (*Citrus limon*)	2	flu
Allium cepa L. (cebolla)	eucalyptus (*Eucalyptus* cf. *saligna*), bee honey, vegetable oil	4	cough
Allium sativum L. (ajo)	milk (*Bos taurus*) and kerosene	3	internal parasites (children)
Allium sativum L. (ajo)	milk and bee honey	3	flu
Citrus aurantium L. (apepú)	salvia (*Lippia alba)* or ambay (*Cecropia pachystachya*), fried sugar (*Saccharum officinarum*)	3	flu
Citrus aurantium L. (apepú)	bee honey	2	cough
Citrus limon L. (limón)	bee honey, rue (*Ruta chalepensis*)	3	flu, cough
Citrus limon L. (limón)	tea (*Thea sinensis*), bee honey	3	flu, common cold
Citrus limon L. (limón)	tea (*Thea sinensis*), sugar (*Saccharum officinarum*)	3	flu, common cold
Citrus limon L. (limón)	tea (*Thea sinensis*)	2	flu, common cold
Citrus limon L. (limón)	bee honey (*Apis mellifera, Tetragonisca angustula*), vegetable oil	3	cough
Citrus paradisi L. (pomelo)	llantén (*Plantago australis)*, bee honey (*Apis mellifera, Tetragonisca angustula*)	3	flu, common cold
Citrus sinensis L. (naranja)	sugar (*Saccharum officinarum*)	2	flu, common cold
Citrus sinensis L. (naranja)	salvia (Lippia alba), burnt sugar (*Saccharum officinarum*)	3	flu, respiratory tract, catarrh
Citrus sinensis L. (naranja)	milk (*Bos taurus*)	2	constipation (small children)
Coffea arabica L. (café)	sugar (*Saccharum officinarum)*	2	slow digestion
Coronopus didymus (L.) Sm. (mintruz)	tabaco (*Nicotiana tabacum*), marijuana (*Cannabis* sp.), *alcanfor*	4	rheumatic pains, sprains (externally)
Crocus sativus L. (azafrán)	cocú (*Allophylus edulis*)	2	hepatitis
Mentha spicata L., Mentha x piperita L. (menta)	bee honey (*Apis mellifera*)	2	common cold
Persea americana Mill. (palta)	lemon (*Citrus limon*)	2	high level of uric acid
Piper nigrum L. (pimienta)	milk	2	intestinal parasites
Vitis vinifera L. (vino tinto)	sugar (*Saccharum officinarum)* or bee honey	2	respiratory tract, flu, cold

are sugar, honey, vegetable oil and milk—common food products, to hand in every kitchen. Two thirds of mixtures are used in the treatment of respiratory system disorders. A certain pattern of change in use is observed in this group of medicinal mixtures. Elderly people reported the use of hot milk with butter and garlic for respiratory problems in the past. The employment of milk has been replaced by tea with lemon and sugar (or alternatively honey), and nowadays a mixture of burnt sugar with leaves of some citrus and other species (e.g. *Cecropia pachystachya* Trécul, *Lippia alba* (Mill.) N.E. Br. ex, Britton & P. Wilson, *Ruta chalepensis* L.) is becoming popular. The latter mixture has been adopted from *Criollos* ethnomedicine.

DISCUSSION AND CONCLUSIONS

Continuity and Change in Migrant Pharmacopoeia

Polish migrants have continued to use 22 botanical taxa from their native home medicine in a new environmental context in Misiones. Most of the legacy plants used in phytotherapy by this group are introduced food species. Other legacy plants, which have been used exclusively as medicine are: yarrow (*Achillea millefolium* L.), aloe (*Aloe arborescens* Mill.), wormwood (*Artemisia absinthium* L.), feverfew (*Tanacetum parthenium* (L.) Sch. Bip.), tansy (*Tanacetum vulgare* L.) and lime tree (*Tilia cordata* Mill.) (Kujawska and Hilgert 2014). This supports the hypothesis outlined in the introduction, which claims that most continuations in the Polish settlers' herbal pharmacopoeia could have been preserved in the use of food plants.

Herbal remedies, which have survived the migration process, principally treat digestive and respiratory complaints, traditionally cured at home. The continuation of these uses can be explained by the fact that digestive and respiratory disorders are common among the study group and have not changed since Poles' arrival in Argentina. Moreover, the used resources are widely available—cultivated in home gardens, on farmland and purchased in markets. Some of them are "globalized" food plants e.g. onion (*Allium cepa* L.), garlic (*Allium sativum* L.), lemon (*Citrus limon* (L.) Osbeck), orange (*Citrus sinensis* (L.) Osbeck), carrot (*Daucus carota* L.), potato (*Solanum tuberosum* L.) or ingredients for "recreational"/social beverages (*maté*, tea and coffee).

The versatile use of some species like garlic (*Allium sativum* L.), tea (*Camellia sinensis* (L.) Kuntze) and mint (*Mentha* x*piperita* L.) which treat several health conditions, and the high number of citations for them can be explained by their popularity both in Polish folk medicine (Udziela 1931; Spittal 1938; Paluch 1984) and in C*riollos* ethnomedicine, too (Amat and Yajía 1991, 1998; Keller and Romero 2006). This indicates that those species that survived migration and have been successfully passed on to generations already born in Misiones, are plants with wide medicinal applications, also

appreciated by groups with whom Polish migrants had contact, and last but not least—easily accessible and available in the new environment.

On the other hand, we observed that some legacy plants, or some specific plant uses known from the country of origin have lost their relevance during the migratory process. In our opinion, this might have happened because they have been confined to Polish migrants' phytotherapy only, and not confirmed in extra-ethnic contacts. Moreover, some ailments traditionally cured with legacy plants have ceased or became less recurrent. For example onion and cabbage leaves employed externally to accelerate the eruption of boils represent past uses, as boils are very rarely reported nowadays. Traditional antihelmintic remedies were garlic, pumpkin (*Cucurbita* spp.) and black pepper (*Piper nigrum* L.). They too, represent mostly past uses. This is due to the current reliance on pharmaceuticals for intestinal worms treatment (Kujawska, forthcoming). However, Polish migrants also found epazote (*caré - Chenopodium ambrosioides* L.) to be a very efficient plant remedy for internal parasites. Its use slowly replaced the remedies known from the country of origin. The last example evokes another possible explanation for the gradual abandonment of some legacy plants—the culturally perceived efficacy of new plants found in a new environmental and cultural context, which eventually replaced heritage species.

Relatively few wild fruits are used for healing in contrast to Poland and Central Europe, where common fruits such as *Rubus, Vaccinium, Sambucus,* etc. are widely used as medicine (Łuczaj and Szymański 2007; Paluch 1984). We could not find this trajectory of use among other ethnic groups of Misiones or the Atlantic Forest ecoregion either. This is probably due to the fact that native fruits, apart from the Myrtaceae family, have not been employed as medicines by these groups (Martínez-Crovetto 1968).

It is noteworthy that the concept of contaminated or too thick blood was known from the country of origin, but Polish people adopted different species, as blood cleansers, from those cited in the Polish folk pharmacopoeia (Paluch 1984; Spittal 1938; Udziela 1931). These species were not recorded among the Mestizo people of Misiones either (Amat and Yajía 1991, 1998; Keller and Romero 2006; Moreau 2006), which indicated that Mestizo still use different plants for blood cleansing. However, this diversity of plants used as blood cleanser in one region may be due to the importance of this health concept among the inhabitants of Misiones. Nevertheless, the very concept of temporal blood cleansing was transferred to Misiones by Polish migrants, something that cannot be said about hot and cold remedies. Polish people learned to distinguish between hot and cold foods and hot and cold remedies from the Mestizo people. Unfortunately, there is still a lack of studies from the ethnomedical perspective among the Mestizo population of Misiones about hot and cold syndromes, or humoral medicines in general. The concept of hot and cold syndromes has been however confirmed by numerous studies from other Latin American

countries and from the Chaco province in Argentina (e.g., Foster 1987; Quinlan and Quinlan 2006; Scarpa 2004).

Two thirds of the above-mentioned medicinal uses were confirmed by Argentinean, Paraguayan and Brazilian (Atlantic Forest ecoregion) literature (table 1). This indicates an advanced acculturation process and adaptation to locally grown medicinal resources. So called "modern complaints" such as high cholesterol and hyper uricemia are treated mostly with plants, which Polish migrants learned to use in Misiones. As many as 28% of uses (47 out of 170)[3] have not been previously registered in phytotherapeutical literature, neither Polish nor from the Atlantic Forest ecoregion. Amongst native species from the Atlantic Forest are: *Allophylus edulis* used as a remedy for stomach cooling (humoral medicine), *Celtis iguanaea* for cough, *Coronopus didymus* for rheumatic pains, *Eugenia uniflora* for blood pressure stabilization and against high cholesterol levels, *Hypochaeris chillensis* for cold sores and *Solanum sisymbriifolium* for contaminated blood. There are more numerous examples of introduced and naturalized plants, whose uses were reported only by Polish people in Misiones. These include: tea (*Camellia sinensis*) for *empacho;* papaya (*Carica papaya*) fruits as a medicine for constipation; sweet lime (*Citrus limettioides*) for cold, bronchitis, anxiety, and high blood pressure; lemon for fat blood (humoral medicine); grapefruit for high blood pressure; mandarine and orange leaves for anxiety, insomnia, and depression; oregano for *empacho; guayava* (*Psidium guajava*) for toothache; rosemary for poor memory; aubergine (eggplant) for high blood pressure, and so on. These last data, however, may be due to the fact that the literature still reports only a limited number of ethnopharmacological and ethnobotanical studies carried out in the region.

On the other hand, some applications of species known from the home country, but not reported in Polish literature, may indicate an "exploration" of these taxa by the Polish settlers and their consequent dynamic adaptation to new environmental and health challenges in Argentina. An example of an application of legacy plants reported only by migrants in Misiones is the use of garlic (*Allium sativum*) as a remedy against snake bites. In Polish literature we find the same remedy, but for dog bites (Paluch 1984). Garlic has also been used for contaminated blood, as a blood cleanser (humoral medicine), which has not been registered in Polish folk medicine. Another species with different applications among Polish émigrés than in Polish folk phytotherapy is lemon (*Citrus limon*), used in the treatment of high blood pressure and as a blood cleanser. In general terms, the uses of lemon have been expanded in Misiones in comparison to Polish folk medicine. Flax (*Linum usitatissimum*), whose use has dramatically decreased in Misiones, provides an example

[3] All the medicinal uses mentioned in Table 1 with an asterisk (*) are uses not previously cited in the ethnobotanical and ethnopharmacological literature, either from Poland or from the Atlantic Forest ecoregion.

of the opposite trend. It is now only used to treat constipation, while in Poland it was used to treat at least 14 different health conditions (Paluch 1984; Spittal 1938). Peppermint (*Mentha* x*piperita*)has been adopted in the treatment of high levels of cholesterol, practice not confirmed by Polish ethnomedical references. An interesting fact about peppermint is that it was reported as a remedy for *fright*—a culture-bound syndrome known from Poland. This remedy was not found among fright medicines in Polish references (Kujawska 2013). Tea also represents an interesting case. In Poland it was chiefly applied in the treatment of respiratory illnesses and eye infections, but its use expanded in Misiones to include digestive tract problems, such as diarrhea, and the treatment of a culture-bound syndrome called *empacho*. This folk illness is widely known in Argentina and over the whole of Latin America (Campos Navarro and Scarpa 2013). Polish migrants have adopted this culture-bound syndrome from *Criollos* ethnomedicine, but at the same time applied a legacy plant to treat it. Tea was not found as an *empacho* remedy among *Criollos* (Keller and Romero 2006; Kujawska 2013).

The herbal remedies discussed here have been predominantly applied solely, and the occasional mixtures stand out for their simplicity. In another piece of research, considering the use of honey in domestic medicine, we found that *Criollos* populations from the same region employed more plants in mixtures with honey to treat ailments than Polish settlers did (Zamudio et al. 2010). The lack of quantitative studies on mixtures in Polish ethnomedical literature is an obstacle to the investigation into whether this attitude is a cultural mark transplanted to Argentina or an approach which has developed as an expression of reserve towards unfamiliar flora. However, the vast majority of mixtures used by Polish settlers express traditional strategies in the treatment of respiratory disorders, while two mixtures refer to boils and internal parasites and can be traced in the Polish literature (Spittal 1938). Hence, although Polish settlers adopted a variety of species from the *Criollos* folk pharmacopoeia, they have shown a reserve towards mixing these plants together (Kujawska and Hilgert 2014).

Why Do Migrant Communities Use Food Plants in their Folk Pharmacopoeias?

Reliance on food plants in folk phytotherapy has also been documented among Brazilian *Caiçaras*—farmers of mixed European and indigenous origin, who live in the Atlantic Forest ecoregion. Among *Caiçaras*' pharmacopoeia, 48% constitutes food plants, of which 53% are exotic (Hanazaki, Peroni, and Begossi 2006). The authors explain that the preference for introduced food species used by *Caiçaras* may stem from the mixed heritage background of this group. Moreover, the authors underline the negative impact of some introduced species, such as sugarcane, coffee and orange, cultivated in extensive mono-cultures, which contributes to the

replacement of native species with introduced ones. In consequence, introduced species have contributed to the erosion of knowledge about local useful species among the inhabitants of Brazil (Hanazaki et al. 2006).

Researchers observed another facet of the importance of introduced food plants in the pharmacopeia of Sikh and Colombian (respectively) migrant groups living in London (Ceuterick et al. 2008; Sandhu and Heinrich 2005). For migrant communities in London, the primary sources of obtaining medicinal herbal products are supermarkets and groceries (Ceuterick et al. 2008; Sandhu and Heinrich 2005; Yöney et al. 2010), which offer a variety of globalised food products. Therefore, these ethnic communities, in an adaptive process, have managed to adjust their traditional phytotherapy to the products' availability in the shops of the host country.

Finally, Vandebroek and Balick (2014) recently found that food plants play a crucial role in the health-seeking strategies of Dominican migrants in New York, and that most of these plants (80%) are also used in the country of origin, while interestingly some plants and plant uses were found to be "new" in New York, thus also suggesting a creative dynamic of change and adaptation. Moreover, most of the food medicines used in New York City are acquired by migrants via their "ethnic" shops.

All these above-mentioned studies underline accessibility as a potential factor for the continuity of food plants in the folk pharmacopoeia of émigré populations moving from the global South to European and North American cities. Vandebroek and Balick (2014) also point to the ease of information exchange and experimentation with food plants in the city context. These authors claim that food plants form part of "open" knowledge, accessible for anyone. Therefore, they do not belong to some sort of secret, privileged knowledge shared only by healers.

Polish migrants who settled in rural subtropical areas adopted a different strategy for maintaining their folk pharmacopoeia: they planted seeds, which they brought from the home country or re-discovered in Misiones. This strategy has also been described among some migrant groups in North America (Corlett, Dean, and Grivetti 2003; Greenberg 2003), with one exception—Polish migrants did not receive any seeds or seedlings in letters or packages from their relatives in Poland. Food plants employed in home therapies by Polish settlers are predominantly cultivated exotic species. They are easily available, as they grow mainly in home gardens and frequented areas. Moreover, food plants applied in home therapies, although very important, do not burden the household budget as only 12 species of all food plants mentioned here are purchased in open-air markets and in local groceries. This strategy offers Polish migrants a certain sovereignty. In our study we did not observe the same behavior as was registered among rural and urban populations in the Dominican Republic, namely that urban people obtained significantly more plants from markets and greengrocers, and generally purchased more food plant products used in home therapy than rural people

did (Vandebroek and Balick 2014). This is because Polish settlers in Wanda still have access to home gardens, farmlands, secondary forest and forest fallows, because many of them still occupy themselves with agriculture while living in the town (Kujawska 2010).

The main open question however, as to why food plants are considered (or re-considered?) important for migrants, can be explained by our study and data, in a number of ways: while practicality may turn out to be the main reason (home-gardening being one of the main activities of the rural Polish diaspora) we still cannot underestimate the role that specific food-medicinal taxa like garlic (*Allium sativum*), tea (*Camellia sinensis*), and peppermint (*Mentha* x*piperita*) may have played in "strengthening" the identity of the migrants.

It could be interesting to see in the future how younger generations of Polish descendants could re-articulate this dynamic knowledge of plants for food and medicine, for example through knowledge exchange via social media with the "outside" world, and how this will create a space for certain "innovations" or even for a stricter adherence to presumed "traditional" ways of using plants.

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