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"If you want to get married, you have to collect *virdura*": the vanishing custom of gathering and cooking wild food plants on Vulcano, Aeolian Islands, Sicily

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ABSTRACT

Despite the comprehensive bio-scientific literature regarding the Mediterranean Diet, in-depth ethnographic studies focusing on wild-food-plant-based folk cuisines are still scarce in Mediterranean coastal areas. This research aimed to analyze the wild and semi-domesticated plant components of the Mediterranean Diet on Vulcano Isle, Sicily, by interviewing thirty elderly people, who were selected among the last remaining traditional environmental and gastronomic knowledge holders. Local food uses of fifty-two plants and one mushroom belonging to twenty-three families were recorded, showing how wild food plant uses are still alive in the folk cuisine of Vulcano among the oldest community members. The resilience of this custom is traceable in the cultural importance ascribed to traditional recipes, to the memories linked to the past agrarian way of life, to the complexity of their tastes, and to their remarkable perception as healthy foods. In the changing environment of Vulcano, however, where consumption of industrialized food has already taken hold also due to seasonal mass tourism, traditional knowledge linked to wild vegetables is under threat, as young and middle generations are detached from it. Wild vegetables-centered traditional knowledge represents, however, one of the fundamental elements of the local heritage that would need to be preserved and re-vitalized via appropriate initiatives of sustainable eco-tourism.

KEYWORDS

Ethnobotany; Mediterranean diet; wild food plants; Sicily; Vulcano

Introduction

The American nutritionist Ancel Benjamin Keys, during the mid-1900s, after having spent some time in the coastal Thyrrenian area of Cilento (Campania Region, Southern Italy), conceptualized what is today widely known as the "Mediterranean Diet" (Keys 1995; Keys et al. 1986).

The Mediterranean Diet is a diet characterized by abundant plant foods, fresh fruits as the typical dessert, olive oil as the principal source of fat, dairy products, fish, and poultry consumed in low to moderate amounts, zero to four eggs consumed weekly, red meat consumed in low amounts, and wine consumed in low to moderate amounts, normally with meals; this dietary pattern was shared especially by populations from Greece, Dalmatia, and Southern Italy, where in the early 1960s adult life expectancy was

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high and rates of coronary heart disease, certain cancers, and other diet-related chronic disease were among the lowest worldwide (Naska and Trichopoulou 2014).

The Mediterranean dietary system that is often celebrated by the worldwide mass media does, in fact, normally include olive oil, red wine, home-made durum wheat pasta, bread, cheese, and a few *cultivated* vegetables, but very often completely ignores *wild* vegetables, which for centuries represented one of the main plant ingredients of the folk cuisines of Mediterranean rural classes. Wild food plants can therefore be considered as a kind of "hidden" portion of the Mediterranean Diet (Biscotti and Pieroni 2015), even though this diet has been officially recognized by UNESCO as intangible cultural heritage (officially attributed to a few circum-Mediterranean countries such as Italy, Spain, Portugal, Morocco, Greece, Cyprus, and Croatia; UNESCO 2013) and has become in the last three decades a worldwide symbol for heathy food and even lifestyle.

However, the Mediterranean Diet can no longer be considered a homogeneous model fitting every country and every region, since the different cultures, religious beliefs, ecological backgrounds, and historic developments around the Mediterranean Basin often resulted in *several* diets, which share a multitude of elements but also revolve around distinct local or regional ingredients, culinary processes, and preparations. In fact, folk customs related to the culinary use of neglected food plants such as wild vegetables seem to be substantially diverse in the Mediterranean region (Hadjichambis et al. 2008).

A few studies only, however, have clearly pointed out the beneficial role that these Mediterranean wild vegetables play against metabolic and chronic degenerative diseases (Conforti et al. 2011; Fragopoulou et al. 2012; Heinrich et al. 2005; Local Food Nutraceuticals Consortium 2005), and thus they may be considered as "folk nutraceuticals" (Pieroni and Quave 2006), although detailed phytopharmacological investigations for many of these species are still lacking.

Despite the extensive international ethnobotanical literature that exists concerning the Mediterranean Basin, studies focusing in depth on the documentation of traditionally gathered vegetables and folk culinary practices along *coastal* Mediterranean areas are still scarce, especially if we consider that the Mediterranean coastline region is considered worldwide as a "hotspot" in terms of biodiversity and cultural diversity as well (Cuttelod et al. 2009). In fact, only a few ethnobotanical studies have been conducted during the last decade in *coastal areas* of the Mediterranean region (Biscotti and Pieroni 2015; Della, Paraskeva-Hadjichambi, and Hadjichambis 2006; Dogan 2012; Dogan, Ugulu, and Durkan 2013; Dolina and Łuczaj 2014; Dolina et al. 2016; Ertuğ 2004; Guarrera, Salerno, and Caneva 2006; Hadjichambis et al. 2008; Lentini, Aleo, and Amenta 1997; Lentini and Venza 2007; Licata et al. 2016; Łuczaj et al. 2013; Łuczaj and Dolina 2015; Marouf et al. 2015; Nebel, Pieroni, and Heinrich 2006; Quave and Saitta 2016). This relative scarcity of ethnobiological field investigations may be due to the diffusion of elements of globalization and the rapid social and economic changes that coastal Mediterranean regions have experienced in the first few decades of the twenty-first century, mainly as a consequence of the abandonment of traditional fishery and agro-pastoral activities and the increasing pressure of the tourist industry.

This is one of the reasons why this research was undertaken on Vulcano Isle, within the Aeolian archipelago, north-east Sicily, Southern Italy, which in 2000 was recognized

as one of the UNESCO World Heritage Sites (UNESCO 2000). In this particular context, Vulcano Isle has been recognized for its geo-thermic and volcanic characteristics, but thus far little has been done in the in-depth exploration and documentation of its traditional gastronomic culture.

Moreover, the ethnographic documentation of perceptions and uses concerning local food plants and animals and their local culinary practices and customs, nowadays sometimes labeled as "*food-scouting*," is increasingly playing an essential role in all initiatives aimed at re-evaluating traditional environmental knowledge (TEK) systems, in the context of both eco-touristic and gastronomic initiatives.

The objectives of this study were therefore to document the local ethnobotanical and gastronomic knowledge linked to wild and semi-domesticated food plants, which are gathered and consumed on Vulcano, as well as their perceived taste and health benefits; and to compare the collected ethnobotanical data with those documented in other coastal South Italian and Mediterranean regions, so as to point out possible elements of novelty. Moreover, we wanted to evaluate to what extent the specific diasporic history of the Vulcano community, which was formed by individuals who moved to the isle during the nineteenth century from a few villages located in the Nebrodi area, north-east Sicily, has influenced the folk uses of wild food plants, in order to assess how locals may have modified their plant-centered *foodscape* during the last century.

Ultimately, we wanted to assess the temporal changes in the gathering and cooking of these plants over the past five decades, as well as to understand the possible reasons for any observed shifts.

Methodology

Study site and its environment and history

Vulcano Isle belongs to the Aeolian Islands situated in the north-east of Sicily, in Southern Italy (Figure 1). It is the third largest isle based on its size (21 square kilometers) and it is characterized by mild volcanic activity (the last eruption dates back to 1888). The isle consists of three main villages: Gelso, Vulcano Piano, and Vulcano Porto, totaling approximately 600 inhabitants. Vulcano boasts a great vegetal and geomorphological biodiversity, characterized mostly by a volcanic and sandy soil, especially in coastal regions up to the highest wooded areas consisting mostly of centuries-old holm oaks (*Quercus ilex*). Despite the remarkable presence of tourist residential areas, and the great influx of tourists mainly during the spring and summer seasons, the island also continues to offer a beautiful agronomic landscape including little orchards of lemon, orange, mandarin, olive, cherry, and almond trees. Most agricultural activities are managed by elderly people, and thus a few fields are now abandoned and consist of semi-wild fruit trees, such as fig (*Ficus carica*), sorb (*Sorbus domestica*), quince (*Cydonia oblonga*), and medlar (*Mespilus germanica*), and several (introduced) prickly pear shrubs (*Opuntia ficus-indica*).

Vulcano Isle was not inhabited until the mid-1800s because of its continuous and intense volcanic activity. In ancient times the Greeks believed that the isle, which they called "Hierà" (from ancient Greek Ἱερά, "sacred"), was sacred to Hephaestus, the God of fire and blacksmiths, which under the Roman Empire became the God Vulcanus.

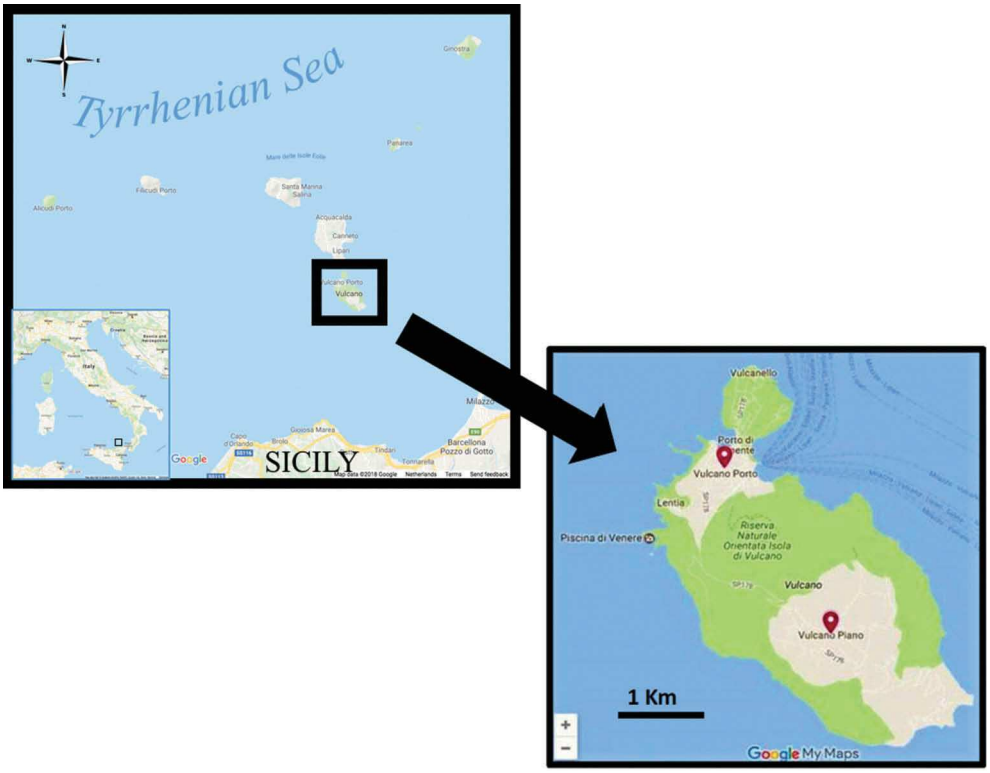

Figure 1. Aeolian Islands in Italy and the Vulcano Isle (Maps data © 2018 Google).

Figure 2. Minestra fritta.

Subsequently, the isle was continuously dominated by varied cultures: Arabians, Normans, Swabians, Angevins and, lastly, in the nineteenth century, Aragoneses.

Local historians have described that at the end of the nineteenth century a few families from Lipari (the principal Aeolian isle), who had already worked for those who were called "*padruna*" or "*ggnuri*" (local landowners), were moved to Vulcano. In the

meantime, several peasant families coming from little villages of the Nebrodi Mountains, north-east Sicily, were asked to work on these wealthy landowners' properties as well (Giacomantonio 2010). They were called "*parsunala*," which means "percentage," because, as in Sicily, at the beginning of the twentieth century, sharecropping existed and peasants used to earn half of what they cultivated: the first harvest was always for landowners, while the rest was to be divided among peasants.

In the past, women and children dealt with collecting vegetables, fruits, grapes, and olives and with reaping durum wheat, rather than men who would carry out the harvest, collect wood, load donkeys, and the like. When sharecropping came to an end in the 1960s, all peasants were set free and wealthy landowners decided to move to Sicily, selling off parts of their big estates. The people of Vulcano continued engaging exclusively in agro-pastoral activities up to the 1980s, when the isle started to be considered as a potential tourist destination for its natural beauty and geo-thermic activities. As a result, many people gave up on cultivating and spending their days in agricultural fields and started to rely more on the tourist industry. Today, only local elderly people actively practice traditional small-scale fishing and agro-pastoral activities, in contrast to most of the members of the middle and young generations, who migrate to Sicily to seek better job opportunities.

The local dialect is unique, and its phonology is more similar to Neapolitan than to Sicilian (Fanciullo 1983; Bauer 2011), as witnessed by the presence of a typical mid-central vowel "ə" (schwa), although linguistically the local dialect is still considered a branch of the Sicilian language.

Sampling and interviews

Elderly people were identified as the TEK holders and most knowledgeable community members in the domain of wild food plants, with some residing in Vulcano Porto and others in Vulcano Piano. The identification of these individuals was first made with the help of local contacts and then via a snowball-sampling technique.

The age of the identified informants ranged from 60 to 86 years; mean age was 74 years. Data were collected from late June to the end of November 2016 via participant observation and also by conducting thirty semi-structured, in-depth qualitative interviews focusing on wild and semi-domesticated food plants (i.e., excluding wild medicinal plants collected for preparing herbal teas), which followed a basic structure: local name of the plant, habitat, and gathering period for each recorded gathered wild plant; plant parts used; gathering process; traditional recipes; possible frequency of consumption; and perceived health value and taste.

Diverse questions were also posed in order to try to understand the reasons behind the fact that these items are (still) collected. Most of the interviews were conducted with single individuals, although in some cases focus-group interviews were preferred in order to help discover, and thus analyze, possible diverging perceptions and uses of wild vegetables. We paid particular attention not only to recording *current* customs of collecting wild food plants, but also to understanding possible temporal changes during the last five decades. Moreover, a few middle-aged and young community members were also interviewed regarding their knowledge of wild food plants and in particular their taste perceptions and preferences.

Interviews were conducted in informal contexts and sometimes entailed going to agricultural fields and taking specimens and photos of the plants, as well as participating in the gathering activities and their processing in the kitchen. All interviews were conducted by the first author in the local dialect, recorded, and later transcribed. The Code of Ethics of the International Society of Ethnobiology was strictly followed (ISE 2008).

Wild plant specimens and their botanical identification

Voucher specimens were collected, identified according to the *Flora d'Italia* by the second author (Pignatti 2002), and later stored in the herbarium of the University of Gastronomic Sciences. Current nomenclature was checked following the standards set by The Plant List database (2012), while plant family assignments followed current designations by the Angiosperm Phylogeny Group (Stevens 2017). Vernacular plant names were transcribed according to rules of the local Vulcano dialect (Bauer 2011; Fanciullo 1983).

Data analysis

All recorded data were compared and discussed via the following sources: the most extensive Italian ethnobotanical database (updated until 2004; Guarrera 2006); two comprehensive reviews of Sardinian and Sicilian (food) plant uses (Atzei 2003; Lentini and Venza 2007); a comparative food ethnobotanical work conducted in diverse locations in Italy (Ghirardini et al. 2007); a few food ethnobotanical surveys conducted in coastline areas of Southern Italy that have been published in international scientific journals (Biscotti and Pieroni 2015; Di Novella et al. 2013; Guarrera, Salerno, and Caneva 2006; Leporatti and Guarrera 2007; Motti, Antignani, and Idolo 2009; Nebel, Pieroni, and Heinrich 2006; Pieroni et al. 2002; Pieroni et al. 2005; Quave and Saitta 2016; Salerno and Guarrera 2008; Scherrer, Motti, and Weckerle 2005); and eventually some Sicilian food ethnobotanical data arising from reviews and studies published in Italian (Arcidiacono, Pavone, and Sameri 2005; Morreale 2012; Schicchi and Geraci 2015).

In addition, the recorded data were compared with those of a recent ethnobotanical investigation conducted in the Nebrodi area, north-east Sicily (Licata et al. 2016)—from where part of Vulcano's population originated—and of some wild food plant-centered ethnobotanical studies conducted in Mediterranean coastal regions (Biscotti and Pieroni 2015; Della, Paraskeva-Hadjichambi, and Hadjichambis 2006; Dogan 2012; Dogan, Ugulu, and Durkan 2013; Dolina and Łuczaj 2014; Dolina et al. 2016; Łuczaj et al. 2013; Marouf et al. 2015; Quave and Saitta 2016).

Results and discussion

Vulcano's wild food ethnobotany

Table 1 presents data on the recorded wild species, along with their local name, status, used parts, period and place of collection, culinary use, the local perception of their health benefits, and their frequency of citation.

Table 1. Wild and semi-domesticated food plants gathered and consumed on Vulcano.

Botanical taxon (or taxa), family, and voucher specimen code	Local name(s)	Status	Used part(s)	Gathering period/site of collection	Recorded culinary use(s)	Perceived value of consumption for human health	Quotation frequency
Amaranthus retroflexus L. (Amaranthaceae) UNISG_VUL01	Abrittu jancu	W	Tender leaves, tender aerial parts, shoots	From November to December/ cultivated areas	Boiled, blanched, stir-fried	++	0.47
Arbutus unedo L. (Ericaceae) UNISG_VUL02	'Mbriacheddi[pl]	W	Fruits	From October to January/ rocky slopes	Raw, jam	–	1.00
Asparagus acutifolius L. (Asparagaceae) UNISG_VUL03	Spinapulici[pl], Sparaci sabbaggi[pl]	W	Young shoots	From December to April/under olive trees	Boiled, blanched, pasta stuffing	+++	0.67
Asphodelus microcarpus Salzm. et Viv. (Asphodelaceae) UNISG_VUL05	Purrazzu	W	False tubers	From February to May/near home gardens, uncultivated areas	Boiled, stewed	–	0.03
Beta vulgaris L. subsp. *vulgaris* (Amaranthaceae) UNISG_VUL06	Guidi[pl]	W	Leaves	From September to December and from March to April/near vineyards, in agricultural fields	Boiled, blanched, stir-fried	++	0.90
Borago officinalis L. (Boraginaceae) UNISG_VUL07	Bburraina	W	Basal rosettes, leaves, aerial parts, flowers	From October to December and from March to April/near vegetable gardens, in agricultural fields	Boiled, blanched, stir-fried, fried, deep-fried	++	0.87
Brassica fruticolosa C. (Brassicaceae) UNISG_VUL08	Rapuddi[pl]	W	Leaves, aerial parts	From October to December and from March to May/near vineyards, in agricultural fields	Blanched, stir-fried, fried	++	1.00
Bunias erucago L. (Brassicaceae), UNISG_VUL09	Cicoria	W	Leaves, basal rosettes	From October to December and from March to April/near vineyards, vegetable gardens, in agricultural fields	Boiled, blanched, stir-fried	+++	0.63
Cichorium intybus L. (Asteraceae) UNISG_VUL10	Cicoria	W	Leaves, basal rosettes	From October to December and from March to April/near vineyards, vegetable gardens, in agricultural fields	Boiled, blanched, stir-fried	+++	0.80

(*Continued*)

Table 1. (Continued).

Botanical taxon (or taxa), family, and voucher specimen code	Local name(s)	Status	Used part(s)	Gathering period/site of collection	Recorded culinary use(s)	Perceived value of consumption for human health	Quotation frequency
Capparis spinosa L. (Capparaceae) UNISG_VUL17	Chiappiri[PI]	W	Flower buds, fruits ("*cucunci*")	From June to September (buds) and from July to September (fruits)/near supporting walls, in agricultural fields	Pickled	+++	1.00
Carlina corymbosa L. (Asteraceae) UNISG_VUL18	Scalera	W	Tender stems	From February to April/ cultivated and uncultivated areas	Blanched, deep fried	+	0.07
Celtis australis L. (Cannabaceae) UNISG_VUL20	Millicuccu	W	Fruits	From September to November/rocky slopes and agricultural fields	Raw	-	0.20
Chondrilla juncea L. (Asteraceae) UNISG_VUL21	Liamedda	W	Leaves, basal rosettes	From November to December and March/near supporting walls, in agricultural fields	Boiled, blanched, stir-fried	++	0.50
Cydonia oblonga Mill. (Rosaceae) UNISG_VUL22	Cutugna	SD	Fruits	From November to January/ abandoned uncultivated fields	Dried jam	–	1.00
Clinopodium nepeta (L.) Kuntze (Lamiaceae) UNISG_VUL24	Nieputa, Neputedda	W	Leaves	From September to July/near supporting walls, in agricultural fields, uncultivated fields	Boiled, seasoning	+++	1.00
Diplotaxis tenuifolia (L.) DC. (Brassicaceae) UNISG_VUL25	Rucula	W	Aerial parts, leaves	From February to September/ near supporting walls, in agricultural fields	Boiled, stir-fried	++	0.53
Ficus carica L. (Moraceae) UNISG_VUL26	Fica	SD	Pseudo-fruits	From June to September/ abandoned uncultivated fields	Boiled as jam, dried, sweet wine	–	1.00
Foeniculum vulgare subsp. *piperitum* (C.Presl.) Bég, (Apiaceae) UNISG_VUL27	Finocchieddu, Finocchieddu rizzu	W	Aerial parts, leaves, stems with flowers, fruits	From September to December and from March to July (aerial parts, leaves), from October to December (fruits) and from July to September (stem with flowers)/fields	Boiled, blanched, stir-fried, pickled	+++	1.00

(*Continued*)

Table 1. (Continued).

Botanical taxon (or taxa), family, and voucher specimen code	Local name(s)	Status	Used part(s)	Gathering period/site of collection	Recorded culinary use(s)	Perceived value of consumption for human health	Quotation frequency
Galactites tomentosa Moench. (Asteraceae) UNISG_VUL19	Scalera	W	Tender stems	From February to April/ cultivated and uncultivated areas	Blanched, deep fried	+	0.07
Helminthotheca echioides (L.) Holub (Asteraceae) UNISG_VUL11	Cicoria	W	Leaves, basal rosettes	From October to December and from March to April/near vineyards, vegetable gardens, in agricultural fields	Boiled, blanched, stir-fried	+++	0.47
Hypochaeris glabra L. and *H. radicata* subsp. *neapolitana* (DC.) Nyman (Asteraceae) UNISG_VUL29 UNISG_VUL28	Cosc'i vecchia	W	Basal rosettes, leaves, galls ("*pinozze*")	From November to December and from March to April/near vineyards, in agricultural fields	Boiled, blanched, stir-fried, and also raw	++	1.00
Lotus edulis L. UNISG_VUL30 (Fabaceae)	Cannavuci[pl]	W	Fruits	From April to June/near supporting walls, in cultivated fields	Raw	-	0.67
Leontodon tuberosus L. (and possibly other *Leontodon* spp.) (Asteraceae) UNSG_VUL12	Cicoria	W	Leaves, basal rosettes	From October to December and from March to April/near vineyards, vegetable gardens, in agricultural fields	Boiled, blanched, stir-fried	+++	0.60
Malva sylvestris L. (Malvaceae) UNISG_VUL31	Marva	W	Leaves	From October to March/near vineyards, in agricultural fields	Boiled	++	0.13
Mentha spicata L. (Lamiaceae) UNISG_VUL32	Amenta	W	Shoots, leaves	From February to November/ near supporting stone walls, in agricultural fields	Seasoning	+++	0.83
Mespilus germanica L. (Rosaceae) UNISG_VUL33	Nespula r'invernu	SD	Fruits	From October to November/in abandoned uncultivated fields	Raw, jam	–	1.00
Myrtus communis L. (Myrtaceae) UNISG_VUL34	'U Mirtu	W	Fruits	From November to January/on rocky slopes	Jam, liqueur	–	0.30

(*Continued*)

Table 1. (Continued).

Botanical taxon (or taxa), family, and voucher specimen code	Local name(s)	Status	Used part(s)	Gathering period/site of collection	Recorded culinary use(s)	Perceived value of consumption for human health	Quotation frequency
Picris hieracioides Sibth. & Sm. (Asteraceae) UNISG_VUL13	Cicoria	W	Basal rosettes, leaves	From October to December and from March to April/near vineyards, vegetable gardens, in agricultural fields	Boiled, blanched, stir-fried	++	0.47
Onopordum horridum Viv. (Asteraceae) UNISG_VUL35	Carduni[pl]	W	Leaf stalks, stems	From November to March/in cultivated and uncultivated fields	Boiled, blanched, deep-fried	+++	0.57
Opuntia ficus-indica (L.) Mill. (Cactaceae) UNISG_VUL36	Fica r'igna	W	Fruits, cladodes ("*gghiappi*")	From January to May (cladodes from July to October)/in cultivated fields, and on rocky slopes	Raw, deep-fried, roasted	+++	(fruits) 0.13 (cladodes)
Oxalis corniculata L. and *O. pes-caprae* L. (Oxalidaceae) UNISG_VUL37 UNISG_VUL37	Agr'e duci, Sucameli[pl]	W	Leaves, stems, flowers	From December to April/in fields	Raw	-	0.30
Paretaria judaica L. (Urticaceae) UNISG_VUL39	Erba 'i vientu	W	Leaves, tender aerial parts	From November to March/ near supporting stone walls, in agricultural fields	Boiled in soups with legumes	–	0.07
Pisolithus arhizus (Scop.) Rauschert (Sclerodermataceae) UNISG_VUL40	Pissuna 'i lupu	W	Whole fruiting body	From December to February/ in cultivated fields, in the woods	Fried	–	1.00
Portulaca oleracea L. (Portulacaceae) UNISG_VUL41	Purciddana	W	Tender leaves, shoots	From September to December and from March to May/near vegetable gardens, in fields	Raw, topping	++	1.00
Raphanus raphanistrum L. (Brassicaceae) UNISG_VUL42	Razzi[pl]	W	Basal rosettes, leaves, aerial parts	From October to December and from March to April/near vineyards, in agricultural fields	Boiled, blanched, stir-fried	++	1.00
Reichardia picroides (L.) Roth. (Asteraceae) UNISG_VUL43	Lazzini[pl]	W	Basal rosettes, leaves	From November to March/ near supporting stone walls, in cultivated fields	Raw, boiled, blanched, stewed	+++	1.00

(*Continued*)

Table 1. (Continued).

Botanical taxon (or taxa), family, and voucher specimen code	Local name(s)	Status	Used part(s)	Gathering period/site of collection	Recorded culinary use(s)	Perceived value of consumption for human health	Quotation frequency
Rubus ulmifolius Schott, (Rosaceae) UNISG_VUL44	'A mura	W	Fruits, young shoots	From December to March (shoots) and from June to September/ on rocky slopes	Raw, jam, deep-fried	+++	1.00
Ruscus aculeatus L. (Asparagaceae) UNISG_VUL04	Spinapulici[pl], Sparaci sabbaggi[pl]	W	Young shoots	From December to April/under olive trees	Boiled, blanched, pasta stuffing	+++	1.00
Scolymus hispanicus L. (Asteraceae) UNISG_VUL45	Sculimbri[pl]	W	Leaf stalks	From November to April/in cultivated and uncultivated fields	Boiled, blanched, deep-fried	+++	1.00
Silene vulgaris (Moench.) Garcke (Caryophyllaceae) UNISG_VUL46	Caulieddu	W	Shoots, young leaves, tender aerial parts ("*cimuzzi*")	From October to December and from March to April/near supporting stone walls, in agricultural fields	Raw, boiled, fried	+++	1.00
Sonchus asper (L.) Hill, *S. oloreaceus* (L.) L., *S. tenerrimus* L., and *S. bulbosus* (L.) N. Kilian & Greuter (Asteraceae) UNISG_VUL47 UNISG_VUL48 UNISG_VUL49 UNISG_VUL50	Cardedda	W	Leaves, basal rosettes	From November to January/ near vegetable gardens, in cultivated fields	Boiled, blanched, stir-fried	+++	1.00
Sorbus domestica L. (Rosaceae) UNISG_VUL51	Sorba	SD	Fruits	From October to November/in abandoned agricultural fields	Raw, jam	–	1.00
Tetragonia tetragonioides (Pall.) Kuntze (Aizoaceae) UNISG_VUL52	Spinaci sabbaggi[pl]	SD	Leaves, basal rosettes	From March to September/ near vegetable gardens, in cultivated fields	Raw, boiled, blanched, stir-fried, stuffing	++	0.83

(*Continued*)

Table 1. (Continued).

Botanical taxon (or taxa), family, and voucher specimen code	Local name(s)	Status	Used part(s)	Gathering period/site of collection	Recorded culinary use(s)	Perceived value of consumption for human health	Quotation frequency
Tolpis virgata (Desf.) Bertol. (Asteraceae) UNISG_VUL14	Cicoria	W	Basal rosettes, leaves	From October to December and from March to April/near vineyards, vegetable gardens, in agricultural fields	Boiled, blanched, stir-fried	++	0.47
Taraxacum megalorrhizon (Forssk.) H.-Mazz. (Asteraceae) UNISG_VUL15	Cicoria	W	Basal rosettes, leaves	From October to December and from March to April/near vineyards, vegetable gardens, in agricultural fields	Boiled, blanched, stir-fried	++	0.63
Urospermum picroides (L.) Scop. ex F.W. Schmidt (Asteraceae) UNISG_VUL16	Cicoria	W	Basal rosettes, leaves	From October to December and from March to April/near vineyards, vegetable gardens, in agricultural fields	Boiled, blanched, stir-fried	++	0.60
Urtica membranacea Poir. ex Savigny (Urticaceae) UNISG_VUL53	'A Drica	W	Young tender leaves, tender aerial parts ("*i cimi*")	From November to March/in cultivated and uncultivated fields	Boiled, blanched, stir-fried	++	0.50
Vitis vinifera L. (Vitaceae) UNISG_VUL54	Racina	SD	Fruits	From August to September	Raw and fermented to obtain a sweet wine	–	1.00

[pl]: plural; W: wild; SD: semi-domesticated; -: no value; +: limited value; ++: average value; +++: high value

Forty-four folk taxa corresponding to fifty-three botanical taxa and one fungal taxon were found to represent the current local wild-food-plant-based heritage. This high incidence of folk taxa vs. botanical taxa was due to a few cases of *under-differentiation* (i.e., local people assigned single folk names to diverse botanical taxa).

Wild species belonging to twenty-two families were recorded, with a high proportion of them belonging to the Asteraceae family (37%), followed by Brassicaceae (8%). This confirms the wide popularity of these families in the wild food panorama of Southern Italy (Ghirardini et al. 2007; Guarrera 2006; Lentini and Venza 2007). Most of the recorded wild food plants (approximately 80%) were represented by leafy wild vegetables, i.e., they were weeds, meaning plants growing entirely or predominantly in situations markedly disturbed by man, without having been deliberately cultivated (Baker 1965). On Vulcano, food weeds are called "*virdura 'i campagna*" (literally meaning "countryside [i.e. wild] vegetables"), or simply "*virdura*".

Very few wild aromatic plants were recorded (such as *Clinopodium and Origanum* species), as well as only a few wild and semi-wild fruits.

The main used parts were leaves (35%) and young rosettes (30%), with interesting exceptions regarding, for example, the gathering and consumption of the modified stems of wild *Opuntia ficus–indica*, locally known as "*gghiappi*", and the galls of *Hypochaeris* spp., known locally as "*pinozze*", because of their peanut shape.

Traditional gathering of virdura

Recorded wild species are mostly collected from autumn to spring, with higher rates in October–December and February–April. In March, in particular, the highest collection frequency occurs (42 wild species overall). During the summer season primarily wild and semi-wild fruits are collected, and a few wild vegetables as well, such as *Tetragonia tetragonioides, Diplotaxis tenuifolia*, and *Clinopodium nepeta*. Informants revealed that traditionally winter vegetables are harvested after the "first rains" ("*'i primi acqui*"), usually occurring at the beginning of the autumn season, at the end of October with a natural break during the end of December. This pattern has also been well described in Lebanon (Marouf et al. 2015). At the end of January, during "*'i secunni acqui*," literally the "second rains," wild species growth and gathering have their second peak.

Food weeds are collected in diverse places, from coastline woody areas in a site called *Vulcanello* to agricultural fields at higher altitudes (about 350–400 m above sea level) in a site called *Vulcano Piano* to private vegetable home-gardens. Notably, informants revealed that for the most part they preferred collecting wild plants in agricultural fields, away from trail edges where weeds are perceived to contain harmful substances coming from car exhaust.

According to our informants, a few plants have their own ideal, specific collection spots: next to vineyards (e.g., *Raphanus raphanistrum*), near vegetable gardens (e.g., *Hypochaeris* spp.), under olive trees (e.g., *Asparagus acutifolius*) and adjacent to stone walls (e.g., *Capparis spinosa*). The cases of *Foeniculum vulgare* and *Silene vulgaris* are particularly interesting: according to most informants, *Foeniculum vulgare* is to be collected in the most sunlit places, as there is a popular belief that the wild fennel flower is yellow because "*é baciatu du suli*" ("it is kissed by the sun"); whereas *Silene vulgaris* grows like a rug in the most wet and shady places. Most weeds collected from

cultivated fields and home-gardens are gathered by women, with the exception of thorny thistles, such as *Scolymus hispanicus*, which are mainly collected by male shepherds while out grazing goats, while women invariably have the task of cleaning and processing the plants at home.

However, considering all the collection spots (coastline woody areas, agricultural fields, and home-gardens), today women and men equally collect wild vegetables (57 and 43% respectively), even though the attached folk culinary knowledge is exclusively known and practiced by women.

Most wild vegetables are collected by hand. Women in particular revealed that they are used to gathering by hand because in the past both women and children were not allowed to use knives in fields (only men could), so their hands molded according to this cultural system. In fact, women seem more capable of collecting the most commonly gathered plant parts: shoots and young rosettes and leaves. Conversely, men gather mainly thorny plants only, since their collection normally required traveling far from the house, having more robust hands, and the obligatory use of a knife. Gathering thorny vegetables may also be very time-consuming, and one informant stated for example:

> Even I had to spend three hours to collect wild thistles, but it is worth spending the time: they are so good to eat! (72-year-old man, interviewed on October 29, 2016)

Most informants pointed out an interesting and important consideration: no one should take the entire plant with all its roots, since in this circumstance the plant would no longer be available, and it will not grow again after the "second rains." During harvesting expeditions, most gatherers thoroughly cleansed the wild plants of topsoil and other herbs, before putting them in bags or traditional wicker baskets known as *'u cuofinieddu*. As interviewees revealed, it is very important to directly clean plants in the field so that all the "organic" would be left in the topsoil for animal feeding, avoiding extra waste at home and, possibly, the use of a lot of water. This is a sustainable practice that may be linked to cultural factors: Vulcano Isle does not in fact have any sort of internal streams, and for this reason the community has always survived by using rainwater. Water, an essential element for life, was basically used for bathing and house cleaning, and for watering personal cultivations and sustaining animals during periods of drought. This encouraged the Vulcano community to be thrifty with water, possibly influencing wild vegetable gathering and cleansing methods.

The local gastronomic heritage

Once wild vegetables are brought home, they are washed using a small amount of water. Since the collection of wild food plants also depends on climatic conditions and the ability of elderly people to physically go gather them in the wild, most informants started, a few years ago, to freeze some wild vegetables that were also commonly mentioned, such as the young aerial parts of *Reichardia picroides, Brassica fruticolosa, Foeniculum vulgare, Hypochaeris* spp., and *Cichorium intybus*, as well as the young shoots of *Asparagus acutifolius* and *Ruscus aculeatus*.

Interviews revealed a wide and remarkable gastronomic diversity related to traditionally gathered wild food plants. The most common culinary preparation we recorded was boiling, while the least common were pickling and eating raw without cooking: if we exclude wild and semi-wild fruits, the informants in general used to eat very few vegetables raw.

The most important traditional preparations used with nearly all recorded wild vegetables were cooking and frying varied combinations of wild vegetables ("*minestra*"):

> After collection, wild vegetables are almost always washed twice, and then placed directly in water (the second time) in order to let any traces of soil settle to the bottom of the sink; then, you have to boil some water in a little pot or in a big one and let them cook for about 20 minutes at high temperature. When ready, serve them in a dish with some cooking water and a little bit of olive oil and lemon juice. Instead, for "*minestra fritta*" once the wild vegetables are boiled, you have to put them in a colander to drain; in the meantime you have to take a saucepan, adding abundantly olive oil and a clove of garlic, and let this fry for a few seconds; after that you add some "*pumamuri 'i piennula*" (traditional cherry tomatoes, hanging in bunches under house canopies at the end of summertime) and let them cook; when the sauce is ready, you have to stir-fry the wild vegetables; you can eventually add some pieces of traditional sausage or pork rinds, previously boiled, to let them lose a bit of their fatty part. (71-year-old female, interviewed on August 24, 2016)

However, on Vulcano wild food plants are also used alone in a few traditional recipes (see Table 2), and some of them are quite distinctive. These specific local dishes demonstrate how important these neglected foods were, and still partially are, within the local food cultural heritage, which is, however, facing a drastic abandonment due to the success of new mass food cultures, especially among middle-aged and young community members.

Nine plant taxa were consumed by interviewees with a use frequency of approximately three times per week, particularly during the late autumn, winter, and early spring seasons: *Brassica fruticolosa, Chondrilla juncea, Cichorium intybus, Foeniculum vulgare, Hypochaeris* spp., *Scolymus hispanicus, Sonchus* spp., *Reichardia picroides*, and *Raphanus raphanistrum*. During the wintertime, very few local cultivated fruits or vegetables are available to the people of Vulcano, especially among the elderly who are still cultivating them on their own, whereas the younger generations have started to depend on supermarkets and packaged foods sold in the nearest Sicilian towns. This shows how on Vulcano *virdura* is an ingredient of the local Mediterranean Diet that follows seasonality and its consumption mainly occurred, and partially still occurs, in accordance with this (apart from those plants that have begun to be frozen).

Sensory perceptions of plants on Vulcano

Indigenous perceptions of taste represent an aspect of modern ethnobiology that is very rarely investigated. In fact, in the South Italian panorama, only in the Arbëreshe community in the Basilicata region has this been explored (Pieroni et al. 2002). The elderly Vulcano community, which still gathers wild food plants, classifies taste in a very specific pattern (Figure 3). It presents similarities to the five tastes that are widely recognized scientifically: sweet as "*duci*", bitter as "*amaru*," salty as "*salatu*," and sour as "*agru*," with the exception of *umami*, which is a typical taste of East Asian populations.

Table 2. Traditional wild and semi-domesticated-plant-based dishes of Vulcano.

Local name of the folk culinary preparation	Culinary process and ingredients	Used wild botanical genera
Frittata	Eggs mixed with young shoots of possible diverse wild plants (borage, wild asparagus, butcher's broom, and bladder champion), *pecorino* (sheep cheese), pepper, parsley, and garlic, fried like an omelet	*Asparagus, Borago, Silene*, and *Ruscus* spp.
Minestra	Mix of wild greens (*virdura*), boiled with olive oil, salt and/or lemon juice	*Brassica, Borago, Bunias, Chondrilla, Cichorium, Foeniculum, Hypochaeris, Leontodon, Picris, Reichardia, Raphanus, Taraxacum, Sonchus, Tolpis*, and *Urospermum* spp.
Minestra fritta	Mix of wild greens, parboiled and stir-fried with cherry tomatoes, garlic, with optional chili pepper and sausage	Same as *minestra*
Neputiddata	Egg-based soup, seasoned with lesser calamint leaves, also adding tomato sauce, garlic and parsley	*Clinopodium nepeta*
Pasta 'a carrittera e cicoria	Pasta with stir-fried tomato sauce and diverse bitter weeds (especially wild chicory and dandelion), dressed with pecorino cheese	*Cichorium, Leontodon, Picris, Taraxacum, Tolpis*, and *Urospermum* spp.
Pasta all'eoliana	Pasta dressed with wild caper buds, tomatoes, cured anchovies sauce, with "*muddica 'nturrata*" (toasted breadcrumbs) on the top	*Capparis spinosa*
Pasta ch'i pumamuri e sculimbri	Pasta dressed with leaf stalks of golden thistle, previously blanched and then stir-fried with tomatoes	*Scolymus hispanicus*
Pasta cu' niru 'i siccia e finocchieddu	Pasta dressed with the leafy aerial parts of wild fennel, blanched and stir-fried together with tomatoes, onion, and squid ink sauce	*Foeniculum vulgare*
Pidoni ch'i rapuddi	Deep-fried calzone, stuffed with cherry tomatoes, *tuma* (cow/sheep cheese), pepper, cured anchovies, and wild Mediterranean cabbage leaves	*Brassica fruticolosa*
Porcu ch'i lazzini	*Lazzini* leaves/rosettes, stewed with red onion, garlic, tomato sauce, and pork meat	*Reichardia picroides*
Rapuddi ch'i fasuli boni	Soup with beans and wild Mediterranean cabbage leaves; traditionally eaten with "*pani caliatu*" (local home-made wood-oven toasted bread)	*Brassica fruticolosa*
Vinu cuottu 'i fica	Traditional kind of sweet "wine" obtained from boiled wild fig must	*Ficus carica*

At a cultural level, it has been clearly demonstrated how taste sensations are depicted in a very complex way (Johns and Keen 1985). In point of fact, the hot/pungent perception is lexically categorized by the people of Vulcano as "*amarosticu*," which is cognitive close to the bitter taste "*amaru*": the former is a *folk specific* whereas the latter is a *folk generic*, as articulated in Berlin's ethno-taxonomical studies (Berlin, Breedlove, and Raven 1966). In this folk generic category, the elderly population of Vulcano also include the folk specific taste perception of "*amaru com'u zagàru*," which in English means "bitter as poison," and it is commonly used to describe something which is extremely bitter and no longer to be considered as a food, but as a medicine only. A similar pattern was described in our previous work carried out in inland southern Italy (Pieroni et al. 2002).

At the same time, bitter taste and astringent sensation ("*raspusu*") are intertwined and thus both belong to a *covert category* roughly corresponding to what in English

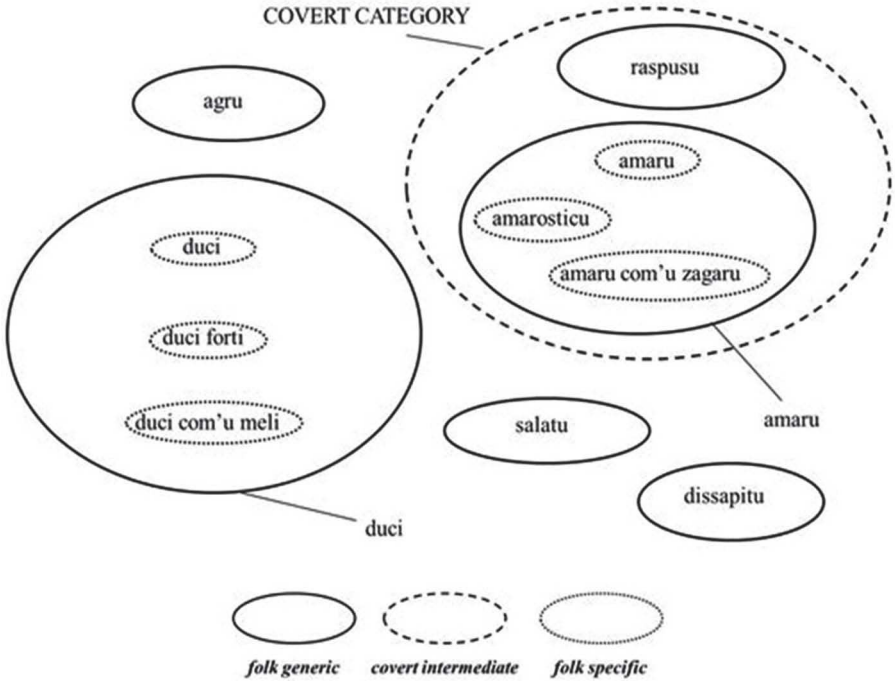

Figure 3. Folk taste classification of wild plants as recorded among elderly community members on Vulcano.

would be regarded as bitter and astringent. The overlapping of bitter and hot-pungent sensations was also described in Bolivia among the Aymara population, where bitter, sour/acidic, and hot tastes were defined by the same lexeme, even if they are perceived differently (Johns 1996).

Vulcano's elderly people used to describe the taste perception for common rocket (*Eruca sativa*) leaves as "something that stings your tongue," but when they had to classify the taste they used to say "*amarosticu*," which is a dialectal term to define something that is similar to a bitter taste, but somehow different: indeed, they used to say "'*a rucula è amara*" ("rocket is bitter") and "'*a cicoria è amara*" ("wild chicory is bitter"). Bitterness and pungency are then clearly distinguished, but they are expressed by the same lexeme; a similar situation was also recorded among the Albanians of Northern Lucania in South Italy (Pieroni et al. 2002).

Moreover, on Vulcano elderly community members do not have a specific term for defining hot tastes. This phenomenon may be due to a relatively late exposure to hot ingredients (chilies and, later, black pepper), but also recalls to some extent what was described in the categorization of color at a cognitive and linguistic level by Berlin and Kay for which an "evolutionary sequence" was defined. From a primary level consisting of basic color terms (white and black) societies move to more complex categorizations where the basic color terms are described using new categories (white, black, yellow, green, and so on), with the most complex categorizations clearly linked to technological advancement (Berlin and Kay 1991). Vulcano's traditional taste classification as articulated by the elder generation is in fact somewhat lexically more "limited" than that of

the middle and young generations, who tend to also use Standard Italian terms indicating the hot taste (defined as "*piccanti*"), the pungent sensation ("*pungenti*"), and the astringent one as well ("*allappanti*").

Yet, "*duci*" (sweet taste) is a folk generic taste category on Vulcano, which includes three groupings: the neutral/herbaceous taste mentioned for a few food weeds (described simply as "sweet"), the aromatic taste of wild fennel (*Foeniculum vulgare* subsp. *piperitum*), whose taste is perceived as "*duci forti*" (very sweet), possibly due to the occurrence of aromatic essential oils, and the extremely sweet taste of very ripe fruits ("*duci com'u meli*": sweet as honey).

Table 3 presents the traditional taste sensations recorded on Vulcano with respect to wild plants, as well as the species that are considered prototypical for these tastes. Most of the collected wild plants gathered and consumed on Vulcano are categorized within the bitter/pungent category. It is known that bitter as well as pungent tastes are often

Table 3. Perceived taste of the wild and semi-domesticated food plants gathered on Vulcano.

Taste (local term)	English correspondent (tentative)	Recorded wild and semi-domesticated plant prototypes
Amaru (amaru)	Bitter	*Asparagus acutifolius*
		Chondrilla juncea
		Cichorium intybus
		Galactites tomentosa
		Helminthia echioides
		Leontodon tuberosus
		Onopordum horridum
		Picris hieracioides
		Reichardia picroides
		Ruscus aculeatus
		Scolymus hispanicus
		Sonchus spp.
		Tolpis. virgata
		Taraxacum megalorrhizon
		Urospermum picroides
Amaru (amarosticu)	Pungent	*Bunias erucago*
		Brassica fruticolosa
		Capparis spinosa
		Diplotaxis tenuifolia
		Raphanus raphanistrum
Amaru (com'u zagaru)	Bitter like poison	*Cynodon dactylon**
Raspusu	Astringent	Every unripe fruit
Agru	Sour	*Oxalis pes-caprae*
Duci	Sweet	*Amarathus retroflexus*
		Beta vulgaris
		Borago officinalis
		Hypochaeris spp.
		Lotus edulis
		Malva sylvestris
		Portulaca oleracea
		Silene vulgaris
		Tetragonia tetragonioides
		Urtica membranacea
Duci (forti)	Very sweet	*Calamintha nepeta*
		Feoniculum vulgare
		Mentha spicata
Duci (com'u meli)	Sweet like honey	*Ficus carica*
Salatu	Salty	Every plant cooked with too much salt
Dissapitu	Unsalted	Every plant cooked without salt (for savory preparations only)

*Collected on Vulcano for preparing a home-made medicinal tea

considered unfavorable to humans because they are commonly associated with toxic compounds (Brett and Heinrich 1998); however, on Vulcano, as in other Mediterranean areas (see aforementioned literature), species belonging to the bitter Asteraceae and pungent Brassicaceae families are the most frequently quoted and actually used wild food plants (John 1990).

Sometimes informants also perceived the fact that wild vegetables have stronger tastes than their cultivated relatives, which was regarded positively. One informant stated:

> Wild asparagus, you know how tasty they are in a fried omelet! Compared to those cultivated, they are much better! (80-year-old female, interviewed on September 18, 2016)

Observing what locals traditionally consumed, and now consume, with these bitter and pungent weeds, it emerges that these plants are often cooked together with salty and sapid foods, such as brined anchovies, sausages, eggs, local sheep and goat cheeses, and dried and salty ricotta cheese. Additionally, those that are perceived by informants as more bitter and pungent than others, such as *Asparagus, Bunias, Capparis, Cichorium, Brassica, Picris, Ruscus, Scolymus, Taraxacum*, and *Urospermum* spp., are used within a broad spectrum of culinary preparations (Table 1). Conversely, *Reichardia picroides* is considered the least bitter food weed and it is the only weed often simply consumed raw in salads.

The possible vital role played by taste appreciation and its complexity, even more so than economic and environmental factors, in the resilience of TEK related to wild food plants has been postulated in a few other Mediterranean studies (Ghirardini et al. 2007; Serrasoles et al. 2016) and probably needs to be further thoroughly addressed in future trajectories of food ethnobotanical research.

"I feel very good when I eat them": the importance of "growing without any help" for human health

The interviews also revealed the extent to which the recorded plants are thought to provide health benefits. In most cases, informants perceived a general health benefit, linked to their belief that these wild vegetables are "good to refresh the body". Indeed, in Table 1 more than 50% of the wild vegetables are perceived as beneficial to health, notably corresponding to the most quoted and most frequently consumed wild greens in the community.

A folk health perception unique to the Vulcano community was also revealed by the interviews. A few wild vegetables are widely regarded as "*virdura frisca*" ("fresh wild vegetables") that when consumed (raw or cooked) "restore" the body or detoxify it, and their cooking water is often drunk; a few others are "*virdura caudda*" ("hot wild vegetables") since when they are consumed, especially raw, can cause some pain, especially in the gastrointestinal tract. The former are mostly wild greens belonging to the Asteraceae family, whereas the latter are members of the Brassicaceae family that are normally lightly blanched and then removed from the cooking water, which is discarded.

Interviewees revealed also the remarkable perceived health properties of these wild vegetables, especially the bitterest ones. An eighty-year-old woman reported:

> These wild greens let us feel good, because they grow alone without any help from us. Lots of diseases started to attack our cultivated vegetables, instead of the wild greens. . .. they survive any sort of problem, they are very strong. That's why I strongly believe they are a powerful natural medicine. Everyone could think of me as mad, but it's true . . . they probably have lots of nutrients good for our body. (80-year-old female, interviewed on October 26, 2016)

Another informant emphasized as well:

> I feel very good when I eat them. I've got to tell you that when I eat cultivated vegetables, even cultivated by me, personally, I sometimes have stomach-aches and I wonder why, what for? When I eat wild greens and especially in a good, hot soup during the winter time, with all its water I suggest, I know my belly is happy. I feel very healthy. I believe in their nutritional properties and that's another reason why I keep on eating them apart from I absolutely love their taste, the bitterish sensation, and also because I can't forget when my mum or my grandmother insisted I eat them when I used to feel sick in the past. (86-year-old female, interviewed on October 29, 2016)

Most of the elderly informants pointed out that wild plants represent a natural and chemical-free alternative to cultivated greens and they continue trying to persuade their youngest family members to take this into account and not buy cultivated vegetables that might be rich in pesticides and other chemicals.

Due to their taste and cultural importance in terms of health, *virdura* represents a kind of "folk nutraceuticals" (Pieroni and Quave 2006), as it occurs elsewhere in Southern Italy (Pieroni et al. 2002; Guarrera and Savo 2013).

The perceived role of weeds as both food and healthy ingredients (Stepp and Moerman 2001; Pieroni et al. 2002), especially within post-Neolithic horticultural food systems, which spread from the Near East to the Mediterranean basin a few millennia ago, is part of a long, complex co-evolution between natural landscapes and human societies that should be better investigated and understood in future studies, especially in terms of the relationships between this double role and the perceived plant tastes described in the previous paragraph.

Comparison with pre-existing South Italian and Mediterranean ethnobotanical studies

In this analysis, we evaluated to what extent community history influenced the traditional gathering of wild vegetables on Vulcano. The inhabitants of Vulcano are partially descendants of Sicilian peasant families who moved to the isle at the beginning of the twentieth century from a few villages within the Nebrodi Mountains, north-east Sicily; one ethnobotanical study has recently recorded traditional food uses in this area (Licata et al. 2016).

A comparison of the botanical genera of the wild vegetable portion of the data we recorded in this study with those reported by Licata and coworkers shows that a majority of Vulcano's wild vegetables have also been recorded as traditionally gathered and consumed in the Nebrodi area (Figure 4). Very few genera (seven) appear to be collected only on Vulcano (and not in Nebrodi), thus possibly representing the result of the complex adaptation that Vulcano's newcomers experienced in their new island environment.

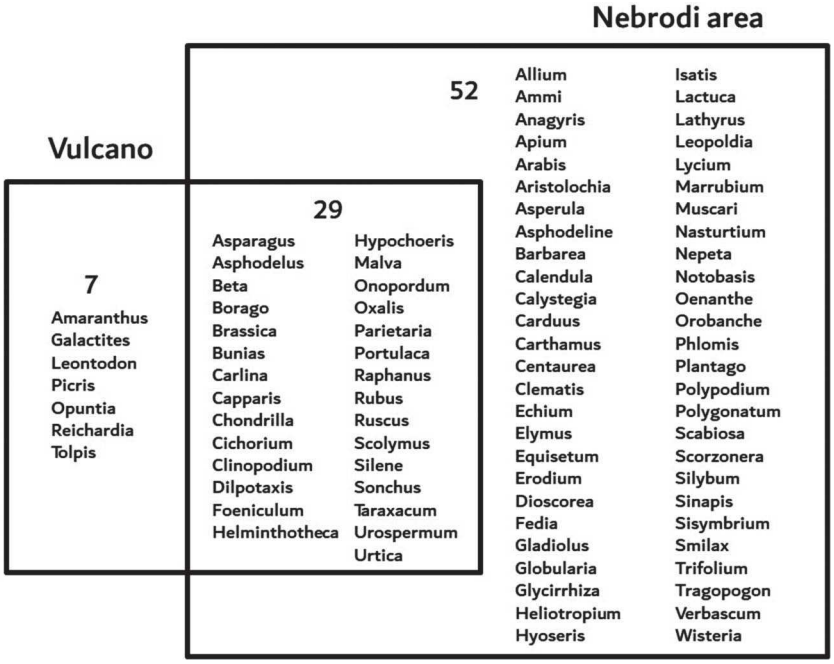

Figure 4. Overlap between the genera of wild vegetables traditionally recorded on Vulcano and those gathered and consumed in the Nebrodi area, north-east Sicily (where a portion of the current population of Vulcano migrated from at the end of the nineteenth century; comparison with data by Licata et al. (2016).

This adaptation included a tremendous reduction in the number of collected food plants with respect to Nebrodi, and possibly this was due a very different ecological availability of certain species, and further reinforced in the second half of the twentieth century by the great exposure the isle had to the external world, as a consequence of the development of the tourist industry.

In a few cases, original plants used in the Nebrodi area may have been substituted on Vulcano. This may be the case for the food use of *Galactites tomentosa*: this thorny plant is gastronomically used only on Vulcano and it was directly referred to by community members as resembling another plant (possibly *Silybum marianum*) that study participants described as widely gathered and consumed in the Nebrodi area:

> We consume this weed that looks like one our ancestors collected in Nebrodi, especially in our zone, Sant'Angelo di Brolo, and there it is called "*buanazza*" and when sometimes we go back to our home town to visit relatives, we collect it and eat it too. (70-year-old male, interviewed on August 17, 2016)

Comparing the data with the pre-existing ethnobotanical and anthropological literature reveals that all genera recorded in the present study have also been quoted as used for food, at least in the recent past, in coastline areas of South Italy and the Mediterranean basin.

Four wild ingredients were very rarely recorded in the considered ethnobiological field studies previously conducted in other Mediterranean coastal areas, namely the

tender stems of *Galactites tomentosa* and *Onopordum horridum*, the galls of *Hypochaeris* spp., and the fruiting body of the mushroom *Pisolithus arhizus*.

The first three ingredients have a bitter taste, which underscores the importance that bitter wild vegetables have had in the folk cuisine on Vulcano. Moreover, *Onopordum* continues to represent a very commonly used wild vegetable on Vulcano, despite the large amount of work needed to remove its thorny parts before cooking and the fact that its food use today has disappeared from most Mediterranean areas.

Temporal shifts in the cultural significance of wild food plants

Interviews also revealed relevant differences between past and present perceptions of the traditional collection and consumption of wild vegetables (Table 4).

In the past collecting wild vegetables was an integral part of the traditional way of life. Most informants recalled that until 50 years ago Vulcano Isle was a great agricultural hotspot and a lot of products were produced every day to be sent to Sicily. These mostly consisted of figs, grapes, raisins, and cheeses. One informant stated:

> I just remember that when I was very young, we were in agricultural fields every day to work on olive trees, wheat, figs. Figs, for example, we took them, we put them in big barrels with sea water and we sent them to Sicily: there were some big, very big, sailing ships that waited for us in the harbor. In the early morning, when the sea was really calm, we placed these barrels in the water and then, the big sailing ships, took them. We, the men, worked a lot … we had not the time to collect wild vegetables! (72-year-old male, interviewed on October 28, 2016)

In the past women for the most part collected wild weeds; they would stay in the fields all day long, cleaning grapes or preparing all that was useful for drying raisins. One old female informant spoke about living in the fields during the end of the 1940s:

> When we, during the day, used to break, at midday or in the late evening, when landowners left us to go eat, we, the women, left and collected some vegetables, those available in season. The oldest women yelled: *'A virdura! 'A virdura*! What we did not collect: wild chicories, *cosc'i vecchia*, and *liameddi*. Ah, how many hits I received. My granny used to say: if you want to get married, *virdura*, *virdura 'i campagna* has to be collected! (86-year-old female, interviewed on October 30, 2016)

Table 4. Main past and present significance of collecting wild food plants on Vulcano.

Past significance	Present significance
• Daily way of life • Quite exclusively linked to women • Staple food during winter and fall seasons, when cultivated vegetables were not available • Mostly boiled, consumed with home-made pasta or bread or, more rarely, fried in pork fat or cooked with meat • Famine food during sharecropping and wartime • Staple food for everyone • Practiced TEK regarding food	• Social activity • Linked to both women and men • Way to diversify everyday meals • Way to enjoy a diversity of tastes and health benefits • Fried in olive oil, often coupled with meat and industrial food products (i.e., bought pasta, bread and so on) • Food mainly prepared and consumed by elderly people • Way to celebrate and preserve local heritage (i.e., semi-wild figs for "*vinu cuottu*") • Both practiced and "told" TEK regarding food, also articulated via memory carriers (i.e., remembrances of past daily life, past recipes)

Wild vegetables were considered staple foods, because famine used to be widespread due to the prevailing sharecropping system, which obliged peasants to give the half of their harvest to landowners.

One elderly informant reported in this study:

> We suffered from cultivating fields. There were the *padruna*, the owners, as we called them.... They treated us worse than donkeys. I remember, over there we harvested hazelnuts ... a lot ... loads and loads ... one day I was with my mum and my sisters.... The owner was behind us, on the horse, fine ... he treated us like slaves. We could not touch anything harvested ... ahi how much famine.... I was maybe ... my mum hid me in between her legs and I, with all my force, I squashed a hazelnut, without being seen, I squashed one ... two. God set us free we were extremely poor ... we were craving, then, wild vegetables, only they could give us something more to eat because, especially during wintertime there was very little to eat: some potatoes, some broccoli ... meat, cheese, when we deserved them: first things were for the landowner! (81-year-old female, interviewed on September 21, 2016)

In seasons where a lot of cultivated vegetables were not available, wild vegetables were always on tables.

Furthermore, the way the vegetables are cooked changed considerably. According to informants, they were mostly consumed boiled. They were also occasionally fried, but in pork fat, since no one had the ability to pay to have their olives pressed to make olive oil, and they were consumed very rarely with meat, which was slaughtered only occasionally, as the refrigerator arrived only in the 1970s. For instance, traditional "*porcu ch'i lazzini*," or pork traditionally stewed with *Reichardia picroides* leaves, was mainly prepared during November, the usual month in which pigs were slaughtered.

Therefore, TEK related to wild food plants still plays an important role on Vulcano in shaping the local *food bio-cultural refugium* (Barthel, Crumley, and Svedin 2013), for which memory carriers are also important. In the last few decades, many traditional local foods on Vulcano have in fact disappeared from active use, but not from the collective memory: as with the custom of cooking loggerhead turtle (*Caretta caretta*) meat with bitter wild greens (until thirty years ago, before its hunting was banned) or preparing dried squid ink, made during the end of summer season for consumption during the winter.

From the mid-1970s, Vulcano Isle started to be more important as a tourist destination. Many people started to give up on agro-pastoral activities, instead working for external enterprises of holiday resorts. A large number of agricultural fields were replaced by a large quantity of "concrete." At the end of the 1970s electricity eventually arrived on Vulcano, and thus many people started to buy their own refrigerators and several small supermarkets began to open in various locations on the island. Most food products including vegetables, fruits, and meat were imported from Sicily. These are some of the reasons why a lot of people started investing their future in tourist activities.

Practically, at the end of the last century, agriculture or other small-scale pastoral activities were limited to only a specific portion of the Vulcano community which is, now, the elderly generation. Older informants mentioned this gradual disappearance of agro-pastoral activities that has been taking place on the island the last 50 years. Now, there is no longer anyone producing cheese or local meat for which Vulcano, according

to informants, was really well known until the 1970s and 1980s, and everything has drastically changed, even the environment in which they have always lived. This has also greatly influenced the traditional gathering of wild vegetables. Indeed, most informants and especially women, who largely collected them in the past, stated that a few of the wild greens, once collected, no longer exist nowadays and others are vanishing and about to disappear as well.

A number of past cultivated plants are now perceived by the community mainly as wildly grown, including *Ficus carica* pseudo-fruits, whose biodiversity is being preserved thanks to a traditional product known as "*vinu cuottu*," which is a local sweetener also produced using burned vine-shoot ashes, used primarily in many Christmas sweets and some dishes such as one based on wild rabbit, which is still sometimes hunted on the island.

Today the collection of wild food plants and greens is seen more as a good time for social activity or a way to be active, and beneficial for the health of older people. The presence of small supermarkets in diverse locations on the island introduced industrialized food into the diet of the community, and thus wild vegetables in particular are consumed to diversify everyday meals. Older people continue collecting these plants in the wild because they represent a feature of their gastronomic cultural heritage in which taste and importance to health intertwine with preserving traditional food products, environmental biodiversity, culinary rituals, memory carriers, and community history.

The words of the oldest female interviewee also highlighted this:

> Collecting *virdura* represents a traditional custom for us, the elderly; a traditional activity like making local cheeses, local fishing, which is at risk of disappearing too. I am so glad to see young people are wishful of transcribing our words to remind their peers, and especially those living on Vulcano, to try to keep these activities alive. In this way, you're going to get into your natural environment. . .. But I know this is difficult to happen. Our wild vegetables are not appreciated by the new generations; they eat only packaged foods and lots of junk foods. Everything containing lots of sugar. Maybe the bitterest thing they continue drinking is a cup of coffee, nothing else! (86-year-old female, interviewed on October 24, 2016)

Living on Vulcano Isle is no longer like in the past decades, when it was difficult to reach the Sicilian coast, and people were limited to what agro-pastoral activities could provide for them. This is also one of the factors that have contributed to the erosion of TEK linked to food weeds on the isle. A number of middle-aged and young community members rarely eat these wild vegetables, generally consuming them only when prepared by their parents or grandparents, as they do not know where to collect them and they do not appreciate their taste with the exception of "sweet" wild vegetables or maybe "*rapuddi*" (*Brassica fruticolosa*).

Moreover, no initiatives on Vulcano have thus far tried to address the economic potential of traditional foraging, and therefore the slow decline of this folk custom and its attached local gastronomy appears inevitable.

While in other European areas foraging is becoming very fashionable, and "new" customers search for wild vegetables in both local farmers' markets and restaurants (Łuczaj et al. 2012, 2013), on Vulcano there is an apparent "delay" in taking advantage of the enormous potential presented by this demand for re-orienting consumption toward local wild resources.

This may be due to the fact that "mainstream" tourism on Vulcano represents a very secure and solid economic certainty: Italian and especially foreign tourists visit the isle mainly to enjoy its thermal activities and the scenic beauty of nature, and thus there is little space left for innovation and potential young entrepreneurs, who could be interested in emphasizing ecological and sustainable gastronomies.

Conclusions

This study reports how wild plants have been and still are gathered and consumed on Vulcano. Above all, perceptions of both taste complexity and health benefits continue to play a role in preserving the local heritage of gathering, processing, and consuming these plants, demonstrating that they are not simply "ingredients," but crucial elements of a complex *bio-cultural cobweb* and, ultimately, of the very essence of the sense of identity of the community.

More field research is needed before these *reservoirs* of local knowledge disappear. Certainly, in a rapidly changing environment, where the industrialization and globalization of food has already taken hold, traditional gastronomic knowledge, and fundamentally that related to wild vegetables, represents a vital source of the local intangible cultural heritage. Some elderly study participants expressed their hope that the young local community members of Vulcano will try to appreciate and valorize their gastronomic heritage, because in this way the most hidden part of the Mediterranean Diet and its complex bio-cultural dimension can perhaps be re-vitalized. This will only happen, however, if sustainable eco-touristic initiatives, and less mass tourism, are able to find a place in the future development of Vulcano, and consequently local foods and their *terroirs* are shifted to the center of the discourse regarding local heritage, including all possible educational initiatives aimed at revitalizing forgotten *virdura*, its attached culture and its tastes.

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