

# The Contribution of Wild Edible Plants to the Mediterranean Diet: An Ethnobotanical Case Study Along the Coast of Campania (Southern Italy)

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**The Contribution of Wild Edible Plants to the Mediterranean Diet: An Ethnobotanical Case Study Along the Coast of Campania (Southern Italy).** Wild edible plants, an essential component of people's diets in the Mediterranean basin, are consumed because they have a positive influence on health, supplying the body with microelements, vitamins, phenols, flavonoids, antioxidants, and fiber. In this paper we provide a list of wild plants used in the local cuisine along the coast of Campania, highlighting the medicinal properties of the most widely used species. Fieldwork was conducted from April 2017 to September 2019; in all, 69 informants were interviewed. We carried out an extensive literature review searching both national and international journals for ethnobotanical articles concerning the whole of Italy and especially the region of Campania, published from 1963 to 2019. The relative frequency of citation (RFC) index for each species is provided. Based on the interviews, 85 species and subspecies distributed in 29 families are documented as being used as food. Asteraceae was the most cited family (26.5%) followed by Brassicaceae and Lamiaceae (7.2%). The culinary uses of 11 wild species (13.5% of the total) were hitherto unreported in the ethnobotanical literature for Campania. The present study confirms the persistence of traditional plant use in the region of Campania. Ethnobotanical data, as well as the phytochemical and nutritional profiles of the species in question, offer insights into designing new dishes such as food pairing with other ingredients to improve nutritional and/or sensory quality (e.g., bitterness reduction, flavor enhancement, antioxidant bioavailability).

**Il contributo delle piante spontanee commestibili alla dieta mediterranea: un caso studio etnobotanico lungo la costa della Campania (Italia meridionale).** Le piante eduli spontanee sono una componente essenziale della dieta delle popolazioni nel bacino del Mediterraneo e vengono consumate per la loro influenza positiva sulla salute, in quanto apportano all'organismo umano microelementi, vitamine, fenoli, flavonoidi, antiossidanti e fiber. In questo articolo forniamo un elenco di piante spontanee utilizzate nella cucina locale lungo la costa campana, evidenziando le proprietà medicinali delle specie più utilizzate. Il lavoro sul campo è stato condotto da aprile 2017 a settembre 2019; in tutto sono stati intervistati 69 informatori. Abbiamo effettuato inoltre una revisione della letteratura etnobotanica su riviste nazionali e internazionali riguardante l'intera Italia e in particolare la regione Campania, prendendo in considerazione gli articoli pubblicati dal 1963 al 2019. Viene fornito l'indice di frequenza relativa di citazione (RFC) per

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ogni specie. Sulla base delle interviste, sono state documentate 85 specie e sottospecie distribuite in 29 famiglie. Le Asteraceae sono la famiglia più citata (26,5%) seguita da Brassicaceae e Lamiaceae (7,2%). Gli usi culinari di undici specie spontanee (il 13,5% del totale) non erano stati finora riportati nella letteratura etnobotanica per la Campania. Il presente studio conferma la persistenza dell'uso tradizionale di piante spontanee nella regione Campania. I dati etnobotanici, nonché i profili fitochimici e nutrizionali delle specie in questione, offrono approfondimenti sulla progettazione di nuovi piatti come, ad esempio, l'abbinamento degli alimenti con altri ingredienti per migliorare la qualità nutrizionale e/o sensoriale (ad esempio riduzione dell'amarezza, miglioramento del sapore, biodisponibilità degli antiossidanti).

**Key Words:** Ethnobotany, gastronomy, mediterranean diet, wild edible plants, local food, foraging, phytochemical compounds.

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## Introduction

The Mediterranean Diet was first defined by the American nutritionist Ancel Keys as consisting mainly of vegetables, fruit, spices, and pasta, with olive oil as the main source of fat; it is also based on a low consumption of meat and dairy products (Davis et al. 2015; Hadjichambis et al. 2008; Keys 1995; Keys et al. 1986).

Cilento, a rural area in the coastal zone of Campania, is considered by scientists as the cradle of the Mediterranean Diet because of its great variety of fruit and vegetables, along with olive oil production and fishing, which underpin the traditional cuisine. The Cilento resident population is well known for its longevity, there being a good number of centenarians in the area (Bifulco and Pisanti 2017).

Two factors seem to play a role in longevity: the genetic component of the population and the Mediterranean Diet (Boccardi et al. 2013; Paul 2011). The latter clearly has beneficial health effects. By improving the lipid profile, endothelial function, and blood pressure, the Diet exerts a protective effect against the development of chronic diseases that are the main causes of death in the Western population; i.e., cardiovascular disease, diabetes, and cancer (Bacchetta et al. 2016; Contaldo et al. 2004; Davis et al. 2015; Di Daniele et al. 2017; Leonti et al. 2006; Ranfa et al. 2014; Trichopoulou et al. 2014).

The Mediterranean Diet has been recognized by UNESCO as Intangible Cultural Heritage of Humanity (UNESCO 2013) and, in recent years, has become a worldwide symbol for healthy food and lifestyle (Cucinotta and Pieroni 2018). However, the Mediterranean Diet includes wild plants in addition to cultivated species. Over the centuries the former has constituted the main food ingredients in rural communities. Wild edible plants can be defined as native species growing in their natural habitat without being cultivated (Łuczaj et al. 2012; Menendez-Baceta et al. 2012). Wild plants are

often identified as functional foods (foods with biological effects that go beyond their mere nutritional properties) and consumed because they have a clear positive influence on health (Bacchetta et al. 2016; Leonti et al. 2006), supplying the body with microelements, vitamins, phenols, flavonoids, antioxidants, and fiber (Łuczaj and Dolina 2015). Wild plants are also perceived as a healthy alternative to cultivated vegetables that might be rich in pesticides and other chemicals (Cucinotta and Pieroni 2018). Therefore, wild species may have great potential as sources of unusual colors and flavors, bioactive compounds, and of dietary supplements (Huang et al. 1986; Sánchez-Mata et al. 2012).

However, the Mediterranean Diet can no longer be considered a homogeneous model fitting every country and region since it often revolves around distinct local ingredients and culinary traditions (Hadjichambis et al. 2008). As highlighted by several authors (e.g., Amprako 2018; Dwivedi et al. 2017; Molina et al. 2014) expanding the diversity of food produced, distributed, and consumed is one of the major challenges of planetary nutrition for the coming years. According to Chivenge et al. (2015), only 7000 of the 30,000 edible plants have been either cultivated or collected as food throughout history. Yet currently, only 20 species provide 90% of the world's food requirements with wheat, maize, and rice accounting for 60% of the human diet (Bacchetta et al. 2016). The decrease of food diversity has led to an increasing concern among researchers, consumers, and farmers about its effects in human health, food security, and food sovereignty (Ayres and Bosia 2011; Molina et al. 2014). It is in this scenario that the knowledge about the state of biodiversity available in local food systems becomes crucial for the improvement of dietary tools and for the development of new ones (Jacob and Albuquerque 2020; Rivera et al. 2006). A crucial portion of this food system is represented by wild plants, and their contribution to the traditional

Mediterranean diet, although qualitatively important, is still practically unknown and largely underestimated by nutritionists and historians of food systems (Łuczaj and Pieroni 2016; Pieroni et al. 2005; Rivera et al. 2007). As underlined by Jacob and Albuquerque (2020), knowing processing techniques and nutritional composition of wild food plants is as important as making an inventory of species.

In recent decades many Italian researchers have sought to analyze the persistence of traditional uses of plants and their products in the Mediterranean basin (e.g., Guarrera 2009; Leporatti and Guarrera 2015; Leporatti and Impieri 2007; Loi et al. 2004; Maruca et al. 2019). Despite this extensive ethnobotanical literature, according to Biscotti and Pieroni (2015), studies focusing in depth on traditionally gathered vegetables and folk cuisine in Italian coastal areas are still scarce, especially given that the Mediterranean coastal region is widely considered a hotspot both in terms of biological and cultural diversity (Cucinotta and Pieroni 2018; Cuttelod et al. 2009). In Campania, the use of wild plants in the human diet can only be inferred through more general studies of ethnobotany (e.g., Di Novella et al. 2013; Mautone et al. 2019; Motti and Motti 2017, Motti et al. 2009). Indeed, there is no specific research on the dietary habits of the coastal populations that make widespread use of the Mediterranean Diet.

The ethnobotanical approach to studying local culinary traditions constitutes an important tool for analyzing and preserving traditional knowledge and counteracting the decline in cultural diversity in the Mediterranean area (Pieroni et al. 2016; Rivera et al. 2006). Against this background, the aim of the present paper is to highlight the use of wild plants as traditional local ingredients in the diet of those living along the coast of Campania. The specific aims of this study were to:

- Document folk knowledge regarding wild food plants in the study area;
- Define the most frequently used plant parts and plants administration and preparation;
- Describe the phytochemical compounds of the most widely used species;
- Compare the collected data with the overall Campanian ethnobotanical literature in order to possibly identify novel wild food plant records; and
- Confirm the persistence of some folk dishes and their composition.

## Material and Methods

Fieldwork was conducted from April 2017 to September 2019 in the study area, namely 27 coastal municipalities in the Campania region within the provinces of Salerno, Naples, and Caserta (Fig. 1). The Campania region, with 5.7 million inhabitants, is the third most populated in Italy and the first in terms of population density (432 inhabitants / km<sup>2</sup>). Over half of the actual population lives in the Naples province where the density can also reach more than 13,000 inhabitants per km<sup>2</sup> in some coastal municipalities. In contrast, small villages characterize the coastal area of Salerno with low population density. In the last five decades, population has moved from inland to the coastal zone with a substantial land abandonment of several mountain areas especially, in the Salerno province (Quaranta and Salvia 2014).

For interviews, we selected local experts (key informants) (Martin 2004) and then, via a snowball-sampling approach (Cotton 1996; Cunningham 2001; Höft et al. 1999; Martin 2004), people who, because of their age, occupation, family tradition, or personal interests, held knowledge concerning plant lore in local cuisine. The informants who agreed to participate in our interviews were asked about past and present folk use and gathering of wild plants and whether they consumed some species also for therapeutic properties. To encourage communication and memory flow, we carried out a semi-structured interview (Idolo et al. 2010) to acquire information on local names of plants, harvest time, parts used, processing, and recipes. During the interview the informants were also asked if some species were eaten also or exclusively for therapeutic purposes.

For all informants we recorded gender, age, and any other information concerning their background. We interviewed 69 informants (48 women, 21 men) whose average age was 63.1 years (range 31–88 years). Most of the informants belonged to the upper two age classes (61–80 and older than 80, respectively 44.1% and 20.6%), while 14.7% of interviewees were between 31 and 40 years old. The plant specimens collected in the presence of the informants were identified in the field except for dubious cases, which were later identified at the Botanical Garden of Portici, according to Pignatti et al. (2017a, 2017b, 2018). The nomenclature follows The Plant List Database (2013). Families are organized based on APG IV (Stevens 2015) for

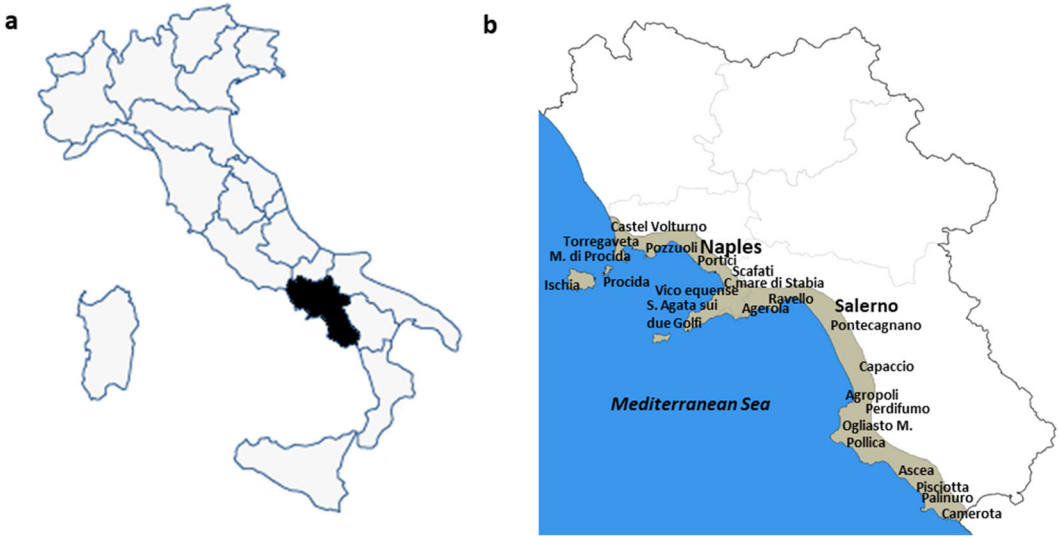


Fig. 1. (A)—Study site; (B)—Location of the coastal municipalities where the interviews were conducted.

angiosperms. Voucher specimens are deposited in the Herbarium Porticense (PORUN), preceded by the code WFPH 00 and range from 1 to 96.

Finally, to compare our data with those previously recorded for wild food plant uses, we searched both national and international journals for ethnobotanical articles concerning the whole of Italy and especially the region of Campania, published from 1963 to 2019. We used online versions of the Science Citation Index, Elsevier Journal Finder, Blackwell Synergy, ISI web of knowledge, Scopus, and Google Scholar using the key words “ethnobotany,” “wild vegetables,” “food plants,” “Italy,” and “Campania.” Many articles and books were found in the references of previously collected papers.

We set up a database including taxon (when helpful, due to the recent changes in nomenclature, synonyms are reported in parentheses), family, local name(s), parts used, preparations, RFC index, and previous bibliographic citations. The relative frequency of citation (RFC) index for each species is obtained by dividing the number of informants who mention the use of the species, also known as frequency of citation (FC), by the number of informants participating in the survey (N). This index theoretically varies from 0 to 1 in the unlikely case that all the informants were to mention use of the species (Tardío and Pardo-de-Santayana 2008).

## Results and Discussion

### QUANTITATIVE ETHNOBOTANICAL ANALYSES

Based on the interviews, 85 species and subspecies distributed in 29 families are documented as being used as food plants by traditional users along the coastal areas of Campania (Table 1). The number of local taxa does not correspond to botanical taxa because in some cases we have an under-differentiation of ethnotaxa in comparison to binomial nomenclature. The informants, in fact, do not have the skills to provide taxonomic details of the species, and single local names are assigned to diverse botanical taxa. This is the case, for example, of the terms chicory assigned to several species of the Asteraceae family (*Cichorium intybus* L., *Crepis bursifolia* L., *Crepis leontodontoides* All., *Taraxacum campylodes* F.H. Wigg., and *Urospermum picroides* (L.) Scop. ex F.W. Schmidt), wall rocket (*Diplotaxis tenuifolia* L. and *Eruca sativa* L.), or sow thistle (*Sonchus oleraceus* L., *S. asper* L., *S. tenerrimus* L.). Asteraceae was the most cited family (26.5%) followed by Brassicaceae and Lamiaceae (7.2%).

As shown in Fig. 2, leaves were the most frequently used plant parts (57.5%), followed by fruits (11.3%), young shoots (7.5%), and flowers (6.3%). The remaining parts, comprising bulbs, roots, seeds, etc., accounted for 17.5% overall.

TABLE 1. TRADITIONALLY WILD EDIBLE PLANTS USED ALONG THE COAST OF CAMPANIA (SOUTHERN ITALY).

Species, (Family), voucher specimen n. (preceded by WFPH 00)	Vernacular names	Part used	Traditional culinary uses	Therapeutic uses	RFC	Previously reported uses for the Campania region
<i>Allium triquetrum</i> L.; <i>A. neapolitanum</i> Cirillo; <i>A. roseum</i> L. (Amaryllidaceae) 37, 27, 4	Agljo, agghie	Bulbs	Raw or cooked as spice.	For blood pressure	0.20	No data found
<i>Amaranthus retroflexus</i> L. (Amaranthaceae) 26	Sovere pelose	Leaves	Boiled in salads and soups.		0.04	Savo et al. 2019
<i>Arbutus unedo</i> L. (Ericaceae) 44		Fruits	Raw or used to prepare jams.		0.12	Di Novella et al. 2013; Mautone et al. 2019; Savo et al. 2019;
<i>Asparagus acutifolius</i> L. (Asparagaceae) 28, 93	Sparagi, sparaci	Turions	Boiled and eaten in salads, with rice or to prepare omelets. Pickled or preserved in oil.		0.45	Scherrer et al. 2005 Guarino et al. 2008; Mautone et al. 2019; Savo et al. 2019; Scherrer et al. 2005
<i>Bellis perennis</i> L. (Asteraceae) 45	Margherita	Leaves	Ingredient of soups.		0.05	Di Novella et al. 2013
<i>Beta vulgaris subsp. maritima</i> (L.) Arcang. 47 (Amaranthaceae)	Bietola, bietta, teta selvatca	Leaves	Ingredient of soups.		0.27	Menale et al. 2016; Di Morti and Morti 2017; Novella et al. 2013; Scherrer et al. 2005
<i>Borago officinalis</i> L. (Boraginaceae) 1	Vurraggine, vurraina	Leaves, flowers	Ingredient of soups, fried or to prepare pies and omelets. Flowers added to sweet fritters.		0.53	Guarino et al. 2008; Morti et al. 2009; Di Novella et al. 2013; Morti and Morti 2017; Mautone et al. 2019; Savo et al. 2019; Scherrer et al. 2005
<i>Brassica fruticulosa</i> Cirillo (Brassicaceae) 61	Cavolo selvatco	Leaves	Ingredient of soups.		0.07	Di Novella et al. 2013
<i>Brassica incana</i> Ten. (Brassicaceae) 46	Cavolo selvatco	Leaves	Ingredient of soups.		0.02	Di Novella et al. 2013
<i>Calendula arvensis</i> (Vaill.) L. (Asteraceae) 3	Calennla	Leaves	Ingredient of soups.		0.01	No data found
					0.19	

TABLE 1. (CONTINUED).

Species, (family), voucher specimen n. (preceded by WFPH 00)	Vernacular names	Part used	Traditional culinary uses	Therapeutic uses	RFC	Previously reported uses for the Campania region
<i>Capparis orientalis</i> Vell. (Capparaceae) 2	Cappero, chiapparello, cucunci	Flower buds, fruits	Buds as flavoring. Fruits pickled in vinegar.			Di Novella et al. 2013; Mautone et al. 2019
<i>Carlina acanthifolia</i> subsp. <i>uzzka</i> (Hacq.) Meusel & Kästner (Asteraceae) 29	Carduognole	Receptacle	Unripe inflorescences like artichoke.		0.01	Savo et al. 2019
<i>Carlina corymbosa</i> L. (Asteraceae) 6	Savuni, cardo	Leaves, aerial parts	Inner part of the tender stem eaten raw. Young leaves and shoots ingredient of soups.		0.04	Scherrer et al. 2005
<i>Castanea sativa</i> Miller (Fagaceae) 30	Castagne	Seeds	Boiled or roasted. Ingredient of soups.		0.24	Scherrer et al. 2005; Mautone et al. 2019; Morti et al. 2009
<i>Centranthus ruber</i> (L.) DC. (Caprifoliaceae) 32	Valeriana, fiocco, e cardinale	Leaves	Raw in salads or ingredient of soups.		0.01	No data found
<i>Chenopodium album</i> (Amaranthaceae) 31	Paccia	Leaves	Ingredient of soups.		0.02	No data found
<i>Cichorium intybus</i> L. (Asteraceae) 13	Cicoria	Leaves	Ingredient of soups or eaten in salads.	As kidney depurative	0.65	Di Novella et al. 2013; Mautone et al. 2019; Savo et al. 2019; Scherrer et al. 2005
<i>Clematis vitalba</i> L. (Ranunculaceae) 33	Vitosa	Young shoots	Raw or boiled and eaten in salads or soups, or to prepare omelets.		0.08	Di Novella et al. 2013; Mautone et al. 2019; Guatino et al. 2008; Mautone et al. 2019; Morti and Morti 2017; Savo et al. 2019; Scherrer et al. 2005
<i>Clinopodium nepeta</i> (L.) Kuntze (= <i>Calamintha nepeta</i> L.) (Lamiaceae) 43, 92	Mentuccia, nepetella	Leaves	Spicc.	Against stomach ache	0.31	Morti et al. 2009; Morti and Morti 2017; Savo et al. 2019
<i>Crepis bursifolia</i> L. (Asteraceae) 14	Margherite gialle, cicoria	Leaves	Ingredient of soups.		0.02	Di Novella et al. 2013; Savo et al. 2019

TABLE 1. (CONTINUED).

Species, (Family), voucher specimen n. (preceded by WFPH 00)	Vernacular names	Part used	Traditional culinary uses	Therapeutic uses	RFC	Previously reported uses for the Campania region
<i>Crepis leontodermoides</i> All. (Asteraceae) 48	Margherite gialle, cicoria	Leaves	Ingredient of soups.		0.02	Di Novella et al. 2013
<i>Daucus carota</i> L. subsp. pl. (Apiaceae) 34	Carota	Roots	Fried.		0.01	Di Novella et al. 2013; Mautone et al. 2019; Salerno and Guarrera 2008; Savo et al. 2019
<i>Diplazis tenuifolia</i> (L.) DC. (Brassicaceae) 36	Rucola, rughetta	Leaves	Raw in salads or pesto used on pasta.	Against stomach ache and as digestif	0.49	Guarino et al. 2008; Menale et al. 2016; Morti et al. 2009; Morti and Morti 2017; Mautone et al. 2019; Savo et al. 2019; Scherrer et al. 2005; Morti et al. 2009
<i>Echium vulgare</i> L.; <i>E. plantagineum</i> L. (Boraginaceae) 39, 12	Buglossa	Young shoots, leaves	Young shoots boiled and in salads, leaves ingredient of soups.		0.02	
<i>Eruca sativa</i> Miller (Brassicaceae) 40	Rucola, rughetta	Leaves	Raw in salads.	Against stomach ache and as digestif	0.06	Di Novella et al. 2013; Guarino et al. 2008
<i>Foeniculum vulgare</i> Mill. (Apiaceae) 62	Fenuccio, finocchio	Fruits, leaves	Fruits (known as seeds) to prepare "taralli," liquors, or herbal tea. Leaves and young shoots as ingredient of "minestra" or to flavor fish dishes.	As digestif and carminative. Also eaten as galactagogue	0.40	Guarino et al. 2008; Mautone et al. 2019; Menale et al. 2016; Morti et al. 2009; Morti and Morti 2017; Savo et al. 2011; Savo et al. 2019; Scherrer et al. 2005
<i>Galactites tomentosa</i> Moench (Asteraceae) 38	Carduognolo	Young shoots, leaves	To prepare soups or pies.		0.06	Morti et al. 2009
<i>Glebionis segetum</i> (L.) Fourr (Asteraceae) 42	Crisantemo spontaneo	Tender leaves	Raw in salads or mixed with ricotta on roasted bread.		0.01	No data found

TABLE 1. (CONTINUED).

Species, (family), voucher specimen n. (preceded by WFPH 00)	Vernacular names	Part used	Traditional culinary uses	Therapeutic uses	RFC	Previously reported uses for the Campania region
<i>Heliosarum comnarium</i> L. (Fabaceae) 5	Sulla	Leaves	Ingredient of soups.		0.01	Salerno and Guarrera 2008; Scherrer et al. 2005
<i>Helianthus tuberosus</i> L. (Asteraceae) 63	Topinambur	Roots	Boiled in salads and soups.	As laxative	0.08	Guarino et al. 2008
<i>Hypochaeris radicata</i> L. (Asteraceae) 64	Cicoriella	Leaves	Ingredient of soups.		0.01	Savo et al. 2019
<i>Inula crithmoides</i> L. (Asteraceae) 35	Critami	Leaves	Added to salads for its salty taste.		0.02	Scherrer et al. 2005
<i>Lactuca saligna</i> L. (Asteraceae) 41	Latughella selvatica	Leaves	Ingredient of soups.		0.02	Di Novella et al. 2013; Savo et al. 2019
<i>Lactuca sativa subsp. serriola</i> (L.) Galasso, Banfi, Bartolucci & Ardenghi (Asteraceae) 11	Scarola	Leaves	Eaten boiled and fried.		0.02	Savo et al. 2019
<i>Laurus nobilis</i> L. (Lauraceae) 8, 91	Alloro	Leaves	To flavor meat dishes or soups.	Against abdominal pains	0.39	Guarino et al. 2008; Mautone et al. 2019; Morti et al. 2009; Scherrer et al. 2005
<i>Lathyrus cicera</i> L. (Fabaceae) 9		Marracuoccio	Seeds	Dried seeds milled to prepare a "polenta."		0.02
Di Novella et al. 2013						
<i>Mascaji comosum</i> (L.) Parl. (Asparagaceae) 10	Lampascioni	Bulbs	Boiled in soups or omelets, roasted or fried. Boiled and preserved in oil.		0.12	Di Novella et al. 2013; Guarino et al. 2008; Savo et al. 2019
<i>Malva sylvestris</i> L. (Malvaceae) 66, 94	Malva	Leaves, flowers	Ingredient of soups or omelets.		0.04	Savo et al. 2019
<i>Mentha spicata</i> L.; <i>M. pulegium</i> L.; <i>M. longifolia</i> L. (Lamiaceae) 67, 69, 68	Menta	Leaves	As spice or to prepare liquors.	As depurative and digestif	0.18	De Natale and Pollio 2007; Di Novella et al. 2013; Guarino et al., 2008; Mautone et al. 2019; Scherrer et al. 2005



TABLE 1. (CONTINUED).

Species, (family), voucher specimen n. (preceded by WFPH 00)	Vernacular names	Part used	Traditional culinary uses	Therapeutic uses	RFC	Previously reported uses for the Campania region
<i>Morus alba</i> L.; <i>M. nigra</i> L. (Moraceae) 70, 25	Cevese	Fruits	Raw or to prepare jam.	As laxative	0.21	Di Menale et al. 2016; Guarino et al. 2008; Novella et al. 2013 Scherrer et al. 2005
<i>Myrtus communis</i> L. (Myrtaceae) 19	Mortella	Leaves, fruits	Fruits to prepare liquors. Leafy branches put around fresh cheese to flavor it.		0.14	
<i>Nasturtium officinale</i> R.Br. (Brassicaceae) 24	Sanacciolo	Leaves	Raw in salads.		0.02	Di Novella et al. 2013; Guarino et al. 2008; Mautone et al. 2019
<i>Onobrychis viciifolia</i> Scop. (Fabaceae) 71	Lupinella	Seeds	Roasted seeds as a coffee substitute.		0.01	Morti et al. 2009
<i>Opuntia ficus-barbarica</i> A. Berger (Cactaceae) 72	Ficu d'India, figurine	Fruits	Raw.		0.09	Di Novella et al. 2013; Menale et al. 2016; Salerno and Guarera 2008; Scherrer et al. 2005
<i>Oxalis pes-caprae</i> L. (Oxalidaceae) 7	Limoncina	Stems	To give a slight acid taste to fish dishes or salads.		0.01	No data found
<i>Pancreaticum maritimum</i> L. (Amaryllidaceae) 73	Giglio di mare	Bulbs	Ingredient of salads as an onion substitute.		0.02	Morti et al. 2009
<i>Papaver rhoeas</i> L. (Papaveraceae) 18, 90	Papavero, papagna	Leaves, shoots	Shoots eaten boiled and fried.		0.07	Guarino et al. 2008; Menale and Muoio 2014; Savo et al. 2019; Scherrer et al. 2005
<i>Pastinaca sativa</i> L. subsp. <i>sativa</i> (Apiaceae) 70	Pastinaca	Roots	Boiled in salads.		0.02	Di Novella et al. 2013; Savo et al. 2019
<i>Pteris echioides</i> L.; <i>P. hieracioides</i> L. (Asteraceae) 74, 75	Spredda, sprella	Leaves	Ingredient of soups.		0.12	Savo et al. 2019; Scherrer et al. 2005

TABLE 1. (CONTINUED).

Species, (Family), voucher specimen n. (preceded by WFPH 00)	Vernacular names	Part used	Traditional culinary uses	Therapeutic uses	RFC	Previously reported uses for the Campania region
<i>Pinus pinea</i> L. (Pinaceae) 70	Pigna	Seeds	Toasted seeds for sweets or as ingredient of escarole stuffed pies. Ingredient of "pesto."		0.21	Morti et al. 2009
<i>Plantago lanceolata</i> L.; <i>P. major</i> L. (Plantaginaceae) 77, 86 Mautone et al. 2019; Savo et al. 2019	Cincheniervè,	centoniervè	Leaves	Ingredient of soups.	0.05	
<i>Portulaca oleracea</i> L. (Portulacaceae) 23	Puchiachiell-a, portulaca	Leaves	Raw in salads. Boiled in water and vinegar and preserved in oil.		0.41	Guarino et al. 2008; Mautone et al. 2019; Menale et al. 2016; Morti and Morti 2017; Morti et al. 2009; Savo et al. 2019; Scherrer et al. 2005
<i>Raphanus raphanistrum</i> L. subsp. pl. (Brassicaceae) 22	Rarice, rafano	Young shoots, leaves	Peeled young shoots ingredient of salads or soups. Roots grated on spaghetti.	Ingredient of soups.	0.09	Di Novella et al. 2013; Guarino et al. 2008; Morti et al. 2009; Morti and Morti 2017; Savo et al. 2019
<i>Reichardia picroides</i> (L.) Roth (Asteraceae) 78	Lattughella	Leaves	Ingredient of soups.		0.09	Di Novella et al. 2013; Mautone et al. 2019; Savo et al. 2019
<i>Robinia pseudacacia</i> L. (Fabaceae) 50, 89	Acacia	Flowers	Sweet fritters.		0.01	Savo et al. 2019
<i>Rubus ulmifolius</i> Schott (Rosaceae) 49	Aruetta, more, spine	Fruits	Raw or to prepare jam.		0.35	Guarino et al. 2008; Morti and Morti 2017; Savo et al. 2019; Scherrer et al. 2005;

TABLE 1. (CONTINUED).

Species, (Family), voucher specimen n. (preceded by WFPH 00)	Vernacular names	Part used	Traditional culinary uses	Therapeutic uses	RFC	Previously reported uses for the Campania region
<i>Ruscus aculeatus</i> L. (Ruscaceae) 20	Pungitopo	Young shoots	Young shoots boiled and eaten in salads, or to prepare omelets. Boiled in water and vinegar and preserved in oil.		0.09	Guarino et al. 2008; Mautone et al. 2019; Morti and Morti 2017; Savo et al. 2019; Scherrer et al. 2005
<i>Salicornia frutescens</i> (L.) L. (Amaranthaceae) 79	Salicornia	Aerial parts	Raw, to flavor fish dishes for its sea taste.		0.01	No data found
<i>Salvia rosmarinus</i> Schleid. ( <i>Rosmarinus officinalis</i> L.) (Lamiaceae) 80, 88	Rosamarina	Leaves	Spice used mainly to flavor pork meat dishes and grilled potatoes.		0.13	Guarino et al. 2008; Morti et al. 2009; Scherrer et al. 2005
<i>Sambucus nigra</i> L. (Caprifoliaceae) 81, 87	Sauco, sammuco, sambuco	Fruits, flowers	Flowers as ingredient of sweet fritters. Fruits to prepare drinks or jam.		0.11	Mautone et al. 2019; Menale et al. 2016; Savo et al. 2019; Scherrer et al. 2005
<i>Satureja montana</i> L. subsp. <i>montana</i> (Lamiaceae) 59	Timo	Leaves	Spice.		0.01	Di Novella et al. 2013; Mautone et al. 2019; Scherrer et al. 2005
<i>Silene vulgaris</i> L.; <i>Silene latifolia</i> Poir. (Caryophyllaceae) 58, 57	Strigole	Leaves	Ingredient of soups.		0.09	No data found
<i>Smyrniolum olusatrum</i> L. (Apiaceae) 53	Sedano selvaggio	Leaves	Raw in salads or mixed with ricotta on toasted bread.		0.05	No data found
<i>Sonchus asper</i> (L.) Hill; <i>S. oleraceus</i> L.; <i>S.</i>	Cardillo, sivune	Leaves	Ingredient of soups or to		0.52	Di Novella et al. 2013; Guarino et al. 2008;

TABLE 1. (CONTINUED).

Species, (Family), voucher specimen n. (preceded by WFPH 00)	Vernacular names	Part used	Traditional culinary uses	Therapeutic uses	RFC	Previously reported uses for the Campania region
<i>tenerrimus</i> L. (Asteraceae) 82, 83, 84			prepare stuffed pies.			Mautone et al. 2019; Morti et al. 2009; Morti and Morti 2017; Savo et al. 2019; Scherer et al. 2005
<i>Sorbus domestica</i> L. (Rosaceae) 52	Sovere	Fruits	Raw.		0.04	Di Menale and Muoio 2014; Guarino et al. 2008; Menale et al. 2016; Novella et al. 2013; Savo et al. 2019
<i>Stellaria media</i> (L.) Vill. subsp. <i>media</i> ; <i>S. neglecta</i> Weihe subsp. <i>cupaniana</i> (Jord. & Fourr.) Gutermann; <i>S. neglecta</i> Weihe subsp. <i>neglecta</i> (Caryophyllaceae) 56, 21, 85	Centocchie	Aerial parts	Raw in salads or ingredient of soups.		0.07	Savo et al. 2019
<i>Taraxacum campyloides</i> G.E. Haglund (Asteraceae) 65	Cecuta, cicurione, cicoria	Basal leaves	Ingredient of soups.	As diuretic	0.15	Di Novella et al. 2013; Guarino et al. 2008; Mautone et al. 2019; Morti et al. 2009; Morti and Morti 2017; Savo et al. 2019; Scherer et al. 2005
<i>Urospermum picroides</i> (L.) Scop. ex F.W. Schmidt (Asteraceae) 51	Cicoria	Basal leaves	Ingredient of soups.		0.01	Salerno and Guarera 2008; Savo et al. 2019
<i>Urtica membranacea</i> Poit.; <i>U. dioica</i> L.; <i>U. urens</i> L. (Urticaceae) 15, 16, 17	Urtica, ardica	Leaves	Boiled and fried, eaten in stuffed pies or as a pesto on pasta. Boiled as ingredient of omelets.	As depurative	0.29	Di Mautone et al. 2019; Guarino et al. 2008; Morti et al. 2009; Morti and Morti 2017; Novella et al. 2013; Savo et al. 2019; Scherer et al. 2005;
<i>Vicia faba</i> L. (Fabaceae) 54	Fava	Leaves	Raw in salads.		0.01	Guarino et al. 2008; Menale et al. 2016

According to the reported data (Fig. 3A), plants are mainly cooked (boiled, stewed, or fried), raw consumption accounts for 33.3%. Soups and salads (Fig. 3B) are the main preparation methods used.

As shown in Table 1, the culinary uses of 11 wild species (13.5% of the total) were hitherto unreported in the ethnobotanical literature for Campania.

In the following paragraphs we discuss the culinary uses and the phytochemical properties of the vegetables cited by at least one-third of the respondents (RFC  $\geq 0.4$ ). A survey of the phytochemical compounds of wild spices and fruits is also done.

#### WILD PLANTS MOST FREQUENTLY USED IN TRADITIONAL CUISINE AND THEIR PHYTOCHEMICAL COMPOUNDS

##### *Vegetables*

**Common chicory** (*Cichorium intybus* L.) grows in mostly arid and ruderal habitats; basal leaves are gathered almost all year except during flowering. This plant is highly appreciated for its slightly bitter taste. However, to remove some of the bitterness when eating it in salads, some informants soak it in cold water after boiling it. For the same purpose, sodium bicarbonate can be added to the cooking water. When consumed in salad, chicory is usually dressed with extra virgin olive oil and lemon, although it is sometimes stewed with garlic and olive oil. Chicory is also eaten in soups.

Some informants reported chicory consumption to treat constipation, hypercholesterolaemia, kidney disorders, and as a detoxificant. The folkloric use of *C. intybus* as a hepatoprotector has been well documented (Chandra and Jain 2016; Street et al. 2013). All parts of this species contain considerable amounts of phytochemicals like tannins, saponins, flavonoids, terpenoids, cardiac glycosides, and anthocyanins, and are good sources of antioxidants (Abbas et al. 2015; Shad et al. 2013).

**Borage** (*Borago officinalis* L.) grows in weedy places with wet, well-drained, rich soils, basal leaves being picked from late autumn to spring. The species is sometimes grown, as a minor crop, by small-scale farmers in family gardens for personal use. Borage is an ingredient of traditional soups or is stewed with olive oil, boiled, and put in omelets or in ricotta-filled pies. Borage flowers are added to sweet fritters. The plant is also eaten also for its depurative and galactagogue properties.

The leaves of borage contain small amounts of the following compounds: pyrrolizidine alkaloids; fatty acids including  $\alpha$ -Linolenic acid and stearidonic acid; esters of squalene-type triterpene, sterol; and flavonoids, coumarins, and tannins (Asadi-Samani et al. 2014; Gilani et al. 2007; Kaskoos et al. 2012). A high concentration of anthocyanins is found in epidermal cells of borage petals (Davies 2004). Borage leaves are used as an anticonvulsant, bronchodilator, and vasodilator; they also have cardio-depressive properties (Bandonien and Murkovic 2002).

**Sow thistle** (*Sonchus* spp.) is very common in weedy and cultivated places, along roadsides and in settlements, between the cracks of pavements or close to old walls. The leaves are harvested throughout the year in areas with a mild climate. Like the previous species, it is used for preparing soups (with beans) or in ricotta-filled pies. Except for limited mentions of this species being eaten raw to cure stomach problems, sow thistle is not usually identified as a functional food. *Sonchus* spp. is rich in minerals, vitamin C, carotenoids, omega-3 fatty acids, flavonoids, flavanols, and total phenols, while showing low levels of saponins, phytate, and alkaloids (Guarrera et al. 2006; Jimoh et al. 2011).

**Wall rocket** (*Diplotaxis tenuifolia* L. and *Eruca sativa* L.) is common along roadsides and in disturbed areas; it is harvested almost year-round. It is eaten raw in salads, used as an ingredient for *pesto* with olive oil and garlic (and sometimes pine nuts), and/or to season spaghetti. In the local restaurants of the whole of Campania, these species are often used to flavor the so-called "Pizza Margherita."

Wall rocket is rich in glucosinolates, ascorbic acid, carotenoids, and polyphenols (Bell et al. 2015). Glucosinolates ( $\beta$ -thioglucoside and N-hydrosulphates) in combination with the enzyme myrosinase are hydrolyzed to create nitrogen compounds (e.g., isothiocyanates, nitriles, and indoles) that are responsible for the characteristic pungent and bitter taste (Bell and Wagstaff 2014). Rocket species also contain large concentrations of polyglycosylated flavonol compounds, which are known to confer numerous beneficial health effects on the gastrointestinal tract and on the cardiovascular system (Bell et al. 2015; Björkman et al. 2011; Traka and Mithen, 2011).

**Purslane** (*Portulaca oleracea* L.) grows as a weed in field crops and lawns, its leaves and young stems being harvested between late summer and early fall. It is eaten raw in salads, pickled or boiled in water

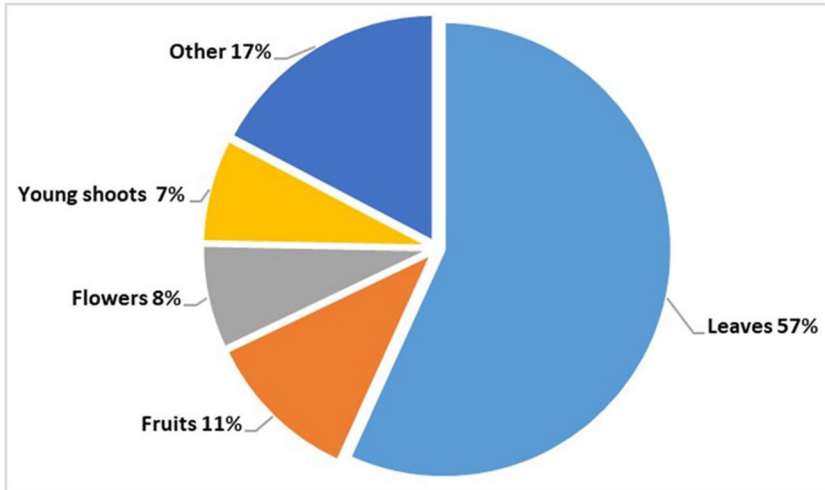


Fig. 2. Plant parts used in the local cuisine.

and vinegar, and preserved in olive oil. This plant is a major source of short-chain omega-3 fatty acids, alpha-tocopherol, melatonin, and bioactive compounds (Oliveira et al. 2009; Uddin et al. 2012).

**Fennel** (*Foeniculum vulgare* L.) grows in dry soils in uncultivated, grassy places; it is harvested during spring and summer. This species is used both for its leaves and young shoots as well as its achenes (known as seeds). The fruits are used as flavoring in *taralli*, savory biscuits used as typical snack food from southern Italy, or to prepare a digestif liqueur. They are also widely used to prepare herbal tea as a carminative (see also Aleo et al. 2013; Camangi et al. 2003; Motti et al. 2018; Scherrer et al. 2005).

Fennel is also a major medicinal and aromatic plant, widely used as a digestif and in treating gastrointestinal disorders. Phenols, phenolic glycosides, and volatile aroma compounds such as trans-anethole, estragole, and fenchone are reported to be the main phytochemicals of this species (Rather et al. 2016; Telci et al. 2009). Phenolic compounds isolated from this species are considered to be responsible for its antioxidant activity (Rather et al. 2016).

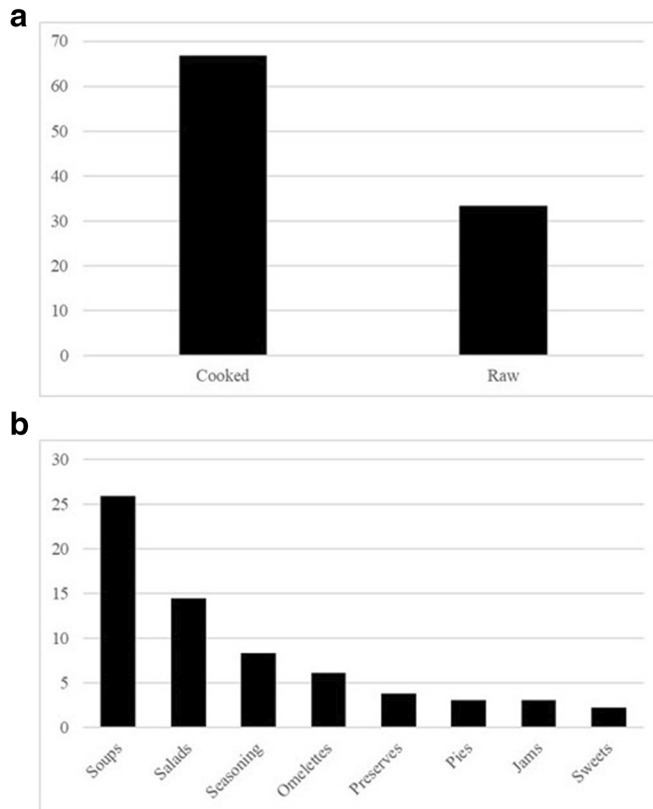
**Asparagus** (*Asparagus acutifolius* L.) grows in maquis, woods, and hedges; its shoots (turions) are picked in the spring. Asparagus shoots are eaten as a side dish, boiled and seasoned with olive oil or butter, sometimes accompanied with eggs; they are also used as the main ingredient for omelets or *risotto*. Asparagus is also pickled, or boiled in water and vinegar, and preserved in olive oil. *A. acutifolius*

appears nutritionally interesting due to its high content in dry matter, proteins, lipids, phenols, flavonoids, tocopherols, and its strong antioxidant properties (Di Maro et al. 2013; Ferrara et al. 2011; Kasture et al. 2009).

**Nettles** (*Urtica* spp.) are nitrophilous and ruderal; their leaves and young shoots are harvested before flowering throughout the year. Nettles are used as a basis for stuffing pies, or to make a *pesto* sauce (sometimes with walnuts or pine nuts) for seasoning pasta. They are also used in cereal-based soups, or boiled and fried as an ingredient for omelets. Nettles are widely used in the Mediterranean basin for their anti-nociceptive, anti-inflammatory, anti-diabetic, diuretic, digestive, and immunostimulatory properties (Benítez et al. 2010; Guarrera and Savo 2013; Marrassini et al. 2010; Motti et al. 2019; Tuttolomondo et al. 2014). Flavonoids, tannins, scopoletin, fatty acids, phenolic compounds, glycoside, and sterols are the main phytochemicals reported for this group of species (Al-Tameme et al. 2015; Asgarpanah and Mohajerani 2012; Grauso et al. 2019; Grauso et al. 2020; Gülçin et al. 2004).

#### Aromatic Herbs

Informants revealed that, besides the commonly cultivated aromatic herbs such as basil and parsley, they usually gather wild plants as spices. The most cited species is **calamint** (*Clinopodium nepeta* [L.] Kuntze), whose leaves are mainly used to season tomatoes or chickpea salads. Calamint is rich in



**Fig. 3.** (A) —Administration and (B)—Preparation modes of the wild edible species along the coast of Campania.

phenols, sterols, pulegone, and piperitone, and is well known for its antioxidant activity (Conforti et al. 2012; Pacifico et al. 2015; Pagni et al. 1990).

Leaves from the **bay laurel** (*Laurus nobilis* L.) are used to season boiled chestnuts or roast meats. Bay laurel is traditionally administered orally to treat the symptoms of gastrointestinal problems. It contains sesquiterpene lactones, flavonoid glycosides, and essential oils. It is reported to possess antioxidant, anti-ulcerogenic, and antibacterial activities (Kivçak and Mert 2002; Patrakar et al. 2012).

Leaves of **rosemary** (*Salvia rosmarinus* Spenn.) are used to flavor baked potatoes or meat dishes. Rosemary is traditionally used in folk medicine as a galactagogue or to treat renal colic and dysmenorrhea. It is also used to relieve symptoms caused by respiratory disorders and to counteract hypercholesterolaemia (Motti and Motti 2017; Motti et al. 2019; Ulbricht et al. 2010). The major active ingredients of rosemary are caffeic acid and its derivatives, terpenes, and flavones (Ulbricht et al. 2010).

**Garlic** (*Allium* spp.) is the most widely used spice to flavor salads, sauces, soups, and so forth. It is widely used for its antibacterial, hypoglycemic, hypotensive, hypocholesterolaemic, anti-atherosclerotic, and anti-thrombotic properties (Lanzotti 2006). Many of these biological effects are related to the thiosulfates, which are also responsible for its characteristic pungent aroma and taste, and to phenols, saponins, and saponins, which are more stable when cooked (Lanzotti 2012).

#### Fruits

Some wild fruits, eaten raw for snacks or dessert, or used to prepare jams, can also be foraged.

**Chestnut** (*Castanea sativa* Miller) grows in hill and upland areas; its fruits are picked in autumn. The seeds are eaten roasted or boiled with laurel leaves, and sometimes used as an ingredient for soups with legumes (mainly beans). Chestnuts have considerable potential as functional food: polyphenolic extracts are

a natural source of antioxidants; other beneficial compounds are gallic and ellagic acids, and the ellagitannins (De Vasconcelos et al. 2010).

**White and black mulberry** (*Morus alba* L. and *M. nigra* L.) are picked in summer and eaten raw or used to prepare jams. Mulberry fruits are rich in phenolic and flavonoid contents and have potential against oxidative stress, providing also cardiovascular protection; the main fatty acids are linoleic, palmitic, and oleic (Ercisli and Orhan 2007; Pawlowska et al. 2008). Likewise, other components such as 1-deoxynojirimycin (DNJ) and Moran 20 K have been reported to be effective against hyperglycemia and lipid peroxidation in diabetics (Butt et al. 2008).

**Strawberry tree** (*Arbutus unedo* L.) is a small tree widely found among the Mediterranean maquis, growing on acid soils. The fruits are picked from October to December and eaten raw or used to prepare jams. Berries are a very good source of antioxidants, which are reported to reduce the risk of cancer, coronary heart disease, and other degenerative diseases. Indeed, the fruits are rich in flavonoids, anthocyanins, ellagic acid, vitamin C, vitamin E, and carotenoids (Fortalezas et al. 2010; Miguel et al. 2014; Pallauf et al. 2008).

#### NEW WILD FOOD SPECIES FOR CAMPANIA OR ITALY

Among the 11 previously unrecorded wild vegetables for Campania, the most cited species were *Silene latifolia* Poir. and *S. vulgaris* (Moench) Garcke. Both species are well known as ingredients of soups or eaten in salads in peasant cuisine in central and southern Italy (Arcidiacono et al. 2007; Biscotti and Pieroni 2015; Guarrera and Leporatti 2007; Idolo et al. 2010; Uncini Manganelli et al. 2002). The use of *Calendula arvensis* L. leaves as an ingredient for soups is new for Italy; in some regions, flowers of this species are added to salads (Uncini Manganelli et al. 2002). The *Glebionis segetum* (L.) Fourr. tender leaves eaten in salads are reported previously only for the region of Lazio (Guarrera 2003). The use of *Oxalis pes-caprae* L. stems to aromatize salads is well known in Sicily (Tuttolomondo et al. 2014). *Lathyrus cicera* L. is well known in the Cilento area (Di Novella et al. 2013) but is unknown in other Italian regions. Finally, there is the interesting case of glasswort (*Salicornia fruticosa* [L.] L.) cited in this research by only one informant, but available in some

well-stocked supermarkets, and known in folk cuisine only in Puglia's Gargano area (Biscotti and Pieroni 2015; Leporatti and Guarrera 2015).

#### SOME FOLK DISHES AND THEIR COMPOSITION

It is worth noting the persistence of some important dishes of the folk cuisine like traditional soups (*minestra maritata* in the Naples area; *mallone* and *minestra terrana* in the province of Salerno) traditionally eaten at Christmas and Eastertide but also throughout the year. The main ingredient of such soups are wild collected greens like *Borago officinalis*, *Sonchus* spp., *Silene* spp., *Taraxacum campyloides*, *Cichorium intybus*, *Reichardia picroides* (L.) Roth, *Papaver rhoeas* L., *Foeniculum vulgare*, *Urtica* spp., and sometimes *Plantago lanceolata* L. (Fig. 4). According to Łuczaj and Pieroni (2016), the use of soup composed of many wild vegetables survives mainly in the Mediterranean areas. In more recent recipes, fresh asparagus are paired with seafood like *tuna bottarga* (salted and dried fish eggs) or little shrimps and/or grated traditional cheeses (*Caciocavallo podolico* in the Cilento area, *provola del monaco* along the Sorrento coast) as a sauce for spaghetti. *Lathyrus cicera* is cultivated in Lentiscolosa, a small village near Camerota, the dried seed is milled and the flour mixed with maize and wheat flour to prepare a unique *polenta*, the so-called *maracucciata*, mixed with hot oil, fried for a few minutes with garlic, onion, and red chili pepper. Fennel leaves are used fresh to flavor fish dishes, added to *zuppa di scarola e fagioli* (escarole and bean soup) and other soups, or very occasionally to omelets. A particular stuffed preparation from Marina di Pisciotta called *cauraro* is based on the use of fresh green fennel leaves added to the basic ingredients (garlic, olive oil, potatoes, green vegetables such as chicory, escarole, etc., and anchovies) and in anchovy or tuna *ragù*, tomato-based fish sauces usually paired with spaghetti or other pasta shapes. The practice of preparing preserves based on wild species is also still fairly consolidated in rural areas, using in particular wild asparagus (*Asparagus acutifolius*), butcher's broom (*Ruscus aculeatus* L.), purslane (*Portulaca oleracea*), and tassel hyacinth (*Muscari comosum* [L.] Miller) (Fig. 4).

#### FINAL CONSIDERATIONS

Although the ethnobotanical literature reports a generalized decrease in the consumption of wild edible plants (e.g., Geng et al. 2016; Kujawska





**Fig. 4.** From left to right, clockwise: Drying purslane; Purslane in vinegar; Tassel hyacinth in olive oil; Asparagus in olive oil; Soup ingredients *Urtica membranacea*, *Sonchus* spp., *Plantago lanceolata*, *Silene latifolia*, *Stellaria neglecta*.

and Łuczaj 2015; Łuczaj et al. 2012), our data show the persistence of traditional uses of these species in the study area and document several unknown or poorly known botanical taxa used in the local cuisine. According also to Łuczaj and Pieroni (2016), these data show that, in contrast with the part of Europe north of the Alps, wild plants used to be commonly eaten in large amounts up until very recently, and are still eaten in many Mediterranean areas. In particular, we observed a recent renewed interest in using wild plants particularly among those under 60 years old who have collated information from previous generations and made it part of their cultural knowledge. Many of the uses of wild food plants are related to the preservation of family or local traditions and are also considered a way to diversify the daily diet. In this context, it is worth stressing the large number, on a regional scale, of foraging courses and wild plant-based cookery classes with experienced botanists and chefs. Despite this renewed interest among the

young and middle-aged, according to some authors (e.g., Łuczaj et al. 2013; Pieroni et al. 2005), many elderly informants perceive the consumption of non-cultivated vegetables negatively because they were eaten in times of famine (especially during World War II) and therefore view them as a symbol of past poverty. In this regard a recurring sentence (pronounced by elderly informants in Neapolitan dialect with a certain annoyance) was: “so’ cose e tiemp e guerra” (literally “these are things of war times”). Although respondents did not openly state that they followed the Mediterranean Diet (“Ca s’è semp magnat accussi” literally: “here we have always eaten like this”), it appeared obvious that their food style was very close to that described by Ancel Keys (1995; Keys et al. 1986). Meat is consumed sporadically and often replaced by fish, while the consumption of fresh (mozzarella) or seasoned (caciocavallo, pecorino, caciocotta) dairy products is quite widespread. A crucial role is played by extra virgin olive oil (EVOO), which can be considered

the pillar fat of MedDiet (Al Jamal and Ibrahim 2011; Camerota and Celletti 2015; Fogliano and Sacchi 2006; Sacchi et al. 2014). EVOO is virtually the only fat condiment used in food preparation; the use of lard has almost disappeared while butter is only used for making sweets. The importance of EVOO is mainly attributed both to its high content of oleic acid, a balanced quantity of polyunsaturated fatty acids and its richness in polar polyphenol-rich compounds, giving EVOO its bitter, pungent taste but also acting as natural antioxidants that contribute to preventing several human diseases (Bulotta et al. 2014; Camerota and Celletti 2015; Vitaglione et al. 2015). The interaction of EVOO during cooking and frying with other Mediterranean vegetables has been extensively studied in recent years (Chiou et al. 2007; Kalogeropoulos et al. 2007; Sacchi et al. 2014), as well as the lipid-solvent role of EVOO for herb and vegetable infusion to obtain naturally flavored and functional EVOOs (Antoun and Tsimidou 1997, 1998; Caporaso et al. 2013; Sacchi et al. 2017).

## Conclusions

The above ethnobotanical data, as well as the phytochemical and nutritional profiles of the species in question, offer insights into designing new dishes. Such insights will be based on the following: i) traditional knowledge of wild species processing and cooking; ii) food pairing with other ingredients to improve nutritional and/or sensory quality (bitterness reduction, flavor enhancement, antioxidant bioavailability, etc.); iii) availability of innovative technologies and cooking methods allowing enhancement of key molecules responsible for functional properties; and iv) recovery and re-design of traditional recipes in response to strategies of sustainable gastronomy.

The potential contribution of wild species to design “new Mediterranean dishes” based on their sensory and nutritional properties, should be explored in the future by local chefs. Such traditional ingredients may enhance bitter/green sensory notes, should confer unique functional properties and a local “signature” to dishes, with distinctive flavor, taste, and healthy properties.

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