
WILD EDIBLE PLANTS AND THEIR TRADITIONAL USE IN THE HUMAN NUTRITION IN BOSNIA-HERZEGOVINA

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This article presents first systematical procedure results on traditional usage of wild, edible, vitaminous, and aromatic plants in the nutrition of human population in Bosnia and Herzegovina (W. Balkan peninsula; SE Europe). By method of an ethnobotanical interview, which comprised of over 250 persons, whose average age was 55, and by research on edible wild flora all around Bosnia and Herzegovina that extended over many years, detected were 308 plants belonging to 73 plant families that are being used in nutrition and diet of indigenous population. Edible wild plants are used as delicious vegetables, fruits, peer and spices, in either fresh, raw, or dried condition. Plants are being used for the making of cooked food (33%), fresh salads (19%), mush and bread (17%), or as fresh, wild fruits and drinks (13%) or as spices and ethno-pharmacological potions (10%). The majority of identified, wild edible plants may satisfy the daily human need for elementary nutrition material, particularly those of vitamins C and A, and for some minerals, according to the regulations of World Health Organization (WHO).

KEYWORDS nutrition, wild food, human ecology, ethnobotany, biodiversity, Balkan peninsula

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INTRODUCTION

One of the most important problems of the current era is hunger. Despite the fact of stepping into the 21st century, according to World Health Organizations (WHO's) estimation, more than one-third of human population suffers from hunger or severe malnutrition, one-third goes to bed semi-hungry or hungry, while only one-third of the world population fully enjoys all the benefits of adequate food supply (ACC/SCN, 1992–1993).

On the other hand, there has been an increasing trend of food contamination by various kind of toxic compounds (pesticides, fertilizers, all sorts of pollutants from the environment), which is prevalent most factor that influences human health. This kind of food additives cause a wide spectrum of pathological conditions in the human body, including different forms of cancer (WHO, 1995). It would be impossible to exclude these food from the human diet entirely due to an increase in hunger all additives over the world. However, certain preventive measures and steps can be undertaken in order to improve the current situation as much as possible.

Hence, there are two major problems facing mankind when it comes to the human diet: First, how to discover potential food resources and decrease hunger that becomes more prevalent everyday, and second how to provide sources of healthy food that would be acceptable for humans. One part of the solution should be looked for in the bio-technology and new technological discoveries. It is commonly believed that this dilemma will be successfully solved in future and that hunger will be minimized in general, or at least evenly distributed on the planet. But in these modern days, there are hungry people who require only minimal assistance to be sufficiently supplied with food, while the rest of the population urgently needs a larger amount of healthy and ecologically safe food.

Wilderness in many parts of the world rich in self-grown vitaminous and spicy plant species that could be a solid base for solving these problems. Although these resources are not an adequate basis for human diet, they could be an important source of supplementary food for starving populations and a dietary replacement for populations that in their daily diet consume unhealthy food (Colic 1962; Becker, 1983; Agrahar-Murugkar and Subbulakshmi, 2005; Addis et al., 2005).

Usage of self-grown plants in human diet has been present since the early age of mans existence (Moffett, 1991; Kubiak-Martens, 1999). That kind of practice has continued up to modern age, especially in countries

that have been struck by chronic hunger or periodical hunger cycles (Vracaric, 1977; Sena et al., 1998; Hanazaki et al., 2000; Ladio, 2000; Lockett and Grivetti, 2000; Britta et al., 2003; Kristensen and Balslev, 2003; Tabuti et al., 2004; Glew et al., 2005).

Besides, usage of plants belonging to the wild flora, is common today as a supplement for healthy diet, even in the most developed regions of the world. Thus *Nasturtium officinale* is a necessary ingredient of salads in Scandinavian dishes and *Valerianella locusta* and *Asparagus officinale* are irreplaceable vegetables in Mediterranean countries (Grlic, 1952; 1954; Bonet and Valles, 2002; Guarrerra, 2003). Wild fruits of the following species: *Fragaria vesca*, *Rubus idaeus*, *R. fruticosus*, *R. hirtus*, *R. caesius*, *R. dalmatinus*, *Vaccinium myrtillus*, *V. vitis-idaea*, *Cornus mas*, *Sorbus torminalis*, and *S. aucuparia* are highly valued in many developed countries (Fleischhauer, 2003; Sanghvi, 2004).

The problem of nutrition and a supply of sufficient food quantities has been present in the regions of Bosnia and Herzegovina and the entire Balkan Peninsula over the past centuries, especially in the western parts. Since the beginning of human settlement on the Balkan Peninsula, which goes back to the early neolith era, man has been fighting for his survival (Fukarek, 1954; Kusan, 1956; Josifovic, 1989). This area was often stricken by crises that were followed by a lack of food over the past historical eras. People were starving not only during dry seasons of the years, but also during the wars or similar disasters, despite the fact that there was a very rich wild flora and fauna surrounding them. Wild flora and fauna were not utilized fully in human nutrition, which was brought about by widespread beliefs and prejudices. Especially in some parts of Bosnia, the following organisms were seldom used in human diet: snakes, snails, frogs, and wild vegetables. Inland people were very conservative in this point-of-view, while inhabitants of the coastline have cherished customs to use both flora and fauna in their daily nutrition since early ages. This can be explained by a small yield of cultivated plants due to common drought during the vegetative season, and progressive land erosion. Thus, inhabitants of coastline and southern Herzegovina were pushed to eat "everything that was green" in order to survive and maintain a basic existence (Bakic and Skare-Kavric, 1967; Bakota, 1967).

In other areas during the years of hunger, people preferred to eat cord (leather pieces from their shoes) or beech's bark, rather than wild fauna or delicious wild vegetables. Flowering plants were not even considered (Filipovic, 1953).

Despite a lack of education in possible sources of food that are to be found in nature, the population of this part of the Balkan Peninsula in its quite long history has developed and cherished the knowledge of nutrition with the dominance of wild edible vitaminous and aromatic plants over a particular year's seasons. Even today in some parts of Herzegovina, such as the Mediterranean Mountains, during the period of cold and strong winds, fundamental fruits for the local population are fruits of wild plants: *Crataegus monogyna*, *Cornus mas*, *Sorbus torminalis*, *Prunus avium*, especially for the children. When the richness of local flora and fauna, as well as possibility of its usage in both daily life and extraordinary situations, became obvious to humans, systematic investigation have been started in edible wild flora and fauna. One reason for this was to fulfill army requirements for development of techniques for survival in nature (Drobnjak, 1962; Ivanisevic, 1962; Colic, 1967; Rajsic, 1974; Vracaric et al., 1966, 1967; Vracaric, 1977; Grlic, 1980). These investigations have continued in cooperation with several scientific and research institutions, as well as with some groups interested in the application of surviving activities in nature.

Wild edible flora did not play a major role in the population's survival only in ancient days. It was crucial in maintenance of lives during the recent war in Bosnia and Herzegovina, especially in the cities that were under siege. At that point, in order to secure the survival of citizens by usage of wild flora in their diet, the Civil Protection Center, requested experts in this field to conduct a study that would enlighten possibilities of human survival in the situation of great shortages of food (Redzic, 1993).

There has been an increasing need for an intensive study on potential sources of healthy food contained in wild flora and fauna due to the growing problem of food shortages and the survival of humans under different conditions. Diversity of flora and fauna in some areas of the world has particular value. One of these is the area of Bosnia and Herzegovina, Mediterranean mountainous country in the central part of the Balkan Peninsula. This is the one of the richest country's in Europe when it comes to the diversity of wild flora (Redzic et al., 2003). Its natural resources have to be studied and made available local community.

The aims of this article are:

- inventarization and documentation of wild edible plants usage by Bosnian communities;

- assessment of the wild edible plants usages;
- assessment of the most common species used in Bosnia and Herzegovina;
- collecting of data on ways of meal's preparation;
- contemplating of nutrition values and comparative analyses of nutrition characteristics with plants from other areas, and evaluation possibilities of disposable species of wild plants in new forms of nutrition of contemporary man.

MATERIAL AND METHODS

Study Area

Bosnia and Herzegovina (B&H) are located in the northwestern part of the Balkan Peninsula with a total land area of 51,129 km² and some 4, 600, 000 inhabitants (Redzic et al., 2003). The total length of the land boundaries is 1,459 km, and that of the coastline is 20 km (Figure 1). This is mainly a hilly mountainous region. Only 5% of the total country area belongs to plains, 24% to hills, 42% to mountains, and 29% to

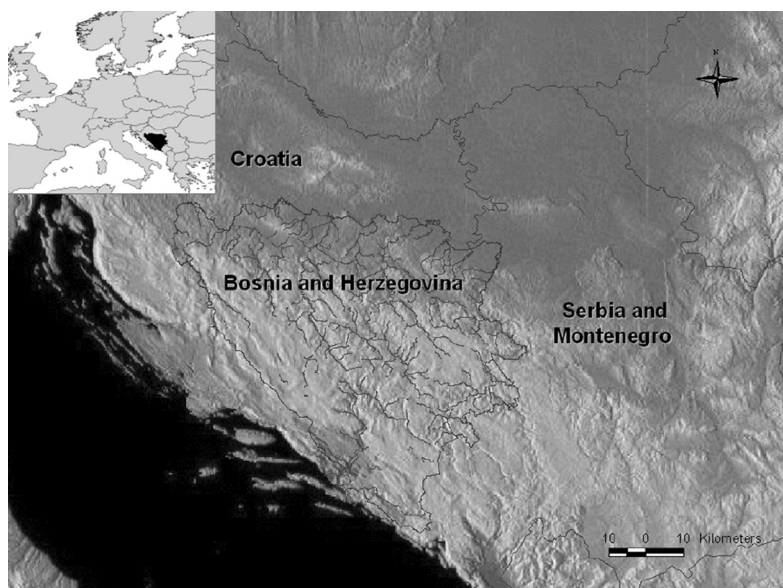


Figure 1. Geographical position of investigated area.

karst. Karst fields comprise up to 19% of the karstic area. Mean altitude above sea level is cca. 500 m (from the sea level in Neum-Klek to the Mt Maglic top 2,387 m).

The climate is very heterogeneous: Mediterranean, sub-Mediterranean, temperate continental, continental, and mountainous climate. A hydrologic network exists in numerous rivers belonging to the Black Sea basin (Una, Vrbas, Bosna, and Drina) and rivers belonging to the Adriatic Sea basin (Neretva, Trebizat, and Trebisnica).

From a phytogeographical standpoint, this area belongs to three regions: Mediterranean with Adriatic province, Eurosiberian-Boreoamerican with Illyrian province, Moesian province, and the province of relic pine forests. The highest peaks belong to the Alpine-high nordic region with more than 50% of the high Dinaric province covered with natural forests. The rest is covered with meadows, rocky grassland, and arable land. From an ecological standpoint, the largest part of the territory is still clean and acceptable, and therefore it is suitable for utilization of plant resources from their natural habitats for nutrition and healing.

Field Work

The basic method used for gathering of data was an ethnobotanical/ethnonutritional interview. The interview contained the following data:

- name and age of interviewed person
- area/region
- time of interview
- local name(s) of herbs
- part of the plant that was being used
- mode of preparation of nutritive potion
- purpose of usage
- place of growing
- Other important remarks (e.g., evaluation of conservatory status).

More than 250 adults were interviewed, average age 55, who have used wild plants in their diet under varied circumstances. Interviewed persons were members of different ethnical groups. Almost 60% were Bosnian Muslims, 39% were Bosnian Catholics and Orthodox, and several Hebrews and other ethnic and minority groups were also interviewed. Approximately 65% were women and 45% were men.

During every field visit, all persons that spent time in nature in any way, were interviewed if they use or are knowledgeable in the usage of wild flora with dietary purposes (mountaineers, collectors of medicina herbs, nomads, nomad populations). On several occasions, collected herb material was displayed to the locals (in villages, suburban areas of cities, mountain lodges, mountain camps) and for those plants that were identified by them, information on its usage were recorded. Each plant that was presented to the interviewees by the investigator and recognized as having dietary purposes, was collected, photographed, and stored within the herbaria.

Intensive field explorations were done in three seasons: spring, summer, and early autumn of 2000–2004.

An enormous amount of very useful information on usage of wild flora in nutrition, both under normal and extraordinary circumstances, were collected by the author during training on survival in nature, in which the author took part (Redzic, 1993), and during the mapping of flora and vegetation (Redzic et al., 1984, 1985, 1986). Data on nutrition values of many autonomous edible plants were extracted from the literature (Vracaric, 1977; Grlic, 1980; Redzic, 1993).

All plant material has been placed within the herbaria and stored in the herbaria of medical and edible plants in the Center of Ecology and Natural Resources at the Faculty of Science, Sarajevo University (CEPRES HERB) and in the herbaria of the National Museum of B&H (SARA). A herbaria number, was assigned to each identified plant species.

Laboratory Work

Determination of plant material has been carried out by the author and final determination of some questionable data has been carried out on behalf of determined herbaria specimens from SARA and CEPRES HERB, and relevant literature (Hayek, 1927–33; Beck-Mannageta and Maly, 1950; Beck-Mannageta et al., 1967, 1974, 1983) Nomenclature of the plant species and their systematical belonging was determined according to the Flora Europaea (Tutin et al., 1964–1980). Preparatory procedures and fields of usage were categorized according to the following authors: Vracaric, (1977); Grlic (1980); Josifovic (1989); and Redzic (1993).

Data Analyses

These investigations have been carried out in order to gather data on:

- number of edible and some aromatic plants used in traditional nutrition,
- local plant name(s),
- number of plant families and the most frequent families,
- the most frequent plant species used in nutrition,
- types of habitats and plant communities where species lives,
- parts of plants being used,
- classification of edible plants,
- forms and presence of preparations.

RESULTS

General Data on Edible Plants

During these investigations, it has been determined that 308 vascular plant species of wild flora have had significant importance in traditional nutrition and ethnoecology in B&H. An overview on these plants and their basic data were given in Table 1. The most frequently used plants in the entire B&H region are: *Urtica dioica*, *Fagus sylvatica*, *Epilobium angustifolium*, *Chenopodium bonus-henricus*, *Brassica* sp., *Castanea sativa*, *Alchemilla* sp., *Allium ursinum*, *Beta* sp., *Atriplex* sp., *Rubus* sp., *Fragaria* sp., *Sorbus* sp., *Malva* sp., *Melissa officinalis*, *Mentha* sp., *Oxalis acetosella*, *Plantago* sp., *Polygonum bistorta*, *Rumex acetosa*, *Portulaca oleracea*, *Polypodium vulgare*, *Pteridium aquilinum*, *Quercus* sp., *Rosa* sp., *Sambucus* sp., *Sempervivum* sp., *Tussilago farfara*, *Orchis* sp., *Arbutus unedo*, *Taraxacum officinale*, *Cichorium intybus*, *Nasturtium officinale*, and others.

For the first time in the B&H region the following edible species have been recorded: *Alchemilla xanthochlora*, *Althaea rosea*, *Barbarea bosniaca*, *Geum montanum*, *G. rivale*, *Jovibarba globifera*, *Lilium cattaniae*, *Pinus heldreichii*, *Plantago reniformis*, *Silene bosniaca*, *Viola elegantula*, and others.

Identifiable edible plants belong to 74 different plant families. Most edible plants belong to the following families: *Rosaceae* (17%), *Compositae* (8%), *Labiatae* (7%), *Cruciferae* (6%), *Liliaceae* (6%), *Leguminosae* (6%), *Polygonaceae* (5%), and *Umbelliferae* (5%).

From an ecological and phytocoenological standpoint, determined plants can be categorized within 49 vegetation orders, which express

Table 1. Edible wild flora of Bosnia and Herzegovina

Voucher	Scientific Name	Local Name	Family	Part(s) Used	Habitat/Community	Preparation/ Kind of Use
E201101	<i>Abies alba</i> Mill.	Jelika, jela	<i>Pinaceae</i>	Young branches/ leaves	<i>Fagetalia</i> , <i>Vaccinio-Piceetalia</i>	Vitamin potion
E301101	<i>Acer platanoides</i> L.	Bijeli javor	<i>Aceraceae</i>	Juice	<i>Fagetalia</i>	Mineral potion
E301102	<i>Acer pseudoplatanus</i> L.	Javor mljijel	<i>Aceraceae</i>	Juice	<i>Fagetalia</i>	Mineral potion
E311401	<i>Achillea millefolium</i> L.	Hajdu lka trava	<i>Compositae</i>	Young leaves	<i>Arrhenatheretalia</i>	Cooked vegetables
E322301	<i>Acorus calamus</i> L.	Idirod	<i>Araceae</i>	Rhizome	<i>Phragmitetalia</i>	Mush, bread
E101101	<i>Adiantum capillus - veneris</i> L.	Vilina vlas	<i>Adiantaceae</i>	Young leaves	<i>Adiantetalia</i>	Salad and vegetables
E314901	<i>Aegopodium podagraria</i> L.	Sedmolist	<i>Umbelliferae</i>	Young leaves	<i>Onopordetalia</i>	Cooked vegetables
E313901	<i>Agrimonia eupatoria</i> L.	Petrovac	<i>Rosaceae</i>	Young leaves	<i>Prunetalia spinosae</i>	Cooked vegetables
E312401	<i>Ajuga reptans</i> L.	Ivica	<i>Labiatae</i>	Young leaves	<i>Arrhenatheretalia</i>	Cooked vegetables
E313902	<i>Alchemilla hybrida</i> Rothm.	Virnjak	<i>Rosaceae</i>	Young leaves	<i>Arrhenatheretalia</i>	Cooked vegetables
E313903	<i>Alchemilla plicatula</i> Gaud.	Planinski virnjak	<i>Rosaceae</i>	Young leaves	<i>Seslerietalia tenuifoliae</i>	Cooked vegetables
E313904	<i>Alchemilla xanthochlora</i> Rothm.	Virnjak zeleni	<i>Rosaceae</i>	Young leaves	<i>Arrhenatheretalia</i>	Cooked vegetables
E311801	<i>Alicaria officinalis</i> Andrzej M.Bieb.	2ešnjala	<i>Cruciferae</i>	Aerial part	<i>Chenopodietalia</i>	Fresh salad
E302101	<i>Alisma plantago-aquatica</i> L.	Vodena bokvica	<i>Alismataceae</i>	Ground part & leaves	<i>Phragmitetalia</i>	Mush, bread
E322601	<i>Allium carinatum</i> L.	Koritasti luk	<i>Liliaceae</i>	Ground part & leaves	<i>Arrhenatheretalia</i>	Fresh salad
E322602	<i>Allium montanum</i> L.	Planinski luk	<i>Liliaceae</i>	Ground part & leaves	<i>Brometalia erecti</i>	Fresh salad

Continued

Table 1. Continued

Voucher	Scientific Name	Local Name	Family	Part(s) Used	Habitat/Community	Preparation/ Kind of Use
E322603	<i>Allium sphaerocephalon</i> L.	Glavilasti luk	Liliaceae	Ground part & leaves	<i>Brometalia erecti</i>	Fresh salad
E322604	<i>Allium ursinum</i> L.	Strimuža, medvjedi luk	Liliaceae	Aerial & ground part	<i>Fagetalia</i>	Fresh salad
E322605	<i>Allium victorialis</i> L.	2 esan	Liliaceae	Ground part & leaves	<i>Pinetalia mugi</i>	Fresh salad
E322606	<i>Allium vineale</i> L.	Vinogradni luk	Liliaceae	Ground part & leaves	<i>Chenopodietalia</i>	Fresh salad
E312701	<i>Athaea officinalis</i> L.	Bijeli sijez	Malvaceae	Leaves and root	<i>Bidentetalia</i>	Cooked vegetables
E312702	<i>Athaea rosea</i> (L.) Cav.	Đulhatna	Malvaceae	Young leaves	<i>Onopordetalia</i>	Cooked vegetables
E315401	<i>Amaranthus retroflexus</i> L.	Štir	Amaranthaceae	Young aerial part	<i>Chenopodietalia</i>	Cooked vegetables
E313905	<i>Amelanchier ovalis</i> Medik.	Jabulica	Rosaceae	Fruit	<i>Quercetalia pubescentis</i>	Fresh fruit and potion
E325401	<i>Anacamptis pyramidalis</i> (L.) L.C.Rich.	Ka0un piramidalni	Orchidaceae	Ground part	<i>Arrhenatheretalia</i>	Mush, bread
E314902	<i>Angelica archangelica</i> L.	Andelika	Umbelliferae	Root and young leaves	<i>Artemisiatalia, Onopordetalia</i>	Cooked vegetables
E312501	<i>Anthyllis vulneraria</i> L.	Ranjenik	Leguminosae	Aerial young part	<i>Artemisetalia</i>	Cooked vegetables
E311901	<i>Arbutus unedo</i> L.	Planika	Ericaceae	Fruit	<i>Quercetalia ilicis</i>	Fresh fruit and potion
E311425	<i>Aretium lappa</i> L.	2ilak, repuh	Compositae	Root and young leaves	<i>Onopordetalia</i>	Mush and vegetables

E311902	<i>Arctostaphylos uva-ursi</i> (L.) Spreng.	Mlivnjak	<i>Ericaceae</i>	Fruit	<i>Prunetalia spinosae</i>	Fresh fruit and potion
E311402	<i>Artemisia vulgaris</i> L.	Metlika, divlji pelin	<i>Compositae</i>	Young shoots	<i>Onopordetalia</i>	Spice
E322302	<i>Arum italicum</i> L.	Konjska blitva	<i>Araceae</i>	Ground part	<i>Quercetalia ilicis</i>	Mush, bread
E322303	<i>Arum maculatum</i> L.	Kozlac pjegavi	<i>Araceae</i>	Ground part	<i>Fagetalia</i>	Mush, bread
E312101	<i>Asclepias syriaca</i> L.	Cigansko perje	<i>Asclepiadaceae</i>	Young shoots	<i>Salicetalia purpureae</i>	Cooked vegetables
E322607	<i>Asparagus officinalis</i> L.	Šparoga	<i>Liliaceae</i>	Young shoots	<i>Quercetalia pubescens</i>	Cooked vegetables
E322608	<i>Asphodeline lutea</i> (L.) Rehb.	Zlatoglavica	<i>Liliaceae</i>	Ground part	<i>Scorzonero- Chrysopogonetalia</i>	Mush, bread
E322609	<i>Asphodelus albus</i> L.	2-apljan	<i>Liliaceae</i>	Ground part	<i>Scorzonero- Chrysopogonetalia</i>	Mush, bread
E322610	<i>Asphodelus microcarpus</i> L.	Mali Iapljan	<i>Liliaceae</i>	Ground part	<i>Chrysopogonetalia</i>	Mush, bread
E311301	<i>Atriplex hortensis</i> L.	Pepeljuga	<i>Chenopodiaceae</i>	Leaves	<i>Chenopodietalia</i>	Cooked vegetables
E311302	<i>Atriplex nitens</i> L.	Sjajna loboda	<i>Chenopodiaceae</i>	Leaves	<i>Chenopodietalia</i>	Cooked vegetables
E311802	<i>Barbarea bosniaca</i> Murbek	Bosanska repnica	<i>Cruciferae</i>	Leaves	<i>Onopordetalia</i>	Cooked vegetables
E311803	<i>Barbarea vulgaris</i> R.Br.	Repnica obil na	<i>Cruciferae</i>	Leaves	<i>Chenopodietalia</i>	Cooked vegetables
E311403	<i>Bellis perennis</i> L.	Prstenjak	<i>Compositae</i>	Leaves	<i>Thero-Brachypodietalia</i>	Salad
E311404	<i>Bellis sylvestris</i> Cirillo	Bijela rada	<i>Compositae</i>	Leaves	<i>Arrhenatheretalia</i>	Salad
E310401	<i>Berberis vulgaris</i> L.	Žutika, šimširika	<i>Berberidaceae</i>	Young shoots	<i>Prunetalia spinosae</i>	Cooked vegetables
E311303	<i>Beta maritima</i> L.	Divlja blitva	<i>Chenopodiaceae</i>	Leaves	<i>Chenopodietalia</i>	Cooked vegetables
E311304	<i>Beta vulgaris</i> L.	Blitva	<i>Chenopodiaceae</i>	Leaves	<i>Chenopodietalia</i>	Cooked vegetables
E310501	<i>Betula pendula</i> Roth.	Breza	<i>Betulaceae</i>	Flowers and juice	<i>Quercetalia robori – petraeae Chenopodietalia</i>	Mush, bread
E311804	<i>Brassica oleracea</i> L.	Divlji kupus	<i>Cruciferae</i>	Leaves		Salad and vegetables
E311805	<i>Brassica nigra</i> (L.) W.D.J.Koch.	Crna gorušica	<i>Cruciferae</i>	Leaves and seeds	<i>Chenopodietalia</i>	Salad and vegetables

Table 1. Continued

Voucher	Scientific Name	Local Name	Family	Part(s) Used	Habitat/Community	Preparation/ Kind of Use
E325501	<i>Briza maxima</i> L.	Majkine suze	Gramineae	Spice with seeds	<i>Thero-Brachypodietalia</i>	Mush, bread
E325502	<i>Briza media</i> L.	Treslica	Gramineae	Spice with seeds	<i>Arrhenatheretalia</i>	Mush, bread
E322401	<i>Butomus umbellatus</i> L.	Vodojzub	Butomaceae	Ground part	<i>Phragmitetalia</i>	Mush, bread
E311903	<i>Calluna vulgaris</i> (L.) Hull.	Vris	Ericaceae	Flowers	<i>Calluno-Ulicetalia</i>	Spice
E314001	<i>Caltha palustris</i> L.	Kaljužnica	Ranunculaceae	Young leaves & flowers	<i>Molinietalia</i>	Cooked vegetables
E310801	<i>Campanula glomerata</i> L.	Zbijeni zvonli0	Campanulaceae	Young shoots	<i>Arrhenatheretalia</i>	Cooked vegetables
E310802	<i>Campanula pyramidalis</i> L.	Postijenak	Campanulaceae	Young shoots	<i>Centaureo-Campanuletalia</i>	Cooked vegetables
E310803	<i>Campanula rapunculoides</i> L.	Repušica	Campanulaceae	Young shoots	<i>Brometalia erecti</i>	Cooked vegetables
E310804	<i>Campanula trachelium</i> L.	Dlakava zvonlika	Campanulaceae	Young shoots	<i>Fagetalia, Prunetalia spinosae</i>	Cooked vegetables
E311001	<i>Capparis spinosa</i> L.	Kapar	Capparidaceae	Flower buds	<i>Centaureo-Campanuletalia</i>	Spice
E311806	<i>Capsella bursa-pastoris</i> (L.) Med.	Rusomata	Cruciferae	Aerial part	<i>Chenopodietalia</i>	Cooked vegetables
E311807	<i>Cardamine pratensis</i> L.	Divilji hren	Cruciferae	Leaves and root	<i>Molinietalia</i>	Cooked vegetables
E311808	<i>Cardaria draba</i> (L.) Desv.	Srdašica	Cruciferae	Young shoot	<i>Onopordetalia</i>	Cooked vegetables
E311405	<i>Carlina acutis</i> L.	Vilino sito	Compositae	Root	<i>Brometalia erecti</i>	Salad and potion
E314903	<i>Carum carvi</i> L.	Kim	Umbelliferae	Fruit	<i>Arrhenatheretalia</i>	Spice
E312101	<i>Castanea sativa</i> Mill.	Kesten, maron	Fagaceae	Fruit	<i>Quercetalia robori-petraeae</i>	Mush, bread
E314801	<i>Celtis australis</i> L.	Koš0ela	Ulmaceae	Fruit	<i>Quercetalia pubescentis</i>	Fresh fruit and potion

E311406	<i>Centaurea jacea</i> L.	Razliak crveni	<i>Compositae</i>	Young leaves	<i>Arrhenatheretalia</i>	Cooked vegetables
E311407	<i>Cichorium inybus</i> L.	Cikorija, vodopija	<i>Compositae</i>	Root & young leaves	<i>Artemisietalia</i>	Mush, salad
E311305	<i>Chenopodium album</i> L.	Loboda	<i>Chenopodiaceae</i>	Leaves	<i>Chenopodietalia</i>	Cooked vegetables
E311306	<i>Chenopodium bonus-henricus</i> L.	Brašnjениk	<i>Chenopodiaceae</i>	Leaves	<i>Chenopodietalia</i>	Cooked vegetables
E311424	<i>Cirsium oleraceum</i> (L.) Scop.	Osjak	<i>Compositae</i>	Young shoots	<i>Molinietalia</i>	Cooked vegetables
E314002	<i>Clematis vitalba</i> L.	Pavit	<i>Ranunculaceae</i>	Young leaves	<i>Prunetalia spinosae</i>	Spice
E311501	<i>Cornus mas</i> L.	Drijen	<i>Cornaceae</i>	Fruit	<i>Quercetalia pubescentis</i>	Fresh fruit and potion
E311601	<i>Corylus avellana</i> L.	Lijeska	<i>Corylaceae</i>	Male flowers & fruit	<i>Coryletalia avellane</i>	Mush, bread
E311602	<i>Corylus colurna</i> L.	Melija ljeska	<i>Corylaceae</i>	Male flowers & fruit	<i>Quercetalia pubescentis</i>	Mush, bread
E313906	<i>Cotoneaster integerrimus</i> Medik.	Dunjarica	<i>Rosaceae</i>	Fruit	<i>Quercetalia pubescentis</i>	Fresh fruit and potion
E313907	<i>Cotoneaster nebrodensis</i> (Guss.) Koch.	Dlakava dunjarica	<i>Rosaceae</i>	Fruit	<i>Quercetalia pubescentis</i>	Fresh fruit and potion
E313908	<i>Crataegus laevigata</i> (Poir.) DC.	Crveni glog	<i>Rosaceae</i>	Fruit & leaves	<i>Prunetalia spinosae</i>	Fresh fruit and potion
E313909	<i>Crataegus monogyna</i> Jacq.	Jednosjemeni glog	<i>Rosaceae</i>	Fruit & leaves	<i>Prunetalia spinosae</i>	Fresh fruit and potion
E314905	<i>Crithmum maritimum</i> L.	Matar	<i>Umbelliferae</i>	Aerial part	<i>Crithmo-Staticetalia</i>	Salad and vegetables
E325601	<i>Crocus neapolitanus</i> (L.) Hill	Šafran	<i>Iridaceae</i>	Pistil	<i>Fagetalia</i>	Spice
E325701	<i>Cyperus rotundus</i> L.	Gomoljasti šij	<i>Cyperaceae</i>	Ground part	<i>Phragmitetalia</i>	Mush, bread
E314915	<i>Daucus carota</i> L.	Divlja mrkva	<i>Umbelliferae</i>	Root & seeds	<i>Artemisietalia</i>	Spice
E101001	<i>Dryopteris filix-mas</i> (L.) Schott.	Muška paprat	<i>Dryopteridaceae</i>	Ground part	<i>Fagetalia, Vaccinio-Piceetalia</i>	Mush, bread

Table 1. Continued

Voucher	Scientific Name	Local Name	Family	Part(s) Used	Habitat/Community	Preparation/ Kind of Use
E313201	<i>Epilobium angustifolium</i> L.	Vrbolika	Onagraceae	Young shoot	<i>Epilobetalia angustifoliae</i>	Cooked vegetables
E314906	<i>Eryngium amethystinum</i> L.	Kotrljan plavi	<i>Umbelliferae</i>	Ground part	<i>Brometalia erecti</i>	Salad and potion
E314907	<i>Eryngium campestre</i> L.	Kotrljan obilni	<i>Umbelliferae</i>	Ground part	<i>Brometalia erecti</i>	Salad and potion
E322616	<i>Erythronium dens-canis</i> L.	Pasiji zuib	<i>Liliaceae</i>	Ground part	<i>Fagetalia</i>	Mush, bread
E312102	<i>Fagus sylvatica</i> L.	Bukva	<i>Fagaceae</i>	Young leaves, fruit & internal bark	<i>Fagetalia</i>	Mush, bread
E313501	<i>Fallopia convolvulus</i> (L.) Loeve	Divlja heljda	<i>Polygonaceae</i>	Aerial part	<i>Chenopodietalia</i>	Cooked vegetables
E314908	<i>Foeniculum vulgare</i> Mill.	Komora l	<i>Umbelliferae</i>	Fruit	<i>Onopordetalia</i>	Spice
E313911	<i>Filipendula hexapetala</i> Gilib.	Krajica polja	<i>Rosaceae</i>	Ground part & leaves	<i>Brometalia erecti</i>	Sweet, salad
E313910	<i>Filipendula ulmaria</i> (L.) Maxim.	Suru lica	<i>Rosaceae</i>	Young leaves	<i>Molinetalia</i>	Spice
E313912	<i>Fragaria elatior</i> Ehrh.	Kitmjala	<i>Rosaceae</i>	Fruit & leaves	<i>Epilobetalia angustifoliae</i>	Vitamin potion
E313913	<i>Fragaria vesca</i> L.	Jagoda šumska	<i>Rosaceae</i>	Fruit & leaves	<i>Epilobetalia angustifoliae</i>	Vitamin potion
E313101	<i>Fraxinus excelsior</i> L.	Bijeli jasen	<i>Oleaceae</i>	Juice	<i>Fagetalia</i>	Potion
E313102	<i>Fraxinus ornus</i> L.	Crni jasen	<i>Oleaceae</i>	Juice	<i>Quercetalia pubescentis</i>	Potion
E312502	<i>Galega officinalis</i> L.	Piskavica	<i>Leguminosae</i>	Young shoots	<i>Agrostietalia</i>	Cooked vegetables
E314301	<i>Galium odoratum</i> (L.) Scop.	Lazarkinja	<i>Rubiaceae</i>	Aerial part	<i>Fagetalia</i>	Spice
E314302	<i>Galium verum</i> L.	Žuti brod	<i>Rubiaceae</i>	Flowers	<i>Brometalia erecti</i>	For milk fermentation

E312402	<i>Galeopsis segetum</i> Necker	Smrdljiva kopriva	<i>Labiatae</i>	Leaves	<i>Chenopodietaalia</i>	Cooked vegetables
E313914	<i>Geum montanum</i> L.	Planinski blaženak	<i>Rosaceae</i>	Root & leaves	<i>Seslerietalia comosae</i>	Salad, spice
E313915	<i>Geum rivale</i> L.	Potolni blaženak	<i>Rosaceae</i>	Root & leaves	<i>Molinietalia</i>	Salad, spice
E313916	<i>Geum urbanum</i> L.	Blaženak	<i>Rosaceae</i>	Root & leaves	<i>Populetalia albae,</i> <i>Glechometalia</i>	Salad, spice
E312403	<i>Glechoma hederacea</i> L.	Dobri lica	<i>Labiatae</i>	Aerial part	<i>Glechometalia</i> <i>hederaceae</i>	Cooked vegetables
E312516	<i>Glycyrrhiza glabra</i> L.	Sladi0	<i>Leguminosae</i>	Ground part	<i>Agrostetalia,</i> <i>Salicetalia purp.</i>	Mush, bread
E325405	<i>Gymnadenia conopsea</i> (L.) R.Br.	Vranjak, salep	<i>Orchidaceae</i>	Ground part	<i>Brometalia erecti,</i> <i>Arrhenatheretalia</i>	Mush, bread
E311408	<i>Helianthus tuberosus</i> L.	2il oka	<i>Compositae</i>	Ground part	<i>Onopordetalia</i>	Mush, bread
E314910	<i>Heracleum orsinii</i> Guss.	Medvedji dlan	<i>Umbelliferae</i>	Root & young shoots	<i>Arabidetalia</i> <i>flavescentis</i>	Cooked vegetables
E314909	<i>Heracleum sphondylium</i> L.	Medvedja šapa	<i>Umbelliferae</i>	Root & young shoots	<i>Arrhenatheretalia</i>	Cooked vegetables
E310901	<i>Humulus lupulus</i> L.	Hmelj	<i>Cannabaceae</i>	Young shoots	<i>Prunetalia spinosae</i>	Cooked vegetables
E312301	<i>Hypericum perforatum</i> L.	Kantaron žuti	<i>Gutiferae</i>	Young shoots	<i>Origanetalia,</i> <i>Brometalia erecti</i>	Spice
E312404	<i>Hyssopus officinalis</i> L.	Miloduh, isop	<i>Labiatae</i>	Young shoots	<i>Scorzonero-</i> <i>Chrysopogonetalia</i>	Spice
E310301	<i>Impatiens noli-tangere</i> L.	Nedirak	<i>Balsaminaceae</i>	Young leaves	<i>Adenosyletalia</i>	Cooked vegetables
E311409	<i>Inula helenium</i> L.	Anduz, oman	<i>Compositae</i>	Root	<i>Atropetalia</i>	Mush, bread
E325602	<i>Iris germanica</i> L.	Perunika ljubilasta	<i>Iridaceae</i>	Ground part	<i>Amphoricarpetalia,</i> <i>Secalinetalia</i>	Mush, bread
E311701	<i>Jovibarba globifera</i> (L.) J.Parm. subsp. <i>hirta</i> (L.) J.Parm.	2uvarku0a divija	<i>Crassulaceae</i>	Laeves	<i>Amphoricarpetalia</i>	Salad and water

Table 1. Continued

Voucher	Scientific Name	Local Name	Family	Part(s) Used	Habitat/Community	Preparation/ Kind of Use
E325801	<i>Juglans regia</i> L.	Orah	Juglandaceae	Fruit	<i>Populetalia albae</i>	Fruit
E205901	<i>Juniperus communis</i> L.	Kleka obilina	Cupressaceae	Fruit	<i>Juniperetalia</i> , <i>Vaccinio-Piceetalia</i>	Potion
E205902	<i>Juniperus oxycedrus</i> L.	Crvena kleka	Cupressaceae	Fruit	<i>Juniperetalia</i> , <i>Quercetalia pub.</i>	Potion
E311410	<i>Lactuca perennis</i> L.	Divlja salata	Compositae	Young leaves	<i>Onopordetalia</i>	Salad
E312406	<i>Lamium maculatum</i> L.	Pjegava mrtva kopriva	Labiatae	Young shoots	<i>Onopordetalia</i>	Cooked vegetables
E312407	<i>Lamium purpureum</i> L.	Mala mrtva kopriva	Labiatae	Young shoots	<i>Chenopodietalia</i>	Cooked vegetables
E311411	<i>Lapsana communis</i> L.	Ognjičina	Compositae	Young shoots	<i>Onopordetalia</i>	Cooked vegetables
E312503	<i>Lathyrus latifolius</i> L.	Dugolinski grahor	Leguminosae	Young shoots	<i>Brometalia erecti</i>	Cooked vegetables
E312504	<i>Lathyrus tuberosus</i> L.	Grahor	Leguminosae	Ground part	<i>Arrhenatheretalia</i>	Cooked vegetables
E326001	<i>Laurus nobilis</i> L.	Lorber	Laureaceae	Leaves	<i>Quercetalia ilicis</i>	Spice
E311412	<i>Leontodon autumnalis</i> L.	Lavlji zub	Compositae	Young leaves & root	<i>Arrhenatheretalia</i>	Salad
E311816	<i>Lepidium draba</i> L.	Srdašica	Cruciferae	Young leaves	<i>Onopordetalia</i>	Cooked vegetables
E311413	<i>Leucanthemum vulgare</i> Lam.	Ivančica	Compositae	Young leaves	<i>Arrhenatheretalia</i>	Salad
E322201	<i>Leucojum aestivum</i> L.	Drijemovac	Amaryllidaceae	Ground part	<i>Populetalia albae</i>	Mush, bread
E322202	<i>Leucojum vernum</i> L.	Rani drijemovac	Amaryllidaceae	Ground part	<i>Trifolio-Hordeetalia</i>	Mush, bread
E322611	<i>Lilium cattaniae</i> (Vis.)Vis.	Katanov ljiljan	Liliaceae	Ground part	<i>Quercetalia pubescens</i>	Mush, bread
E322612	<i>Lilium martagon</i> L.	Zlatan	Liliaceae	Ground part	<i>Fagetalia</i>	Mush, bread
E312505	<i>Lotus corniculatus</i> L.	Zvezdan	Leguminosae	Young shoots	<i>Arrhenatheretalia</i>	Salad
E311809	<i>Lunaria annua</i> L.	Mjese Inica	Cruciferae	Young shoots	<i>Adenosypletalia</i>	Cooked vegetables
E311810	<i>Lunaria rediviva</i> L.	Ruži lasta mjese Inica	Cruciferae	Young shoots	<i>Adenosypletalia</i>	Cooked vegetables

E313917	<i>Malus silvestris</i> Mill.	Divlja jabuka	<i>Rosaceae</i>	Fruit	<i>Fagitalia</i>	Cooked vegetables
E312703	<i>Mahva moschata</i> L.	Sljez livadski	<i>Malvaceae</i>	Young shoots	<i>Arrhenatheretalia</i>	Cooked vegetables
E312704	<i>Mahva neglecta</i> L.	Mali sljez	<i>Malvaceae</i>	Young shoots	<i>Chenopodietalia</i>	Cooked vegetables
E312705	<i>Mahva silvestris</i> L.	Crni sljez	<i>Malvaceae</i>	Young shoots	<i>Chenopodietalia</i>	Cooked vegetables
E312422	<i>Marrubium vulgare</i> L.	O1ajnica	<i>Labiatae</i>	Young shoots	<i>Artemisietalia</i> , <i>Brometalia erecti</i>	Cooked vegetables
E312506	<i>Medicago sativa</i> L.	Lucerka	<i>Leguminosae</i>	Young shoots	<i>Agrostetalia</i>	Salad, spice
E312507	<i>Mellilotus officinalis</i> (L.) Lam.	Kokotac	<i>Leguminosae</i>	Young shoots	<i>Onopordetalia</i>	Salad, spice
E312408	<i>Melissa officinalis</i> L.	Mati Injak, limun trava	<i>Labiatae</i>	Young shoots	<i>Quercetalia pubescentis</i>	Salad, spice
E312409	<i>Melittis melissophyllum</i> L.	Medenika	<i>Labiatae</i>	Flowers & shoots	<i>Quercetalia pubescentis</i>	Salad, spice
E312411	<i>Mentha arvensis</i> L.	Njivska nana, metvica	<i>Labiatae</i>	Young shoots	<i>Chenopodietalia</i>	Spice
E312410	<i>Mentha longifolia</i> (L.) Huds.	Dugolisna nana	<i>Labiatae</i>	Young shoots	<i>Bidentetalia</i>	Spice
E312412	<i>Mentha pulegium</i> L.	V erem trava	<i>Labiatae</i>	Young shoots	<i>Bidentetalia</i>	Spice
E312001	<i>Mercurialis annua</i> L.	Resulja	<i>Euphorbiaceae</i>	Young shoots	<i>Chenopodietalia</i>	Cooked vegetables
E312002	<i>Mercurialis perennis</i> L.	Lažna resulja	<i>Euphorbiaceae</i>	Young shoots	<i>Fagitalia</i>	Cooked vegetables
E312801	<i>Morus alba</i> L.	Bijeli dud	<i>Moraceae</i>	Fruit	<i>Populetalia albae</i>	Fresh fruit and potion
E312901	<i>Myrtus communis</i> L.	Mr1a	<i>Myrtaceae</i>	Fruit & leaves	<i>Quercetalia ilicis</i>	Potion
E311811	<i>Nasturtium officinale</i> R. Br.	Dragušac	<i>Cruciferae</i>	Aerial part	<i>Potametalia</i>	Salad
E314003	<i>Nigella sativa</i> L.	2urekot, mal kovi	<i>Ranunculaceae</i>	Seed	<i>Chenopodietalia</i>	Spice
E313901	<i>Nuphar lutea</i> Sm.	Lopo1	<i>Nymphaeaceae</i>	Water part & seed	<i>Potametalia</i>	Mush, bread
E313902	<i>Nymphaea alba</i> L.	Lokvanj bijeli	<i>Nymphaeaceae</i>	Water part & seed	<i>Potametalia</i>	Mush, bread
E312508	<i>Ononis spinosa</i> L.	Gladiška, ze lji trn	<i>Leguminosae</i>	Young shoots	<i>Brometalia erecti</i>	Cooked vegetables
E325402	<i>Ophytis sphrgoides</i> Mill.	Kokica	<i>Orchidaceae</i>	Ground part	<i>Brometalia erecti</i>	Mush, bread
E320701	<i>Opuntia ficus-indica</i> (L.) Mill.	Svekrvin jezik	<i>Cactaceae</i>	Fruit	<i>Thero-Brachypodietalia</i>	Fresh fruit and potion

Table 1. Continued

Voucher	Scientific Name	Local Name	Family	Part(s) Used	Habitat/Community	Preparation/ Kind of Use
E325403	<i>Orehis morio</i> L.	Salep, ka0un	<i>Orchidaceae</i>	Ground part	<i>Brometalia erecti</i>	Mush, bread
E325404	<i>Orehis simia</i> Lam.	Ka0un	<i>Orchidaceae</i>	Ground part	<i>Brometalia erecti</i> , <i>Arrhenatheretalia</i>	Mush, bread
E312413	<i>Origanum vulgare</i> L.	Mravinac	<i>Labiatae</i>	Young shoot & flower	<i>Origanetalia</i>	Spice
E322613	<i>Omithogalum umbellatum</i> L.	Ptilije mljeko	<i>Liliaceae</i>	Ground part	<i>Scorzoner-</i> <i>Chrysopogonetalia</i>	Mush, bread
E313301	<i>Oxalis acetosella</i> L.	Zeliji kupus	<i>Oxalidaceae</i>	Leaves	<i>Vaccinio-Piceetalia</i>	Salad
E313302	<i>Oxalis stricta</i> L.	Žuta soca	<i>Oxalidaceae</i>	Leaves	<i>Chenopodietalia</i>	Salad
E313506	<i>Oxyria dygima</i> (L.) Hill.	Rudjevica	<i>Polygonaceae</i>	Young shoot	<i>Arabidietalia</i> <i>flavescentis</i>	Salad
E314101	<i>Palturus spina-christi</i> Mill.	Dra la	<i>Rhamnaceae</i>	Fruit	<i>Palturetalia</i>	Mush, bread
E314911	<i>Pastinaca sativa</i> L.	Paštrnjak	<i>Umbelliferae</i>	Root & young shoot	<i>Arrhenatheretalia</i>	Cooked vegetables
E311422	<i>Petasites hybridus</i> (L.) P. Gaertn., B. Meg. et Schreb.	Repuh	<i>Compositae</i>	Young leaves	<i>Adenosylectalia</i>	Cooked vegetables
E325503	<i>Phragmites australis</i> Trin. ex Steud.	Trska	<i>Gramineae</i>	Rhizoma & young shoot	<i>Phragmitetalia</i>	Mush, bread
E314501	<i>Physalis alkekengi</i> L.	Ljoskavac	<i>Solanaceae</i>	Fruit	<i>Prunetalia spinosae</i>	Fresh fruit and potion
E310805	<i>Phyteuma spicatum</i> L.	Zelica	<i>Campanulaceae</i>	Young shoot	<i>Adenosylectalia</i>	Cooked vegetables
E201106	<i>Picea abies</i> (L.) H.Karst.	Smrla, homarika	<i>Pinaceae</i>	Young branches/ leaves	<i>Vaccinio-Piceetalia</i>	Vitamin potion
E314912	<i>Pimpinella saxifraga</i> L.	Bedrenika	<i>Umbelliferae</i>	Root & young shoot	<i>Brometalia erecti</i>	Cooked vegetables

E201102	<i>Pinus heldreichii</i> Christ	Munika	<i>Pinaceae</i>	Young branches/ leaves	<i>Pinetalia heldreichii-nigrae</i>	Vitamin potion
E201103	<i>Pinus mugo</i> Turra	Planinski bor	<i>Pinaceae</i>	Young branches/ leaves	<i>Pinetalia mugi</i>	Vitamin potion
E201104	<i>Pinus nigra</i> J.F. Arnold	Crni bor	<i>Pinaceae</i>	Young branches/ leaves	<i>Pinetalia heldreichii-nigrae</i>	Vitamin potion
E201105	<i>Pinus silvestris</i> L.	Bijeli bor	<i>Pinaceae</i>	Young branches/ leaves	<i>Pinetalia sibesstris</i>	Vitamin potion
E311101	<i>Pistacia lentiscus</i> L.	Tršija	<i>Anacardiaceae</i>	Fruit	<i>Quercetalia ilicis</i>	Potion
E311102	<i>Pistacia terebinthus</i> L.	Smrdljika	<i>Anacardiaceae</i>	Fruit	<i>Quercetalia ilicis</i>	Potion
E325406	<i>Platanthera bifolia</i> (L.) Rehb.	Vimenjak	<i>Orchidaceae</i>	Ground part	<i>Fagetalia, Vaccinio-Piceetalia Scorzonero- Chrysopogonetalia</i>	Mush, bread Cooked vegetables
E313401	<i>Plantago coronopus</i> L.	Vranina noga	<i>Plantaginaceae</i>	Aerial part	<i>Arrhenatheretalia, Agrostetalia</i>	Cooked vegetables
E313402	<i>Plantago lanceolata</i> L.	Muška bokvica	<i>Plantaginaceae</i>	Aerial part	<i>Brometalia erecti</i>	Cooked vegetables
E313403	<i>Plantago media</i> L.	Srednja bokvica	<i>Plantaginaceae</i>	Aerial part	<i>Plantaginetalia maioris</i>	Cooked vegetables
E313404	<i>Plantago major</i> L.	Ženska bokvica	<i>Plantaginaceae</i>	Aerial part	<i>Onopordetalia</i>	Cooked vegetables
E313405	<i>Plantago reniformis</i> G.Beck	Ilirska bokvica	<i>Plantaginaceae</i>	Aerial part	<i>Fagetalia, Quercetalia pub.</i>	Mush, bread
E312617	<i>Polygonatum odoratum</i> (Mill.)Druce	Pokosnica	<i>Liliaceae</i>	Ground part	<i>Plantaginetalia maioris</i>	Cooked vegetables
E313502	<i>Polygonum aviculare</i> L.	Troskot	<i>Polygonaceae</i>	Aerial part	<i>Arrhenatheretalia</i>	Cooked vegetables
E313503	<i>Polygonum bistorta</i> L.	Sr lenjak, srlanica	<i>Polygonaceae</i>	Root & young leaves	<i>Bidentetalia</i>	Spice
E313504	<i>Polygonum hydropiper</i> L.	Papreni lisac	<i>Polygonaceae</i>	Aerial part	<i>Seslerietalia tenuifoliae</i>	Cooked vegetables
E313505	<i>Polygonum viviparum</i> L.	Živorodni dvornik	<i>Polygonaceae</i>	Root & young leaves	<i>Amphoricarpetalia</i>	Mush, bread
E103601	<i>Polypodium cambricum</i> L.	Slatka paparat	<i>Polypodiaceae</i>	Ground part		

Table 1. Continued

Voucher	Scientific Name	Local Name	Family	Part(s) Used	Habitat/Community	Preparation/ Kind of Use
E103602	<i>Polypodium vulgare</i> L.	Slatka paprat	<i>Polypodiaceae</i>	Ground part	<i>Amphoricarpetalia</i>	Mush, bread
E313701	<i>Portulaca oleracea</i> L.	Tušt	<i>Portulacaceae</i>	Aerial part	<i>Chenopodietalia</i>	Cooked vegetables
E313920	<i>Potentilla anserina</i> L.	Gušljija trava	<i>Rosaceae</i>	Aerial part	<i>Agrostetalia</i>	Salad and vegetables
E313921	<i>Potentilla erecta</i> (L.) Raeusch.	Trava od srdobolje	<i>Rosaceae</i>	Rhizome & young shoot	<i>Nardetalia</i> ,	Salad and potion
E313802	<i>Primula intricata</i> Gren. & Godr.	Planinski jaglac	<i>Primulaceae</i>	Young leaves	<i>Molinietalia</i>	Salad
E313801	<i>Primula veris</i> L.	Jaglac	<i>Primulaceae</i>	Young leaves	<i>Pinetalia mugi</i>	Salad
E313803	<i>Primula vulgaris</i> Huds.	Jagorčevina	<i>Primulaceae</i>	Young leaves	<i>Brometalia erecti</i> ,	Salad
E312414	<i>Prunella vulgaris</i> L.	Celinica	<i>Labiatae</i>	Young shoot	<i>Coryletalia</i>	Salad
E313938	<i>Prunus avium</i> L.	Trešnja	<i>Rosaceae</i>	Fruit	<i>Fagetalia</i> ,	Cooked vegetables
E313939	<i>Prunus mahaleb</i> L.	Rašeljka	<i>Rosaceae</i>	Fruit	<i>Arrhenatheretalia</i>	Fresh fruit and potion
E312509	<i>Psoralea bituminosa</i> L.	Djetečinjak	<i>Leguminosae</i>	Young shoot	<i>Glechonetalia spinosae</i>	Fresh fruit and potion
E106101	<i>Pteridium aquilinum</i> (L.)Kuhn	Bujad	<i>Dennstaedtiaceae</i>	Young shoot	<i>Fagetalia</i>	Cooked vegetables
E313922	<i>Prunus spinosa</i> L.	Trninja	<i>Rosaceae</i>	Fruit & leaves	<i>Quercetalia pubescentis</i>	Fresh fruit and potion
E310601	<i>Pulmonaria officinalis</i> L.	Plu0njak	<i>Boraginaceae</i>	Young shoot	<i>Thero-Brachypodietalia</i>	Cooked vegetables
					<i>Pteridietalia</i>	Cooked vegetables
					<i>Prunetalia spinosae</i>	Fresh fruit and potion
					<i>Fagetalia</i>	Cooked vegetables

E313901	<i>Punica granatum</i> L.	Nar	<i>Punicaceae</i>	Fruit	<i>Ostrya-Carpinetalia</i>	Fresh fruit and potion
E313918	<i>Pyrus amygdaliformis</i> Vill.	Kruška trnova la	<i>Rosaceae</i>	Fruit	<i>Quercetalia ilicis</i>	Fresh fruit and potion
E313919	<i>Pyrus pyrastrer</i> Burgsd.	Divlja kruška	<i>Rosaceae</i>	Fruit	<i>Fagetalia</i>	Fresh fruit and potion
E312103	<i>Quercus cerris</i> L.	Hrast cer	<i>Fagaceae</i>	Fruit & bark	<i>Quercetalia pubescentis</i>	Mush, bread
E312104	<i>Quercus frainetto</i> Ten.	Sladun	<i>Fagaceae</i>	Fruit & bark	<i>Quercetalia pubescentis</i>	Mush, bread
E312105	<i>Quercus ilex</i> L.	2 esmina	<i>Fagaceae</i>	Fruit & bark	<i>Quercetalia ilicis</i>	Mush, bread
E312106	<i>Quercus petraea</i> (Matt.) Liebl.	Hrast kitnjak	<i>Fagaceae</i>	Fruit & bark	<i>Fagetalia</i>	Mush, bread
E312107	<i>Quercus pubescens</i> Willd.	Hrast medunac	<i>Fagaceae</i>	Fruit & bark	<i>Quercetalia pubescentis</i>	Mush, bread
E312108	<i>Quercus robur</i> L.	Hrast lužnjak	<i>Fagaceae</i>	Fruit & bark	<i>Quercetalia robori-petraeae</i>	Mush, bread
E311812	<i>Raphanus raphanistrum</i> L.	Rodakva divlja	<i>Cruciferae</i>	Young shoot	<i>Chenopodietaia</i>	Salad and vegetables
E313514	<i>Reynoutria japonica</i> Houtt.	Japanska kiselica	<i>Polygonaceae</i>	Young shoot	<i>Onopordetalia</i>	Cooked vegetables
E312201	<i>Ribes alpinum</i> L.	Planinska ribizla	<i>Grossulariaceae</i>	Fruit & leaves	<i>Fagetalia</i>	Fresh fruit and potion
E312202	<i>Ribes petraeum</i> Wulfen	Ribizla	<i>Grossulariaceae</i>	Fruit & leaves	<i>Fagetalia</i>	Fresh fruit and potion
E312203	<i>Ribes uva-crispa</i> L.	Šmanjak	<i>Grossulariaceae</i>	Fruit & leaves	<i>Epilobietalia angustifoliae</i>	Fresh fruit and potion
E312510	<i>Robinia pseudacacia</i> L.	Bagrem	<i>Leguminosae</i>	Flower	<i>Robinetalia</i>	Sweet
E311813	<i>Rorippa sylvestris</i> (L.)Besser	Repnica	<i>Cruciferae</i>	Young shoot	<i>Agrostetalia</i>	Cooked vegetables
E313924	<i>Rosa arvensis</i> Huds.	Divlja ruža	<i>Rosaceae</i>	Fruit	<i>Prunetalia spinosae</i>	Fresh fruit and potion
E313923	<i>Rosa canina</i> L.	Šipurak	<i>Rosaceae</i>	Fruit	<i>Prunetalia spinosae</i>	Fresh fruit and potion

Continued

Table 1. Continued

Voucher	Scientific Name	Local Name	Family	Part(s) Used	Habitat/Community	Preparation/ Kind of Use
E313925	<i>Rosa glauca</i> Pourr.	Modra ruža	<i>Rosaceae</i>	Fruit	<i>Quercetalia pubescens</i>	Fresh fruit and potion
E313926	<i>Rosa pendulina</i> L.	Alpska ruža	<i>Rosaceae</i>	Fruit	<i>Pinetalia mugii</i>	Fresh fruit and potion
E313927	<i>Rubus caesius</i> L.	Ostruga	<i>Rosaceae</i>	Fruit & leaves	<i>Salicetalia purpureae</i>	Fresh fruit and potion
E313928	<i>Rubus hirtus</i> Waldst. et Kit.	Kupina	<i>Rosaceae</i>	Fruit & leaves	<i>Vaccinio-Piceetalia</i>	Fresh fruit and potion
E313930	<i>Rubus fruticosus</i> L.	Kupina	<i>Rosaceae</i>	Fruit & leaves	<i>Prunetalia spinosae</i>	Fresh fruit and potion
E313929	<i>Rubus idaeus</i> L.	Malina	<i>Rosaceae</i>	Fruit & leaves	<i>Epilobietalia angustifoliae</i>	Fresh fruit and potion
E313508	<i>Rumex acetosa</i> L.	Ljutika, kiselica	<i>Polygonaceae</i>	Leaves	<i>Arrhenatheretalia</i>	Salad and vegetables
E313509	<i>Rumex acetosella</i> L.	Mala kiselica	<i>Polygonaceae</i>	Leaves	<i>Festuco-Sedetalia</i>	Salad and vegetables
E313510	<i>Rumex alpinus</i> L.	Planinska kiselica	<i>Polygonaceae</i>	Leaves	<i>Onopordetalia</i>	Salad and vegetables
E313511	<i>Rumex crispus</i> L.	Štavalj	<i>Polygonaceae</i>	Leaves	<i>Agrostetalia</i>	Salad and vegetables
E313512	<i>Rumex patientia</i> L.	Masnik	<i>Polygonaceae</i>	Leaves	<i>Agrostetalia</i>	Salad and vegetables

E313513	<i>Rumex scutatus</i> L.	Rimska kiselica	<i>Polygonaceae</i>	Leaves	<i>Arbidetalia flavescens</i>	Salad and vegetables
E322614	<i>Ruscus aculeatus</i> L.	Veprina	<i>Liliaceae</i>	Young shoots	<i>Ostryo-Carpinetalia orientalis</i>	Cooked vegetables
E321002	<i>Sagittaria sagittifolia</i> L.	Vodena strijela	<i>Alismataceae</i>	Ground part	<i>Phragmitetalia</i>	Mush, bread
E311307	<i>Salicornia herbacea</i> L.	Omaga	<i>Chenopodiaceae</i>	Aerial part	<i>Salicornietalia</i>	Cooked vegetables
E312415	<i>Savia officinalis</i> L.	Kadulja	<i>Labiatae</i>	Young shoots	<i>Scorzonero-Chrysopogonetalia</i>	Spice
E312416	<i>Salvia pratensis</i> L.	Kadulja livadska	<i>Labiatae</i>	Young shoots	<i>Brometalia erecti</i>	Spice
E311101	<i>Sambucus ebulus</i> L.	Havdika	<i>Caprifoliaceae</i>	Fruit	<i>Epilobietalia angustifoliae</i>	Potion
E311102	<i>Sambucus nigra</i> L.	Bazga, zoha	<i>Caprifoliaceae</i>	Flower & fruit	<i>Fagetalia, Salicetalia albae</i>	Fresh fruit and potion
E311103	<i>Sambucus racemosa</i> L.	Zrvena zoha, bazga	<i>Caprifoliaceae</i>	Fruit	<i>Adenosylectalia</i>	Fresh fruit and potion
E313931	<i>Sanguisorba minor</i> Scop.	Dinjica mala	<i>Rosaceae</i>	Aerial part	<i>Brometalia erecti</i>	Salad
E313932	<i>Sanguisorba officinalis</i> L.	Dinjica, krvara	<i>Rosaceae</i>	Aerial part	<i>Molinietalia</i>	Salad
E314913	<i>Sanicula europaea</i> L.	Milogled	<i>Umbelliferae</i>	Aerial part	<i>Fagetalia</i>	Cooked vegetables
E312417	<i>Satureja montana</i> L.	Vrijesak bijeli	<i>Labiatae</i>	Aerial part	<i>Scorzonero-Chrysopogonetalia</i>	Spice
E312418	<i>Satureja subspicata</i> Bartl. ex Vis.	Vrijesak crveni	<i>Labiatae</i>	Aerial part	<i>Scorzonero-Chrysopogonetalia</i>	Spice
E311414	<i>Scorzonera rosea</i> Waldst. & Kit.	Crni korjen	<i>Compositae</i>	Root & young shoot	<i>Arrhenatheretalia</i>	Mush, bread
E311415	<i>Scorzonera villosa</i> Scop.	Žuti korjen	<i>Compositae</i>	Root & young shoot	<i>Scorzonero-Chrysopogonetalia</i>	Mush, bread
E311702	<i>Sedum acre</i> L.	Žuti žednjak	<i>Crassulaceae</i>	Aerial part	<i>Scorzonero-Chrysopogonetalia</i>	Salad and spice

Table 1. Continued

Voucher	Scientific Name	Local Name	Family	Part(s) Used	Habitat/Community	Preparation/ Kind of Use
E311703	<i>Sedum album</i> L.	Bijeli žednjak	Crassulaceae	Aerial part	<i>Scorzeno- Chrysopogonetalia</i>	Salad and spice
E311704	<i>Sedum montanum</i> Perr. & Song.	Planinski žednjak	Crassulaceae	Aerial part	<i>Scorzeno- Chrysopogonetalia</i>	Salad and spice
E311705	<i>Sempervivum marmorum</i> Griseb.	2uvarku0a crvena	Crassulaceae	Leaves	<i>Seslerietalia tenuifoliae</i>	Salad and water
E311201	<i>Silene bosniaca</i> (Beck)Hand.-Mazz.	Bos. Pucavac	Caryophyllaceae	Young shoots	<i>Arrhenatheretalia</i>	Cooked vegetables
E311202	<i>Sielne vulgaris</i> (Moench) Garcke	Pucavac obilni	Caryophyllaceae	Young shoots	<i>Arrhenatheretalia</i>	Cooked vegetables
E311814	<i>Sinapis arvensis</i> L.	Sla Ilica	Cruciferae	Leaves	<i>Chenopodietalia</i>	Cooked vegetables
E311815	<i>Sisymbrium officinale</i> (L.) Scop.	Strižica	Cruciferae	Young shoots	<i>Sisymbrietalia</i>	Cooked vegetables
E322615	<i>Smilax aspera</i> L.	Tetivika	Liliaceae	Young shoots	<i>Quercetalia ilicis</i>	Cooked vegetables
E314502	<i>Solanum nigrum</i> L.	Pomo0nica crna	Solanaceae	Young shoots	<i>Chenopodietalia</i>	Cooked vegetables
E311416	<i>Sonchus arvensis</i> L.	Kostrika	Compositae	Young shoots	<i>Chenopodietalia</i>	Cooked vegetables
E311417	<i>Sonchus oleraceus</i> L.	Kostriš	Compositae	Young shoots	<i>Chenopodietalia</i>	Cooked vegetables
E313933	<i>Sorbus aria</i> (L.) Crantz	Mukinja	Rosaceae	Fruit	<i>Quercetalia pubescens</i>	Fresh fruit and potion
E313934	<i>Sorbus aucuparia</i> L.	Jarebika	Rosaceae	Fruit	<i>Vaccinio-Piceetalia</i>	Fresh fruit and potion
E313935	<i>Sorbus chamaemespilus</i> (L.)Crantz.	Mukinjica	Rosaceae	Fruit	<i>Pinetalia mugii</i>	Fresh fruit and potion

E313936	<i>Sorbus domestica</i> L.	Oskoruša	Rosaceae	Fruit	<i>Fagetalia</i>	Fresh fruit and potion
E313937	<i>Sorbus torminalis</i> (L.) Crantz	Brekinja	Rosaceae	Fruit	<i>Fagetalia</i>	Fresh fruit and potion
E312419	<i>Stachys officinalis</i> (L.) Trevis. 2istac		Labiatae	Young shoots	<i>Quercetalia</i> <i>robori-petraeae</i>	Cooked vegetables
E311203	<i>Stellaria holostea</i> L.	Mišjakinja	Caryophyllaceae	Young shoots	<i>Fagetalia</i>	Cooked vegetables
E311204	<i>Stellaria media</i> (L.) Vill.	Ptlija trava	Caryophyllaceae	Young shoots	<i>Chenopodieta</i>	Cooked vegetables
E310602	<i>Symphlytum officinale</i> L.	Gavez crni	Boraginaceae	Root & young shoot	<i>Bidentetalia</i>	Cooked vegetables
E310603	<i>Symphlytum tuberosum</i> L.	Žuti gavez	Boraginaceae	Root & young shoot	<i>Bidentetalia</i>	Cooked vegetables
E326201	<i>Tamus communis</i> L.	Bljušt	Dioscoreaceae	Young shoots	<i>Quercetalia pubescentis</i>	Cooked vegetables
E311418	<i>Tanacetum vulgare</i> L.	Vrati0	Compositae	Young shoots	<i>Atropetalia</i>	Cooked vegetables
E200101	<i>Taxus baccata</i> L.	Tisa	Taxaceae	External part of fruit	<i>Fagetalia</i>	Fresh fruit and potion
E311817	<i>Thlaspi arvense</i> L.	2estika	Cruciferae	Young shoots	<i>Chenopodieta</i>	Cooked vegetables
E311419	<i>Taraxacum officinale</i> Weber	Maslak, radi0	Compositae	Root & young leaves	<i>Arrhenatheretalia</i> , <i>Agrostetalia</i>	Salad and potion, bread
E312420	<i>Thymus serpyllum</i> L.	2ubra	Labiatae	Aerial part	<i>Brometalia erecti</i>	Spice
E312421	<i>Thymus pulegioides</i> L.	Majkina dušica	Labiatae	Aerial part	<i>Brometalia erecti</i>	Spice
E314701	<i>Tilia cordata</i> Miller	Sitnolisna lipa	Tiliaceae	Flower	<i>Quercetalia pubescentis</i>	Potion
E314702	<i>Tilia platyphyllos</i> Scop.	Krupnolisna lipa	Tiliaceae	Flower	<i>Fagetalia</i>	Potion
E326401	<i>Trapa natans</i> L.	Rašac	Hydrocharydaceae	Fruit	<i>Potametalia</i>	Mush, bread
E311420	<i>Tragopogon orientalis</i> L.	Kozija brada	Compositae	Young shoots	<i>Arrhenatheretalia</i>	Salad
E311421	<i>Tragopogon pratensis</i> L.	Kozobrad	Compositae	Young shoots	<i>Arrhenatheretalia</i>	Salad
E312511	<i>Trifolium hybridum</i> L.	Švedska djetelina	Leguminosae	Aerial part	<i>Molinetalia</i>	Salad
E312512	<i>Trifolium pannonicum</i> L.	Panonska djetelina	Leguminosae	Aerial part	<i>Brometalia erecti</i>	Salad
E312513	<i>Trifolium pratense</i> L.	Crvena djetelina	Leguminosae	Aerial part	<i>Arrhenatheretalia</i>	Salad
E312514	<i>Trifolium repens</i> L.	Bijela djetelina	Leguminosae	Aerial part	<i>Agrostetalia</i>	Salad

Continued

Table 1. Continued

Voucher	Scientific Name	Local Name	Family	Part(s) Used	Habitat/Community	Preparation/ Kind of Use
E312515	<i>Trifolium resupinatum</i> L.	Mirisna djetelina	<i>Leguminosae</i>	Aerial part	<i>Trifolito-Hordeetalia</i>	Salad
E326601	<i>Triglochin maritimum</i> L.	Morska brulja	<i>Juncaginaceae</i>	Young leaves	<i>Thero-Brachypodietalia</i>	Cooked vegetables
E311423	<i>Tussilago farfara</i> L.	Podbjel	<i>Compositae</i>	Leaves	<i>Onopordetalia</i>	Cooked vegetables
E326701	<i>Typha angustifolia</i> L.	Rogoz uskolisni	<i>Typhaceae</i>	Rhizome & spike	<i>Phragmitetalia</i>	Mush, bread
E326702	<i>Typha latifolia</i> L.	Rogoz velelisni	<i>Typhaceae</i>	Rhizome & spike	<i>Phragmitetalia</i>	Mush, bread
E315001	<i>Urtica dioica</i> L.	Kopriva, žara	<i>Urticaceae</i>	Young shoots	<i>Onopordetalia</i>	Cooked vegetables
E315002	<i>Urtica urens</i> L.	Mala kopriva	<i>Urticaceae</i>	Young shoots	<i>Onopordetalia</i>	Cooked vegetables
E311904	<i>Vaccinium myrtillus</i> L.	Borovnica	<i>Ericaceae</i>	Fruit	<i>Vaccinietalia</i>	Fresh fruit and potion
E311905	<i>Vaccinium vitis-idaea</i> L.	Brusnica	<i>Ericaceae</i>	Fruit	<i>Vaccinietalia</i>	Fresh fruit and potion
E315101	<i>Valerianella locusta</i> (L.) Later.	Matovilec	<i>Valerianaceae</i>	Young shoots	<i>Onopordetalia</i>	Salad
E314401	<i>Veronica beccabunga</i> L.	2estoslavica	<i>Scrophulariaceae</i>	Young shoots	<i>Molinietalia</i>	Cooked vegetables, salad
E315201	<i>Viola alba</i> L.	Bijela ljubilica	<i>Violaceae</i>	Flower	<i>Origanetalia</i>	Spice and potion
E315202	<i>Viola biflora</i> L.	Dvocvjetna ljubilica	<i>Violaceae</i>	Flower	<i>Pinetalia mugi</i>	Spice and potion
E315304	<i>Viola elegantula</i> Schott	Lijepa ljubilica	<i>Violaceae</i>	Flower	<i>Arrhenatheretalia</i>	Spice and potion
E315203	<i>Viola odorata</i> L.	Ljubica mirisna	<i>Violaceae</i>	Flower	<i>Prunetalia spinosae</i>	Spice and potion
E315305	<i>Viola tricolor</i> L.	Danino0, ma0uhica	<i>Violaceae</i>	Flower	<i>Arrhenatheretalia</i>	Spice and potion
E315301	<i>Vitis silvestris</i> Gmel.	Divlja vinova loza	<i>Vitaceae</i>	Leaves	<i>Prunetalia spinosae</i>	Cooked vegetables

different habitat types. Most of them belong to the mesophyllous deciduous woods of the *Fagetalia* order, mesophyllous grassland of the *Arrhenatheretalia* order, anthropogenous communities of the *Chenopodietalia* and *Onopordetalia* orders, then termophyllous woods and grassland of the *Quercetalia pubescentis* and *Brometalia erecti* orders, as well as to sub-Mediterranean rocky grasslands of the *Scorzonero-Chrysopogonetalia* order, and to shrub's formation of the *Prunetalia spinosae* order and Mediterranean sclerophyllous, evergreen oak woods of the *Quercetalia ilicis* order.

Classification of Wild Edible Plants

In accordance with possibilities of usage, identified edible wild species are classified into four fundamental groups:

- a. vegetables
- b. fruits
- c. bread plants
- d. spices

Wild vegetables dominate this spectrum (Figure 2). Garden plants encompass tuberous vegetables with leaves and blossoms. The most common species in this group are as follows: *Urtica dioica*, *Tussilago farfara*, *Taraxacum officinale*, *Allium ursinum*, *Chenopodium bonus-henricus*,

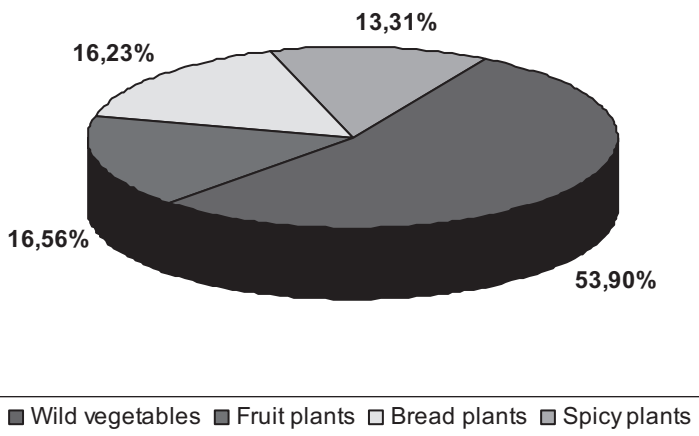


Figure 2. Classification of wild edible plants with possibilities of usage.

Amaranthus retroflexus, *Portula oleracea*, *Malva sylvestris*, *Oxalis acetosella*, *Rumex acetosa*, *Rumex patientia*, *Cichorium intybus*, *Epilobium angustifolium*, *Primula* sp., *Campanula pyramidalis*, *Crithmum maritimum*, *Nasturtium officinale*, *Alchemilla* sp., *Brassica* sp., *Pastinaca sativa*, *Picea abies*, *Polygonum bistorta*, *Pteridium aquilinum*, *Salicornia herbacea*, *Sanguisorba minor*, *Silene* sp., *Stellaria media*, and *Valerianella locusta*.

Wild fruit plants comprise 17% of the spectrum. They are widely distributed in almost every climate belt and yield fruit over the entire year. The most frequently common in this group are: *Arbutus unedo*, *Celtis australis* (mediterranean region), *Cornus mas*, *Rosa* sp., *Crataegus* sp., *Cotoneaster* sp., *Sorbus* sp., *Fragaria* sp., *Rubus* sp., *Juniperus communis*, *Malus sylvestris*, *Pyrus pyraster*, *Morus alba*, *Prunus avium*, *Prunus spinosa*, and *Vaccinium myrtillus* in other regions.

There are only a few plants where a flowers is produced (approximately 16%). The most important species are: *Fagus sylvatica*, *Castanea sativa*, *Quercus* sp., *Corylus* sp., *Asphodelus albus*, *Lilium martagon*, *Orchis* sp., *Ornithogalum umbellatum*, *Phragmites australis*, *Polypodium vulgare*, *Trapa natans*, *Paliurus spina-christi*, and *Typha* sp.

The portion of spicy plants in the spectrum that have some nutritive values amounts to 13%. The most important ones are: *Laurus nobilis*, *Capparis spinosa*, *Carum carvi*, *Daucus carota*, *Geum* sp., *Hyssopus officinalis*, *Melissa officinalis*, *Origanum vulgare*, *Salvia officinalis*, *Satureja* sp., *Thymus* sp., *Viola* sp. In addition to being used as spices, a majority of these plants are being used in ethno-therapy.

Parts of Edible Plants Being Used

In the investigation, each plant's part is being used in human nutrition (root, stem, leaf, rhizoma, fruit, juices), depending on the season. The most frequently used parts are young and juicy shoots (22%), fruits (13%), overground parts such as young leaves (11%), underground parts (10%), and others as shown in Table 2

Nutritive Preparations of Wild Edible Plants

Wild edible plants in these areas are being used for making a wide array of nutritive preparations, of which the most common is cooked meals (33%), fresh salad (19%), stews and bread (17%), and fresh fruits and drinks (13%). More details are given in Table 3.

Table 2. Part of edible plants

Plant Part	Number of Species	%
Aerial part	35	11.36
Young shoots	67	21.75
Young branches/leaves	6	1.95
Leaves (root and seed)	29	9.42
Young leaves (flowers, fruit, bark)	24	7.79
Flowers (shoot, fruit, buds, juice)	14	4.54
Male flowers (fruit, pistil)	3	0.97
Spike (seeds)	4	1.23
Fruit	39	12.66
Fruit (bark and leaves)	19	6.17
Juice	4	1.23
Ground part	30	9.74
Ground part (and leaves)	7	2.27
Rhizome (young shoots, spike)	5	1.62
Root (leaves, seeds, shoots)	20	6.49
Water part and seeds	2	0.65
Total:	308	

Table 3. Nutritive preparation of edible wild plants

Kind of Preparation	Number of Species	%
Cooked vegetables	102	33.12
Fresh fruit and potion	40	12.99
Potion (vitamin and mineral)	22	7.14
Salad (potion, spice and water)	58	18.83
Spice (and potion)	30	9.74
Sweet	2	0.65
Mush and bread (vegetables)	53	17.21
Milk fermentation	1	0.32
Total:	308	100

DISCUSSION

Usage of Edible Plants in Human Nutrition

Through detailed analysis of the results (Table 1), one can get insight into the richness of edible wild plants that have been highly significance to the human population of B&H and the Balkan Peninsula, in general, since ancient times. This is illustrated by the comparative analysis with the

results gained in a similar way for the rest of the Balkan Peninsula. Thus, there were 300 recorded vascular plants of edible wild flora in Serbia (Josifovic, 1989; Vracaric, 1977). In the Montseney Biosphere Reserve region (Catalonia, Iberian Peninsula) there were 132 edible plants identified, only 75 of them used in human nutrition (Bonet and Valles, 2002).

An ethnobotanical study on edible wild plants in a few chosen districts of Ethiopia (Addis et al., 2005) reveals 30 plants that are being used in human nutrition, especially in periods of food shortage. The same study has shown that children use edible wild plants to a much higher extent than adults. Similar experiences have been achieved in the Senegal area (Becker, 1983), where the local population uses many species of wild edible flora in its everyday nutrition.

The usage of wild edible plants is widespread in many European countries as well. For example in Italy (Guarrera, 2003), several hundred wild plants are being used in human nutrition. In the central part of Italy (Marche, Abruzzo, and Latium) 126 wild plants from 39 families are being used. In other parts of the world, such as in southeastern Asia, wild plants are highly valued as an important food source, too. Thus, investigations that were carried out by Britta et al. (2003) have confirmed that in Vietnam over 90 species of edible wild plants are being used, of which many are an unavoidable part of human medicine. Usage of wild edible plants with a nutritive purpose is especially outlined among inhabitants of South American, where several hundred species have been recorded (Ladio and Lozada, 2000a, 2000b, 2001, 2004; Hanazaki et al., 2000).

If compared with these results, Bosnia and Herzegovina are extremely rich in edible wild plants. On the other hand, this is a relatively small number when compared with the total plant diversity (about 5000 species of vascular flora) (Beck-Mannagetta et al., 1983; Hayek, 1927–1933).

Namely, a vast number of species inhabiting areas that are situated far from human settlements despite their potential nutritive value, are not being used for nutritive purposes. A similar phenomenon is evident with the usage of medical herbs (Lakusic et al., 1980, 1991; Redzic et al., 1989, 1990). These studies have shown that plants being used for their nutritive purpose indicate boundaries of human settlements, starting from sea level up to mountain peaks. The highest situated permanent settlement in B&H is on the plateau of Kupres, at 1000m above sea level, while temporary settlements such as shepherd's cottages which are active only during the summer months, during grazing season, are situated at 1600m above sea level (Vranica, Maglic, Volujak, Zelengora, Vlastic

Mountains). In mountain lodges, in everyday nutrition, healthy vegetables are prepared. *Chenopodium bonus henricus*, *Rumex alpinus*, and endemic *Plantago reniformis*, which are being prepared into very delicious and nutritive mountain soups; *Barbarea bosniaca*, numerous mountain species of genus *Alchemilla*, *Allium ursinum*, and *Allium victorialis* are prepared into healthy, delicious salads.

In their daily diet people of the coastline area use many edible wild plants, for they have less prejudices toward these food sources than the inland population. Over the entire year, thanks to the mild Mediterranean climate, it is possible to find various plants in nature that are suitable for supplementary and healthy nutrition of humans. The most important are plants growing along the shore and containing high concentrations of different ions and minerals, such as *Crithmum maritimum* and *Salicornia europaea*. Juicy parts of these plants are being used for preparation of delicious dishes and salads, along with homemade olive oil. Furthermore, soups and stews are being made with fresh plant parts from the following species: *Asparagus officinale*, *Beta maritima* (very nutritive and valued in cooking), *Brassica nigra*, and *Campanula pyramidalis*. Tasty salads are being prepared with the following: *Valerianella locusta*, *Psoralea bituminosa*, *Bellis sylvestris*, *Smilax aspera*, *Ruscus aculeatus*, and flowering buds of *Capparis spinosa*, *Salvia officinalis*, *Myrtus communis*, *Laurus nobilis* (whose leaves are added to every cooked meal) and are highly valued spices in the Mediterranean kitchen.

There are certain species whose underground parts are enriched with starch and thanks to these are being used to prepare stews and bread. Such species are: *Ornithogalum umbellatum*, *Asphodelus albus*, *A. microcarpus*, *Asphodeline lutea*, and fruits of *Paliurus aculeatus* and *Quercus ilex*. Widely distributed in the nutrition of coastline populations are also fruits of *Arbutus unedo*, *Punica granatum*, *Ficus carica*, *Celtis australis*, and *Opuntia fixus-indica*.

Plains makes up to 20% of the state's total and are situated at 300m above sea level. They encompass plains, arable areas, natural oak woods, lowland meadows, and swampy habitat types. In contrast to the other areas, here grow a majority of wild plants that contain huge quantities of carbohydrates, and due to this have been used in processing flour since ages ago. Underground organs (rhizoms) of the following plants—*Acorus calamus*, *Butomus umbellatus*, *Glychyrriza glabra*, *Leucojum sp.*, *Cyperus rotundus*, *Nuphar lutea*, *Nymphaea alba*, *Phragmites australis*, and *Typha sp.*—are being harvested in order to prepare bread and tasteful stews.

More than 50% of Bosnia and Herzegovina's total area is sculptured as a mountainous/hilly relief. Different habitats of oak hornbeam, beech, and mixed beech fir woods or coniferous woods hide many edible plants. Among these plants the following dominate: *Betonica officinalis*, species of genus *Campanula*, then *Cirsium oleraceum*, *Humulus lupulus*, *Heracleum sp.*, *Chamaenerion angustifolium*, *Lunaria sp.*, *Leucanthemum vulgare*, *Mercurialis sp.*, *Pastinaca sativa*, *Pteridium aquilinum*, *Pulmonaria officinalis*, *Symphytum sp.*

Delicious and vitaminous salads are being prepared from: *Allium sp.*, *Carlina acaulis*, *Leontodon autumnalis*, *Cichorium intybus*, *Nasturtium officinale*, *Oxalis acetosella*, *Polygonum sp.*, *Rumex sp.*, *Trifolium sp.* In forms of fruits and vitaminous drinks used are: *Amelanchier ovalis*, *Arctostaphylos uva ursi*, *Cornus mas*, *Cotoneaster sp.*, *Crataegus sp.*, *Fragaria sp.*, *Juniperus communis*, *Pirus sp.*, *Prunus sp.*, *Ribes sp.*, *Rosa sp.*, and some species of genus *Sorbus*, *Vaccinium sp.* (Table 1).

Nutritionally, the most frequently used edible wild plants are those that grow close to the human settlements. Man has started to use these plants at first exclusively as a food source and as phytopharmacs. Since the early days of civilization people have been preparing tasty stews, soups, pies, salads, and vitaminous drinks of wild plants such as: *Althaea sp.*, *Amaranthus retroflexus*, *Atriplex sp.*, *Beta vulgaris*, *Brassica sp.*, *Che-nopodium sp.*, *Plantago sp.*, *Malva sp.*, *Portulaca oleracea*, *Sonchus sp.*, and *Urtica sp.* Many of these plants play important roles in human medicine and in folk and religious customs.

A distribution analysis of edible plants on vertical profiles of B&H lead to the conclusion that a number of these species significantly decline as one proceeds toward higher altitudes, although B&H mountains do hide the richness of potentially edible wild plants. Many among them are endemic, such as numerous species of genus *Orchis*, *Dactylorhiza*, *Viola*, *Silene*, and *Alchemilla*, which has a significant comparative advantage from the standpoint of providing new sources of healthy food.

The majority of edible plants bring forth their fruit in spring, summer, and autumn. The lowest yield is during winter, which can be long-lasting and severe in some regions. Because of this, the first growth of stinging nettle *Urtica dioica* used to bring much joy to hungry households, for it was used in preparing stews, soups, or pies. Next in the growth cycle was dandelion *Taraxacum officinale*, then *Tussilago farfara*, and other edible plants.

During winter in the largest part of B&H apical parts are being used (short branche segments) of *Abies alba*, *Picea abies*, and *Pinus sp.* in order

to obtain vitaminous potions, which was the main food source for guerilla fighters and the occupied population. During the recent war in B&H, people of encircled cities, used hazelnut blossom in winter's season to obtain flour from it. Flour was also obtainable from the bark of beech *Fagus sylvatica* and oak *Quercus petraeae*. Salads were prepared with *Nasturtium officinale* and *Veronica beccabunga* that were collected from unpolluted springs and brooks.

During the spring months, vegetables with leaves are dominant; in summer, flowers and fruits; and in autumn, underground vegetables are important sources of carbohydrates. Although each season is marked by its own edible plants, it is possible to make it through even the harshest food shortage and survive due to the natural food resources.

An analysis of the usage of edible plants within various ethnic and cultural communities has not shown significant differences among them. In the same environment, from the ecological point-of-view, people are more or less familiar with the usage of wild plants as a nutritional supplement and medicine.

Nutritional Value of Wild Plants and Possibilities of Use

Issues of food and healthy nutrition are of atmost concern in the modern world. In order to meet current nutritional needs in the world, people strive for edible wild plants and animals (Ladio, 2000; Sundriyal, 2001, 2004; Saidov, 2001). Modern civilization has spotted big chance in these food resources as a solution to declining hunger and attaining new nutritive and medical principles that will provide healthy diets (Guil Guerrero et al., 1998; VanderJagt et al., 2000; Johnson and Grivetti, 2002; Turan et al., 2003; Glew et al., 2005).

There are poor records on nutritional values of wild plants in Bosnia and Herzegovina and also on the entire Balkan Peninsula. Nevertheless, investigations that were conducted during the twentieth century (Vracaric, 1977; Grlic, 1980; Redzic et al., 1993) have confirmed extremely a high nutritive value of some wild plants, especially those with developed overground organs. Young shoots and leaves are rich in vitamin C and carotene, and due to this play an important role in human nutrition, which is of high importance in spring when there is a lack of conventional vitamin sources.

Many plants develop underground organs that store large quantities of carbohydrates, proteins, and fats, therefore being a very useful source

of flour. Beside vitamins, keratin, and minerals, fruits of many wild plants also contain large quantities of sugar and pectin.

Wild edible plants that are known to contain an abundance of vitamin C in these investigations based on data published by Vracaric (1977), Grlic (1980), and Redzic et al. (1993) can be classified in four groups:

- A. Plants that contain more than 200 mg % of vitamin C
- B. Plants that contain between 100–200 mg % of vitamin C
- C. Plants that contain from 50 to 100 mg % of vitamin C
- D. Plants that contain less than 50 mg % of vitamin C.

Group A, among many others, comprises the following species: *Juglans regia* (3000 mg %), *Rosa canina* (do 2000 mg %), *Allium victorialis*, *Primula vulgaris*, *Sanguisorba officinalis*, *Sanguisorba minor*, *Thlaspi arvense*, *Phyteuma spicatum*, *Prunus avium*, *Typha latifolia*, *Raphanus raphanistrum*, *Ribes alpinum* (1000 mg %).

Group B is comprised of: *Alchemilla vulgaris*, *Amaranthus retroflexus*, *Brassica nigra*, *Chenopodium bonus-henricus*, *Fragaria vesca*, *Galega officinalis*, *Lotus corniculatus*, *Nasturtium officinale*, *Barbarea vulgaris*, *Capparis spinosa*, *Malva silvestris*, *Mredicago sativa*, *Oxalis acetosella*, *Trifolium pratense*, *Rubus idaeus*, *Rubus fruticosus*, *Silene vulgaris*, *Sorbus aucuparia*, *Valerianella locusta*, *Rumex crispus*, *Rumex patientia*, *Physalis alkekengi*, *Plantago major*, *Filipendula vulgaris*.

Group C are: *Abies alba*, *Atriplex hortensis*, *Capsella bursa pastoris*, *Foeniculum vulgare*, *Lamium purpureum*, *Lepidium draba*, *Atriplex nitens*, *Campanula trachelium*, *Chamaenerion angustifolium*, *Chenopodium album*, *Heracleum sphondylium*, *Ononis spinosa*, *Rumex acetosa*.

Group D includes the following species: *Achillea millefolium*, *Aegopodium podagraria*, *Arctium lappa*, *Cichorium intybus*, *Crithmum maritimum*, *Pastinaca sativa*, *Polygonum bistorta*, *Sedum acre*, *Symphytum officinale*, *Taraxacum officinale*, *Stellaria media*, and many others.

Usage of the aforementioned species, as well as similar wild plants from this area, may fulfill the needs of the human body for vitamin C as one of the essential substances in the development and life of modern man.

Investigations that were performed all over the world on nutritive composition of wild plants indicate a high content of proteins (Freiberger et al., 1998; Glew et al., 2005), fatty acids (Guil et al., 1996;

Guil Guerrero and Rodriguez-Garcia, 1999), then high quantities of minerals, especially K, Na, Ca, P, Mg (Guil Guerrero et al., 1998; Agrahar-Murugkar and G. Subbulakshmi, 2005). Investigations of the vitaminous composition of wild plants indicate a great amount of vitamin C, then keratin (Zennie and Ogzewalla, 1977; Guil et al., 1997), and similar compounds that indicate great anti-oxidant properties of these plants (Cook et al., 1998; Sena et al., 1998; Kelawala and Ananthanarayan, 2004). There are some of them, such as fruits of plant *Rosa canina* from several localities in Turkey that contain a wide spectrum of fatty acids: palmitic (3.17%, 1.71%, and 2.14%), stearic (2.47%, 2.14%, and 1.69%), oleic (16.73%, 18.42%, and 14.71%), linoleic (54.41%, 51.71%, and 48.64%), linolenic (17.14%, 16.42%, and 18.41%), and arachidic (2.11%, 1.87%, and 2.61%) (Ozcan, 2002).

In some cases, wild edible plants can be an efficient means to increase weight and the condition of the female body, which is important in many undeveloped countries where women suffer malnutrition in comparison to men (Salehi et al., 2005).

Many of investigated wild edible plant's species originating from the territory of B&H and the Balkan Peninsula, according to the rules of WHO (WHO, 2002) may satisfy human body needs for vitamin C and because of that be a much more efficient prevention for contagious diseases and any other pathological conditions of the human body, securing more healthy and qualitative life (WHO, 1990). Besides, cancerogenous conditions can also be prevented by the exploitation of wild plant richness with vitamin C (Young et al., 1997). People believe that it is enough to consume 2–3 fresh leaves of certain species of genus *Primula* to satisfy the daily needs of the body with this priceless substance.

The needs of the human body for vitamin A can be satisfied mainly by the consumption of wild edible plants (FAO/WHO, 1988) in turn preventing many diseases and securing a more adequate development of children (Blomhoff, 1991; WHO, 1995, 1998). The regular usage of vitamin A may prevent the most malitious diseases, such as leukemia and similar forms of cancer (van Dillen et al., 1996).

Wild plants growing in the territory of B&H might be more than a local food resource. Thanks to its high quality and ecological safety, they could be a source of very valuable nutritive substances containing vitamins and minerals, and to become a significant base for human nutrition creating better health, development, and sustainable life in accordance with a global agenda in fighting malnutrition in the population (WHO, 2000).

Usage of Wild Edible Plants in Ethnotherapy

A significant number of wild edible plants (Table 1) are used in ethnopharmacology. Since early civilization, people have been using a majority of these plants for the treatment of various diseases. Some of them are used both in ethnopharmacology, official pharmacy, and in medicine (PH.Yug. IV, 1984).

In the treatment of different respiratory diseases, the most frequently utilized plants are: *Ajuga reptans*, *Allium ursinum*, *Betonica officinalis*, *Fraxinus ornus*, *Hyssopus officinalis*, *Laurus nobilis*, *Inula helenium*, then species of genuses *Malva*, *Althaea*, *Pinus*, *Orchis*, *Plantago*, *Primula*, *Sambucus*, *Satureja*, *Thymus*, *Tilia*, *Viola*, as well as following species: *Myrtus communis*, *Pimpinella saxifraga*, *Pulmonaria officinalis*, *Salvia officinalis*, and *Tussilago farfara*. These plants were used in the making of teas, decocts, syrups, tinctures, and etheric oils, following the rules prescribed by traditional recipes (Sadikovic, 1928).

A second group is composed of edible plants that are used in the treatment of gastro-intestinal illnesses such as: *Achillea millefolium*, *Acorus calamus*, *Angelica archangelica*, *Artemisia vulgaris*, *Capsella bursa-pastoris*, *Centuarea jacea*, *Cichorium intybus*, *Carum carvi*, *Foeniculum vulgare*, *Glycyrrhiza glabra*, *Palliurus spina christi*, *Polygonum bistorta*, *Potentilla erecta*, *Sanguisorba officinalis*, *Punica granatum*, *Taraxacum officinale*, species of genus *Rosa*, *Mentha*, *Quercus*, *Rubus*, and *Rumex*, of which were used flourishing outgrowths, roots, or rhizomes, in order to prepare teas, decocts, and medical flour (Sadikovic, 1928; Ib Al Nefis, 1961).

Urinary system diseases are treated primarily with: *Arctium lappa*, *Arctostaphylos uva-ursi*, *Betula pendula*, *Calluna vulgaris*, *Carlina acaulis*, *Eryngium campestre*, *Glycyrrhiza glabra*, *Galega officinalis*, *Ononis spinosa*, *Physalis alkekengi*, *Polygonum aviculare*, *Ruscus aculeatus*, *Silene vulgaris*, *Urtica dioica*, *Vaccinium myrtillus*, and different species of genus *Bellis* and *Juniperus*. Leaves, roots, and fruits of these plants are basis for all sort of teas (Sadikovic 1928; Grujic-Vasic and Redzic, 2003).

Certain species have been used as tranquilizers for centuries: *Geum urbanum*, *Humulus lupulus*, *Hypericum perforatum*, *Mentha pulegium*, *Artemisia vulgaris*, *Thymus serpyllum*, and *Viola odorata*. Heart and vein diseases have been treated with: *Asperula odorata*, *Filipendula ulmaria*, *Melilotus officinalis*, *Nasturtium officinale*, *Marrubium vulgare*, different species of genus *Crataegus* (ground and tip of leaves) and *Alchemilla*.

Species of genus *Sempervivum* and *Sedum* exercise antimicrobial activity, therefore being traditionally applied (juice obtained from its squashed leaves) by ear infections and inflammatory skin conditions (Tucakov, 1973; Redzic, 1999, 2005). Resin of fir is the basic ingredient for the preparation of special balms for treatment of hard-healing wounds.

Usage of Wild Edible Plants for Other Purposes

During chronic food and medicine shortages in this area, people did not have access to tobacco as well, especially in the northern part of Bosnia where tobacco does not grow. As a substitute for real tobacco, people used to smoke a mixture of dried leaves of *Tussilago farfara* and walnut *Juglans regia*. This mixture was consumed by people of the surrounding Sarajevo, during its siege (1992–95). Whereby in some remote regions of the country, dried leaves of *Prunus spinosa* were used and *Datura stramonium* (noted were even cases of poisoning). Even today in some remote places, children are poisoned by smoking leaves of burdock *Arctium lappa* and plants of worm *Clematis vitalba*.

Dried flowering branches of *Hysopus officinalis*, *Satureja subspicata*, *Thymus sp.*, and the root of *Inula helenium* are being burned during religious ceremonies.

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