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Biodiversity for Food and Nutrition Project: Black Sea Region Studies

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ABSTRACT: *Although wild species, landraces and species diversity play an important role in global food security and are necessary for food safety and nutrition, they are very rarely included in daily diets. The "Biodiversity for Food and Nutrition" project, which aims to ensure sustainable use of agricultural biodiversity, was carried out in three pilot sites in Turkey. As part of the project, Kastamonu, Samsun and Sinop provinces were chosen as the pilot sites in the Black Sea Region. At the beginning of the project, ten wild edible species and a landrace were identified by the pre-surveys performed at the Black Sea pilot site. The samples of the species were collected from at least ten locations and analyzed to determine their nutritional content. Most of the wild edible species found to be intensively consumed in the Black Sea pilot site are rich in minerals, vitamins and fiber. Preliminary surveys were conducted to obtain socio-economic information and traditional knowledge on wild edibles. The monograph technique was used and detailed data were collected using questionnaires. The surveys were conducted by collecting species and meeting face-to-face with collectors and consumers. Questionnaires were administered to a sample of 111 collectors and 295 consumers. The survey results showed that the most well-known and consumed wild edible species in Sinop and Kastamonu is Kaldirik. Most of the consumers stated that they consume wild species once or twice a week. Preparation of necessary policies and legislation will be addressed on the basis of knowledge that was obtained from this project. Awareness-raising activities will be held with the stakeholders to strengthen the sustainable use of these species.*

Keywords: *Wild edible, landrace, biodiversity, nutrition, traditional knowledge, einkorn, Black Sea Region.*

Gıda ve Beslenme için Biyoçeşitlilik Projesi: Karadeniz Bölgesi Çalışmaları

ÖZ: *Yabani yenilebilir türler, yerel çeşitler ve tür çeşitliliği küresel gıda güvenliği ve beslenme için hayati önem taşısa da günlük beslenmemizde oldukça az yer tutmaktadır. Tarımsal biyoçeşitliliğin sürdürülebilir kullanımının sağlanmasını amaçlayan "Gıda ve Beslenme için Biyoçeşitlilik projesi" Türkiye'de üç pilot alanda yürütülmektedir. Bu amaçla Karadeniz bölgesi çalışma alanı için Kastamonu, Samsun ve Sinop illeri seçilmiştir. Projenin başlangıcında, Karadeniz bölgesinde yapılan ön çalışmalarla on yenilebilir yabani tür ve bir adet yerel çeşit seçilmiştir. Bu türler besin içeriklerinin belirlenmesi için en az on noktadan toplanmıştır. Analiz sonuçlarında Karadeniz'de yaygın olarak tüketilen türlerin çoğunun mineral, vitamin ve lif açısından zengin olduğu görülmüştür. Hedef türlere ait sosyoekonomik ve geleneksel bilgilerin elde edilmesine yönelik ön*

araştırmalar yapılmıştır. Anketlerde monografi tekniği kullanılarak detaylı bilgi elde edilmiştir. Toplama ve anket çalışmalarında toplayıcı ve tüketicilerle yüz yüze görüşmeler yapılmıştır. Anket çalışmalarında toplam 111 toplayıcı ve 295 tüketici ile görüşülmüştür. Yapılan çalışmalar sonucunda Sinop ve Kastamonu'da en çok bilinen ve tüketilen yabani yenilebilir türün Kaldirik olduğu anlaşılmıştır. Çoğu tüketici yabani yenilebilir türler haftada bir iki kez tükettiklerini ifade etmişlerdir. Gerekli politika ve mevzuatın hazırlanması konusu bu projeden elde edilen bilgilere dayanarak ele alınacaktır. Bu türlerin sürdürülebilir kullanımını güçlendirmek için paydaşlarla birlikte bilinçlendirme faaliyetleri düzenlenmektedir.

Anahtar Sözcükler: *Yabani yenilebilir, yerel çeşit, biyoçeşitlilik, beslenme, geleneksel bilgi, siyez, Karadeniz Bölgesi.*

INTRODUCTION

The world's population has been growing for several decades. Biodiversity is very important for meeting the nutritional needs of such a growing population. The growth of population causes a decrease in the food supplies. Therefore, sustainable use of wild edibles as a source of alternative nutrition is very important. For this purpose, the BFN Project (Biodiversity for Food and Nutrition) was carried out in the Black Sea Region (Kastamonu, Samsun and Sinop provinces), the Aegean Region (Izmir, Balikesir, Muğla and Aydın provinces) and the Mediterranean Region (Antalya, Konya, Içel and Karaman Provinces) of Turkey. Within the scope of this project, some studies on wild edibles and Einkorn were conducted in the Black Sea pilot site. This study aims to increase welfare of target users and to contribute to the improvement of food security by ensuring conservation and sustainable use of biodiversity for food and nutrition. The objective of the project is to ensure conservation of agricultural biodiversity and to strengthen its sustainable management through national and global nutrition, food and livelihood security strategies and programs.

The project also aims to create an integrated knowledge base about agriculture, environment and public health and to make it available to the use of the relevant sectors for the purpose of contributing to the conservation of biodiversity and improvement of welfare in four partner countries. Besides, promoting conservation and sustainable use of biodiversity across all sectors by means of policies (policy and strategy development), raising awareness of the importance of biodiversity in food and nutrition and developing tools and equipment that will help disseminating best practices at the local and national level (awareness raising and dissemination) are also among the aims of the project. Within the scope of the project, some pilot sites were defined and the target species in these areas were selected.

There are various studies conducted on alternative nutrition trends and traditionally consumed species to prevent the fast food consumption, especially in the developed countries. Additional assessment of the use of these species, found to be mostly consumed by the preliminary studies in the Black Sea pilot site will be helpful for the sustainable management of agricultural biodiversity and the passing down of traditional knowledge. Studies on the use of wild edibles and landraces, especially in the countries like Turkey where traditional knowledge is widely used are very important for ensuring the sustainable use of biodiversity and meeting the food needs of the growing population.

MATERIALS AND METHODS

MATERIALS

The project site, i.e. the Black Sea pilot site, is located in the Euro-Siberian biogeographic region and through the Irano-Turanian biogeographic region. The region is very mountainous and heavily forested and exhibits a rich fauna and flora with a high level of endemism. The people living in the rural areas use various plants for nutritional purposes. Therefore, the Black Sea pilot site was included in this project.

To identify the prioritized species, selection criteria for the wild edibles and landraces were set in 2013 at the beginning of the Project as follows potential in nutrition, market opportunities, multi-user functionality and traditional and modern use of the edible wild species and landraces. The information about the species was revised based on

the information gathered from each region by pre-surveys and the most common edible plants in each pilot site were determined.

11 different species were identified (Table 1) and the current data on these species were obtained via surveys, questionnaires, field observations and the studies in the related literature.

METHODS

Collection

In 2014, data collection and standardization of sampling protocols were completed. Training of the enumerators for the assessment of local biodiversity for food and nutrition was done and the related traditional information was collected. The sampling form including a detailed description of the collected species (their scientific name, their local name, sampling region and harvesting time) was used to record information. In this study, all collection activities were done under the rules of the FAO Gene Bank Standards (Anonymous, 2014). To ensure the quality of samples and to prevent deterioration, the samples were promptly sent to the Central Research Institute of Food and Feed Control in Bursa, where composite samples were produced by combining the primary samples.

Socio economic studies

The monographic research technique was used to examine in detail the process from the collection/ production of species to their consumption. Data collection was performed using questionnaires. Besides, a pre-data collection was conducted in the residential areas and the farmers markets. The sample size was selected purposefully in a way to represent the population. Surveys were conducted in 2014 in 8 districts of the pilot provinces of Kastamonu and Sinop. Totally 339 consumer, 143 collector/producer were surveyed (Table 2).

Questionnaires targeting local markets, local food restaurants, supermarkets and a selected number of villages in the Black Sea pilot site were conducted to document information on the trade and consumption of wild edibles and Einkorn and preparation and cooking methods and to assess the socio-economic importance of target biodiversity. Some information was also obtained from the wild edible plant collectors about the collection sites, harvesting seasons and the availability of landraces and wild edibles.

In summary, the village information form included the following information: altitude, geographical location, population and household information, immigration status, market information, cooperatives status, amount of land in the lands deemed as village, animal assets, crops grown in the village and wild edibles collected in the village.

The data was analyzed using the basic statistical techniques such as weighted mean, frequency distribution and proportional distribution. The analysis also provided preliminary data for the value chain analysis.

Table 1. Target species of the Black Sea Region pilot site.
Çizelge 1. Karadeniz Bölgesi pilot alanı hedef türleri.

	Family Familya	Botanical name Botanik isim	Turkish name Türkçe isim	English name İngilizce isim
1	Amaranthaceae	*Chenopodium album* L.	Aksirken	Lamb's quarters, melde
2	Apiaceae	*Aegopodium podagraria* L.	keçiayağı	Ground elder
3	Apiaceae	*Oenanthe pimpinelloides* L.	Deli maydanoz	Corky-fruited water-dropwort
4	Asparagaceae	*Ornithogalum umbellatum* L.	Sunbala	Star of Bethlehem
5	Boraginaceae	*Trachystemon orientalis* (L.) G. Don	Kaldirik	Eastern borage (oriental borage)
6	Brassicaceae	*Capsella bursa-pastoris* (L.) Medik.	Çobançantası	Shepherd' purse
7	Caryophyllaceae	*Silene vulgaris* (Moench) Garcke	Ecibücü	Bladder campion
8	Polygonaceae	*Rumex crispus* L	Labada	Curly dock
9	Polygonaceae	*Polygonum cognatum* Meissn.	Madımak	Knotgrass (knotweed)
10	Smilacaceae	*Smilax excelsa* L.	Dikenucu	Prickly ivy
11	Poaceae	*Triticum monococcum* L.	Siyez	Einkorn wheat

Table 2. The Statistics of the Survey at the Black Sea Region Pilot Area.
Çizelge 2. Karadeniz Bölgesi pilot alanı survey istatistikleri.

Number of Provinces Surveyed Survey yapılan il sayısı	2
Number of Counties Surveyed Survey yapılan ilçe sayısı	8
Number of Sites Surveyed Survey yapılan mahalle sayısı	50
Number of Consumers Surveyed Survey yapılan tüketici sayısı	339
Number of Collectors/Producers Surveyed Survey yapılan toplayıcı/üretici sayısı	143

Food Analysis

Ten wild edible species and a landrace were collected from at least ten locations and analyzed to determine their nutritional content. Various wild edible species and one landrace were found to have some key nutrients for a healthy diet, macronutrients, minerals and vitamins. Samples were collected from Kastamonu and Sinop in the Black Sea pilot site during the optimum harvesting time between March and April in 2014. The plant samples were transported to the laboratory using cold packs at refrigerated temperatures on the same day of collection in order to preserve the nutrient composition of samples.

For sample preparation, the inedible parts of plants were removed and the edible parts were rinsed with tap water for 1-2 min and then with distilled water for 1 min. After cleaning, the plant samples were homogenized and subsamples were prepared for analysis. Accepted standardized techniques were used for nutrient analysis. The analysis was performed at the Central Research Institute of Food and Feed Control located in Bursa.

Policy Frame work

Within the framework of the Biodiversity for Food and Nutrition Project, activities were carried out to develop policies for the improvement of the relationship between biodiversity and nutrition. Moreover, some activities were done to strengthen cooperation between researchers, farmers and consumers for the purpose of promoting the use and consumption of biodiversity products. Meetings and workshops were held with the municipalities, civilian authorities and non-governmental organizations in the region, and presentations were made during different activities. The importance of nutritional value of local species in human health and nutrition was emphasized. This helped increasing the existing knowledge of people and reintroducing the forgotten local species to the society.

As part of the policy component of the project, the BFN activities are well integrated into the national policy, i.e. the Ministry of Food, Agriculture and Livestock's (MFAL) strategy on agriculture for the period of 2013-2017. One of the main research areas established by the strategy is biological diversity and genetic resources and GDAR Agricultural Research Master Plan 2016-2020 with various Research Opportunity Areas which is related to BFN. The Master Plan encourages research activities on agricultural biological diversity related to traditional knowledge which is valuable for nutrition, food security and safety as well as agricultural production. Besides, the 10th Development Plan of Turkey for 2014-2018, the Nutrition and Health Research of Turkey, the Healthy Nutrition and Active Life Program 2014-2017 and the Nutrition Friendly School Program are the related policies and strategies which makes the BFN linkage strong and support the sustainability of the BFN activities.

RESULTS AND DISCUSSION

Collection

In the Black Sea pilot site, the species were collected from the local markets and, where available, from the natural habitat. They were mostly collected directly from their natural habitats. Just few of them were bought from the local bazaars because of some unusual seasonal reasons and the very limited time for the sampling. Each sample was collected during their eating vegetation stage. The main principle was to ensure that the samples represent at least 10 different locations.

The information about the target species gathered from the surveys:

1. *Chenopodium album* L.: Lamb's quarters, melde is an ascending annual plant with 20-150 cm height and angular stem. It isfound in

all regions of Turkey. It is known by the local people by various Turkish names includingsirken, kelebek, iblice, yaban otu, unluca, ak kaz ayağı, ak pazı andyabani ıspanak. It is consumed by roasting, cooking with rice or bulgur and baking as fritter and pancake.

2. *Aegopodium podagraria* L.: Ground elder is a perennial plant with hallowed and grooved stem. It is found in Istranca andthe Eastern Black Sea region and the provinces of Istanbul, Artvin, Kırklareli, Rize. It is known by the local people by various Turkish names including keçi ayağı, mendek, kır marulu and gıvışkan. It is consumed raw or by roastingand cooking with rice or bulgur.

3. *Oenanthe pimpinelloides* L.: Corky-fruited water-dropwort is a perennial plant with 1m height. It is found in the Marmara, Black Sea andAegean Regions and the Adana province. It is known by the local people by various Turkish names includingdeli maydonoz, kazıyak and gazyak. It is consumed by roasting or cooking with yoghurt and bulgur.

4. *Ornithogalum umbellatum* L.: Star of Bethlehem is a perennial plant found in the Marmara, Black Sea andAgean Regions and the Hakkari province. It is known by the local people by various Turkish names includingsumbala, sakarca, sakarcık, akyıldız, çöplüce, karga soğanı and tükrük otu. It is consumed by roasting, frying or cooking.

5. *Trachystemon orientalis* (L.) G. Do: Eastern borage (oriental borage) is a perennial plant with hairy coarse-textured, heart-shaped leaves and stems. It is found in the Marmara and Black Sea Regions. It is known by the local people by various Turkish names including kaldirik, kaldırayak, kalduruk, galdirik, galdirek, ispıt, zılbıt, hodan, zıbıdık, deremancarı, burğı, deve mancarı and tamara. It is consumed in salads or byroasting or cooking with bulgur.

6. *Capsella bursa-pastoris* (L.) Medik.: Shepherd' pürse is an annual herbaceous plant with 55 cm height and a smoothed stem. It is found in all regions of Turkey. It is known by the local people by various Turkish names includingçoban çantası, medik and kuşekmeği. It is consumedraw or in salads, rice meals, andrice soups. It is also used in pastry or pancakes.

7. *Silene vulgaris* (Moench) Garcke: Bladder campion is a perennial plant with flowered 9-35 length stem. It is found in the Marmara, Black Sea and Central Anatolia regions. It is known by the local people by various Turkish names including ecibücü, mendek, gıvışkan, tavukayağı andkır marulu. It is consumed by roasting or it is cooked with rice or bulgur or used insoups.

8. *Rumex crispus* L.: Prickly ivy is a perennial flowering plant with stalks up to 100-150 cm height with shooting curled and wavy leaves from large basal rosettes. It is found in all regions. It is known by the local people by various Turkish names includinglabada, mancar, kıvırcık labada, labada otu, efelek, evelik, eveleyük and ekşi mancar. It is consumed by roasting or it is cooked with bulgur and soups.

9. *Polygonum cognatum* Meissn.; Knotgrass (knotweed) is a perennial plant with 15-30 cm height with ascending branched stems. It is found in all regions of Turkey. It is known by the local people by various Turkish names includingmadımak, ibi out and kuşekmeği. It is cooked plain or with bulgur or it is used in soups.

10. *Smilax excelsa* L.: Prickly ivy is a perennial plant with climbing and thorny stems and greenish flowers. It is found in the Marmara, Black Sea, Aegean and Mediterranean regions. It is known by the local people by various Turkish names includingkırçan, çoban ekmeği, dikenözü, müzmelek, müzmüldek, itmük, özdikeni, öz, kırçıyık, melevcan, melocan, melvocan, boylu gıcır, saparna, anadolu saparnası, iz dikeni, silcan, zimbilaçi, zimilaci and zimilas. Young shoots are consumed raw or are cooked or roasted. It is also used as an ingredient in pastries.

11. *Triticum monococcum* L.: Einkorn is annual plant with 100 cm height. It is found mostly in the northern part of Anatolia and the Central

Black Sea Region of Turkey. It is known by the local people by various Turkish names including zız, kaplıca and siyez. Einkorn wheat is used in traditional bread making or commonly processed into Bulgur in stone mills and used in dishes such as sour pilaf, dry pilaf or pilaf with tomato paste.

Socio economic studies

Extensive market surveys were carried out in 2014 to document information on the marketing of the target species in the pilot site. In the Black Sea Region pilot site, researchers collected information on the availability of wild edibles and Einkorn along with information on collecting sites and harvesting from 9 local markets in the towns and villages across three provinces (Samsun, Kastamonu and Sinop). Surveys were completed for this pilot site and the data were analyzed. Preliminary findings indicate good opportunities for the marketing of traditional wild edibles. The annual per capita consumption of wild edibles ranges from 1.1 kg to 6.2 kg. The most consumed wild edible species is Kaldirik. The annual per capita consumption of Siyez is 14.2 kg (Table 3).

Most of the consumers usually consume these species once or twice a week, except for madımak. Gıvışkan, sumbala, kaldirik and labada are the most consumed species (Table 4).

Some of the annually collected/produced wild species are reserved for household consumption, while some are distributed to neighbors/relatives and some are marketed. The most marketed species are those commonly known and consumed in the region. 85% of siyez, 63% of kaldirik and 52% of dikenucu are marketed (Table 5).

In the Black Sea Region, wild edibles, except for madımak and gıvışkan, are usually directly sold to consumers at the farmers market. They are not sold to wholesalers and middlemen. However, most of the manufacturers of local Siyez sell their products to middlemen/wholesalers at the farmers market. Collectors reach local markets making 8 to 35 km (Table 6). Sales are made at at least 2 local markets every week.

Table 3. The amount of wild edibles per household and annual consumption per capita in the Black Sea Region pilot site.
Çizelge 3. Karadeniz Bölgesi pilot alanında yenilebilir yabani türlerin hane başına ve yıllık tüketim miktarı.

Wild edibles Yenilebilir yabani türler	English name İnglizce isim	Consumption per household (kg/year) Hane başına tüketim (kg / yıl)	Consumption per capita (kg/year) Yıllık tüketim (kg / yıl)
Madımak	Knotgrass or knotweed	5.8	1.1
Ak sirken	Lamb's quarters ormelde	8.7	2.0
Gıvışkan	Bladder campion	5.3	1.1
Kaldirik	Eastern borage or oriental borage	25.9	6.2
Diken ucu	Prickly ivy	7.3	1.6
Çoban çantası	Shepherd' purse	7.5	1.9
Sunbala	Star of Bethlehem	5.4	1.3
Deli maydanoz	Corky-fruited water-dropwort	7.5	1.8
Labada	Curly dock	8.3	2.2
Keçi ayağı	Ground elder	7.6	2.0
Siyez Bulgur	Einkorn as bulgur	84.0	14.2

Table 4. Consumption of the wild species of the Black Sea Region pilot site (%).
Çizelge 4. Karadeniz Bölgesi pilot alanında yenilebilir yabani türlerin tüketim sıklığı (%).

Wild edibles Yenilebilir yabani türler	English name İnglizce isim	5-6 per week 5-6 kez/hafta	3-4 per week 3-4 kez/hafta	1-2 per week 1-2 kez/hafta	1 in 15 days 1 kez/15 gün	1 per month 1 kez/ay
Madımak	Knotgrass or knotweed	4.0	8.0	36.0	8.0	44.0
Ak sirken	Lamb's quarters ormelde	1.7	8.8	42.1	19.3	28.1
Gıvışkan	Bladder campion	4.6	22.7	45.5	13.6	13.6
Kaldirik	Eastern borage or oriental borage	3.6	10.7	58.3	13.1	14.3
Diken ucu	Prickly ivy	1.7	5.2	55.2	6.9	31.0
Çoban çantası	Shepherd' purse	4.5	9.1	50.0	18.2	18.2
Sunbala	Star of Bethlehem	3.5	14.3	42.9	10.7	28.6
Deli maydanoz	Corky-fruited water-dropwort	-	5.9	58.8	13.7	21.6
Labada	Curly dock	2.2	10.6	51.1	19.1	17.0
Keçi ayağı	Ground elder	3.1	6.2	50.0	12.5	28.2
Siyez Bulgur	Einkorn as bulgur	7.0	34.0	43.0	5.0	11.0

Table 5. Distribution of collected amounts of wild edibles in Black Sea Region pilot site by using pattern.
Çizelge 5. Karadeniz Bölgesi pilot alanında yenilebilir yabani türlerin kullanım miktarı ve amacına göre dağılımı.

Wild edibles Yenilebilir yabani türler	English name İnglizce isim	Household consumption (%) Hane halkı tüketimi (%)	Distributed to neighbors/ relatives (%) Komşulara ve akrabalara dağıtım (%)	Used as animal feed (%) Hayvan yemi (%)	Marketed (%) Satılan (%)	Amount collected (kg) Toplanan miktar (kg)
Madımak	Knotgrass or knotweed	95	5	-	-	146
Ak sirken	Lamb's quarters ormelde	69	4	1	26	496
Gıvışkan	Bladder campion	94	5	-	1	18
Kaldirik	Eastern borage or oriental borage	31	6	-	63	2.179
Diken ucu	Prickly ivy	46	2	-	52	407
Çoban çantası	Shepherd' purse	78	6	-	16	158
Sunbala	Star of Bethlehem	70	3	-	27	151
Deli maydanoz	Corky-fruited water-dropwort	67	6	-	27	399
Labada	Curly dock	56	6	-	38	400
Keçi ayağı	Ground elder	82	-	-	18	234
Siyez Bulgur	Einkorn as bulgur	11	4	-	85	25.505

Table 6. The Marketing Status of the Wild Edible Collectors in the Black Sea Pilot Site.
Çizelge 6. Karadeniz Bölgesi pilot alanında yenilebilir yabani tür toplayıcılarının pazarlama durumları.

Wild edibles Yenilebilir yabani türler	English name İnglizce isim	Average distance to market (km) Pazara ortalama uzaklık (km)	Proportion of sales to consumers at local market (%) Yerel pazarda tüketicilere satış oranı (%)	Proportion of sales to traders at local market (%) Yerel pazarda tüccara satış oranı (%)
Madımak	Knotgrass or knotweed		no sales at local market	
Ak sirken	Lamb's quarters ormelde	12	100	-
Gıvışkan	Bladder campion		no sales at local market	
Kaldirik	Eastern borage or oriental borage	14	100	-
Kaldirik	Eastern borage or oriental borage	14	100	-
Diken ucu	Prickly ivy	11	100	-
Çoban çantası	Shepherd' purse	25	100	-
Sunbala	Star of Bethlehem	7	100	-
Deli maydanoz	Corky-fruited water-dropwort	10	100	-
Labada	Curly dock	8	100	-
Keçi ayağı	Ground elder	35	100	-
Siyez Bulgur	Einkorn as bulgur	29	44	56

Nutrition Analysis

In this study, the analyzed wild species were found to have a wide range of nutrients. There are several factors known to affect the nutrient composition of foods: climate, geography, geochemistry, agricultural practices such as fertilizer use, stage of maturity, growth period. Dietary fiber was high in P. cognatum and S. excels, providing nearly one third of the Dietary Reference Intake. P. cognatum revealed the highest levels of Fe, Ca and Cu. The values for Vitamin C ranged between 2 and 83.1mg/100g. The highest Vitamin C value was found in O. umbellatum. Polygonum cognatum Meissn., Ornithogalum umbellatum L. and Smilax excelsa L. are some of the species which can be highlighted for their high contribution to dietary fiber, microelement and vitamin C intake. The food composition data of these wild species and the related traditional knowledge were incorporated to the BFN project database. Adding these findings to the food composition database would be helpful to promote the use of more biodiverse foods and healthy diets in Turkey (Guzelsoy *et al*., 2015).

CONCLUSIONS

The Black Sea region is especially rich in wild edibles and landraces. Due to the geographical features of the region, housing areas are scattered far from each other, which makes it difficult for people to reach the large cities. The people living in this mountainous region now prefer larger cities to live in. Villages had a large number of out-migrants who left the villages for education purposes or for the job opportunities in other sectors. Most of the villages visited for the study had a very small population size. The current population consists of either too old and lonely people or a few people who returned to village after being retired. This has a negative impact especially on the wild edible species because the traditional knowledge becomes extinct as it is used less and less over time. In the villages we visited, we had difficulty in finding people with knowledge about wild edible species. The reason is that there was usually only one or a maximum of two people with such knowledge in each village. These people were either above middle age or very old. Unfortunately, the traditional knowledge these people have will become extinct after they die. During the chats we had with them, we learned that young people do not like consuming these species and they prefer eating foods of the modern city life. Especially the adaptation of wild edibles and landraces to the urban style nutrition systems is very important for preventing children from consuming fast food.

Preparation of necessary policies and legislation will be addressed on the basis of knowledge that was obtained from this project. Awareness-raising activities will be held with the stakeholders to strengthen the sustainable use of these species. Therefore, the information gathered during this study is highly valuable. During the field studies, the local people were also provided with information about the wild edibles for awareness-raising purposes. Especially the importance of supporting sustainable consumption of these species and passing down this valuable information to the next generations was emphasized especially by pointing out the health benefits of these species and the tendency of people living in cities to consume them. During the field studies, it was pleasing to see that local people send by cargo some of the wild edibles to those who left the region. Even if they constitute a small population, these people have not forgotten the local tastes although they are used to the country life and they still consume these species, thus contributing, even if partially, to the conservation of the traditional knowledge about these species.

REFERENCES

Anonymous. 2014. FAO Gene Bank Standards. (http://www.fao.org/3/a-i3704e.pdf).

Guzelsoy, N. A., O. Ucurum, E. Tokat, A. Tan, S. Tugrul Ay, K. Ozbek, and I. Ozkan. 2015. Nutrient content of selected biodiverse food in Turkey. 11th International Food Data Conference (IFDC) 3-5 November, 2015 Hyderabad, India.