Traditional uses of medicinal plants and animals of Hatila Valley National Park, Artvin

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Abstract

This study was carried out between 2016 and 2017 to investigate and determine ethnobotanical and ethnozoological utilization of the plant and animal species, including traditional names, uses and preparations, used by the local people living in the Hatila Valley National Park, Artvin, Turkey. Direct interviews of 62 informants were done to define uses and preparations of native medicinal plants and animals. All datas were surveyed with the factor the informant consensus (FIC), fidelity level (FL) and use value (UV). As a result of study, %57 of interviewed people use plants or animals as a medicine was determined. We encountered 37 plant species belonging to 22 families and 36 genus utilized by the local people, and 6 animal species for medicinal purposes 1 plant and 2 animals were found to have no literature records. It has been determined for the first time that 11 of the them have an allergic reaction. Lamiaceae, Rosaceae, Asteraceae and Plantaginaceae were the primary families that included medicinally important plant taxa. Bear, calf, goat and bee were the main animals using for medicinal purpose and generally using for bone and skin health. Hormonal Disorders, Respiratoryotic, gastrointestinal and dermatological diseases were the primary categories that were classified as perfactor informant consensus (Fic). This study reveal that this enormous richness of medicinal plants and animals played an important role in the health care of the local people in Hatila Valley National Park..

Key words: Artvin, ethnopharmacology, Hatila, medicinal plants, use value

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Hatila Vadisi Milli Parkı Tıbbi Bitki ve Hayvanlarının Geleneksel Kullanımı

Özet

Bu çalışma 2016 ve 2017 yılları arasında Artvin ili Hatila Vadisi Milli Parkı ve çevresinde yaşayan yerel halk tarafından kullanılan bitki ve hayvan türlerinin geleneksel isimleri, hazırlanması ve kullanımları da dahil olmak üzere etnobotanik ve etnozoolojik kullanımını incelemek ve belirlemek amacıyla gerçekleştirildi. Yerli tıbbi bitki ve hayvanların kullanımlarını ve hazırlanma aşamalarını belirlemek için 62 kişiyle doğrudan görüşme yapıldı. Veriler, bilgilendirici konsensüs (FIC), geçerlik düzeyi (FL) ve kullanım değeri (UV) faktörü ile analiz edildi. Çalışma sonucunda, görüşülen kişilerin % 57'sinin bitki veya hayvanları ilaç olarak kullandıkları belirlendi. Yöre halkı tarafından kullanılan 22 familyaya, 36 cinse ait 37 bitki türünün ve 6 hayvan türünün tıbbi amaçla kullanıldığı gözlendi. 1 bitki ve 2 hayvan türünün literatür kayıtları bulunmadığı tespit edildi. Çalışılan örneklerden 11 tanesinin alerjik reaksiyon gösterdiği ilk defa belirlendi. Tıbbi açıdan tespit edilen önemli bitki familyaları Lamiaceae, Rosaceae Asteraceae ve Plantaginaceae. Tıbbi amaçlı olup, genellikle kemik ve cilt sağlığı için kullanılan ana hayvanlar ayı, buzağı, keçi ve arı türleriydi. Hormonal Bozukluklar, Solunum sıkıntısı, gastrointestinal hastalıklar ve dermatolojik hastalıklar bilgilendirici konsensüs (Fic) analizlerinde ana kategoriler olarak sınıflandırılmışlardır. Mevcut çalışmanın sonuçları, çalışma bölgesindeki bu muazzam bitki ve hayvan zenginliklerinin yerel halkın sağlığı bakımından önemli bir rol oynadığını ortaya koymaktadır.

Anahtar kelimeler: Artvin, etnofarmakoloji, Hatila, tıbbi bitkileri, kullanım oranı

1. Introduction

It is significant to consider that human health is dependent on nature and on the natural functioning of healthy ecosystems (Chivian, 1997). Ethnobotany has been determined as the discipline concerned with the interplay between plants and people (Jones, 1941). Plants supply people with lots of types (food, medicine). Their biologic, chemical, physologic and genetic components are being progressively discovered for human benefit (Hamilton, 2003).

The relationship between peoples and other animals, is one of the oldest cultural wealths. Animals and their parts and products are a main sources used by peoples for curing their illnesses (O'Hara-May, 1971). Folk medicine still makes use of animals and products obtained from animal organs (Lev, 2003), examples of current uses of animal-derived remedies can be found in many urban, semiurban, and more remote localities in different parts of the world (Romeu et al., 2013).

The World Health Organization (WHO) estimates that as many as 80% of the world's more than six billion people rely primarily on animal and plant-based medicines (Alves and Rosa, 2005; Ullah et al., 2014). Traditional medicine is also a potential source of knowledge to the discovery of new drugs to the modern medicine, though laboratory studies about the chemical and biological properties of these products, which would validate their effectiveness in the treatment of diseases and consequently their relevance to human health, are surprisingly scarce and still preliminary (Barros et al., 2012).

The vascular plant flora of Artvin is represented by 2727 taxa, 2616 species, 397 subspecies, and 144 varieties belonging to 761 genera and 137 families (Eminağaoğlu, 2015). Artvin has rich fauna and flora thanks to its geographical location, geomorphologic structure and influence of various climate types. The diversity in flora provides a rich sources of medicinal plants. Majority of people living in Artvin traditionally use plants (Eminagaoglu, 2005, 2012, 2015). A total of (55) mammals belonging to 20 families (total 6 orders; insectivora (7), chiroptera (14), lagomorpha (1), rodentia (18), carnivora (10) and artiodactyla (5)) were reported in Artvin. Although floristic and faunistic diversity are very rich in Artvin, there is not enough information about medicinal properties of them. Artvin has got richest and most varied mammals of Turkey, too (Gokturk et al., 2011). Hatila Valley National Park has 796 taxa belonging to 374 genera and 95 families (Eminagaoglu and Anşin, 2003).

The aim of this study is documented not only traditional wild plant and animal using for medicinal purpose by local people in Hatila Valley National Park but also local names of these species.

2. Materials and methods

2.1. Study area

Hatila Valley National Park is within the Colchic province of the Euro-Siberian floristic area in the Holarctic region. The altitude of the area is between 170 and 3224 m. The area is situated between lat 41°3'-41°13'30" N and long 41°31'- 41°48' E and is about 25.000 ha (Fig. 1). The annual average rainfall is 741.5 mm and the average warmth is 12.6 °C in the area. The climate type of the area is semi-humid and the main vegetation type of the area is forest.
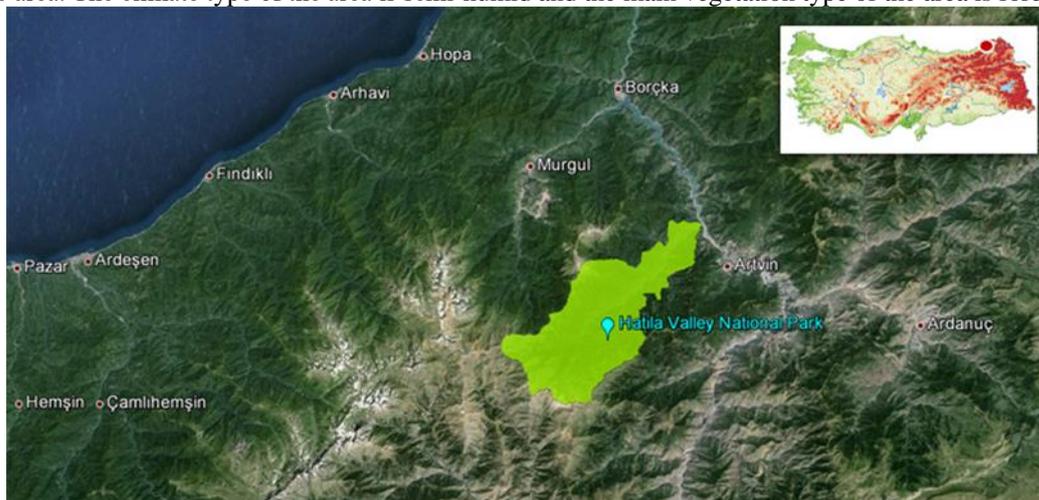

Figure 1. Map of Research Area, Hatila Valley National Park.

2.2. Data Collection

Direct interviews with people were performed from December 2016 to April 2017. A total of 35 informants were interviewed with oral prior informed consent in this region. During the interviews, we recorded demographic characteristics of the study participants, and local names, utilized parts and preparation methods of the plants and animals. Sociodemographic characteristics are given in Table 1. Most participants were over 50 years old, because only very few younger people remain in Hatila Valley National Park.

Table 1. Sociodemographic characteristics

Characteristics	Value	Frequency
Age group (years)	20-30	4
	30-40	5
	40-50	8
	50+	18
Gender	Women	24
	Men	11
Sector	Public	6
	Private	29
Education Level	Primary School	13
	Secondary School	13
	High school	7
	University	2

2.3. Data analysis (Calculations)

In order to characterize similarities and differences between individual knowledge sets and determine importance of medicinal plants and animals in Hatila Valley National Park, different quantitative indices were used. The use value (Trotter and Logan, 1986), aquantitative method that demonstrates the relative importance of species known locally, was also calculated according to the following formula: **UV=U/N**, where UV refers to the use value of a species; *U* to the number of citations per species; and *N* to the number of informants. The FIC was calculated as the number of use citations in each category (nur) minus the number of species used (nt), divided by the number of use citations in each category minus one (Heinrich et al., 1998):

FIC = nur − nt / nur − 1

The FL developed by Friedman et al., (1986) was used to determine used species to treat a particular ailment category. This index was calculated for each species in a particular ailment category. The formula to calculate this index is: **FL(%) = Np/(N × 100),** where Np is the number of UR (use reports) for a plant species in a particular ailment category and N is the total number of UR for the same plant species (Friedman et al., 1986). Medicinal plants with the highest FL ratio are considered as the most preferred for a particular ailment category. A low FL of a given plant reveals its use within various ailment categories. Plant and animal species used in folk medicine in Hatila Valley National Park were given Table 2 and 3.

Table 2**.** Animal species, animal and inorganic sources used in folk medicine in Hatila Valley National Park

Scientific name, Family	Common name	Vernacular name	Part used	Medicinal Uses, Ailments treated	Used and administration	UV	Recorded Literature uses
Bos taurus primigen B. (Bovidae)	Calf	Dana	Bone	Cooked and drink gravy	Muscular diseases	0,11	Jaundice (Ezer and Arisan, 2006)
			Skin	Applied to hair and skin	For hair and skin hea		
			Dirty wo	Applied to hair and skin	For hair and skin hea		
			Eye	Applied to wounds	Wound healing		
Ursus arctos L., (Ursidae)	Brown Bear	Boz Ayı	Fat	Applied to affected area	Knee pain ulcer, slipped disc, itch	0,14	Hepatic diseases (Sezil al., 2004)
Bubalus bubalis bubalis L., (Bovidae	Water buffalo	Manda Camuş	Skin	Applied to hair and skin	Leg pain For hair and skin hea	0,02	
Capra aegagrus Erxleben, (Bovidae)	Goat	Keçi, Oğlak	Skin	Applied to hair and skin	Backache, For hair a skin health	0,11	
			Bristle	Applied to hair and skin	For hair and skin hea		
Ovis aries aries L. (Bovidae)	Sheep, mouflon	Koyun	Tail	Salted and hanged. Applied to wounds	Wound healing	0,08	Bruises (Ezer and Aris 2006)
			Skin	Applied to hair and skin	Backache		
Apis mellifera L. (Apidae)	Honey Bee	Bal Arısı	Polen	Applied to wounds	Inflammation	0,11	Honey (Barros et al., 2012)

Table 3. Plant species used in folk medicine in Hatila Valley National Park

Family	Scientific name, voucher	Vernacular name (Turkish)	Plant part(s) used	Preparation	Utilization method	Use	UV	Recorded Literature uses	Side effect
Fagaceae	*Castanea sativa* Mill. **ARTH 3605**	Kestane	Lea, Fru, Pol	Raw Infusion Decoction	Oral, Topic	Herniation, rheumatism bronchitis	0,19	Asthma(Chiarini et al., 2013; Melikoğlu et al., 2015) Cough, cold, bronchitis, expectorating, and bronchial affection (Chiarini et al., 2013).	
Asteraceae	*Cota tinctoria* (L.) J.Gay. **ARTH 3100**	Boyacı papatyası, çayır papatyası	Flo, Who, Lea	Raw Infusion Decoction	Oral	Sedative, Acne, liver oiling, diuretic, cough, headache	0.19	Diabet (Arıtuluk and Ezer, 2012) Asthma (Melikoğlu et al., 2015) Immune, Stomach (Korkmaz and Alpaslan, 2014)Gyneco-logical disease (Ozturk et al., 2013).	Allergy
Rosaceae	*Crataegus microphylla* K.Koch. **ARTH 4167**	Kocakarı armudu	Fru, Lea	Poultice, Decoction	Oral	Diabet Cold	0,05	Asthma (Melikoğlu et al., 2015) Cardiovascular, blood pressure (Korkmaz and Alpaslan, 2014) myocarditis, ischemia, antidiarrhetic (Ivanova et al., 2005).	
Rosaceae	*Crataegus orientalis* Pall. ex Bieb. **ARTH 1694**	Alıç, kirkat, gaga	Fru, Lea	Poultice Decoction	Oral	Diabet, stomach, cough	0,16	Cardiovascular diseases, blood pressure (Korkmaz and Alpaslan, 2014).	
Primulaceae	*Cyclamen coum* Mill. var. *caucasicum* (C.Koch) Meikle **ARTH 3234**	Yersomunu	Tub, Flo, Lea	Root Poultice	Oral	Hepatitis	0,02	Cancer (Yildiz et al., 2013).	
Plantaginaceae	*Digitalis ferruginea* L. **ARTH 3363**	Arıkovanı, kesik otu	Lea, Roo, Seed	Poultice	Oral, Topic	Wounding closure	0,02		
Araliaceae	*Hedera helix* L. **ARTH 4236**	Kara sarmaşığı	Lea	Decoction	Oral	Asthma, Cold	0,05	Laxative, menstrual cycle regulator, anthelmintic exudative Leaves; swollen inflamed wounds (Ozturk et al., 2013).	
Ranunculaceae	*Helleborus orientalis* Lam. **ARTH 3570**	Noel Gülü, kara çöpleme	Lea, Bra	Poultice	Topical	Antibiotic	0,10		
Hypericaceae	*Hypericum perforatum* L. **ARTH 3982**	Kantaron, sarı ot	Bra, Flo, Pol	Decoction	Oral, Topic	Prostate, cancer, infection, inflammation, stomach Hepatitis	0,14	Diabet (Arıtuluk and Ezer, 2012) Asthma (Melikoğlu et al., 2015) Gastric and duodenal ulcer regenerative, antiinflammatory agent in digestive tract diseases, epithelotonic (Ivanova et al., 2005)	Allergy
Juglandaceae	*Juglans regia* L. **ARTH 3595**	Ceviz, zingoi pikceviz	Lea, Fru	Infusion Decoction R	Oral, Topic	Cholestrol, Foot pain, psoriasis, infection, diabet, cough goiter	0,25	Cleaning of teeth. Tonic (Aziz et al., 2017) Diabet (Arıtuluk and Ezer, 2012) Rheumatism (Korkmaz and Alpaslan, 2014).	Diarrhoea
Malvaceae	*Malva sylvestris* L. **ARTH 3983**	Ebegümeci	Lea, Flo	Seed Poultice leaf decoction	Oral	Diuretic, stomach, rheumatism papilloma infertilite	0,19	Diabet (Arıtuluk and Ezer, 2012) Asthma (Melikoğlu et al., 2015; Kökçü et al., 2015).	
Rosaceae	*Mespilus germanica* L. **ARTH 4145**	Muşmula, beşbıyıklı	Lea, Fru, Seed,	Leaf decocti fruit raw	Oral	Sedative, Diabet	0,11	Diabet (Arıtuluk and Ezer, 2012) Asthma (Melikoğlu et al., 2015).	
Brassicaceae	*Nasturtium officinale* R.Br. **ARTH 3783**	Suteresi	Bra	Poultice	Oral	Stomach	0,02	Diabet (Arıtuluk and Ezer, 2012).	
Lamiaceae	*Origanum vulgare* L. subsp. *vulgare* **ARTH 3480**	Karakınık, dağ çayı	Flo, Bra	Fruit and whole plant decoct	Oral	Cold, Infection, Asthma	0,11	Take fright, Sourness (Andrade-Cetto, 2009) Vomiting, diarrhea (Alonso-Castro et al., 2017) Diabet (Arıtuluk and Ezer, 2012) Antitussive, expectorant, sedative, choleretic, cholagogue (Ivanova et al., 2005).	

Table 3. (*continued*)

Family	Species / ARTH	Local names	Parts	Preparation	Admin.	Uses		Literature	
Oxalidaceae	*Oxalis acetosella* L. **ARTH 4000**	Ekşiyonca, ekşi ot	Lea, Rhiz, Flo	Raw	Oral	Wounding closure	0,02	Anaemia, dysentery, diarrhoea, skin diseases (Chetia et al., 2014).	
Rhamnaceae	*Paliurus spina-christi* Mill. **ARTH 4010**	Karaçalı	Fru, Lea,Pol	Decoction	Oral	inflammation	0,02	Diabet (Arıtuluk and Ezer, 2012) Asthma (Melikoğlu et al., 2015).	Diarrhoea
Solanaceae	*Physalis alkekengi* L. **ARTH 3345**	Güvey feneri	Fru	Poultice	Oral	Attenuation , Acceleration of metabolism	0,05	Asthma (Melikoğlu et al., 2015).	
Phytolaccaceae	*Phytolacca americana* L. **ARTH 3972**	Şekerciboyası	Fru	Fruit Poultic	Oral	Diabet	0,02	Exudative, emetic, irritant, diarrhea a (Ozturk et 2013)	
Plantaginaceae	*Plantago major* L. **ARTH 3556**	Sinirotu, damar otu, lağvazana, balizga, yedi damarlı ot	Lea	Decoction	Oral, Topic	Rheumatism, diüretic, Asthma, bronchitis, Inflammation, furoncle,	0,22	Asthma (Melikoğlu et al., 2015) Expectorant, ant inflammatory agent in respiratory and digestive tract diseases (Ivanova et al., 2005).	Allergy
Polygonaceae	*Polygonum bistorta* C. Koch. **ARTH 4778**	Dağ pancarı, kurt pençesi, kara panc	Tub, Lea	Decoction	Oral	appetizer, inflammation, stomach, menstru disorders, Cardiovascular diseas Cold	0,19	Diuretic, diabetes (Ozturk et al., 2013).	
Primulaceae	*Primula elatior* (L.) Hill **ARTH 9711**	Çayırtutyası, tutya	Flo, Lea, Roo	Decoction	Oral	Infection	0,02	Cough, Catarrhs of respiratory tract, bronchitis, Nervousness, Headache, Diaphoretic, Rheumatism, Gout, Diur (Länger, 2012)	Allergy Diarrhoea
Rosaceae	*Pyracantha coccinea* M.Roem. **ARTH 4158**	Ateşdikeni, dadashağra	Fru, Pol	Raw, decoct	Oral	Stomach Cardiovascular disease Cold	0,05	Cancer (Vahabi et al., 2014) Diuretic, Cardiac and Tonic agents (Sokołowska-Krzaczek al., 2009).	
Rosaceae	*Pyrus elaeagnifolia* Pall. subsp. *elaeagnifolia* **ARTH 4181**	Ahlat, güz bantası	Pol	Fruit decocti	Oral	Diabet, Diarrhoea	0,05	Diabet (Arıtuluk and Ezer, 2012).	
Anacardiaceae	*Rhus coriaria* L. **ARTH 4017**	Sumak, tutuba sumak, ehmi, tirimli	Lea, Fru	Raw	Oral	stomach Cardiovascular diseases Diabet	0,16	Throat and gum disorders, constipation, as mouthwash, styptic and antiseptic, muscle contraction (Ozturk et al., 2013; Güner et al., 2016).	Diarrhoea
Rosaceae	*Rosa canina* L. **ARTH 4144**	Kuşburnu	Fru, Flo	Infusion	Oral	Diabet, Cold, stomach, sedative, cholesterol	0,55	Diabet (Arıtuluk and Ezer, 2012) Asthma (Melikoğlu et al., 2015).	
Rosaceae	*Rubus caesius* L. **ARTH 4098**	Büküzümü, makval, duda, karabüke kara diken	Fru	Raw or infusion	Oral	Cardiovascular diseases Diabet stomach cough cancer menstrua disorders	0,19	Astringent, antidiarrhetic, anti-inflammatory (Ivanova et al., 2005).	Diarrhoea
Polygonaceae	*Rumex acetosella* L. **ARTH 9454**	Kuzukulağı, galo, yeşil ağaç	Lea, Roo, Fru	Decoction	Oral	Eczema, infection, Cardiovascu diseases	0,08	Diabet (Arıtuluk and Ezer, 2012) Diuretic, bilige fever reducer (Korkmaz and Alpaslan, 2014).	Allergy Diarrhoea
Lamiaceae	*Salvia sclarea* L. **ARTH 3500**	Paskulak, yalancı çay, adaçayı	Lea	Decoction	Oral	Cold, Cardiovascular diseases	0,05	Cold, constipation, stomach (Korkmaz and Alpaslan, 2014).	Allergy
Adoxaceae	*Sambucus ebulus* L. **ARTH 6025**	Mürver otu, ansli	Fru, Lea, Roo	Leaf decocti seed raw	Oral Topic	herniation, rheumatism	0,02	Diabet (Arıtuluk and Ezer, 2012) Asthma (Melikoğlu et al., 2015) Cold, Cough, Diarrhea, Gastro intestinal system, Liver, Lungs (Rainer W al., 2016)	Dangerous varicosis

Table 3. (*continued*)

Family	Species	Local name	Plant part[a]	Preparation	Application	Usage	UV	Previous studies	
Lamiaceae	*Satureja spicigera* (K.Koch) Boiss. **ARTH 3484**	Çorba kekiği	Aer, Lea	Leaf and flowers poultice	Tropical	inflammation	0,08	Antioxidant (Carović-Stanko et al., 2016) Digestives and diuretics (Satil and Kaya, 2007) Cramps, muscle pains, nausea, indigestion, diarrhoea, and infectious diseases (Eminagaoglu, 2005).	
Asteraceae	*Tanacetum parthenium* (L.) Schultz Bip. **ARTH 3105**	Beyaz papatya	Lea, Flo	Influsion	Oral	Diuretic, Muscle pain, Nerve disease, menstrual disorders	0,14	Menstrual colic (Alonso-Castro et al., 2017).	
Lamiaceae	*Thymus praecox* Opiz subsp. *grossheimii* (Ronniger) Jalas var. *grossheimii* **ARTH 3491**	Kaf kekiği	Flo, Bra, Pol	Poultice	Oral	Stomach, Cold infection	0,05	Asthma (Melikoğlu et al., 2015).	
Malvaceae	*Tilia rubra* subsp. *caucasica* (Rupr.) V.Engl. **ARTH 10310**	Kafkas ıhlamuru	Fru, Pol	Decoction	Oral	Cold, Stomach	0,52	Diuretic, sedative, soporofic, expectorant, throat, exudative (Ozturk et al., 2013).	
Fabaceae	*Trifolium pratense* L. var. *pratense* **ARTH 4063**	Çayır üçgülü, üç kulak, samkur otu, ballı	Who, Pol	Decoction flowers raw	Oral	Headache, Stomach	0,08	Psoriasis and eczema, asthma and cough (World Health Organization, 2009).	Dizziness
Urticaceae	*Urtica dioica* L. **ARTH 3578**	Isırgan, cincar, balla macun	Bra, Lea, Seed, Roo	Leaf decocti	Oral, Topic	Infection, Menstrual disorders, Cancer, Ac Rheumatism, Cold, Cough	0,36	Diabet (Arıtuluk and Ezer, 2012) Asthma (Melikoğlu et al., 2015) Diuretic, appetizer, bloc purifier, Hemorrhoid, diabetes, cancer, hair health, rheumatism, stomach ache, hypertension, kidney, cancer, inflammatory wounds, gynecological infalamtions (Ozturk et a 2013; Güner et al., 2016; Kökçü et al., 2015).	Diarrhoea
Ericaceae	*Vaccinium myrtillus* L. **ARTH 4721**	Ayıüzümü, markıman, meşe üzümü	Fru, Lea	Raw	Oral	Stomach Diabet, Cancer	0,14	Laxative (Ozturk et al., 2013; Kökçü et al., 2015).	
Euphorbia	*Euphorbia oblongifolia* (K.Koch) K.Koch **ARTH 969**	Sütleğen, yılanotu	who, Lat	Decoction	Oral, Topic	Wounding closure Papilloma cancer	0,14	Anthelmintic, laxative, rheumatism (Ozturk et al., 2013).	

[a] Plant part(s) used: Aer, aerial parts; Bra, branches; Bu, bulbus; Flo, flowers; Fru, fruits; Lat, Latex; Lea, Leaves; Roo, roots; Tub, tuber; Pol, pollen; Who, whole plants; Rhiz, Rhizom.

3. Results

As a result of study, %57 of interviewed people use plants or animals as a medicine was determined. We encountered 37 plant species belonging to 22 families and 36 genus utilized by the local people, and 6 animal species for medicinal purposes. One plants and two animals were found to have no literature records. All of species were wild-distributed. Lamiaceae, Rosaceae Asteraceae and Plantaginaceae were the main plant families that comprised medicinally important plant species. Local peoples generally used aerial part of plants. Bear, calf, goat and bee were the main animals using for medicinal purpose and generally using for bone and skin health. Plants have highest use values (UV) are *Juglans regia*, *Rosa canina*, *Tilia rubra* subsp. *caucasica*, *Urtica dioica*. Hormonal disorders, respiratoryotic, gastrointestinal and dermatological ailments were the main categories that were classified as perfactor informant consensus (Fic).

3.1. Diversity of medicinal plants and animals

We performed 35 interviews the inhabitants of the Hatila Valley National Park region. 37 plants of 64 and 12 animal parts are used for medicinal proposes. These plants were distributed in 22 families and 36 genera. The most used medicinal plant families are Lamiaceae, Rosaceae Asteraceae and Plantaginaceae. The plants with the major number of use-mentions for any sickness were *Rosa canina* (30), *Urtica dioica* (14), *Juglans regia* (10), *Plantago major* (10) (Table 3). They are being used in folk remedies for the treatment of various illness including gastrointestinal problems, reproductive ailments, urinary tract infections, diabetes and skeletal system problems. Herbs (56%) were the main source of medicine among the 37 plant species, followed by trees (21%), shrubs (17 %) and climbing plants (4%). It has been determined for the first time that 11 of the them have an allergic reaction (Table 3). Animal diversity in Artvin is very rich like plants. But 6 of them were determined using for medicinal purpose.

3.2. Plant and animal parts used in the preparation of herbal recipes

Whole plants were used the most (54%), followed by leaves (45%), fruits (37%), flowers (29%) and roots (13%) by local people of Hatila Valley National Park in descending order. Various parts of animals are using for meal and medicine in Artvin. But skin of animals is the most used part for medicinal purpose in Hatila Valley National Park region.

3.3. Use value of medicinal plants and animals

The highest use value reported in this study was 0.55, andthe lowest value was 0.02. The most commonly used medicinal plants were *Juglans regia* (UV=0.25), *Rosa canina* (UV=0.55), *Tilia rubra* subsp. *caucasica* (UV=0.52), *Urtica dioica* (UV=0.36) and *Plantago major* (UV=0.22) (Table 3).

The use value of animal parts are between 0,14-0,02. The most useful and known animal part is fat of bear (UV=0.14), following eye of calf (UV=0.11) and skin of goat (UV=0.11) (Table 2). This animal parts is generally used to treat muscular diseases and hair and skin health.

Previous studies show that these plants and animals to treat various ailments. The whole plant and flowers of *Cota tinctoria* plant is used to treat diabet (Arıtuluk and Ezer, 2012), immune-stomach (Korkmaz and Alpaslan, 2014), gyneco-logical disease (Ozturk et al., 2013). The leaves of *Hedera helix* is used to treat menstrual cycle regulator, swollen inflamed wounds (Ozturk et al., 2013). The whole plant of *Origanum vulgare* L. subsp. vulgare is used to traet diarrhea (Alonso-Castro et al., 2017) and provide sedative effects (Ivanova et al., 2005). The tuber of *Polygonum bistorta* is used to treat diuretic and dibetes (Ozturk et al., 2013), the leaves and fruit of *Rhus coriaria* is used to treat throat and gum disorders (Ozturk et al., 2013), the whole plant of *Trifolium pratense* is used to treat psoriasis and eczema, asthma and cough (World Health Organization, 2009). The bone of calf is used to treat muscular diseases and its skin and dirty wool used for hair and skin health.

Previous studies confirmed the medicinal properties of the plant species that are mentioned in the present study using pharmacological analysis. *Castanea sativa* Mill. is traditionally used for treat asthma (Chiarini et al., 2013; Melikoğlu et al., 2015), bronchial affections (Chiarini et al., 2013), the flowers of *Hypericum perfoliatum* plant is used to treat gastric, ulcer (Ivanova et al., 2005), *Mespilus germanica* is used to treat Diabet (Arıtuluk and Ezer, 2012), Asthma (Melikoğlu et al., 2015), the leaf of *Urtica dioica* is used to treat cancer and asthma (Melikoğlu et al., 2015; Ozturk et al., 2013), the leaf of *Thymus praecox* is used to treat asthma and cold (Melikoğlu et al., 2015), the leaf and flowers of *Tanacetum parthenium* is used to treat muscle pain (Alonso-Castro et al., 2017), the fruit of *Rosa canina* is used to treat cold and diabetes, the fruit of *Pyrus elaeagnifolia* is used to treat Diabet (Arıtuluk and Ezer, 2012).

In animals, the tail of sheep is used to treat bruises (Ezer and Arisan, 2006), the polen of bee is used to treat inflammation (Barros et al., 2012) and the fat of bear is used to treat hepatic diseases (Sezik et al., 2004).

3.4. Use value of Factor informant consensus (Fic)

Diseases were classified into 10 different categories according to (Andrade-Cetto 2009), before factor informant consensus was determined (Table 4). The results of the *F*IC showed that the oncologic category had the greatest agreement with a *F*IC of 0.55, followed by gastrointestinal (0.47) respiratory (0.43), urological (0.42), cardiovascular (0.28), dermatological (0.28), and diabetes (0.22). The least information between the informants was observed in the nervous category with an *F*IC of 0.20, followed by rmuscular /skeletal pain (0.11), see Table 4.

The major reported diseases were stomach pain (13 reports) in the gastrointestinal category, there were 12 reports of cough and 4 reports of asthma in the respiratory category. In the present work, we found that the gastric disorders, diabetes and respiratory categories used the most plants.

Table 4. Factor informant consensus (*F*IC)

No	Category	Use citation	All use citation (%)	*F*IC
1	Gastric Disorders	13	12.0	0.47
2	Respiratory	19	17.5	0.43
3	Intestinal Disorders	10	10.8	0.30
4	Cardiovascular	6	5.5	0.28
5	Dermatological	11	10.8	0.28
6	Diabetes	25	23.1	0.22
7	Urological	5	4.6	0.42
8	Muscular/skeletal pain	9	8.3	0.11
9	Oncologic	5	4.6	0.55
10	Nervous	6	5.5	0.20

3.5. Use value of Fidelity level (Fl)

We analyzed the categories with the primary agreements to emphasize the most important plants in each category. For the gastrointetsinal category, we found that the most important species were *Polygonum bistorta* (Fl = 71), *Hypericum perfoliatum* (Fl = 40), and *Thymus praecox* (Fl = 50). They were *Tilia rubra* (Fl = 100), *Rosa canina* (Fl = 100), *Hedera colchica* (Fl = 100), *Castanea sativa* (Fl = 100) and *Origanum vulgare* (Fl = 90) for the respiratory category. They were *Phytolacca americana* (Fl = 100), *Rhus coriaria* (Fl = 83) and *Mespilus germanica* (Fl = 75) for the diabetes category. The most important plants in the dermatological category were *Euphorbia oblongifolia* (Fl = 60) and *Plantago major* (Fl = 44) and animals in the muscular category was Bear (Fl = 100), Calf (Fl = 50).

4. Conclusions and discussion

Ethnobotanical and ethnozoological utilization of the plant and animal species, including traditional names, preparations and uses, used by the local people living in the Hatila Valley National Park, were investigated and determined. The respondents of the questionnaire are Artvin citizens, with various ethnic backgrounds. It was determined that 10 plants' and 3 animals' information overlaps with the literature in terms of etnobotanical properties, 26 plants and 3 animals have different uses. At the same time, 30 of 37 studied plant species were reported from other same communities of the country. The most used plants were *Juglans regia, Plantago major, Tilia rubra* and *Rosa canina* and animals were *Bos taurus primigenius, Ursus arctos, Capra aegagrus*. These plants and animals are used in the treatment of many diseases. The some healing plants that grow in Artvin are used in different countries for the treatment of same diseases.

In this study study, one plant namely *Digitalis ferruginea* used for early healing of open wounds, and two animals used for hair and skin healty, namely buffalo and goat were reported in traditional medicinal uses for the first time. These species require a thorough research in the context of pharmacological efficacy. In the future, critical toxicological researches are also required for the safe and secure use of such drugs. Moreover, it is highly recommended to authenticate the traditional herbal preparations and brought them under the control of experienced herbal practitioners (Hakim and Chishti, 1988).

The main problems treated by traditional medicine in Hatila Valley National Park are oncological, gastrict and respiratory problems and there is also a consensus about the plants to treat these disease. Folk knowledge on medicinal plants and animals and using of this species are still alive in the studied region. Some medicinal plants are only known by the urban people leading to the conclusion that the practice of the natural animal and herbal treatment is not popular or used by local people. Further biological activity and biochemical studies should also be investigated on the medicinal plant and animal species of the study area so as to use them in drug development.

Knowledge about animals that were used for treatment of diseases in the past and are still used as such to the present day is part of traditional and ethnic medicine. This knowledge is connected to science and society, even though it

does not suggest any future gain or the development of new medicinal drugs. Its importance lies in its fostering better understanding of this from sociological, historical, anthropological, economic and environmental viewpoints in the past.

There is also a need to increase our knowledge of the biology and ecology of species commonly used as drug. Medicinal species have a conservation status, should pay attention and damages such as habitat loss and extinction of species because of some activities should be discussed relating to present and future medicinal uses.

Acknowledgements

References

Alonso-Castro, A.J., Domínguez, F., Maldonado-Miranda, J.J., Castillo-Pérez, L.J., Carranza-Álvarez, C., Solano, E., Isiordia-Espinoza, M.A., del Carmen Juárez-Vázquez, M., Zapata-Morales, J.R., Argueta-Fuertes, M.A., Ruiz-Padilla, A.J., Solorio-Alvarado, C.R., Rangel-Velázquez, J.E., Ortiz-Andrade, R., González-Sánchez, I., Cruz-Jiménez, G., Orozco-Castellanos, L.M. (2017). Use of medicinal plants by health professionals in Mexico. Journal of Ethnopharmacology, 198: 81-86.

Alves, R.R.N., Rosa, I.L.(2005). Why study the use of animal products in traditional medicines?. Journal of Ethnobiology and Ethnomedicine, 1, 5.

Andrade-Cetto, A. (2009). Ethnobotanical study of the medicinal plants from Tlanchinol, Hidalgo, Mexico. Journal of Ethnopharmacology, 122, 163–171.

Arıtuluk, Z., Ezer, N. (2012). Halk Arasında Diyabete Karşı Kullanılan Bitkiler (Türkiye)-II. Hacettepe Üniversitesi Eczacılık Fakültesi Dergisi, 32, 179–208.

Aziz, M.A., Khan, A.H., Adnan, M., Izatullah, I. (2017). Traditional uses of medicinal plants reported by the indigenous communities and local herbal practitioners of Bajaur Agency, Federally Administrated Tribal Areas, Pakistan. Journal of Ethnopharmacology, 23:198,268-281.

Barros, F.B., Varela, S.A., Pereira, H.M., Vicente, L. (2012). Medicinal use of fauna by a traditional community in the Brazilian Amazonia. Journal of Ethnobiology and Ethnomedicine, 8,1-37.

Carović-Stanko, K., Petek, M., Grdiša, M., Pintar, J., Bedeković, D., Ćustić, M.H., Satovic, Z. (2016). Medicinal plants of the family lamiaceae as functional foods-A review. Czech Journal of Food Sciences, 34, 377-390.

Chetia, J., Upadhyaya, S., Bora, D. (2014). Screening of phytochemicals, antioxidant and antimicrobial activity of some tea garden weeds. International Journal of Pharmaceutical Sciences Review and Research. 26(1), 193-196.

Chiarini, A., Micucci, M., Malaguti, M., Budriesi, R., Ioan, P., Lenzi, M., Fimognari, C., Gallina Toschi, T., Comandini, P., Hrelia, S. (2013). Sweet chestnut (Castanea sativa Mill.) bark extract: Cardiovascular activity and myocyte protection against oxidative damage. Oxidative Medicine and Cellular Longevity. doi:10.1155/2013/471790

Chivian, E. (1997). Global environmental degradation and biodiversity loss: implications for human health, in: Grifo F, R.J. (Ed.), Biodiversity and Human Health. Washington DC, 7–38.

Eminagaoglu, Ö. (2005). Şavşat (Artvin) Yöresinin Tıbbi ve Ekonomik Bitkileri. İstanbul Üniversitesi Orman Fakültesi Dergisi, 55, 87–111.

Eminagaoglu, Ö., Anşin, R.(2003). The Flora of Hatila Valley National Park and its Close Environs (Artvin). Turkish Journal of Botany, 27, 1–27.

Eminağaoğlu, Ö. (2015). Artvin'in Doğal Bitkileri (Native Plants of Artvin). ISBN:978-605-030-854-9, İstanbul: Promat, 456 p.

Eminağaoğlu Ö. (2012). Artvin'de Doğa Mirası, Camili'nin Doğal Bitkileri, ISBN:978-605-359-936-4, İstanbul: Promat, 376 p.

Ezer, N., Arisan, M. (2006). Folk medicines in Merzifon (Amasya, Turkey). Turkish Journal of Botany, 30. 223-230.

Friedman, J., Yaniv, Z., Dafni, A., Palewitch, D. (1986). A preliminary classification of the healing potential of medicinal plants, based on a rational analysis of an ethnopharmacological field survey among Bedouins in the Negev desert, Israel. Journal of Ethnopharmacology, 16, 275–287.

Gokturk, T., Bucak, F., Artvinli, T. (2011). Mammalian fauna of Artvin. African Journal of Agricultural Research, 6, 1418–1425.

Güner, Ö., Selvi, S. (2016). Wild medicinal plants sold in Balıkesir/Turkey herbal markets and their using properies. Biological Diversity and Conservation, 9(2), 96-101.

Hakim, G.., Chishti, N.., (1988). The Traditional Healer's Handbook. Healing Art Press, Vermont.

Hamilton, A. (2003). Medicinal Plants and Conservation: Issues and Approaches. UK.

Heinrich, M., Ankli, A., Frei, B., Weimann, C., Sticher, O. (1998). Medicinal plants in Mexico: Healers' consensus and cultural importance. Social Science & Medicine, 47, 1859–1871.

Ivanova, D., Gerova, D., Chervenkov, T., Yankova, T. (2005). Polyphenols and antioxidant capacity of Bulgarian medicinal plants. Journal of Ethnopharmacology, 4:96, 145-150.

Jones, V. (1941). The nature and scope of Ethnobotany. Chronica Botanica, 6, 219–221.

Korkmaz, M., Alpaslan, Z. (2014). Ergan Dağı (Erzincan-Türkiye)'nın etnobotanik özellikleri. Bağbahçe Bilim Dergisi, 1, 1–31.

Kökçü, B., Esen, O., Uysal, I. (2015). Medicinal plants sold in Çanakkale /Turkey city center herbalists. Biological Diversity and Conservation, 8(3), 80-91.

Länger, R. (2012). Assessment report on Primula veris L. and/or Primula elatior (L.) Hill, floş. European Medicines Agency.

Lev, E. (2003). Traditional healing with animals (zootherapy): Medieval to present-day Levantine practice. Journal of Ethnopharmacology, 85, 107–118.

Melikoğlu, G., Kurtoğlu, S., Kültür, Ş. (2015). Türkiye'de Astım Tedavisinde Geleneksel Olarak Kullanılan Bitkiler. Marmara Pharmaceutical Journal, 19, 1–11.

O'Hara-May, J. (1971). Foods or medicines? A study in the relationship between foodstuffs and materia medica from the sixteenth to the nineteenth century. British Society for the History of Pharmacy, 1, 61–97.

Ozturk, M., Uysal, I., Gucel, S., Altundag, E., Dogan, Y., Baslar, S. (2013). Medicinal Uses of Natural Dye - Yielding Plants in Turkey. Research Journal of Textile and Apparel information, 17(2), 69-80.

Rainer W, B., Narel Y, P.Z., Shalva, S., Zaal, K., David, K. (2016). Medicinal and Food Plants of Svaneti and Lechkhumi, Sakartvelo (Republic of Georgia), Caucasus. Medicinal and Aromatic Plants, 5,266. doi:10.4172/2167-0412.1000266.

Romeu, R., Alves, N., Santana, G.., I.L, R. (2013). The role of Animal- Derived Remedies as Complementary Medicine in Brazil, in: Animals in Traditional Folk Medicine Implications for Conservation. Springher.

Satil, F., Kaya, A. (2007). Leaf anatomy and hairs of Turkish Satureja L. (Lamiaceae). Acta Biologica Cracoviensia Series Botanica, 49(1), 67-76.

Sezik, E., Yesilada, E., Shadidoyatov, H., Kulivey, Z., Nigmatullaev, A.M., Aripov, H.N., Takaishi, Y., Takeda, Y., Honda, G. (2004). Folk medicine in Uzbekistan: I. Toshkent, Djizzax, and Samarqand provinces. Journal of Ethnopharmacology, 92, 197-207.

Sokołowska-Krzaczek, A., Szewczyk, K., Bawół, Z. (2009). Determination of free and bound phenolic acids in leaves and fruits of Pyracantha coccinea (L.) Roem. (Rosaceae). Annales Universitatis Mariae Curie-Sklodowska, Sect. DDD Pharmacology, 22, 107-112.

Trotter, R., Logan, M. (1986). Informant consensus : a new approach for identifying potentially effective medicinal plants. Ed. Bedfore Hills, New York.

Ullah, S., Khan, M.R., Shah, N.A., Shah, S.A., Majid, M., Farooq, M.A. (2014). Ethnomedicinal plant use value in the Lakki Marwat District of Pakistan. Journal of Ethnopharmacology, 158, 412-422.

Vahabi, L., Monajemi, R., Shahanipour, K., Moridnia, A., Mortazavifar, F. (2014). Studying the Cytotoxic Effect of Methanolic Extract of Pyracantha coccinea M. Roemer Fruit on HeLa cell Line and Antioxidant Capacities and Total Phenol Contents of Methanolic and Aquatic Extract of this Fruit. Pharmacology and Life Sciences, 3, 206–209.

World Health Organization. (2009). WHO monographs on selected medicinal plants - Folium Rosmarini [WWW Document]. http://apps.who.int/medicinedocs/en/m/abstract/Js16713e (Date of access: 26.06.2017).

Yildiz, M., Bozcuk, H., Tokgun, O., Karagur, E.R., Akyurt, O., Akca, H. (2013). Cyclamen exerts cytotoxicity in solid tumor cell lines: A step toward new anticancer agents?. Asian Pacific Journal of Cancer Prevention, 14, 5911–5913.