

## Indigenous knowledge of wild remedial and fodder plants used for Livestock in Iğdır, Turkey

Ernaz Altundag Cakir

Duzce University, Faculty of Arts and Sciences Department of Biology, Duzce, Turkey

### Abstract

This paper presents the wild remedial and fodder plants for livestock in Iğdır province (Eastern Anatolian). This study was prepared during an ethnobotanical survey of Iğdır province from 2007 to 2012. It was carried out 120 interviews in 78 villages. This paper provides information about 87 wild plant taxa belonging to 9 families. Among them, 74 taxa have been used as fodder and 13 taxa as remedial. These 13 plant taxa were used for curing anthrax, edema, scabies, bloody diarrhea, anthelmintic and as galactagogue. The wild remedial and fodder plants with their vernacular names and their usage methods are presented. 7 endemic taxa have been reported as fodder.

**Keywords:** ethnobotany, remedial plant, fodder, Iğdır, Turkey

### 1. Introduction

There is deep indigenous knowledge about the plants which have been used for feeding and treatment for illnesses of livestock in Turkey and in rural areas due to lack of formal veterinarians all applications used for treatment approach are named as folk veterinarians [1, 2].

There are 8796 species in flora of Turkey [3, 4, 5]. According to the last check list an additional 945 species were added flora of Turkey [6]. The rate of endemism is about %34 [3].

The nature grasslands and meadows are important sources in providing plenty of cheap and rough fodder [7]. Iğdır province is situated on plains covered with mountains in eastern part of Turkey. The main sources of livelihood are agriculture in plain villages and animal husbandry in mountain villages. The nature and environment give great advantages for livestock farming. Sustainable production of livestock usually involves efficient utilisation of locally available resources as fodder and remedies. Most people living in the rural areas, especially the low income groups, rear livestock for feeding and cultivate high quantities of indigenous plants [8].

In this study the plants which were used by folk for feeding livestock and in treatment of some animal diseases in Iğdır were presented.

### 2. Material and methods

Iğdır province is located in the Erzurum-Kars part of the East Anatolian Region of Turkey. It is comprised of four districts (Central, Tuzluca, Aralık, Karakoyunlu) and 156 villages. Its area covers 3539 km<sup>2</sup> and the elevation of its land varies from 795 to 5165 m. Iğdır has nearly 74 % of mountain and high plateaus and 26 % of plains [9].

This study was carried out from May 2007 to October 2012 to determine the traditional uses and common names of the wild remedial and fodder plants used for livestock. In this study 78 villages especially mountain villages were studied.

During the research, in all 360 plant specimens were collected

with the help of the informants. The collected plant specimens were kept in ISTE (the herbarium of the Istanbul University, Faculty of Pharmacy). These specimens were identified basically with the Flora of Turkey [3, 5]. Scientific plant names were checked by using the website of Plantlist [10].

A questionnaire was applied to the local people face to face. The informations for these plants, such as local names, their usages, used parts and methods of preparation were recorded. A total of 120 interviews were conducted with 72 female and 48 male including both elder and young people 14 of them are shepherds. The mean age of respondents was 47 years (in 23-90 years range). Interviews were carried out especially in their houses, fields, and grasslands. The informants were visited at least two times through study.

The use value (UV) [11] was calculated for each species according to the following formula:  $UV=U/N$ , where UV refers to the use value of species; U to the number of citations per species; and N to the number of informants. It is a quantitative method that demonstrates the prominence of species known locally.

### 3. Results & Discussion

Within the scope of study, after identification of the plant specimens, 87 taxa were determined. Among them, 74 taxa have been used as fodder and 13 taxa as remedial. These 13 plant taxa were used for curing anthrax, edema, scabies, bloody diarrhea, anthelmintic and as galactagogue. The wild fodder and remedial plants with their vernacular names and their usage methods were presented in Table 1 and 2 in alphabetical order. According to number of taxa, Fabaceae (39 taxa), Asteraceae (9 taxa), Boraginaceae (9 taxa), Apiaceae (7 taxa), Lamiaceae (4 taxa) are the largest families. The largest genera are *Astragalus* (12 taxa), *Lathyrus* (5 taxa), *Onobrychis* (5 taxa) and *Trifolium* (5 taxa). Fabaceae is the most common family used as fodder as normal.

Table 1: List of wild plants used as fodder in Iğdır province

Scientific and family names; Herbarium number (ISTE)	Local names	Used parts	UV (N=120)	Previous Record
<i>Alhagi pseudalhagi</i> (M.Bieb.) Desv. ex B.Keller & Shap. (Fabaceae) 85831	Devediş	Herb	0.45	-
<i>Astragalus aureus</i> (Willd.) Podlech (Fabaceae) 85682	Geven	Herb	0.32	-
<i>Astragalus eriocarpi</i> M.Bieb. (Fabaceae) 84628	Yonca	Herb	0.3	-
<i>Astragalus galegiformis</i> L. (Fabaceae) 85570	Köpürtgen	Herb	0.54	-
<i>Astragalus halicacabus</i> Lam. (Fabaceae) 84617	Yonca	Herb	0.2	-
<i>Astragalus humifusus</i> Willd. (Fabaceae) 85483	Yonca	Herb	0.27	-
<i>Astragalus hyalolepis</i> Bunge (Fabaceae) 85568	Yonca	Herb	0.16	-
<i>Astragalus jodostachys</i> Boiss. & Buhse (Fabaceae) 84612	Yonca	Herb	0.18	-
<i>Astragalus latifolius</i> Lam. (Fabaceae) 85631	Geven yoncası	Herb	0.38	-
<i>Astragalus ornithopodioides</i> Lam. (Fabaceae) 84627	Yonca	Herb	0.56	-
<i>Astragalus pinetorum</i> Boiss. (Fabaceae) 85477	Yonca	Herb	0.67	-
<i>Astragalus stevenianus</i> DC. (Fabaceae) 84629	Arıkgaldıran	Herb	0.73	-
<i>Astragalus tigridis</i> Boiss. (Fabaceae) 84614	Yonca	Herb	0.38	-
<i>Bunias orientalis</i> L. (Brassicaceae) 85601	Galatürpenk	Herb	0.65	-
<i>Calligonum polygonoides</i> L. (Polygonaceae) 85711	Ebuçehil çalı	Whole part	0.35	-
<i>Carduus nutans</i> L. (Asteraceae) 85520	Şeker tikanı	Herb	0.75	M <sup>[12, 13]</sup> , F <sup>[14]</sup>
<i>Centaurea glastifolia</i> L. (Asteraceae) 85782	Kötan goparan	Herb	0.71	M <sup>[15, 16]</sup>
<i>Centaurea iberica</i> Trevir. ex Spreng. (Asteraceae) 85830	Çakırdikeni	Herb	0.81	M <sup>[15, 17]</sup>
<i>Cephalaria procera</i> Fisch. & Avé-Lall. (Dipsacaceae) 85776	Ganteper	Herb	0.54	M <sup>[18]</sup>
<i>Cerinthe minor</i> L. (Boraginaceae) 84458	Cücegözü	Herb	0.35	F <sup>[14, 17]</sup>
<i>Chaerophyllum angelicifolium</i> M.Bieb. (Apiaceae) 85581	Cacık	Herb	0.19	-
<i>Chaerophyllum aureum</i> L. (Apiaceae) 85765	Deli manda	Herb	0.13	-
<i>Chondrilla juncea</i> L. (Asteraceae) 85756	Ağ sakkız	Herb	0.7	M <sup>[13, 17, 18]</sup> , F <sup>[14, 19]</sup>
<i>Cichorium intybus</i> L. (Asteraceae) 85514	Cızdankuş	Herb	0.85	M <sup>[13, 15, 16, 18, 20, 21]</sup> , F <sup>[14, 19]</sup>
<i>Cirsium arvense</i> (L.) Scop. (Asteraceae) 85612	Hemirkesen tikeni	Herb	0.88	F <sup>[14]</sup> , M <sup>[17, 18]</sup>
<i>Cyanus cheiranthifolius</i> (Willd.) Soják (Asteraceae) 84490	Perpatıkanı	Herb	0.61	M <sup>[17]</sup>
<i>Descurainia sophia</i> (L.) Webb ex Prantl (Brassicaceae) 84564	Süpürge otu	Herb	0.56	-
<i>Echinops pungens</i> Trautv. var. <i>pungens</i> (Asteraceae) 85728	Topuz	Herb	0.8	F <sup>[14, 17]</sup> , M <sup>[17, 22]</sup>
<i>Echium italicum</i> L. (Boraginaceae) 85642	Sorma	Herb	0.81	M <sup>[17, 18, 20, 21, 23]</sup>
<i>Echium vulgare</i> L. (Boraginaceae) 85648	Pişik guyuğu	Herb	0.69	M <sup>[17]</sup>
<i>Eryngium billardieri</i> Delile (Apiaceae) 85404	Buğa tikanı	Herb	0.85	M <sup>[15, 18, 21]</sup> , F <sup>[17, 22, 24, 26]</sup>
<i>Eryngium campestre</i> L. var. <i>virens</i> (Link) Weins (Apiaceae) 84467	Buğa tikanı	Herb	0.92	M <sup>[17, 18]</sup> , F <sup>[14, 17]</sup>
<i>Ferula orientalis</i> L. (Apiaceae) 85609	Eşşek çası	Herb	0.38	M <sup>[17, 18, 22, 25]</sup> , F <sup>[17, 22, 24, 26]</sup> , FD <sup>[17]</sup>
<i>Glycyrrhiza glabra</i> L. (Fabaceae) 85509	Şirinbiyan	Herb	0.73	M <sup>[12, 13, 17, 18, 20, 25]</sup> , F <sup>[27]</sup>
<i>Halostachys belangeriana</i> (Moq.) Botsch. (Amaranthaceae) 85867	Garağan	Herb	0.38	-
<i>Hedysarum elegans</i> Boiss. & Huet (Fabaceae) 85668	Kır yoncası	Herb	0.3	-
<i>Lathyrus cicera</i> L. (Fabaceae) 84432	Eşek kürülü	Herb	0.37	M <sup>[18]</sup> , M <sup>[25]</sup>
<i>Lathyrus palleseus</i> (M.Bieb.) K.Koch (Fabaceae) 85676	Gürül, Kürül	Herb	0.47	-
<i>Lathyrus pratensis</i> L. (Fabaceae) 85820	İlan tağı	Herb	0.39	-
<i>Lathyrus rotundifolius</i> Willd. (Fabaceae) 85560	Hırğürü	Herb	0.43	M <sup>[18]</sup> , F <sup>[22]</sup>
<i>Lathyrus tuberosus</i> L. (Fabaceae) 85779	Gürül	Herb	0.68	M; F <sup>[22]</sup>
<i>Leonurus glaucescens</i> Bunge (Lamiaceae) 85566	Öküzguyuğu	Herb	0.1	M <sup>[18]</sup>
<i>Lotus corniculatus</i> L. (Fabaceae) 84429	Sancı otu	Herb	0.56	M <sup>[17, 18]</sup>
<i>Marrubium astracanicum</i> Jacq. (Lamiaceae) 85594	Çayotu	Herb	0.26	M <sup>[18]</sup>
<i>Medicago lupulina</i> L. (Fabaceae) 84435	Yonca	Herb	0.57	-
<i>Medicago minima</i> (L.) L. (Fabaceae) 84433	Yonca	Herb	0.7	M <sup>[18]</sup>
<i>Medicago papillosa</i> Boiss. (Fabaceae) 85644	Yonca	Herb	0.63	-
<i>Melilotus officinalis</i> (L.) Pall. (Fabaceae) 84439	Eşek yoncası	Herb	0.47	M <sup>[17, 18, 25]</sup> , FD <sup>[22]</sup>
<i>Nonea macrosperma</i> Boiss. & Heldr. (Boraginaceae) 84456	Sorma	Herb	0.12	M <sup>[18]</sup>
<i>Nonea pulla</i> L. (DC.) (Boraginaceae) 84450	Sorma	Herb	0.14	M <sup>[15, 17, 18]</sup> , F <sup>[24]</sup>
<i>Nonea stenosolen</i> Boiss. & Balansa (Boraginaceae) 85282	Sorma	Herb	0.18	-
<i>Onobrychis atropatana</i> Boiss. (Fabaceae) 84440	Galeme çiçeği	Herb	0.65	-
<i>Onobrychis radiata</i> (Desf.) M.Bieb. (Fabaceae) 84444	Galeme çiçeği	Herb	0.53	-
<i>Onobrychis stenostachya</i> Freyn subsp. <i>sosnowskyi</i> (Grossh.) Hedge (Fabaceae) 85576	Gorunga, Körülgen	Herb	0.71	M <sup>[18]</sup>
<i>Onobrychis transcaucasica</i> Grossh. (Fabaceae) 85734	Gorunga	Herb	0.67	M <sup>[18]</sup>
<i>Onobrychis vicifolia</i> Scop. (Fabaceae) 8442	Gorunga	Herb	0.77	-
<i>Onosma argentata</i> Hub.-Mor. (Boraginaceae) 85554	Sorma	Herb	0.12	F <sup>[14]</sup>
<i>Onosma bornmuelleri</i> Hausskn.&Bornm. (Boraginaceae) 85630	Sorma	Herb	0.18	-
<i>Onosma nigricaulis</i> Riedl (Boraginaceae) 85661	Sorma	Herb	0.1	-
<i>Prangos ferulacea</i> (L.) Lindl. (Apiaceae) 85647	Eşek çası	Herb	0.56	M <sup>[17, 18]</sup> , F <sup>[14, 17, 26]</sup> , FD <sup>[17]</sup>
<i>Salsola dendroides</i> Pall. (Amaranthaceae) 85870	Soda	Herb	0.46	-
<i>Salvia aethiopsis</i> L. (Lamiaceae) 85761	Öküzgulağı	Herb	0.36	-
<i>Salvia limbata</i> C.A. Mey. (Lamiaceae) 85532	Maldili	Herb	0.28	-
<i>Securigera orientalis</i> (Mill.) Lassen (Fabaceae) 84438	Yonca	Herb	0.56	-

<i>Securigera varia</i> (L.) Lassen (Fabaceae) 84441	Yonca	Herb	0.62	-
<i>Serratula coriacea</i> Fisch. & C.A.Mey. (Asteraceae) 85837	Çıt otu	Herb	0.65	-
<i>Trifolium ambiguum</i> M.Bieb. (Fabaceae) 85699	Pişik kulağı	Herb	0.75	-
<i>Trifolium campestre</i> Schreb. (Fabaceae) 85822	Üzüm	Herb	0.88	-
<i>Trifolium pratense</i> L. (Fabaceae) 84431	Alma otu	Herb	0.77	M <sup>[12, 18, 23, 28]</sup> , F <sup>[27]</sup>
<i>Trifolium repens</i> L. (Fabaceae) 84430	Alma otu	Herb	0.8	M <sup>[12, 17, 18, 23, 25]</sup>
<i>Trifolium spadicum</i> L. (Fabaceae) 85694	Tut	Herb	0.81	-
<i>Turgenia latifolia</i> (L.) Hoffm. (Apiaceae) 85524	Pıtrak	Herb	0.3	-
<i>Vicia cracca</i> L. (Fabaceae) 85518	Gürül	Herb	0.85	M <sup>[12,18]</sup> , F <sup>[24]</sup>
<i>Vicia sativa</i> L. subsp. <i>nigra</i> (L.) Ehrh. (Fabaceae) 84436	Eşek gürlüğü	Herb	0.81	FD <sup>[22]</sup>

M: Medicinal, F: Food, FD: Fodder

**Table 2:** List of wild plants used as remedial in Iğdır province

Scientific and family names; Herbarium number ISTE	Local names	Used parts	Utilization Method	UV (N=120)	Previous records
<i>Arctium platylepis</i> (Boiss. & Bal.) Sosn. ex Grossh. (Asteraceae) 85773	Bayırkırde, Garahort	Roots	Edema in legs	0.36	M <sup>[18]</sup>
<i>Cirsium simplex</i> C.A. Mey. subsp. <i>armenum</i> (DC.) Petr. (Asteraceae) 85681	Su dikeneni	Herb	Treatment scabies	0.56	-
<i>Lepidium draba</i> L. (Brassicaceae) 85288	Acıgavuk	Leaves	Wound healer for anthrax	0.28	M <sup>[16]</sup>
<i>Malva neglecta</i> Wallr. (Malvaceae) 84599	Ebemekmeği Ebenkömeci	Herb	Mixed with whole wheat flour for growing chicks	0.68	M <sup>[12, 13, 15, 18, 20, 23, 25, 28]</sup> , F <sup>[14, 17, 19, 22, 26]</sup>
<i>Taraxacum androssovii</i> Schischk. (Asteraceae) 85269	Acıgıcı Zeze	Capitulum	For bloody diarrhea	0.36	-
<i>Taraxacum fedtschenkoii</i> Hand.-Mazz. (Asteraceae) 84498	Acıgıcı, Zeze	Capitulum	For bloody diarrhea	0.28	-
<i>Taraxacum macrolepium</i> Schischk. (Asteraceae) 84494	Acıgıcı, Zeze	Capitulum	For bloody diarrhea	0.38	-
<i>Trifolium pratense</i> L. (Fabaceae) 84431	Alma otu	Herb	As galactagogue	0.75	M <sup>[23]</sup> , F <sup>[27]</sup>
<i>Trifolium repens</i> L. (Fabaceae) 84430	Alma otu	Herb	As galactagogue	0.78	M <sup>[23]</sup>
<i>Trifolium trichocephalum</i> [Fabaceae] M.Bieb. 85596	Üçkulak otu, Yonca	Herb	As galactagogue	0.54	-
<i>Verbascum agrimoniifolium</i> Huber-Morath (Scrophulariaceae) 84487	Sığırguyruğu	Herb	As anthelmintic	0.36	M <sup>[18]</sup>
<i>Verbascum oreophilum</i> C.Koch (Scrophulariaceae) 85807	Majak, Sığırguyruğu	Herb	As anthelmintic	0.31	M <sup>[16, 17, 18]</sup>
<i>Verbascum speciosum</i> Schrad. (Scrophulariaceae) 85793	Majak, Sığırguyruğu	Herb	As anthelmintic	0.38	M <sup>[18]</sup>

M: Medicinal, F: Food

Among all the wild remedial and fodder plants in the province, there are 7 endemic taxa which are as following *Astragalus halicacabus*, *Nonea macrosperma*, *N. stenosolen*, *Onobrychis stenostachya* subsp. *sosnowskyi*, *Onosma argentatum*, *O. bornmuelleri*, *O. nigricaulis*. Uncontrolled collecting of these endemic plants is a big threat especially for continuation of generation.

According to the calculation of the use value<sup>[13]</sup>; *Eryngium campestre* var. *virens* (0.92); *Cirsium arvense* and *Trifolium campestre* (0.88); *Cichorium intybus* and *Eryngium billardieri* (0.85); *Centaurea iberica*, *Echium italicum*, *Trifolium spadicum* and *Vicia sativa* subsp. *nigra* (0.81) were reported having the highest use value (Table 1).

The data presented in this paper was compared with some published ethnobotanical studies in Eastern Anatolia<sup>[12, 28]</sup>. The results of this comparison were presented in Table 1-2. As seen in Table 1-2 the plants in just one study<sup>[22]</sup> were used in similar usages but in the others the plants were used as food or medicinal purposes. In the other studies conducted for treatment of animal diseases in Turkey recorded plant taxa were not same with the plants we presented in our study<sup>[1, 2, 29]</sup>.

Due to lack of knowledge on production technics and inaccurate usage, pasturage, irrigation region farmers should be trained on farming of fodder cultivation. It should be

encouraged to cultivate the plant species which are tolerated aridity due to scarcity of water and salty soil in Iğdır<sup>[7]</sup>.

#### 4. Conclusions

It can be suggested to cultivate especially *Calligonum polygonoides* and *Halostachys belangeriana* which is native for Iğdır and suitable to be grown in arid habitats.

The study shows that people, who live far away from the town, like in the mountain villages, have used the wild plants more common. Local people generally recognise the plant species which are well appreciated by ruminants and their nutritive importance. It is needed for extensive investigations to track and discover wild plants and their effects on human life which have been used for centuries in these rural regions.

#### 5. Acknowledgement

This study was supported by the Research Fund of Istanbul University. Project No. 1441. Thanks are expressed to all the local people who generously collaborated with us and shared their knowledge of plants. I want to thank to Ertugrul Cakir for his encouragement and advices.

#### 6. References

- Yaşar A, Sinmez ÇÇ, Aslım G. İç Anadolu Bölgesi Konya Bölümü Folklorunda Ruminatların Paraziter

- Hastalıkları ve Tedavi Yöntemleri. Kafkas Univ Vet Fak Derg. 2015; 21(1):1-7.
2. Sinmez ÇÇ, Yaşar A. Sığırkuyruğu Bitkisinin (*Verbascum lasianthum*) Hayvanlardaki Çeşitli Deri Hastalıklarındaki Folklorik Kullanımı. Türk Veteriner Hekimleri Birliği Dergisi. 2010; 10:133-139.
  3. Davis PH. Flora of Turkey and the East Aegean Islands. University Press, Edinburgh, 1965-1985, 1(9).
  4. Davis PH, Mill RR, Tan K. Flora of Turkey and the East Aegean Islands. University Press, Edinburgh. 1988, 10(Supplement I).
  5. Güner A, Özhatay N, Ekim T, Başer KHC. Flora of Turkey and the East Aegean Islands. Vol 11 (Supplement II), University Press, Edinburgh. 2000.
  6. Özhatay N, Kültür Ş, Gürdül B. Check-list of additional taxa to the supplement flora of Turkey. J Fac Pharm Istanbul. 2013; 43(1):33-82.
  7. Temel S, Şahin K. İğdir İlinde Yem Bitkilerinin Mevcut Durumu, Sorunları ve Çözüm Önerileri. YYÜ Tar Bil Derg. 2011; 21(1):64-72.
  8. Chepape RM, Mbatha KR, Luseba D. Local Use and Knowledge Validation of Fodder Trees and Shrubs Browsed by Livestock in Bushbuckridge Area, South Africa. Livestock Research for Rural Development. 2011, 23(6).
  9. İğdir Governorship. <http://www.igdir.gov.tr>. 12 jan. 2017.
  10. The Plant List. <http://www.plantlist.org>. 10 jan, 2017.
  11. Trotter RT, Logan MH. Informant consensus: a new approach for identifying potentially effective medicinal plants, In, Etkin NL (Ed): Plants in Indigenous Medicine and Diet, Behavioural Approaches. Redgrave Publishing Compant, Bredford Hills, New York. 1986.
  12. Hayta Ş, Polat R, Selvi S. Traditional uses of medicinal plants in Elazığ (Turkey). Journal of Ethnopharmacology. 2014; 154:613-623.
  13. Tetik F, Civelek Ş, Çakılcıoğlu U. Traditional uses of some medicinal plants in Malatya (Turkey). Journal of Ethnopharmacology. 2013; 146:331-346.
  14. Doğan A, Tuzlacı E. Wild Edible Plants of Pertek (Tunceli-Turkey). Marmara Pharmaceutical Journal. 2015; 19:126-135.
  15. Kaval İ, Behçet L, Çakılcıoğlu U. Ethnobotanical study on medicinal plants in Geçitli and its surrounding (Hakkari-Turkey). Journal of Ethnopharmacology. 2014; 155:171-184.
  16. Mükemre M, Behçet L, Çakılcıoğlu U. Ethnobotanical study on medicinal plants in villages of Çatak (Van-Turkey). Journal of Ethnopharmacology. 2015; 166:361-374.
  17. Öztürk M, Özçelik M. Doğu Anadolu'nun Faydalı Bitkileri. Semih Ofset Basım Tesisleri, Ankara. 1991.
  18. Altundağ E, Öztürk M. Ethnomedicinal studies on the plant resources of East Anatolia, Turkey. Procedia Social and Behavioral Sciences. 2011; 19:756-777.
  19. Yeşil Y, Akalın E. The use of edible plants in Kürecik (Akçadağ/Malatya). Istanbul J Fac Pharm. 2010; 41:90-103.
  20. Özgökçe F, Özçelik H. Ethnobotanical Aspects of Some Taxa in East Anatolia, Turkey I. Econ Bot. 2004; 58(4):697-704.
  21. Tabata M, Sezik E, Honda G, Yeşilada E, Fukui H, Goto K *et al.* Traditional medicine in Turkey III. Folk medicine in East Anatolia, Van and Bitlis Provinces. Int J Pharmacog. 1994; 32(1):3-12.
  22. Güneş F, Özhatay N. An ethnobotanical study from Kars (Eastern) Turkey. Biological Diversity and Conservation. 2011; 4(1):30-41.
  23. Çakılcıoğlu U, Khatun Selima, Türkoğlu İ, Hayta Ş. Ethnopharmacological survey of medicinal plants in Maden (Elazığ-Turkey). Journal of Ethnopharmacology. 2011; 137:469-486.
  24. Kaval İ, Behçet L, Çakılcıoğlu U. Survey of wild food plants for human consumption in Geçitli (Hakkari, Turkey). Indian Journal of Traditional Knowledge. 2015; 14(2):183-190.
  25. Kılıç Ö, Bağcı E. An ethnobotanical survey of some medicinal plants in Keban (Elazığ-Turkey). Journal of Medicinal Plants Research. 2013; 7(23):1675-1684.
  26. Özgen U, Kaya Y, Coşkun M. Ethnobotanical Studies in the Villages of the District of Ilıca (Province Erzurum), Turkey. Econ Bot. 2004; 58(4):691-696.
  27. Polat R, Çakılcıoğlu U, Ulaşan MD, Paksoy MY. Survey of wild food plants for human consumption in Elazığ (Turkey). Indian Journal of Traditional Knowledge. 2015; 1(1):69-75.
  28. Polat R, Çakılcıoğlu U, Satıl F. Traditional uses of medicinal plants in Solhan (Bingöl-Turkey). Journal of Ethnopharmacology. 2013; 148:951-963.
  29. Yerlikaya H. Elazığ ve Çevresinde Hayvan Hastalıklarında Halk Hekimliği Üzerine Araştırmalar. Kafkas Univ Vet Fak Derg. 2002; 8(2):131-138.