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A COMPARATIVE ANALYSIS OF MEDICINAL AND AROMATIC PLANTS USED IN THE TRADITIONAL MEDICINE OF IĞDIR (TURKEY), NAKHCHIVAN (AZERBAIJAN), AND TABRIZ (IRAN)

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Abstract

A total of 341 naturally distributed taxa belonging to 65 families are used in the traditional medicine in Iğdır (Turkey), Nakhchivan (Azerbaijan), and Tabriz (Iran). Local people in three different regions generally use herbal remedies for digestive, respiratory, urogenital systems, as well as dermal, neurological and psyschological diseases. On the basis of localities three highly prevelant usesin Iğdır are colds (32 taxa), stomach disorders (28 taxa), and cough (24 taxa); in Nakhchivan rheumatism (24 taxa), gastrointestinal disorders (24 taxa), and anthelmintic (20 taxa), and in Tabriz diuretic (24 taxa), fever (22 taxa), and cough (20 taxa). Our findings reveal that in these three areas belonging to three neighbouring countries 4 taxa are widely distributed and used almost forthe same applications; *Glycyrrhiza glabra* (for digestive and respiratory systems), *Malus sylvestris* ssp. *orientalis* (for respiratory system), *Rosa canina* (for digestive and urinogenital systems), and *Urtica dioica* (for digestive system). The studied areas show several resemblances from cultural and other aspects.

Key words: Turkey, Azerbaijan, Iran, Cross-border ethnobotany.

Introduction

Plant species have different uses in different countries as well as different areas of the same country (Ozdemir & Alpınar, 2015).The interest in the plants to be used in medicine today and in the future is a multistep process involving gathering of plant specimens, collection of reliable ethnobotanical data, investigating the bioactivity and toxicity of crude extracts, and identifying and analyzing chemical structure of constituents (Anon., 2002). Infact tremendous work is done currently to find new drugs and bioactive compounds involving different ethnic groups (Leporatti & Ghedira, 2009; Saslis-Lagoudakis *et al*., 2011). However, some species used in this connection may not show the expected pharmacological activity, consequently, other factors seem to play a role here (Gertsch, 2012; Menendez-Baceta *et al*., 2015). The groups sharing similar habitats but distributed in diverse cultural back grounds do differ in their use as folk medicine (Plotkin, 2000; Hamilton, 2004; Halberstein, 2005; Ozturk *et al*., 2012a, 2017a,b; Bellia & Pieroni, 2015; Quave & Pieroni, 2015; Pieroni *et al*., 2015). It is not clear to what extent culture, economy, isolation, social and political situations contribute to such differences (Sõukand & Pieroni, 2016).

The objective of this study is to present the results on the medicinal and aromatic plants of three bordering states of three neighbouring countries namely; Turkey (Iğdır), Azerbaijan(Nakhchivan), and Iran (Tabriz). The plant diversity in these countries is comparatively high. Turkey has nearly 11.000 taxa of higher plants, Azerbaijan nearly 5000 taxa, and Iran 8.000 taxa. All the three bordering states have a long traditional use and learning of plant remedies.

Materials and Methods

Study areas: Iğdır (Turkey) is located in the Eastern Anatolian Region around Erzurum-Kars in Turkey, with an area of 3.539 km^2,located within a large depression basin of the Aras River (Ozturk *et al*., 2016). This river and the border between Turkey-Armenia along the river bed make up the northern and northeastern borders of the province. It is the only province in Turkey which has borders with three countries (Fig. 1). Nearly 1000 plant taxa are distributed naturally in this area (Altundağ, 2009).

Nakhchivan (Azerbaijan)is located in the southwesternpart of the Lesser Caucasus Mountain. Thetotal length of the border is 398 km. Theregion covers 5363 km^2 and borders Armenia (221km) to the east and north, Iran (179 km) to the South and west, and Turkey (15 km) to the north-west(Seyidova & Hüseyin, 2012). It is surrounded on the south by Turkey-Iran border (Fig. 1). The flora is very diverse (Seyidova & Hüseyin, 2012). According to Talybov & Ibragimov (2008) nearly 3000 species of higher plants are distributed in the province.

Tabriz (Iran) is the largest city in northwest Iran, with an area of 45.481 km^2(Taghipour & Mosaferi, 2009). The city of Tabriz (38°05′, 46°17′) (Fig. 1) (Amiri *et al*., 2009) shows is remarkably high plant diversity.

Analysis: In this research, studies carried out by Altundağ (2009), Altundağ & Oztürk (2011), and Oztürk *et al*. (2012b, 2016) in Iğdır-Turkey; by Mir-Babayev & Waigh (1997), Hasanova *et al*. (2000), Mehtiyeva & Zeynalova (2013) and Novruzova *et al*. (2015) in Nakhchivan-Azerbaijan; and Ghazanfar (2011), as well as Joudi & Bibalani (2010) in Tabriz-Iran have been evaluated, together with other ethnobotanical investigations undertaken in the neighbouring areas. Interview sheets also have been evaluated from the regions at local scale.

Fig. 1.Map showing the study areas.

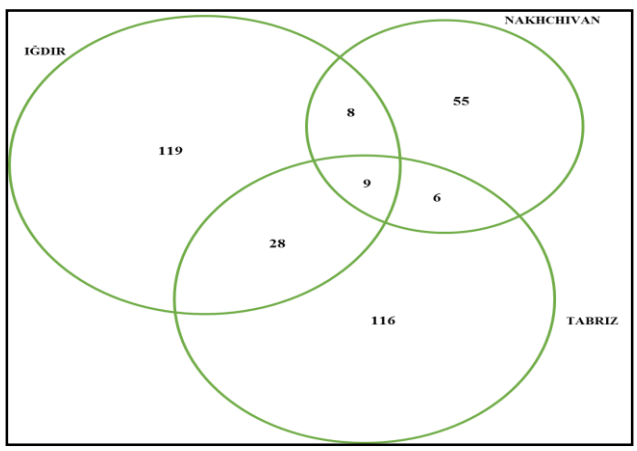

Fig. 2. Venn diagram representing the overlap of medicinal and aromatic plant taxa cited in the study areas.

Results and Discussion

The medicinal and aromatic plants determined in the studied areas show the following distribution; 164 taxa in Iğdır, 78 taxa in Nakhchivan, and 159 taxa in Tabriz. A total of 28 taxa are common in Iğdır-Tabriz, 8 in Iğdır-Nakhchivan, and 6 in Nakhchivan-Tabriz (Fig. 2). Nearly 9 taxa are common in Iğdır-Nakhchivan-Tabriz. Most common taxa among these are; *Achillea millefolium* L. and *Cichorium intybus* L. (Asteraceae), *Glycyrrhiza glabra* L. and *Melilotus officinalis* (L.) Desr. (Fabaceae), *Malus sylvestris* (L.) Mill. subsp. *orientalis* (Uglitzkich) Browicz and *Rosa canina* L. (Rosaceae), *Peganum harmala* L. (Nitrariaceae), *Plantago major* L. (Plantaginaceae) and *Urtica dioica* L. (Urticaceae).

An evaluation of the results on the basis of diseases shows that in Iğdır (Turkey)major number of taxa are used for digestive system disorders (119 taxa-20.52%), followed by respiratory disorders (92 taxa-15.86%), urogenital disorders (80 taxa-13.79%) and skin disorders (59 taxa-10.17%). In Nakhchivan (Azerbaijan) this distribution is as follows;for digestive disorders (130 taxa-24.34%), followed by respiratory disorders (87 taxa-16.29%), skin disorders (59 taxa-11.05%) and urogenital disorders (55 taxa-10.30%). In Tabriz (Iran) for urogenital disorders (102 taxa-16.14%), followed by respiratory disorders (83 taxa-13.13%), neurological and psychological (70 taxa-11.08%) and digestive system disorders (68 taxa-10.76%) (Table 1, Fig. 2).

In all three areas diseases related to the herbal treatments of digestive, respiratory and urogenital systems top the list. In Iğdır and Nakhchivan skin disease treatments too are common, in Tabriz surprisingly treatments of neurological and psychological disorders (70 taxa-11.08%) are among the first four diseases (Table 1, Fig. 3). The lowest number in all these states has been recorded for opthalmological treatments. The gynecological disorders in Iğdır (31 taxa-5.35%) stand at medium level on the basis of treatment with medicinal aromatic plants, whereas in Tabriz the ratio is low (12 taxa-1.90%) and in Nakhchivan very very low (1 taxa-0.19%) (Table 1, Fig. 3).

An evaluation on the basis of localities shows that for the top three diseases in each of these areas, maximum use of medicinal/aromatic plant taxa is as follows; colds (32 taxa), stomach disorders (28 taxa), and cough (24 taxa) in Iğdır; rheumatism (24 taxa), gastrointestinal disorders (24 taxa), and anthelmintic (20 taxa) in Nakhchivan; and diuretic (24 taxa), fever (22 taxa), and cough (20 taxa) in Tabriz (Table 2).

Most commonly used 4 plant taxa in these provinces are; *Glycyrrhiza glabra* (for digestive and respiratory systems), *Malus sylvestris* ssp. *orientalis* (for respiratory system), *Rosa canina* (for digestive and urogenital systems), and *Urtica dioica* (for digestive system) (Table 3). Most common parallelity in the use is seen with *Urtica dioica*, *Rosa canina*, *Glycyrrhiza glabra* and *Origanum vulgare* ssp. *gracile*, other taxa are presented in Table 3.

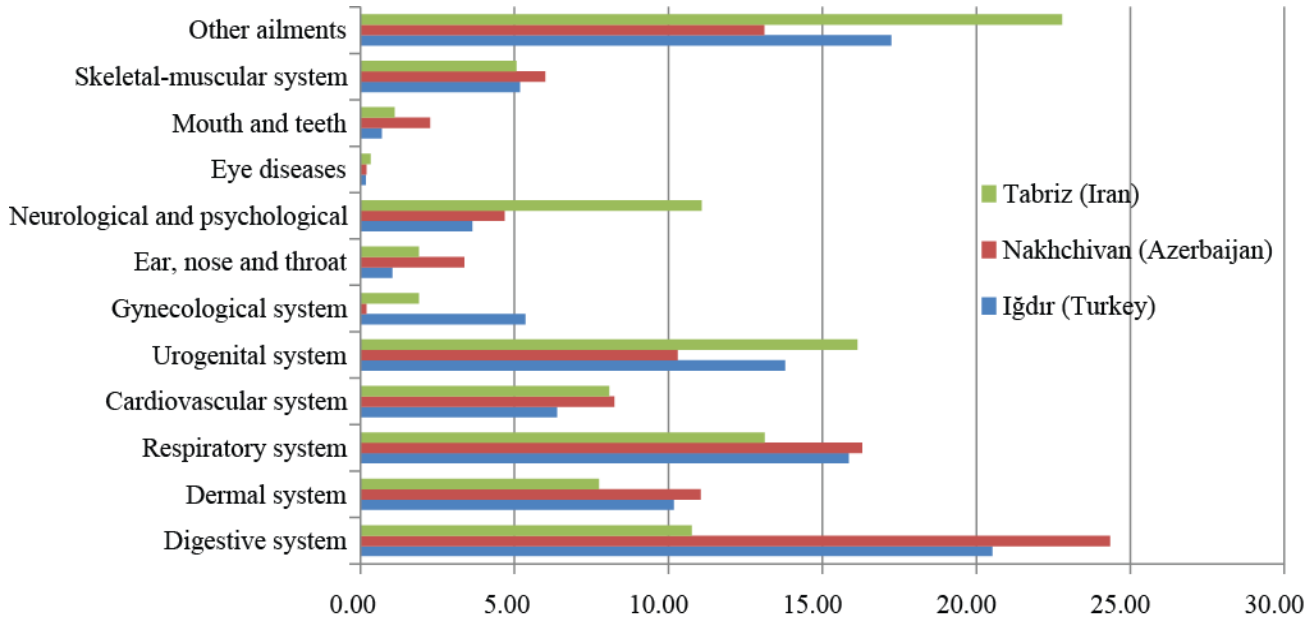

Fig. 3. Comparison of the therapeutic use of medicinal and aromatic plant taxa in the study areas (%).

Table 1. Comparison of therapeutic uses of the medicinal and aromatic plant taxa in the studied areas.

Medicinal use categori	Iğdır (Turkey)		Nakhchivan (Azerbaijan)		Tabriz (Iran)	
	Number of taxa	Percent (%)	Number of taxa	Percent (%)	Number of taxa	Percent (%)
Digestive system	119	20.52	130	24.34	68	10.76
Dermal system	59	10.17	59	11.05	49	7.75
Respiratory system	92	15.86	87	16.29	83	13.13
Cardiovascular system	37	6.38	44	8.24	51	8.07
Urogenital system	80	13.79	55	10.30	102	16.14
Gynecological system	31	5.35	1	0.19	12	1.90
Ear, nose and throat	6	1.04	18	3.37	12	1.90
Neurological and psychological	21	3.62	25	4.68	70	11.08
Eye diseases	1	0.17	1	0.19	2	0.32
Mouth and teeth	4	0.69	12	2.25	7	1.11
Skeletal-muscular system	30	5.17	32	5.99	32	5.06
Other ailments	100	17.24	70	13.11	144	22.78

Table 2. The most common medicinal and aromatic plant taxa used for the most common ten diseases.

	Iğdır	Number of taxa	Nakhchivan	Number of taxa	Tabriz	Number of taxa
1.	Colds	32	Rheumatism	24	Diuretic	24
2.	Stomach disorders	28	Gastrointestinal disorders	24	Fever	22
3.	Cough / Antitussive	24	Anthelmintic	20	Cough / Antitussive	20
4.	Diabetes	22	Wounds, Swollen wounds, Inflamed wounds	17	Astringent	18
5.	Appetizing / Orexigenic	21	Skin diseases	14	For veterinary purposes	17
6.	Anti-inflammatory	21	Colds	14	Diarrhoea	15
7.	Stomachache	20	Diuretic	14	Laxative	15
8.	Diuretic	20	Diarrhoea	14	Skin diseases	13
9.	Antipyretic	19	Dysentery	13	Sedative	12
10.	Rheumatism	18	Cough / Antitussive	13	Anxiety treatment	11

Table 3. Same and/or similar uses of medicinal and aromatic plant taxa in the studied areas.

	Iğdır	**Nakhchivan**	**Tabriz**
Achillea millefolium	Digestive	Digestive	-
	Gynecological	-	Gynecological
	-	Neurological	Neurological
	Urogenital	Urogenital	-
Agrimonia eupatoria	-	Digestive	Digestive
Arctium platylepis	Dermal	-	Dermal
Artemisia absinthium	Digestive	Digestive	-
	Respiratory	Respiratory	-
	Neurological	Neurological	-
Berberis vulgaris	Respiratory	Respiratory	-
	Diabetes (other)	Diabetes (other)	-
Capsella bursa-pastoris	Cardiovascular	-	Cardiovascular
Chenopodium album	Gynecological	-	Gynecological
	Urogenital	-	Urogenital
Cichorium intybus	Dermal	-	Dermal
Crataegus azarolus var. *azarolus*	Cardiovascular	-	Cardiovascular
Equisetum arvense	-	Urogenital	Urogenital
Fumaria asepala	Dermal	-	Dermal
Glycyrrhiza glabra	**Digestive**	**Digestive**	**Digestive**
	Respiratory	**Respiratory**	**Respiratory**
	Dermal	Dermal	-
	Urogenital	Urogenital	-
	Neurological	-	Neurological
Helichrysum plicatum	Digestive	Digestive	-
Hypericum perforatum	Digestive	Digestive	-
	Dermal	Dermal	-
	Urogenital	Urogenital	-
Hypericum scabrum	Digestive	-	Digestive
	Gynecological	-	Gynecological
	Urogenital	-	Urogenital
	Neurological	-	Neurological
Malus sylvestris ssp. *orientalis*	**Respiratory**	**Respiratory**	**Respiratory**
	-	Digestive	Digestive
	-	Urogenital	Urogenital
	Diabetes (other)	Diabetes (other)	-
Malva neglecta	Respiratory	-	Respiratory
	Urogenital	-	Urogenital
Malva sylvestris	-	Respiratory	Respiratory
Matricaria chamomilla	-	Digestive	Digestive
	-	Dermal	Dermal
Medicago sativa	Cardiovascular	-	Cardiovascular
Melilotus officinalis	-	Respiratory	Respiratory

Table 3. (Cont'd.).

	Iğdır	**Nakhchivan**	**Tabriz**
	Urogenital	-	Urogenital
	Neurological	-	Neurological
	Skeletal-muscular	-	Skeletal-muscular
Mentha longifolia	Digestive	-	Digestive
	Respiratory	-	Respiratory
	Neurological	-	Neurological
Origanum vulgare ssp. *gracile*	Digestive	Digestive	-
	Mouth and teeth disease	Mouth and teeth disease	
	Dermal	Dermal	-
	Respiratory	Respiratory	-
	Neurological	Neurological	-
Peganum harmala	Urogenital	Urogenital	-
	Skeletal-muscular	Skeletal-muscular	-
Plantago major	Digestive	Digestive	-
	Dermal	Dermal	-
	-	Respiratory	Respiratory
Polygonum aviculare	Digestive	-	Digestive
	Cardiovascular	-	Cardiovascular
	Respiratory	-	Respiratory
Ranunculus arvensis	Dermal	-	Dermal
	Skeletal-muscular	-	Skeletal-muscular
Rheum ribes	Digestive	-	Digestive
	Urogenital	-	Urogenital
Rosa canina	**Digestive**	**Digestive**	**Digestive**
	Urogenital	**Urogenital**	**Urogenital**
	-	Dermal	Dermal
	Cardiovascular	-	Cardiovascular
	-	A lack of vitamin (other)	A lack of vitamin (other)
Rubia tinctorum	-	Urogenital	Urogenital
Scutellaria orientalis	Digestive	Digestive	-
Stachys lavandulifolia	Respiratory	-	Respiratory
Thymus transcaucasicus	Digestive	Digestive	-
	Cardiovascular	Cardiovascular	-
Tragopogon pratensis	Digestive	-	Digestive
Urtica dioica	**Digestive**	**Digestive**	**Digestive**
	Dermal	Dermal	-
	Cardiovascular	-	Cardiovascular
	Respiratory	Respiratory	-
	Urogenital	-	Urogenital
	Diabetes (other)	Diabetes (other)	-
Ziziphora clinopodioides	Digestive	-	Digestive
	Respiratory	-	Respiratory

Conclusion

Some 7 billion people and about 300.000 plants co-existent on our planet. Indeed, the main difference between people and plants is that plants can live without people, but people cannot live without the plants, the survival of humankind and civilization on earth depends on plants (Mamedov & Craker, 2012).

The discovery of healing powers of thousands of plant taxa is regarded as an important step in human folk medicine applications. This field still requires a great deal of work to fill the gap. It is supported by the importance gained by ethnobotanical bio-cultural heritage for fostering a peaceful and sustainable development (Halberstein, 2005; Mustafa *et al*., 2015). A close link between the living habits of indigenous and other inhabitants is very crucial for the survival of biodiversity together with the protection of cultural diversity (Cocks, 2006). A number of researchers have shown that ethnic differences are essential in explaining the use of given plants. Therefore, sharing medicinal plant knowledge requires a high degree of affinity and trust, as it is a very sensitive topic (Maffi, 2005; Menendez-Baceta *et al*., 2012, 2015). However, erosion of traditional knowledge is not homogeneous as it ranges from changes in living habits to food preferences or elements of cultural identity (Gomez-Baggethun *et al*., 2010; Quave *et al*., 2012; Reyes-Garcia *et al*., 2013; Leonti & Casu, 2013). Ethnobotanical research is keystone in the development of drugs from natural sources. The information obtained on medicinal and aromatic plants will dramatically facilitate the search for new drugs (González-Tejero *et al*., 2008; Ozturk *et al*., 2017a,b). A major problem for herbal therapies is a mix up of indigenous knowledge with modern medical practices due to lack of scientific data regarding the safety and efficacy of the herbals. It is therefore of paramount urgency to document and authenticate the available indigenous knowledge.

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