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Chapter 34

Ethnomedicinal Uses of Colchicaceae and Liliaceae Taxa in Turkey

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INTRODUCTION

All living things on earth continue to live in a certain balance. As mentioned in the sources of mythology, it is known that since the existence of human beings, their connection with plants will continue in the future and that plants are the most valuable gift given to man (Gezgin 2007). As a result of this connection, the ethnobotanical concept, which has been very important since the past and on which many pieces of research have been made, has emerged (Koçyiğit 2005). Ethnobotany ensures that the knowledge gained through trial and error is passed down from generation to generation and that this information is a guide to subsequent scientific studies (Farnsworth and Soejarto 1985). Human beings have benefited from plants in many areas (shelter, food, fuel, treatment, etc.) since ancient times (Baytop 1999).

Information on the use of plants is mentioned in the inscriptions of ancient civilizations, archaeological writings, and materials used in the Paleolithic period (Kaya 2010). People living in Anatolia from the Paleolithic

period to the present day have used many plants in different areas from generation to generation (Özbek 2005). Medicine, pharmacy, spices, soft drinks, soap, essences, aroma, ornamental, and landscape are many uses (Sıcak *et al.* 2013, Gül 2014). Archaeological findings from ancient ages showed that people used plants for any health problems or as food (Koçyiğit 2005). In particular, they used extracts from plants for treatment to cure many diseases (Baytop 1999). The treatment with plants dates back to the 2700s BC in China. It is known that plants were used as food in ancient Egypt, and various plant extracts, such as Mint, were used in the mummification of deceased persons (Faydaoğlu and Sürücüoğlu 2013).

‘Phytotherapy’, which is used for the first time by French physician Henri Leclerc (1870-1955) and means ‘treatment with medicinal plants’ (Farnsworth and Soejarto 1985), is a natural form of treatment in which plants are used, which has developed and continued from past to present since the existence of human beings (Colombo *et al.* 2011). Since the 19th century, herbal medicines have been produced from active substances extracted from plants and pharmaceutical institutes have started to be opened (Baytop 1999).

When we look at the effects of herbal medicine production and trade on countries, the role of plants in treating diseases has started to decrease due to the positive developments in the pharmaceutical industry. However, due to the side effects of synthetic drugs and economic problems, the treatment with plants has become popular again (Özbek 2005).

Today, the fact that synthetic drugs have more side effects has led people to treatment with herbal medicines and thus people from many different cultures around the world have started to adopt this method (Lubbe and Verpoorte 2011). Because of the lack of side effects of herbal medicines and they're being useful, there is increasing interest in drugs obtained by Phytotherapy science (Policepatel and Manikrao 2013). Research on the use of plants as medicine attracts more attention day by day (Baytop 1999). The World Health Organization reports that the rate of treatment with plants is 80% in some countries, and about 4 billion people around the world use plants to treat diseases. Also, in some countries, about 25% of prescription drugs are found to contain plant-derived components (Farnsworth and Soejarto 1985).

It is assumed that there are between 750.000 and 1.000.000 plant species on earth (Kaya 2010). According to the World Health Organization data, there are about 20 thousand plant species used for Phytotherapy in the world (WHO 1992). The formation of different use areas of medicinal plants,

especially after 1990, has led to the increasing consumption of many plants. Today, the medicinal plant market is estimated to be about \$ 60 billion annually (Tilburt and Kaptchuk 2008).

The number of plants used for herbal medicine in Turkey is estimated to be about 500. About 200 of these plants can be sold to foreign countries (Baytop 1999, Ekim *et al.* 2000, Aydın 2004). To support Modern medicine and enhance the treatment methods of developing countries, the World Health Organization initiated a traditional medicine strategies program between 2001 and 2005 (WHO 1998). Based on this information, it is seen that Turkey has great potential to research medicinal plants (Kendir and Güvenç 2010).

However, in parallel with migrations from the countryside to cities and evolving technology, new generations do not know the value of this treasure trove of information and risk being lost because this valuable information is not used. Therefore, it is necessary to record this valuable information in writing as soon as possible. This obligation is also important for the Turkish economy. The determination of which plants can be used in which regions can only be determined in the light of ethnobotanical studies and thus the information obtained from the public will contribute to the Turkish economy (Başaran 2003, Sadıkoğlu 1998).

In light of this information, the importance given to medicinal plants in Turkey has increased in recent years and an increase in studies on ethnobotanical/ethnomedicinal use of plants has been observed (Satıl *et al.* 2008, Yücel *et al.* 2008, Uysal *et al.* 2010, Uysal *et al.* 2012, Bulut and Tuzlacı 2015, Güzel *et al.* 2015, Kökçü *et al.* 2015, Canlı *et al.* 2016a, Canlı *et al.* 2016b, Canlı *et al.*, 2016a, Canlı *et al.* 2016b, Canlı *et al.* 2017a, Canlı *et al.* 2017b, Canlı *et al.* 2017a, Canlı *et al.* 2017b, Canlı *et al.* 2017c, Güneş *et al.* 2017, Bozyel and Merdamert 2018, Güzel and Güzelşemme 2018, Yetgin *et al.* 2018, Bozyel *et al.* 2019a, Bozyel *et al.* 2019b, Canlı *et al.* 2019, Yaşar *et al.* 2019, Bozyel and Merdamert-Bozyel 2020a, Bozyel and Merdamert-Bozyel 2020b, Bozyel *et al.* 2020a, Bozyel *et al.* 2020b, Bozyel *et al.* 2020c, Erarslan *et al.* 2020).

The Colchicaceae Family

The family Colchicaceae, first described by De Candolle in 1805, is spread throughout temperate and tropical regions of Africa, Asia, Australia, Europe, and North America. It is a family of about 250 species (19 genera) perennial bulbous and rhizomatous plants. Many researchers suggest that these plants should be classified within the Liliaceae family. Therefore, the taxonomic status of some species is still uncertain. For example, the genus *Colchicum* is

classified to include the genera *Bulbocodium* and *Merendera*. However, some researchers make a distinction to encompass three genera based on sepal and tepal characters. Subgeneric taxa of the genus *Colchicum*, which includes several genera such as *Bulbocodium*, *Fouha*, *Merendera*, *Monocarium*, and *Synsiphon* are listed by Persson (2007).

The high frequency of species and the presence of numerous endemic species in Turkey and the Balkans suggest that these regions are the main center of speciation and diversity (Brickell 1984, Persson 1993, Nordenstam 1998, Persson 2000, Vinnersten and Reeves 2003, Persson 2005, Akan and Satil 2005, Düşen and Sümbül 2007, Persson 2007, Kahraman and Celep 2010). Colchicaceae are perennial cormose or rhizomatous geophytes that contain nectar at the base of their tepals and therefore their flowers pollinated with the help of pollinator animals (Nordenstam 1998).

All members of the family Colchicaceae contain colchicine, an alkaloid traditionally used to treat gout. Additionally, colchicine is used as a microtubule polymerization inhibitor in cytogenetics (Vinnersten and Larsson 2010).

The Liliaceae Family

The family Liliaceae is a large monocotyl family with a cosmopolitan distribution, mainly in tropical and temperate regions, with about 250 genera and 3500 species. The gene center of the family is South-West Asia and China. The family has spread mostly in the steppes and mountainous areas. It contains many taxa used as medicinal and ornamental plants. This large family was divided into many smaller families in itself by some researchers in the 1980s. These families are Alliaceae, Amaryllidaceae, Asparagaceae, Colchicaceae, Fritillariaceae, Hyacinthaceae, Tulipaceae, Alstroemeriaceae, Anthericaceae, Aphyllanthaceae, Asphodelaceae, Asteliaceae, Blandfordiaceae, Calochortaceae, Convallariaceae, Eriospermaceae, Hemerocallidaceae, Herreriaceae, Hostaceae, Hypoxidaceae, Melanthiaceae, Medeolaceae, Ruscaceae, Tecophilaeaceae, and Trilliaceae (Tutin and Heywood 1980, Bryan 1989, Valdes 2004, Dashwod and Mathew 2005, Simpson 2006).

It was first introduced to the world of Science in 1789 by Antoine Laurent de Jussieu. The families identified as Liriaceae, Tulipaceae, Erythroniaceae, and Fritillariaceae are synonyms of Liliaceae (Tamura 1998, Takhtajan 2008).

It has a natural spread in the Northern hemisphere and temperate Eurasia with 11 genera and about 550 species (Tamura 1998). According to

Simpson (2006), it is represented by 16 genera and about 600 species.

In this study, we examined recent ethnobotanical studies to identify and list the ethnomedicinal uses of Colchicaceae and Liliaceae taxa, which are naturally spreading in Turkey, by local people.

RESULTS

As a result of the study, we found that two *Colchicum* taxa of the Colchicaceae family and three *Fritillaria*, two *Lilium*, and two *Tulipa* taxa of the Liliaceae family were used ethnomedicinally by local people in Turkey. One of the *Fritillaria* and *Tulipa* taxa are endemic (Table 1).

Table 1: Colchicaceae and Liliaceae taxa were used ethnomedicinally by local people in Turkey.

Plant species*	Local name*	Parts	Usage form	Intended use	References
Colchicaceae					
<i>Colchicum speciosum</i> Steven	Şepart	Seeds	Fresh	Diuretic	Akbulut & Bayramoglu, 2013
				Diaphoretic	Akbulut & Bayramoglu, 2013
				Laxative	Akbulut & Bayramoglu, 2013
			Crushed	Rheumatism	Akbulut & Özkan, 2014
				Wounds of small cattles	Akbulut & Özkan, 2014
		Tubers	Poultice	Rheumatism	Akbulut & Bayramoglu, 2013
<i>Colchicum szovitsii</i> Fisch. & C.A.Mey.	Katr çiğdemi	Bulbs	Raw eaten	Medicinal	Akgül, 2008
		Aerial parts	Raw eaten	Tonic	Nadiroğlu et al., 2019
		Leaves	Decoction	Diabetes	Özaktan, 2009
Liliaceae					
<i>Fritillaria crassifolia</i> subsp. <i>kurdica</i> (Boiss. & Noë) Rix	Boz lale	Bulbs	Powdered	Wounds	Mükemre et al., 2015
<i>Fritillaria pinardii</i> Boiss.	Mahçup lale	Bulbs	Powdered	Wounds	Mükemre et al., 2015
			Bulb is cut into halves and warmed with olive oil	Abscess	Doğan, 2014
** <i>Fritillaria</i>	Sarı	Flowers,	-	Medicinal	Bağcı et al., 2016

<i>wendelboi</i> (Rix) Tekşen	duguk	Sap			
		Bulbs	Poultice	Headache	Bağcı et al., 2016
			Poultice	Rheumatism	Bağcı et al., 2016
<i>Lilium</i> sp.	Zambak	Flowers	Oil	Skin firming	Kökçü et al., 2015
			Oil	Menstrual pain	Kökçü et al., 2015
		Roots	Crushed with <i>Nasturtium officinale</i> leaves	Abdominal pain in infants	Saraç et al, 2013
<i>Lilium candidum</i> L.	Akzambak	Leaves	Crushed with olive oil	Wounds	Ugulu et al., 2009; Ugulu, 2011
			Crushed with olive oil	Edema	Ugulu et al., 2009; Ugulu, 2011
			Crushed with olive oil	Toothache	Ugulu et al., 2009; Ugulu, 2011
			Treatment with olive oil	Wounds	Ugurlu & Secmen, 2008
<i>Tulipa armena</i> Boiss.	Hoşlale	Bulbs	Chew	Halitosis	Nadiroğlu et al., 2019
			Crushed and wrapped in a cloth	Wounds (for animals)	Doğan, 2014
<i>**Tulipa cinnabarina</i> K. Perss.	Karaman lalesi	Bulbs	Raw eaten	Abdominal pain	Bağcı et al., 2016

*Güner *et al.* 2012, **Endemic taxon, “-”No information

CONCLUSIONS

This study includes two *Colchicum* taxa of the Colchicaceae family and three *Fritillaria*, two *Lilium*, and two *Tulipa* taxa of the Liliaceae family. It has been determined that the taxa of these families are mostly used by local people for wounds and rheumatism. It is the *Colchicum* genus that has the greatest number of ethnomedicinal uses. The most used plant parts are bulbs, flowers, and seeds.

The human-plant relationship has been ongoing since the beginning of human history. Today, it maintains its presence in both developing and developed countries. There is a great wealth of ethnobotanical knowledge in Turkey. Today, migration from village to city due to economic reasons leads to the loss of this wealth of knowledge. To prevent this situation from getting worse, ethnobotanical studies need to be increased and this wealth of knowledge should be recorded both in writing and in visual records as soon as possible.

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