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Endemic Plants Belonging to the *Asteraceae* Family in Rize Province and Their Possible Use in the Folk Medicine

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Abstract

Turkey is one of the world's richest countries in terms of endemic plants focussing on its geographical zone. Endemic plants showing narrow distribution in our country have been maintaining their life with a certain mountain and mountain chains in certain habitats. Black Sea Region with 220 endemic plant species is in the fourth place in geographic areas and its surrounded with high mountains. Rize is considered as a place with high rates of endemism. The *Asteraceae* (*Compositae*) family is the richest family in terms of 115 endemic taxa from total of 26 families in Rize. 24.3 % (28 taxa) of these endemic taxa belongs to the *Asteracaea* family, while the part of the 10.4 % (12 taxa) belongs to the *Poaceae* family and a part of 7.0 % (8 taxa) to the *Scrophulariaceae* family.

This review broughts research conducted previously on the endemic plants from *Asteraceae* family in Rize province together, the use of these plants (such as *Centaurea armena* Boiss, *Centaurea helenioides* Boiss., *Centaurea appendicigera* C. Koch. and *Helichrysum chionophilum* Boiss. Et Bal.) and their major components will be discussed in detail.

Keywords: *Asteracea,* endemic plants, treatment

Introduction

Because of its distinctive climatic, geographic and topographic characteristics, Eastern Black Sea region and Rize display a huge plant genetic diversity. From the sea level up high mountains, Rize province contains also a wide rage of plant species. A part of this valuable plants are endemic. Medicinal and aromatic plants of these endemic taxa stated a significant role in local people for centuries. Besides their use as food, herbal tea and spice, these plants include important bioactive components and therefore they have been used especially for traditional medicine.

Turkey's richest family is *Asteraceae* (*Compositae*) in terms of plant species. Morever this family is also rich in endemic species. In the flora of Turkey, 447 from total 1.209 species belonging to this family are endemic (Acikbas, 2009).

The *Asteraceae* (*Compositae*) family, one of the plant 26 families in Rize, has 28 (24.3 %) of 115 endemic taxa while the part of the 10.4 % (12 taxa) belongs to the *Poaceae* family and a part of 7.0 % (8 taxa) to the *Scrophulariaceae* family.

Endemic plants of *Asteraceae* family in Rize

28 endemic taxa belonging to the family *Asteracea* are given below:

1 *Anthemis melanoloma* Trautv. subsp. *trapezuntica* Grierson
2 *Cicerbita boissieri* (Rouy) C. Jeffrey (Synonym: *Lactuca sonchoides*)
3 *Cirsium pseudopersonata* Boiss. Et Bal. subsp. *pseudopersonata* Boiss. Et Bal.
4 *Cirsium sommieri* Petrak
5 *Cirsium trachylepis* Boiss.
6 *Doronicum balansae* Cavill.
7 *Helichrysum chionophilum* Boiss. Et Bal
8 *Hieracium hypopityforme* Juxip
9 *Hieracium insolitum* (Zahn) Juxip
10 *Hieracium ovalifrons* (Woronow Et Zahn) Juxip

11 *Hieracium djimilense* Boiss. Et Bal.
12 *Hieracium lazicum* Boiss. Et Bal.
13 *Hieracium microtum* Boiss.
14 *Senecio inops* Boiss. Et Bal.
15 *Senecio integrifolius* (L.) Clairv. subsp. *karsianus* Matthews
16 *Senecio lazicus* Boiss. Et Bal.
17 *Senecio ovatifolius* Boiss.
18 *Tragopogon aureus* Boiss
19 *Carduus lanuginosus*
20 *Doronicum* alf. Macrolepis
21 *Tanacetum repens* (Freyn. Et Sint.)
22 *Tanacetum monticolum* (Boiss. Et Huet)
23 *Centaurea armena*
24 *Centaurea helenioides* Boiss.
25 *Centaurea appendicigera* C. Koch.
26 *Taraxacum revertens* G. Hagl.
27 *Jurinea alpigena* C. Koch
28 *Pilosella hoppeana* (Schultes) C. H. Et F. W. Schultz subsp. *isaurica*

In Rize and *Asteraceae* family, there are a few endemic taxa conducted researches on. These taxa consist species of *Centaurea armena* Boiss, *Centaurea helenioides* Boiss., *Centaurea appendicigera* C. Koch. and *Helichrysum chionophilum* Boiss. Et Bal.

Centaurea armena Boiss. from *Asteraceae* family grows in the range of 2.300-2.800 m above sea level on the mountain slopes in Rize. The other taxa in *Asteraceae* family, *Centaurea helenioides* Boiss., grows in 1.400 m above sea level and shows the spread at an altitude 2.600 m in subalpine meadows in the Ikizdere district. *Centaurea appendicigera* C. Koch, in Camlihemsin district, finds the chance to grow at an altitude 2.800 m while it can grow Ballikoy-Bayburt strait (altitude: 3.040 m) in Ikizdere district. As similar to that of *Centaurea appendicigera* C. Koch, *Helichrysum chionophilum* Boiss. Et Bal. has adapted at an altitude 2.950-3.000 m in Ballikoy (Guner et al., 1987).

Endemic plants of *Asteraceae* family that known benefits in Rize

Centaurea sp.

179 species of the genus *Centaurea* are found in Turkey, which 109 species are endemic. Many *Centaurea* species have long been used in traditional medicine to cure various ailments, such as hemorrhoids, abscess and the common cold (Baytop, 1999; Tekeli et al., 2011).

Some authors focused on the chemical components and antimicrobial activity of the essential oil of *Centaurea* species. In a study, Yayli et al. (2005) obtained the essential oils of air-dried *Centaurea armena* Boiss. by hydrodistillation and analyzed by gas chromatography-mass spectrometry (GC–MS). Twenty components were identified in the essential oils and the main component of these taxa was b-eudesmol in the ratios of 19.3% from *C. armena* Boiss. Essential oil of the plants showed moderate antibacterial activity against Gram-positive and Gram-negative bacteria. In addition, Yayli et al. (2009) investigated the antimicrobial effect of the essential oils from two *Centaurea* species (*C. helenioides* Boiss. and *C. appendicigera* C. Koch) and demonstrated a moderate antibacterial activity on Gram-positive and Gram-negative too.

Grosheimin and cynaropicrin sesquiterpenes were isolated from the flowers of *C. helenioides* Boiss. by (Yayli et al., 2006). In another researche, *C. helenioides* Boiss. was one of the prominent species with their MIC values (Buruk et al., 2006).

The essential oils of air-dried *C. appendicigera* C. Koch and *C. helenioides* Boiss. were obtained by hydrodistillation in a Clevenger-type apparatus and analyzed by GC-MS. Forty-five

and fifty-one components were identified in the essential oils of *C. appendicigera* C. Koch. and *C. helenioides* Boiss., respectively, and the main components of these taxa were found to be *β*-caryophyllene (17.5%) from *C. appendicigera* C. Koch. and caryophyllene oxide (18.2%) from *C. helenioides Boiss*. The antimicrobial activity of the isolated essential oil of the plants was demonstrated moderate antibacterial activity against Gram-positive, Gram-negative bacteria, and yeast-like fungi (Yayli et al., 2009).

Helichrysum sp.

Among the other endemic species, in Rize, is *Helichrysum chionophilum* Boiss. Et Bal.. *Helichrysum* Mill., (*Asteraceae*) species (popularly known as immortal flower), grow wild in Anatolia. They are plants widely used as tea. They are used for the treatment of kidney stone, uro-genital and stomach pain, jaundice, diarrhea and asthma. In a study, it was found that mitotic and replication indexes rates of *H. chionophilum* Boiss. Et Bal. did not show a cytotoxic effect (Eroglu et al., 2010).

It was reported that *Helichrysum* species would be useful to take into consideration as an alternative in terms of antioxidant activities for food processing industries (Tepe et al., 2005). Albayrak et al. (2010) investigated the methanolic extracts of 16 *Helichrysum* species for their in vitro antioxidant, radical scavenging and antimicrobial activities. All the extracts showed strong antioxidant and radical scavenging activity. Among the tested *Helichrysum* species; *H. kitianum* had highest extract yields while *H. chionophilum* Boiss. Et Bal. had lowest extract yield. In this study total phenolic content, antioxidant and antimicrobial activities (IC50 value) of methanolic extracts of *H. chionophilum* Boiss. Et Bal. collected from Turkey were 106.97 mg GAE/g extract, 140.43 mg AAE/g extract and 53.10 lg/ml respectively.

Hieracium sp.

Hieracium L. is a large genus of perennial herbs well known for its taxanomic complexity. *Hieracium* species are important components of natural ecosystem. They never pose a problem as weeds, but often are considered desirable and beneficial, not only for the environment, but also for some of their medical properties. Several species of *Hieracium* at the blooming stage, including the root, are used for infusions and tinctures. Also the plants have antibiotic properties and are used against dropsy, nephritis, gout, dyspna, hemoptysis, cardiac oedema, diarrhoea and intermittent fevers. In addition, *Hieracium* species are an important source of nectar for honeybees and can be eaten by livestock providing a complementary source of foods. Several reports on the chemical composition of *Hieracium* species have appeared in the literature but, there are a few records about the endemic species of *the genus Hieracium*. One of these records is present in a study which conducted by Durmu et al. (2002) to compare the contents of phenolic substances and soluble sugar in the leaves of four *Hieracium* species (*H. hypopityforme* Juxip, *H. karogoellense*, *H. microtum* and *H. gentiliforme*). The results showed that leaves of the *Hieracium* species were very rich in phenolic substances and sugars.

In additon to these species, Kirbag and Zengin, (2006) reported that the plant infusion (5%) of *Taraxacum revertens* has been used as laxative, diuretic and kolagog in Elazıg in Turkey. There are very limited studies related endemic plants of *Asteraceae* family in Rize. It is need to expand the researches on the endemic plants for more data.

Conclusions

This review focused on the endemic plants belonging to the *Asteraceae* family in rize province and their possible use in the folk medicine by considering the studies conducted before.

From the sea level to high mountains, Rize province has also wide rage of plant species. A part of this valuable plants is endemic. Medicinal and aromatic plants of endemic taxa have been significant role in local people for centuries. These plants include important bioactive

components and therefore have been used especially for traditional medicine. Among these valuble taxa from *Asteraceae* family, there are species such as *Centaurea armena* Boiss, *Centaurea helenioides* Boiss., *Centaurea appendicigera* C. Koch. and *Helichrysum chionophilum* Boiss. Et Bal. The studies on endemic plants remained limited in our country. In addition to make efforts to protect these valuable genetic resources, it should be also focused on opportunities to benefit from these plants.

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