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Ethnobotanical Features of *Ziziphora* L. (Lamiaceae) Taxa in Turkey

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Abstract

The purpose of this study was to reveal the ethnobotanical features of taxa belonging to the genus *Ziziphora* represented with 5 species (9 taxa) in Turkish Flora. The study was carried out in the localities in the Marmara, Aegean, Mediterranean, Black Sea, Central Anatolia, Southern and Eastern Anatolian regions where 4 species (5 taxa) of *Ziziphora* genus spread. Local names and ethnobotanical uses of taxa were determined by making face-to-face interviews with the local people in these regions. In addition, based on the data in the literature are presented in the ethnobotanical study made in Turkey. In the study, it has been observed that *Z. persica* has very rare use among the local people as only spice. Also endemic *Z. taurica* subsp. *cleonioides* has been demonstrated that is used only in certain regions (Aegean). The use ethnobotanical aspects of *Z. capitata, Z. clinopodioides, Z. tenuior* and *Z. taurica* subsp. *taurica* in has been found in different geographical regions in Turkey. As a result; when *Ziziphora* taxa are evaluated ethnobotanically; It has been determined that it is used among the people as food (spice), beverage (pleasure tea) and medicinal plants.

Key words: Ethnobotany, Lamiaceae, medicinal plant, spice, *Ziziphora* L.

1. Introduction

Lamiaceae is third largest family of Turkey after the family Asteraceae and Fabaceae. The Lamiaceae family is represented with 45 genera in the Turkish flora. As the result of the revision work made in recent years, *Perilla* L. and *Lophanthus* Adans. genera were added in Flora of Turkey and the number of genus was to be 47 (Dönmez, 2002; Dirmenci et al., 2010; Fırat, 2017; Selvi and Satıl, 2020).

Ziziphora L., which is in the Lamiaceae family and contains some species with medicinal properties, is an important genus of this family. *Ziziphora* spreads throughout Mediterranean countries, East and West Asia, Central Europe and North Africa in the World and is represented by 19 species and 31 taxa. It is represented five species (nine taxa) in Turkey. In these taxa, only *Z. taurica* subsp. M. Bieb. *cleonioides* (Boiss.) P.H. Davis is endemic for Turkey and endemism ration is about 11% (Edmondson, 1982; Selvi et al. 2015). In addition, *Z. clinopodioides* Lam. is perennial and all other taxa are annual. The glandular hairs (capitate and peltate types) found in *Ziziphora* taxa accumulate and secrete abundant essential oils. Therefore, it emits a sharp and aromatic smell around it. There are many chemical studies on the essential oils of *Ziziphora* taxa. In these studies, "pulegone" appears to be the most abundant compound in the composition of essential oils (Kaya et al., 2013). In addition, limonene, 1.8 cineol, piperitenone, piperitone, menthol and thymol are other major components detected in essential oils *Ziziphora* taxa have been reported in many scientific studies that they have antioxidant, antiseptic and antibacterial effects due to the content of their essential oils (Tumen, 1980; Sezik and Tümen 1990; Baser et al. 1991; Sezik et al. 1991; Nezhadali et al. 2010). Due to these features, some taxa of the *Ziziphora* genus are used for medicinal purposes among the local people. In this study, ethnobotanical properties of taxa belonging to the genus *Ziziphora* which spread in different regions of Turkey, have been determined local names and using based on both field studies and literature.

2. Material and Methods

The study was carried out in the localities in the Marmara, Aegean, Black Sea, Mediterranean, Central Anatolia, Southern and Eastern Anatolian Regions where 6 taxa belonging to the genus *Ziziphora* spread. In table 1, the localities of the *Ziziphora* L. taxa collected from the field and in figure 1 are given general distribution map of *Ziziphora* L. taxa. In addition, field photos of examined taxa are presented in Figure 2.

Table 1. Collection areas and collector's number of specimen gathered for ethnobotanical studies.

Taxa	Collection region, localities and collector's number
Z. clinopodioides Lam.	Black Sea Region; A4 Kastamonu: Ilgaz Mount, behind the Television tower, 2000 m, 12.07.2016, S. Selvi (SV 1658). Eastern Anatolian Region; A8 Erzurum: Tortum-Oltu road, 25. km, 1455 m, 22.06.2018, S. Selvi (SV 1862).
Z. capitata L.	Aegean Region; B2 Kütahya; Domaniç, 760 m, 09.07.2016, S.Selvi (SV 1678).
Z. tenuior L.	Central Anatolia Region; C4 Konya: Gülnar road, 10. km, 970 m, 12.06. 2017, S. Selvi (SV 1720). Southern Anatolian Region; C7 Şanlıurfa: Ceylanpınar, 570 m, 22.06.2017, S. Selvi (SV 1742).
Z. taurica M. Bieb. subsp. *taurica*	Marmara Region; B1 Balıkesir: Kazdağı Mount, Edremit, Çamlıbel village, 27.06. 2018, S. Selvi (SV 1892).
Z. taurica M. Bieb. subsp. *cleonioides* (Boiss.) P.H. Davis	Aegean Region; B2 Manisa: between Sarıgöl and Alaşehir, 840 m, 12.06.2016, S. Selvi (SV 1639).

*Endemic taxon

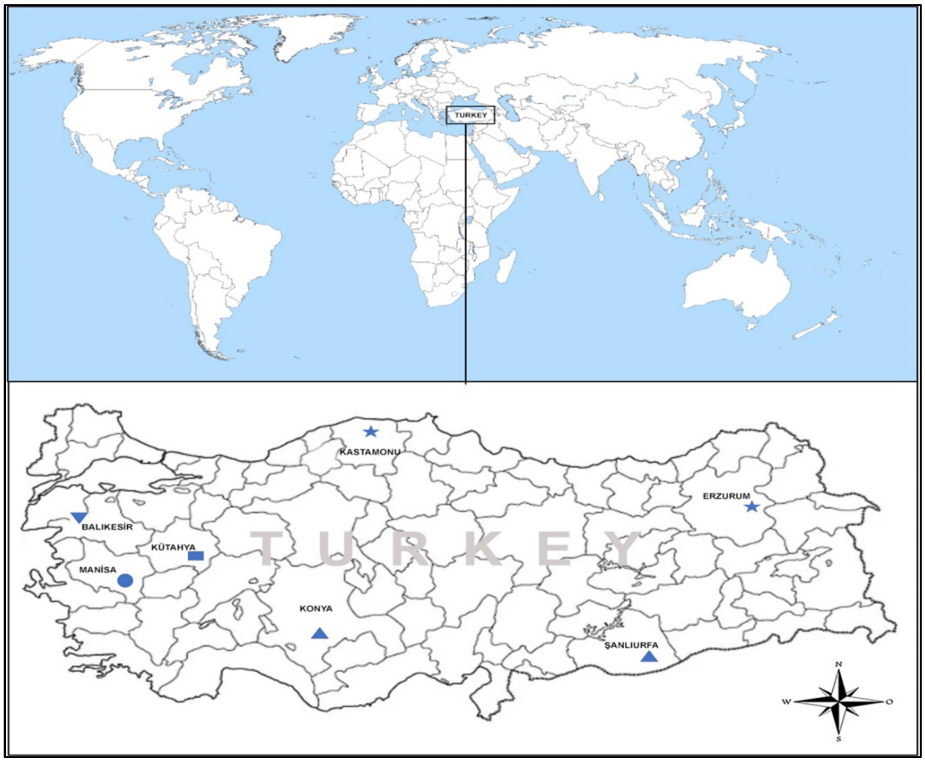

Figure 1. Provinces where ethnobotanical studies were conducted and examples collected.
Z. clinopodioides ★, *Z. capitata* ■, *Z. tenuior* ▲, *Z. taurica subsp. taurica* ▼, *Z. taurica* subsp. *cleonioides* ●.

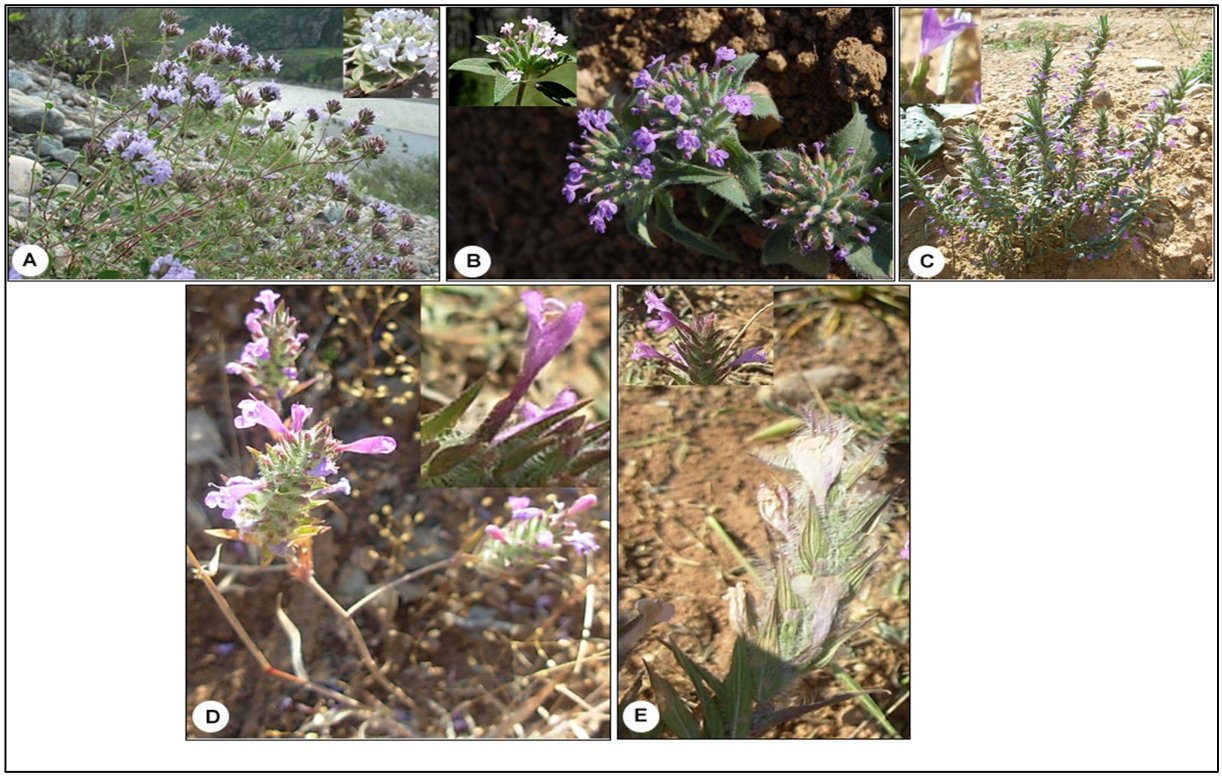

Figure 2. Field photos of *Ziziphora* taxa to be ethnobotanical uses A). *Z. clinopodioides*, B). *Z. capitata*, C). *Z. tenuior*, D). *Z. taurica* subsp. *taurica*, E). *Z. taurica* subsp. *cleonioides*.

Floristic studies were carried out different regions of Turkey between 20016-2018 (Table 1). The samples collected during the study were pressed and dried in accordance with standard herbarium techniques and turned into herbarium material and recorded at the Altınoluk Vocational School Botanical Laboratory. For the identification of the taxa have been used various floristic works (Tutin et al., 1976; Davis, 1982; Strid and Tan, 1991). Turkish names of plants are given according to Güner et al. (2012). To determine the ethnobotanical uses of taxa determined during the field studies; plants were shown to local people and their ethnobotanical uses were revealed. Ethnobotanical studies were carried out in 7 provinces (Balıkesir, Erzurum, Isparta, Kastamonu, Konya, Manisa and Şanlıurfa). A total of 40 informants, ages 40 and over, mostly female, were reached. In addition, herbal markets and bazaars were also visited. During the study, face-to-face interviews made with the informants were determined local names and usage of taxa. In literature research, ethnobotanical studies (article and thesis) made in Turkey have examined. In these studies, the ethnobotanical uses and local names of *Ziziphora* taxa were comprehensively recorded (Table 2).

3. Results and Discussion

Ziziphora L. taxa spreading different regions of Turkey is referred to by many different vernacular names (Table 1). The aerial parts of these plants are generally dried and drunk by making tea in the form of infusions (25%), and there is a common use in folk medicine. In addition, leaves are used as a spice in soups and meats (Table 1).

Ethnobotanical studies were carried out in the provinces of Erzurum, Kütahya, Isparta, Konya, Balıkesir and Manisa where are located in different regions of Turkey, It is noted that the aerial parts of *Z. clinopodioides* in Kastamonu and Erzurum are used by local people for cold and stomach symptoms. The drug obtained by drying the leaves of the plant is consumed mostly in meat dishes as a spice. Also, flowering parts are used as a pleasure tea. In Kütahya, only medicinal use of *Z. capitata* was found. It has been reported to be used by local people for colds and flu infections. *Z. tenuior* were found to be using as spices and medicinal herbal in Konya and Şanlıurfa. It is used as a spice due to its strong aroma. It is also consumed as herbal tea in symptoms such as cold and cough. *Z. taurica* subsp *taurica* is consumed as herbal tea in Balıkesir province. In addition, it is stated that this tea is good for stomachic and colds. *Z. taurica* subsp. *cleonioides* is consumed as a pleasure tea in Manisa due to its strong aroma. It is also used for colds in winter and spring seasons.

In ethnobotanical studies were interviewed with 40 informants. Bazaars and herbal markets were made excursions. As a result of this study, food, beverage and medicinal use of *Ziziphora* taxa were determined. The spices obtained by drying the leaves as food are used in the meals to give taste and aroma. The use of *Z. clinopoodioides*, *Z. tenuior* and *Z. capitata* as spices are common (Figure 3). Except for *Z. capitata* and *Z. persica,* other taxa are also consumed as pleasure tea. In literature studies, these taxa have been found to have similar uses (Table 2). Infusions prepared from aerial parts of *Ziziphora* taxa are drunk as tea and used in the treatment of various diseases. Herbal tea is mostly used to treat in symptoms and diseases such as stomachic, cold and flu, cough, appetizer, respiratory tract, wound and burn (Figure 4). However, external uses of taxa have not been found.

In literature studies, it has been revealed that taxa are used in the treatment of 20 different diseases and symptoms. These diseases and symptoms are abscess, aphrodisiac, appetizer, carminative, cholesterol, circulatory system disorders, cold and flu, constipation, cough, diabetes, diarrhea, eye diseases, headache, hemorrhoid, hypertension, respiratory tract diseases, stomachic, wound and burn (Table 2). Of these, hemorrhoids, wound and burn are used externally. The aerial parts boiled by the decoction method are either applied to the skin or pressed to the injured area by turning it into a mash (Table 2).

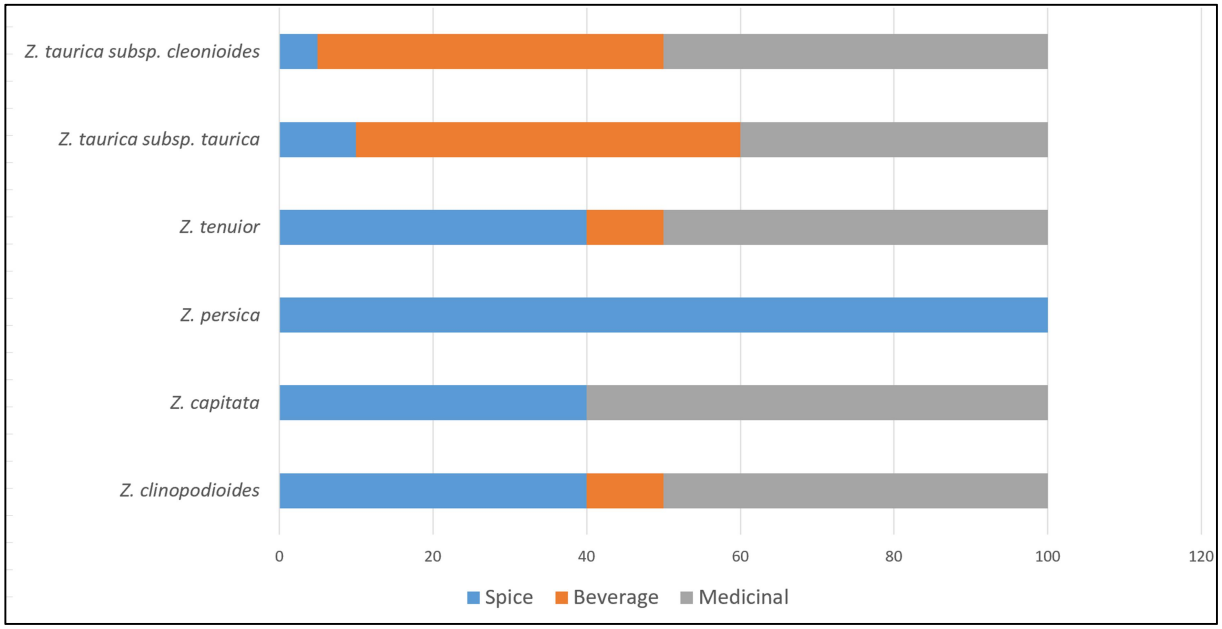

Figure 3. Purposes of use of *Ziziphora* taxa according to ethnobotanical studies.

Ethnobotanical features based on the literature of *Ziziphora* taxa in Turkey is given Table 2. When Table 2 is examined, it is seen that *Ziziphora* taxa are given many vernacular names. However, the most used vernacular names are; Anıh, Catır (*Z. clinopodioides*), Anuk, Dağ reyhanı (*Z. capitata*), Anık, nane ruhu (*Z. tenuior*), Çöl reyhanı, nane ruhu (*Z. taurica* subsp. *taurica*) and firüskül, Dağ reyhanı (*Z. taurica* subsp. *cleonioides*). *Z. taurica* subsp. *taurica* is used for gastrointestinal disorders among the people. This plant is known by the local people living in the Köroğlu Mountains as "Nane ruhu". *Z. clinopodioides* is spreading in Central, Eastern and Southern Anatolia in our country. *Z. clinopodioides*, known as "Kır nanesi" or "Nane ruhu", is used as an appetizer, carminative and antiseptic. The use of *Z. persica* in our country is very rare. Only two studies have identified its use as a spice. However, in these studies, vernacular names were not mentioned (Ozturk and Ercıslı 2006; Kılıc and Bagcı, 2013). However, in Iran, the leaves of this plant are used as spices to give flavor and aroma of food (Nezhadali et al., 2010). In another study, it was revealed that it has a medicinal use as flatulence and dyspepsia (Naghibi et al., 2005).

Z. capitata is consumed as herbal tea in Erzurum and its surroundings (Aksakal and Kaya, 2008). *Z. tenuior* is a very common species in Anatolia. This taxon is used as a carminative by local people (Sezik and Tumen, 1991).

Of these taxa, especially infusion of *Z. taurica* subsp. *cleonioides* and *Z. taurica* subsp. *taurica* are used quite frequently to treat gastrointestinal symptoms such as ulcers and abdominal pain. *Z. taurica* subsp. *taurica* is used externally due to its wound-healing properties (Sezik and Tümen 1984; Baytop, 1999).

Z. taurica subsp. *cleonioides* is used for appetizing, stimulating, antiseptic, and healing wounds. This taxon is a popular plant used especially by local people living around Denizli-Bozdağ. In Bozdağ region, this plant is known by the name of "Firüskül", while it is known as the "Dağ reyhanı" in the Western Anatolia Region.

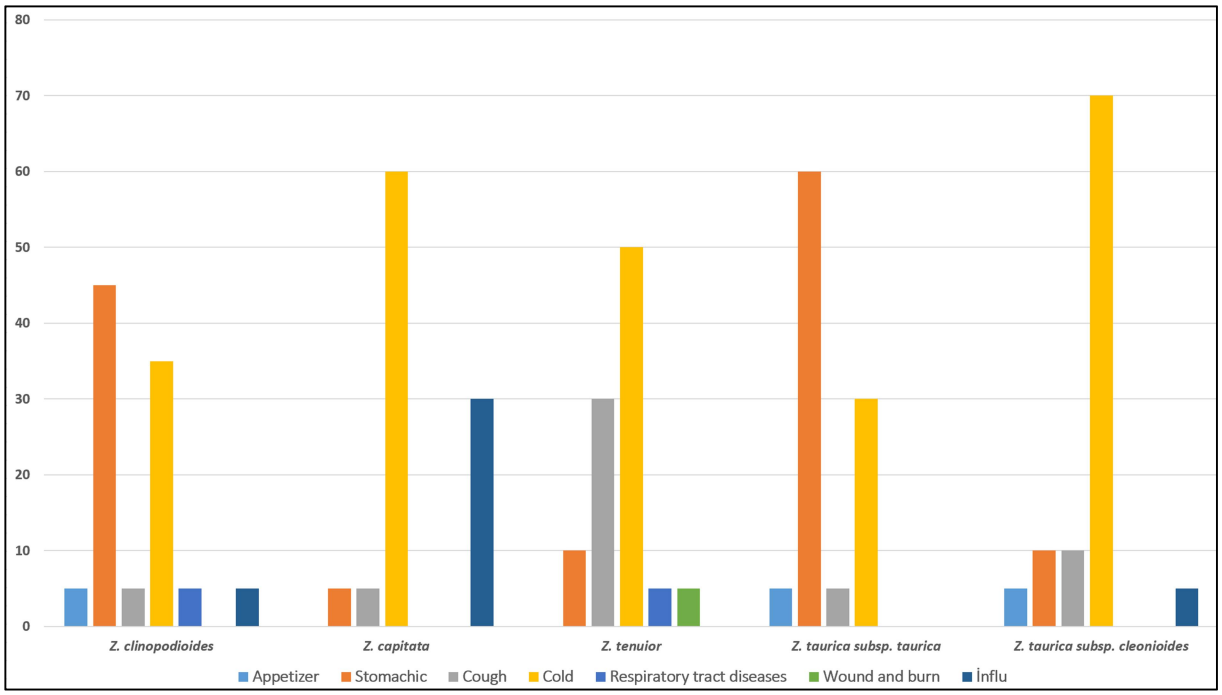

Figure 4. Diseases and symptoms using *Ziziphora* taxa according to ethnobotanical studies.

4. Conclusion

The family of Lamiaceae contains rich species in respect to medicinal and aromatic plants. The genus *Ziziphora* is one of them. Due to the high rate of pulegon in the essential oil composition of this genus, it has its own aroma and taste, therefore it is used as healing as well as consumed as pleasure tea and spice. Especially *Z. clinopodioides* and *Z. tenuior* species should be used as spices. Again, *Z. taurica* subsp. *taurica* and *Z. taurica* subsp. *cleonioides* taxa should be used as beverages. In addition, in case of stomach ailments and colds, it should be preferred from its aroma and comfort. As a result, the *Ziziphora* taxa; It is one of the important potential plants that can be utilized in the food (as spice and herbal tea), pharmaceutical, cosmetic (due to essential oils) and beverage industry.

Table 2. Ethnobotanical features based on the literature of *Ziziphora* taxa in Turkey.

Taxa	Turkish name	Vernacular names	Region /Province	Parts of use	Use			References
					Food	Beverage	Medicinal	
Z. clinopodioides	Dağ reyhanı	Anığ, Anıh, Catır, Catri, Dağ çayı, Kekik, Kır nanesi, Merze, Nane ruhu, Reyhan,	Eastern Anatolia (Erzincan, Hakkari, Iğdır, Malatya Tunceli, Van); South Eastern Anatolia (Mersin)	Whole plants, leaves	Spice (leaves)	Herbal tea (whole plants)	Appetizer, carminative, stomachic, diabetes, cold, diarrhea, eye diseases, aphrodisiac, respiratory tract diseases. Aerial parts of plant is used internally among the local people. Infusion method (%1 or 2) is applied. External use of genus hasn't been observed.	Öztürk and Özçelik (1991); Yeşil (2007); Altundağ (2009); Metin (2009); Tekin (2011); Uce and Tunçtürk (2014); Doğan and Tuzlacı (2015); Sancaktaroğlu (2017); Korkmaz (2018)
Z. capitata	Anuk	Anuk, Benefsek, Çay kekiği, Dağ nanesi, Dağ reyhanı, Kekik, Nane, Kır nanesi, Saplıcan otu	Eastern Anatolia (Erzurum, Tunceli); Mediterranean (Kahramanmaraş, South Eastern Anatolia (Adıyaman, Şanlıurfa, Mardin); Osmaniye); Marmara Region (Bilecik, İstanbul	Whole plants, leaves	Spice (leaves)	Herbal tea (whole plants)	Appetizer, stomachic, cold, diarrhea, hemorrhoid, cough, respiratory tract diseases. Except hemorrhoid, aerial parts of plant is used internally among the local people. Infusion method (%1 or 2) is applied. For external use, the aerial parts of plant are boiled, the plant is mashed and rubbed into the injured surface (hemorrhoid).	Özdemir (2005); Mart (2006); Aksakal and Kaya (2008); Koyuncu et al. (2010); Demirci and Özhatay (2012); Doğan and Tuzlacı (2015); Furkan (2016); Abak (2018)
Z. persica	Karareyhan	-	-	-	Spice	-	-	Ozturk and Ercisli (2006)
Z. tenuior	Fareotu	Anık, çay kekiği, fare otu, hırpkesen, karın ağrısı otu, mentollü adaçayı, morkız çayı, nane kekiği, nane ruhu, narpuz,	Marmara Region (Balıkesir, Bilecik); Aegean Region (Denizli, Manisa, Muğla); Central Anatolia Region (Nevşehir); Eastern Anatolia (Malatya, Tunceli); South Eastern Anatolia Region (Şanlıurfa)	Whole plants, leaves	Spice (leaves)	Herbal tea (whole plants)	Stomachic, cold and flu, cough, respiratory tract diseases, constipation, abscess, eye diseases, wound and burn. Except abscess, wound and burn, aerial parts of plant is used internally among the local people. Infusion method (%1 or 2) is applied. For external use, the aerial parts of plant are boiled (decoction), and boiled water is smeared on skin surface (wound and burn, abscess).	Baytop (1999); Ertuğ (2002); Ertuğ et al. (2004); Koyuncu et al. (2010); Akan et al. (2013); Şenkardeş (2014); Doğan and Tuzlacı (2015); Abak (2018)
Z. taurica subsp. *taurica*	Çöl reyhanı	Çay kekiği, çöl reyhanı, merze, sivri kekik, nane kekik, naneli kekik, mor kekik, nane, kokar nane, nane ruhu	Marmara Region (Balıkesir, Bilecik); Aegean Region (Aydın, Denizli, Manisa, Muğla); Mediterranean Region (Isparta); Eastern Anatolia (Iğdır), South Eastern Anatolia Region (Şanlıurfa)	Whole plants, leaves	Spice (leaves)	Herbal tea (whole plants)	Appetizer, carminative, hypertension, circulatory system disorders cholesterol, stomachic, cold, diarrhea, wounds and burns. Aerial parts of plant is used internally among the local people. Infusion method (%1 or 2) is applied. For external use, the aerial parts of plant are boiled (decoction), and boiled water is smeared on skin surface (wounds and burns).	Tümen (1980); Ertuğ (2002); Ertuğ et al. (2004); Altundağ (2009); Koyuncu et al. (2010); Polat (2010); Sancaktaroğlu (2017); Abak (2018)
Z. taurica subsp. *cleonioides*	Nane ruhu	Kır kekiği, mor kekik, nane kekiği, Firüskül, Dağ reyhanı	Aegean Region (Denizli, Manisa)	Whole plants, leaves	-	Herbal tea (whole plants)	Headache, stomachic, cold and flu. Aerial parts of plant is used internally among the local people. Infusion method (%1 or 2) is applied. External use of genus hasn't been observed.	Ertuğ et al. (2004)

Conflicts of Interests

Authors declare that there is no conflict of interests

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