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Natural Sage Taxa (*Sideritis* spp.) of Davraz Mountain in Isparta Province of Turkey

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ABSTRACT : *According to the floristic studies conducted for the flora of Isparta province located at the intersection of the Mediterranean and Iran-Turan Flora regions in terms of plant geography, it is known that a total of 2280 different plant taxa are distributed, 190 of them are medicinal, aromatic and perfume and 160 of them have high spice value. The Lamiaceae family, which is usually a fragrant or perennial herb, is rarely cosmopolitan with shrubs or trees, contains 546 species, 45 genus, and a total of 731 taxa. The genus Sideritis that is a member of the Lamiaceae family, has a wide distribution in subtropical and middle regions. Leaves are pilose or tomentos hairy and full-edged or toothed. Bracteoles are leaf-shaped, calyx tube or bell-shaped, 5-10 veins, 5 teeth, corolla usually yellow, sometimes white or red, about 20-90 cm high or perennial grasses or small bushes. Turkey is one of the two main gene center for Sideritis genus and endemism rate is quite high (79.5%). In this study, the leaves and flowers of 4 natural Sideritis L. taxa, which are distributed in Davraz Mountain, were collected from three different sample areas between 2017-2018 and the coordinates, elevations and slopes of taxa were recorded. This study constitutes the basis for the economic value of plants consumed as natural tea in the region and to provide conscious consumption.*

KEYWORDS: *Sideritis spp., natural tea plant, Davraz Mountain, Isparta*

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I. INTRODUCTION

Turkey's flora has about 11.466 taxa of flowering plants and about 3649 of them are endemic of this plant taxa [1]. Isparta province is rich in floristry due to its location at the intersection of Mediterranean and Iran-Turan Flora regions in terms of plant geography. 40 new taxa have been defined from Isparta region where more than 600 endemic taxa grow. In floristic studies conducted for Isparta flora, 2280 different plant taxa are distributed, 190 of them are medicinal, aromatic and perfume [2]. Turkey is a gene centre for the Lamiaceae family comprising a plurality of aromatic plants. Generally, fragrant or perennial grasses, rarely the shrubs or trees are cosmopolitan family of 546 species, 45 genera and 731 taxa in total. The proportion of endemic plants in the family is 44.2% [3].

Due to the combination of flowers in the form of lower lip and upper lip, The name of the family called Labiatae by De Jussieu was renamed Lamiaceae by Lindley in 1836 [4]. The members of the family Lamiaceae, which is one of the largest families in the world, are distributed in different habitats and elevations from Africa to America, Hawaii and Australia, Himalayas to Southeast Asia [5]. Lamiaceae family members are important in the pharmacology and perfumery industry due to their volatile and aromatic oil content. Etheric oil is obtained from the species, used as a spice and grown as an ornamental plant.

Sideritis L. genus that is member of Lamiaceae family, has a wide distribution in subtropical and middle regions in the world. Leaves are pilos or tomentos hairy, full-fledged, bracteole in the form of leaves, calyx tube or bell-shaped, 5-10-core, 5-threaded, corolla usually yellow, sometimes white or red, about 20-90 cm high or perennial herbs or small bushes [3,6]. *Sideritis* L. has more than 150 taxa, mostly in the Mediterranean Sea. This species is represented by 46 species and 55 taxa, and 42 of these taxa are endemic [1,3]. Turkey is one of the two main gene center for *Sideritis* genus and endemism rate is quite high (79.5%) [7].

Davraz Mountain, which is selected as research area of this study, located within the borders of Isparta and the Lakes region of the Mediterranean Region, is a natural area that contains rich populations of botanical rich and rare, endangered and endemic plant species. This area is located in C3 square. The highest point of the research area is 2635 m [8,9]. In this study, general characteristics and usage areas of *Sideritis condensata* (Boiss. & Heldr.) subsp. *condensata*, *Sideritis hispida* P. H. Davis, *Sideritis libanotica* Labill. subsp. *linearis* and *Sideritis perfoliata* L. taxa were investigated.

II. MATERIALS AND METHODS

Sideritis L. specimens that collected from Davraz Mountain (C3 square) between the years 2017-2018 constitute the research material (Figure 1). In order to determine the areas where natural *Sideritis* taxa, which are distributed in Davraz Mountain, are distributed, land program has been prepared and studies have been carried out according to that program. At the end of the excursions in the research areas, the coordinates of the *Sideritis* species were determined and then the locations of the sample areas were determined.

In the selection of the sample areas, it was taken into consideration that the species is the dominant species in the field, the individuals belonging to the species have reached a certain maturity, and representing different habitats and also as far away from human impact as possible. Specimens of *Sideritis* were collected in flowering period of plant from 12 sample areas that were determined as 20x20 m dimensions in Davraz Mountain. While collecting samples, tools such as land bag, loaf, steel shovel, compass, topographic and co-curved map, stand map, pruning shears, land notepad, altimeter, press, blotter, camera, steel meter have been used.

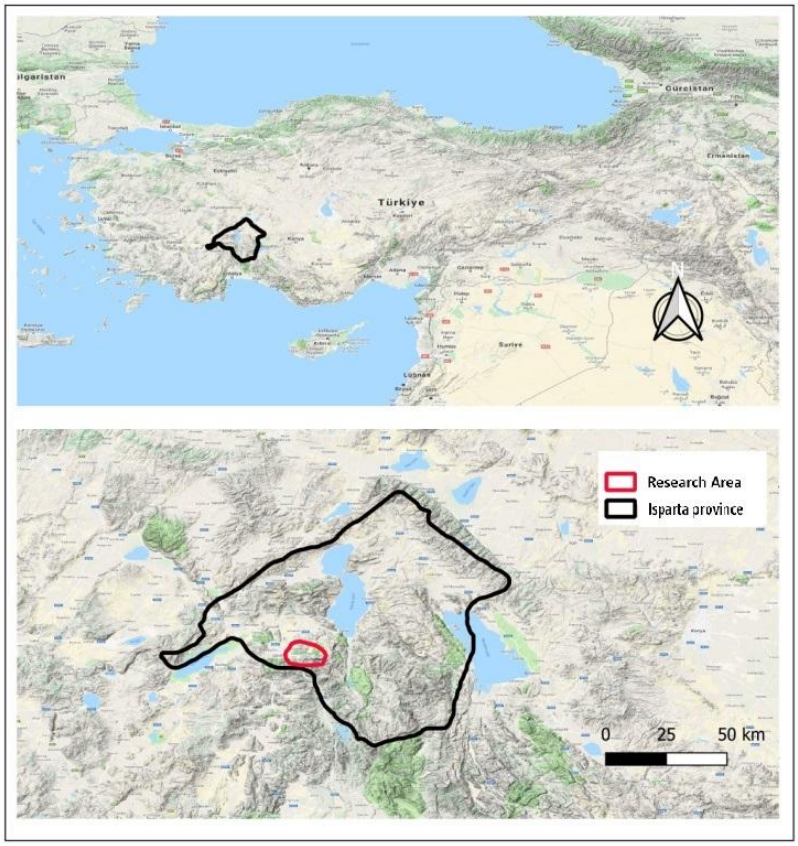

Figure 1. Geographic location of research area

III. RESULTS AND DISCUSSIONS

In this study that is conducted in Davraz Mountain of Isparta province, 4 taxa belonging to the genus *Sideritis* were determined. These are *Sideritis condensata* (Boiss. & Heldr.) subsp. *condensata*, Sideritis hispida P. H. Davis, *Sideritis libanotica* Labill. subsp. *linearis* and *Sideritis perfoliata* L. Information on sampling plots are given in Table 1.

Table 1. The geographic location of collected *Sideritis* L. taxa

Taxa	Sampling Plots	Latitude	Longitude	Altitude (m)	Slope (%)
S. condensata	1.Plot	37°47'15"	30°37'13"	1015	25
	2.Plot	37°44'37"	30°38'58"	1068	15
	3.Plot	37°44'47"	30°35'34"	1113	40
S. hispida	1.Plot	37°48'32"	30°54'35"	1128	30
	2.Plot	37°47'14"	30°38'48"	1033	25
	3.Plot	37°46'09"	30°37'13"	989	45
S. libanotica	1.Plot	37°43'54"	30°38'15"	930	15
	2.Plot	37°47'39"	30°40'47"	1354	20
	3.Plot	37°45'24"	30°39'27"	1152	25
S. perfoliata	1.Plot	37°47'16"	30°37'24"	1010	35
	2.Plot	37°47'39"	30°40'47"	1365	30
	3.Plot	37°46'12"	30°38'38"	1089	45

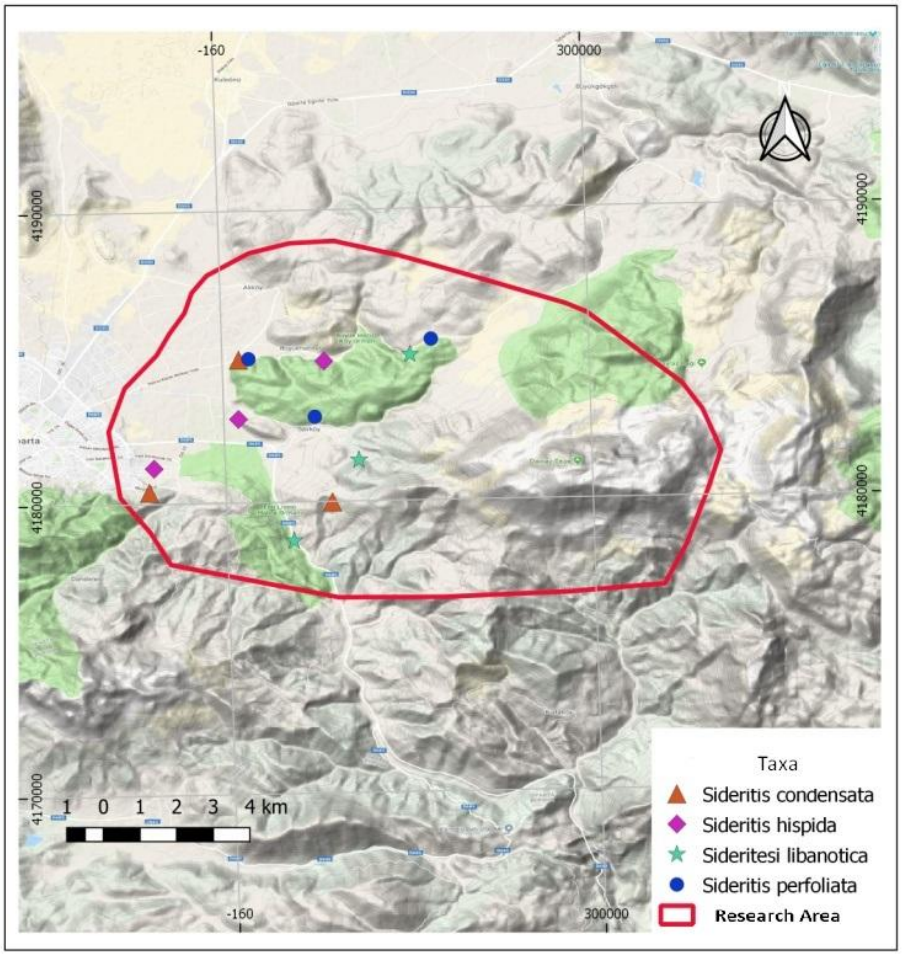

Figure 2. Sampling sites of *Sideritis* taxa

Sideritis condensata (Boiss. & Heldr.) subsp. *condensata* (Figure 3) is endemic, perennial herbaceous plant. It is about 15-100 cm, upright body, simple or branched, usually dense white tomentose hairy at the base, the upper part gland without or rarely glandular hairy. Leaves are lanseolate, linear-oblong, oblong-lanseolate, usually tomentose hairy, glandless, chrenate, serrate, serrulate, rounded tip, acute, mucronate. Vertisillates 3-13-(15), 1-2 cm intermittent, 4-6 flowers. Bracheoles are ovate-orbicular, orbicular-cordate, pubescent and rarely glandular. Calyx 8-12 mm, densely pubescent and short glandular pubescent, teeth 3-5 mm, corolla yellow, 10-14 mm, brown striated, lips 2-4 mm, hazelnuts 1-3 mm, brown, rounded, triangular-ovoid. Flowering period is between June and August [10]. The leaves and flowers were collected from three sampling sites which were

located in Büyükhacılar (1015 m), Çobanisa (1068 m), and Darıderesi (1113 m) provinces. The above-ground parts as flowers, leaves and stems are consumed as tea for 5-10 minutes in boiled water. It has been observed to be used as pain relief and appetite against stomach pain among the public.

Figure 3. Sideritis condensata (Boiss. & Heldr.) subsp. condensata

Sideritis hispida P. H. Davis is 35-90 cm, steep body, simple or rarely branched, intense short gland hairy, the upper part of the almost hairless and dense pubic hairy, endemic, perennial herbaceous plant (Figure 4). Both sides of the leaves are sparse long veils and short glands along the veins. Leaves are sessile, linear-lanseolate, edge is full or light serrate. The flowers are simple or branched, verticillates 2-8 (-10), each vertisillate 6 flowers. Braces are ciliate, hairless or sparsely pubescent, with full edges. Calyx is 10-12 mm; teeth lanseolat, 3-4x1,2-1,6 cm, corolla yellow, 11-14 mm, the inner side of the upper lip is sparsely short-veined, and the inner part is brown, the inner side of the lower lip is densely flattened, hairy, hazelnut ovate, 3- 4 mm and light brown. Flowering period is between July and September [10]. Samples of *S. hispida* were collected from Akdoğan (1128 m), Büyükhacılar (1033 m) and Yazısöğüt (989 m) provinces. The above-ground parts like flowers, leaves and stalks are consumed as brewed tea in boiled hot water (Figure 4). It has been found to be used against pain relief, intestinal regulator and cough among people.

Figure 4. *Sideritis hispida* P. H. Davis

Sideritis libanotica Labill. subsp. *linearis* is 30-120 cm, perpendicular, dense white-tomentose hairy at the base, without gland, the upper part is sparsely pubescent, simple or branched perennial plant (Figure 5). Leaves are oblanseolate, lanseolate, elliptical, linear oblong, dense pubescent, glandless, krenate-serrate or flat, no leaf petal or up to 2 cm. Vertisillasters are 3 to 6, not squeezed, 6 flowers. Droplets are ovate-cordate, rarely lanseolate, short glandular hair. Calyx 6-10 mm, densely pubescent, teeth 2-4 mm. Corolla is yellow or purple violet, 8-14 mm, inside and outside with hairy, inside brown stripes or not, nuts 1-3 mm, brown, obovate-oblanseolate, tip rounded, pubescent or hairless, body leaves 1-6x0,03-1 cm. Flowering period is between May and September [10]. Leaves and flowers of *S. libanotica* Labill. subsp. *linearis*, were collected from Direkli (930 m), Büyükhacılar (1354 m) and Sav (1152 m) provinces. The above-ground parts like flowers, leaves and stalks are consumed as tea by infusing for 5-10 minutes in boiled hot water. It has been found to be used as pain killer, stomach pain, intestinal regulator, carminative, diuretic, cough suppressant and appetite among people.

Figure 5. *Sideritis libanotica* Labill. subsp. *linearis*

Sideritis perfoliata L. is 20-90 cm, perpendicular, dense, long, upright, white and intense secretion hairy, simple or branched, perennial herbaceous, woody plants at the base (Figure 6). Both sides of the leaves are white engraved cover pubescent and dense secretion pubescent or not, all petals are sessile, leaves are laminated oblong, lanseolate, ovate, krenat-dentate, thin denticular-serrulata, sometimes full, round, round, cordate. Flower is simple or branched, verticillates 6-17, each verticillate (3-) 6 flowers. Crops are sparse, white covered and thin gland with hair, inner side is sparse, white, flat cover and thin gland hairy, lower brats are ovate, cordate. Calyx are 10-14 (-15) mm, teeth linear, acute-mucronate, teeth edges ciliate, corolla bright yellow, 13-16 (-17) mm, 2 brown lines in the inner part of the upper lip. Flowering period is between May and September [10]. Leaves and flowers of *S. perfoliata* were collected from Yazısöğüt (1010 m), Büyükhacılar (1365 m) and Sav (1089 m) provinces. The above-ground parts, including flowers, leaves and stems, are consumed as brewed tea in boiled hot water. It has been found to be used as pain killer, stomach pain, intestinal regulator, cough suppressant and carminative among people.

Figure 6. *Sideritis perfoliata* L.

In other studies, it was reported that *Sideritis* samples are used extensively as herbal tea among the public against various diseases such as antiflamator, antispasmodic, carminative, analgesic, sedative, cough suppressant, antipyretic, anticonvulsant, cold coughs and digestive complaints [11-33].

IV. CONCLUSİON

Leaves and flowers of *Sideritis condensata* (Boiss. & Heldr.) subsp. *condensata*, *S. hispida* P. H. Davis, *S. libanotica* Labill. subsp. *linearis* and *S. perfoliata* were collected Davraz mountain. *Sideritis* L. taxa, which is known as mountain tea among the people, is used as tea in the boiled hot water for 5-10 minutes. It has been found to be used as pain killer, stomach pain, cough suppressant, degasser, intestinal regulator, diuretic and appetizer.

Studies should be increased to show the availability of plants as raw materials in pharmaceutical and cosmetic products or in order to add natural preservatives and flavors in food products. In addition, detailed studies on the antibacterial, antiseptic and antimicrobial and detergent properties of *Sideritis* species are recommended.

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