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# The role of transhumance in the traditional food uses among three ethnic groups in Greece

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Transhumance shaped a particular way of life for the herders. In Greece, there were three ethnic groups, mainly who moved their animals for grazing. During the summer period, they moved to mountain rangelands, while during the winter period, to the lowlands. This process influenced various aspects of their lifestyle, particularly their diet, as they adapted to the natural environment in which they lived. Through this research, a first attempt is made to record the ethnobotanical knowledge regarding the plants they used in their diet and to capture any differences between these three ethnic groups. The results showed that they used 41 taxa for their diet, with most of them belonging to the Rosaceae family. The most mentioned plant part was the "fruit" with 23 citations, and the most mentioned taxa were *Cornus mas* with four different uses: juice, jam, beverage, and raw. Furthermore, the differences in plant species consumed among the three ethnic groups were minimal. Nowadays, the dietary habits of the three ethnic groups, *Koupatsaraioi*, *Sarakatsanaioi*, and *Vlachs*, haven't changed.

**Keywords**: Cultural heritage, Dietary habits, Edible plants, Ethnobotany, Pastoralism

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In recent decades, several ethnobotanical studies have been carried out both in the Mediterranean region and the Balkan Peninsula[1-3] through which information was sought on the traditional uses of wild plants, mainly in medicine[1,4-7]. Also, there is interest in traditional uses of these plants in folk cuisines[8-11]. In Greece, ethnobotany research is limited and mainly focused on medicinal uses of wild plants[12-16] and less related to the edible use[17,18] while there is no reported research among ethnic groups.

A large percentage of the economically active population in Greece (17.8%) is employed in agriculture and animal husbandry. As regards livestock, 18.8% relates to holdings dealing with transhumance[19].

Transhumance in Greece is a traditional livestock production for which there are references in ancient times. After the creation of the modern Greek state (1832) and until the beginning of the 20th century it flourished due to the existence of "Tsifliki" (large rural area, even the whole village belonged to owners during the period of Ottoman conquest), while after the agrarian reform[20] (1922) and especially after the Second World War it began to decline[21]. Most transhumant herds were in the Thessaly region, as even today[19]. Moreover, in the Thessaly region found the three ethnic groups, *Vlachs*, *Koupatsaraioi*, and *Sarakatsanaioi*, dealing with transhumance. In the past, these movements were carried out either on foot or by a combination of foot and train. Today, however, the majority of them are conducted using trucks[22].

The primary objective of this study was to investigate the role of transhumance in herders' diets and to determine whether there were differences in the consumption of edible wild plants among the three ethnic groups.

## Material and Methods

### Study sites, field study, and data collection

To carry out the research, transhumant herders who live in the Thessaly region and move their animals to mountain pastures during the summer in Central or Western Macedonia and Epirus were sought. The main part of the field research was conducted in the Thessaly region (16 locations) and less in Western Macedonia (3 locations) and Epirus (1 location) (Fig. 1).

The identification of these interviewees was achieved through personal referrals and the assistance

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of cultural associations. 68 semi-structured interviews were conducted, including information about wild plants used by herders. The data recorded in the first section were gender, age, origin, and level of education, and in the second section, information about the wild plants used (plant uses, used part, collection period). In addition, interviewees were also asked to report their daily eating habits.

**Data analysis**

The plants were grouped according to their use in 6 main categories: medicinal, edible, distillery, dyeing, construction, and other uses. Importance Value (IV) (1) was calculated[23] and the *Jaccard* similarity index[24] (2) was additionally calculated among the three ethnic groups.

$$IV_s = \frac{ni_s}{n} \quad \ldots (1)$$

Where:

$ni_s$: the number of informants who mentioned the plant species

n: total number of informants.

Values range between 0 and 1

$$J = \frac{a}{b + c - a} \quad \ldots (2)$$

Where:

a: the plants mentioned from the two ethnic groups,

b: the plants mentioned from the first ethnic group and

c: the plants mentioned from the second ethnic group.

Values range between 0 and 1

The map was created using ArcGIS Desktop 10.8 software (Esri 2020)[25] and the satellite imagery basemap (Esri 2025)[26]. Finally, for the correlation between ethnic groups and plants mentioned, Spearman's rank correlation coefficient was calculated in Past 4.03 statistical package[27].

## Results

**Food system of the three ethnic groups**

These three ethnic groups, dealing with pastoralism, have as a main characteristic in their diet habits, the consumption of dairy products (different kinds of goat and sheep cheese, yogurt, ayran) and pies (cheese, vegetable, or mixed cheese and vegetable pies).

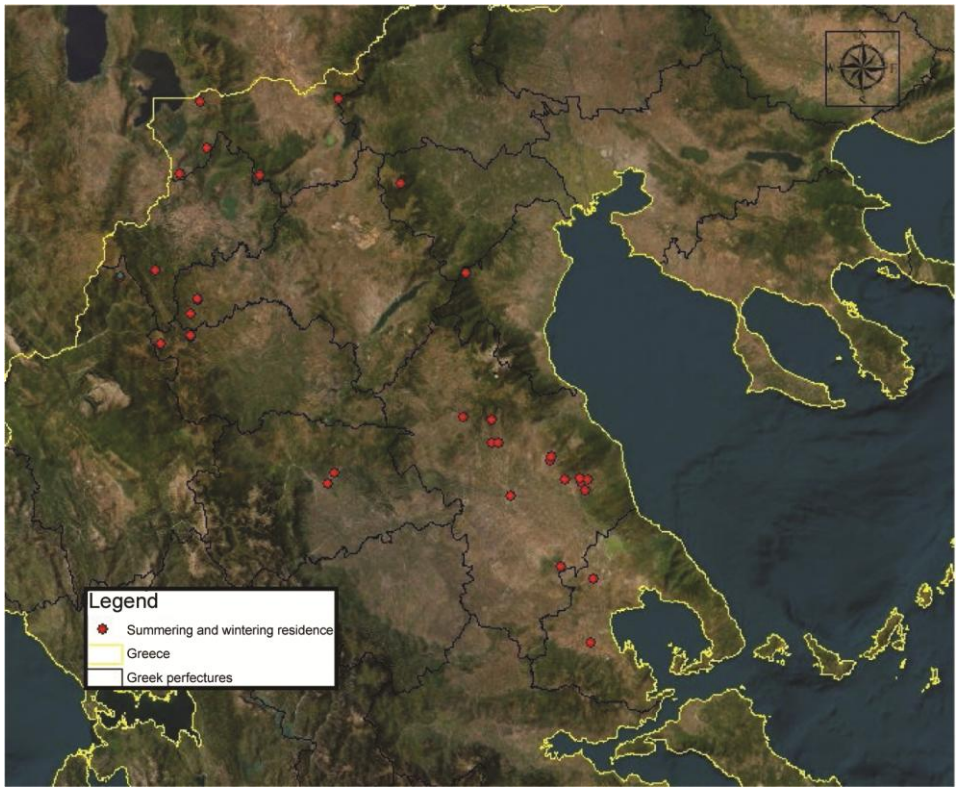


Fig. 1 — Wintering and summering transhumance herder's settlements (Created by the author using ArcGIS. Background: Esri, "Satellite imagery basemap").

The most important of all was that their dietary habits depend on their present location. Although *Vlachs* and *Koupatsaraioi* had stable places of residence either during the wintering period or the summering period, their diet was as simple as that of *Sarakatsanaioi*, who lived in seasonal camps during the summering period (Fig.) 2. They preferred to eat peppers, tomatoes, green beans, beans, lentils, "trachana" soup (a kind of pasta made from wheat flour and milk) (Fig. 3), and different pies. The meat consumption was usually done once a week.

Different dairy habits they had during the herds' movement. The movement usually lasted 10-20 days during the summer period, while 20-30 days during the winter period. In those periods, *Vlachs*' and *Koupatsaraioi*'s diet consisted mainly of pies, salted meat, and fruits collected from trees and shrubs.

**Ethnobotany research**

Through ethnobotany research, 79 plant taxa were recorded, 77 of them were identified, and of these 41 taxa had edible, medicinal, and beverage use Table 1. In Table 1, the scientific name of taxa, the family in which they belong, the local names, the part used of the plant, the preparation process for each taxon, which ethnic group mentioned each taxon, and the frequency citation in each ethnic group are reported. Table 2, "Summary of plant parts used" summarizes the results regarding the part of the plant reported to be used by transhumant herders. The "fruit" was the part of the plant with the most mentions (23 records), while the next most mentioned was the "aerial part" (8 records). For *Thymus sibthorpii* taxa, two different plant parts are mentioned, leaf and flower.

Fig. 2 — Transhumant herders in Mt Vermio in Central Macedonia, Greece during summer (Source; A. Polyzos)

Fig. 3 — Making "trachana" during summer period (Source; A. Polyzos)

Table 1 — Taxa with edible, medicinal, and beverage uses from the three ethnic groups

| Taxon and family | Local name | Part Use | Traditional preparation | Ethnic group | | | Frequency citation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | V | K | S | V | K | S |
| *Amaranthus hybridus* L. (Amaranthaceae) | Vlito | Leaf | Boiled and ate as a salad | | | √ | | | 0,10 |
| *Achillea millefolium* L. (Asteraceae) | Achillea | Flower | Boiled for cough | √ | | | 0,03 | | |
| *Carlina acanthifolia* subsp. *utzka* (Hacq.) Meusel & Kästner (Asteraceae) | Tourta | Flower | Ate fresh or fried capitula | √ | √ | √ | 0,38 | 0,40 | 0,32 |
| *Matricaria chamomilla* L. (Asteraceae) | Chamomili | Flower | Dried and boiled for cold/flu | √ | | | 0,03 | | |
| *Corylus avellana* L. (Betulaceae) | Fountoukia | Fruit | Ate dried fruits | | √ | √ | | 0,20 | 0,29 |
| *Blitum bonus-henricus* (L.) Rchb. (Chenopodiaceae) | Nana | Aerial part | Boiled and ate as a salad/ ingredient for pies (boiled) | √ | √ | √ | 0,69 | 0,80 | 0,71 |
| *Cornus mas* L. (Cornaceae) | Krania | Fruit | Ate fresh fruits/ingredients for making beverages with sugar, and tsipouro/boiled the fruits with sugar for making jam/squeezed for juice | √ | √ | √ | 1,00 | 0,80 | 0,58 |

… *Contd.*

Table 1 — Taxa with edible, medicinal, and beverage uses from the three ethnic groups (Contd.)

| Taxon and family | Local name | Part Use | Traditional preparation | Ethnic group | | | Frequency citation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | V | K | S | V | K | S |
| *Juniperus communis* L. (Cupressaceae) | Kedros | Fruit | Used fresh fruit to flavor the wine | | | √ | | | 0,32 |
| *Juniperus deltoides* R.P. Adams (Cupressaceae) | Kedros | Fruit | Boiled fresh fruits for different illnesses | √ | | | 0,13 | | |
| *Vaccinium myrtillus* L. (Ericaceae) | Mavradakia | Fruit | Ate fresh fruits | | | √ | | | 0,19 |
| *Castanea sativa* Mill. (Fagaceae) | Kastania | Fruit | Gilled or boiled the fruits | √ | | | 0,03 | | |
| *Fagus sylvatica* L. (Fagaceae) | Oksia | Seeds | Ate the seeds | | | √ | | | 0,03 |
| *Hypericum perforatum* L. (Hypericaceae) | Valsamo | Aerial part | Fresh in olive oil for stomach ache | √ | | √ | 0,13 | | 0,10 |
| *Juglans regia* L. (Juglandaceae) | Karudia | Fruit | Ate dried fruits/ingredients for making a beverage with sugar and tsipouro | √ | √ | √ | 0,34 | 0,40 | 0,10 |
| *Origanum vulgare* L. (Lamiaceae) | Rigani | Aerial part | Dried and used in different recipes | | √ | √ | | 0,20 | 0,16 |
| *Sideritis scardica* Griseb. (Lamiaceae) | Tsai | Aerial part | Tea for cold/flu | √ | √ | √ | 0,38 | 0,40 | 0,71 |
| *Stachys iva* Griseb. (Lamiaceae) | Lefko tsai | Aerial part | Tea for cold/flu | | | √ | | | 0,06 |
| *Thymus sibthorpii* Benth. (Lamiaceae) | Thimari | Leaf/Flower | To flavor the wine | | | √ | | | 0,06 |
| *Morus nigra* L. (Moraceae) | Mouria | Fruit | Ingredients for making a beverage with sugar and tsipouro | √ | | | 0,03 | | |
| *Orchis mascula* (L.) L. subsp. *mascula* (*Orchidaceae*) | Salepi | Root | Dried the tuber, then grated it and boiled it | √ | √ | | 0,22 | 0,60 | |
| *Orchis pallens* L. (Orchidaceae) | Salepi | Root | Dried the tuber, then grated it and boiled | | | √ | | | 0,03 |
| *Pinus heldreichii* Christ (Pinaceae) | Rompolo | Fruit | Boiled the cone for asthma | √ | √ | √ | 0,50 | 0,20 | 0,26 |
| *Pinus nigra* J.F. Arnold subsp. *nigra* (*Pinaceae*) | Pefko | Fruit | Boiled the cone for asthma | √ | √ | √ | 0,38 | 0,80 | 0,55 |
| *Rumex acetosella* L. (Polygonaceae) | Xinithra | Leaf | Boiled and ate as a salad | | | √ | | | 0,03 |
| *Rumex crispus* L. (Polygonaceae) | Lapata | Leaf | Boiled and ate as a salad/ ingredient for pies (boiled) | √ | √ | √ | 0,16 | 0,40 | 0,42 |
| *Crataegus monogyna* Jacq. (Rosaceae) | Trikokkia | Fruit | Ate fresh fruit | | | √ | | | 0,13 |
| *Crataegus orientalis* Pall. Ex. M. Bieb. subsp. *orientalis (Rosaceae)* | Trikokkia | Fruit | Ate fresh fruit | | | √ | | | 0,10 |
| *Cydonia oblonga* Mill. (Rosaceae) | Kidonia | Fruit | Ate fresh fruit | √ | | | 0,13 | | |
| *Fragaria vesca* L. (Rosaceae) | Chamokerasa | Fruit | Boiled the fruits with sugar for making jam/ ate fresh fruit/dried the fruit, and boiled to fight a common cold/an ingredient for making beverages with sugar and tsipouro | √ | √ | √ | 0,19 | 0,20 | 0,68 |
| *Malus domestica* (Suckow) Borkh. (Rosaceae) | Agriomilia | Fruit | Ate fresh fruit | | √ | √ | | 0,20 | 0,06 |
| *Prunus avium* (L.) L. (Rosaceae) | Agriokerasia | Fruit | Ate fresh fruit/ingredients for making a beverage with sugar and tsipouro | √ | | √ | 0,09 | | 0,03 |
| *Prunus cerasifera* Ehrh. (Rosaceae) | Agriokoromilia | Fruit | Boiled the fruits with sugar for making jam/ ate fresh fruit/dried the fruit and boiled to fight common cold | √ | √ | √ | 0,50 | 0,60 | 0,87 |
| *Prunus insititia* L. (Rosaceae) | Agriokoromilia | Fruit | Boiled the fruits with sugar for making jam/ ate fresh fruit | √ | | | 0,22 | | |
| *Pyrus communis* L. subsp. *communis* | Gkortsia | Fruit | ate fresh fruit | | | √ | | | 0,03 |
| *Pyrus spinosa* Forssk. (Rosaceae) | Gkortsia | Fruit | ate fresh fruit | √ | √ | √ | 0,47 | 0,80 | 0,48 |
| *Rubus canescens* DC. (Rosaceae) | Vatomouria | Fruit | Boiled the fruits with sugar for making jam/ ate fresh fruit | | | √ | | | 0,06 |
| *Rubus idaeus* L. (Rosaceae) | Niaoura | Fruit | Boiled the fruits with sugar for making jam/ ate fresh fruit | | | √ | | | 0,39 |
| *Rubus creticus* Tourn. ex L. (Rosaceae) | Vatomouria | Fruit | Boiled the fruits with sugar for making jam/ ate fresh fruit | √ | | √ | 0,19 | | 0,55 |
| *Urtica dioica* L. (Urticaceae) | Tsouknida | Aerial part | Ingredient for pies (boiled) | √ | √ | √ | 0,78 | 0,80 | 0,48 |
| *Mutarda arvensis* (L.) D.A.German | Grouva | Aerial part | Salad (boiled) | | | √ | | | 0,03 |
| Undentified 2 | Prasoulithra | Aerial part | Ingredients for pies (boiled) | √ | | | 0,03 | | |

For Vlachs, the most mentioned taxa are *Cornus mas* with four different uses (juice, jam, beverage, and raw), *Urtica dioica*, and *Blitum bonus-henricus* which used for salads and pies. Regarding *Koupatsaraioi*, the three taxa previously identified as common with *Vlachs* also exhibit a high frequency of *Pinus nigra* subsp. *nigra* (beverage for asthma) and *Pyrus spinosa* (fruit).

The most consumable wild plants from transhumant herders are the fruit, which they either preferred to eat fresh or made into jams and liquors. The fruits from the wild plants that the three ethnic groups mentioned were walnuts (*Juglans regia*), cornelian cherries (*Cornus mas*), wild strawberries (*Fragaria vesca*), wild mulberries *(Prunus divaricata*), and wild pears (*Pyrus spinosa*).

Furthermore, common nettle (*Urtica dioica*), curly dock (*Rumex crispus*), perennial goosefoot (*Blitum bonus-henricus*), and carline (*Carlina acanthifolia* subsp. utzka) were the wild plants mentioned for the three ethnic groups that were used in pies and salads. Finally, for disease treatment, the three ethnic groups mentioned mountain tea (*Sideritis scardica*) and the cones from black pine (*Pinus nigra*) and Bosnian pine (*Pinus heldreichii*).

#### Nowadays food system

From the three ethnic groups, *Sarakatsanaioi* have stopped moving their flocks on foot, while the other two, either in the winter or both in summer and winter, are moving their flocks on foot. Their diet habits have not changed, and they continue to consume products that they consumed in the past. They continue to consume a lot of dairy products, pies, and wild edible plants. The only change was observed in plants with medicinal use. Wild plants as *Achillea millefolium*, *Juniperus deltoides*, *Pinus heldreichi*, and *Pinus nigra* subsp. *nigra* is no longer used to treat diseases.

#### Similarity between ethnic groups

The Jaccard index was used to calculate the similarity between the three ethnic groups Table 3. *Vlachs* and *Koupatsaraioi* have the greatest similarity between the ethnic groups (0.48), and *Vlachs* with *Sarakatsanaioi* have the least similarity (0.36). The similarity between *Koupatsaraioi* and *Sarakatsanaioi* is 0.45.

In addition, a correlation analysis was performed between the three ethnic groups (Fig. 4). The analysis showed that there was a strong positive correlation for the mentioned plants between *Vlachs* and *Koupatsaraioi* which was statistically significant ($r_s$= 0.712, p=0.05) and between *Koupatsaraioi* and *Sarakatsanaioi* ($r_s$= 0.645, p=0.05). Between *Vlachs* and *Sarakatsanaioi* there was a statistically significant positive correlation ($r_s$= 0.401, p=0.05).

## Discussion

Transhumance is a process in which herders and their families move from specific lowland rangelands to highlands and vice versa[28]. This process was traditionally done on foot[22,29] and for this reason, before it started, the herders carried out various tasks for the successful organization of this multi-day trip[30-32]. The work which they had held for the successful completion of these movements was a) the equipment should have been provided for the creation of shelters during overnight stops, and b) the available food[33]. Due to the method they used to move their animals, and because they spent many hours outdoors during

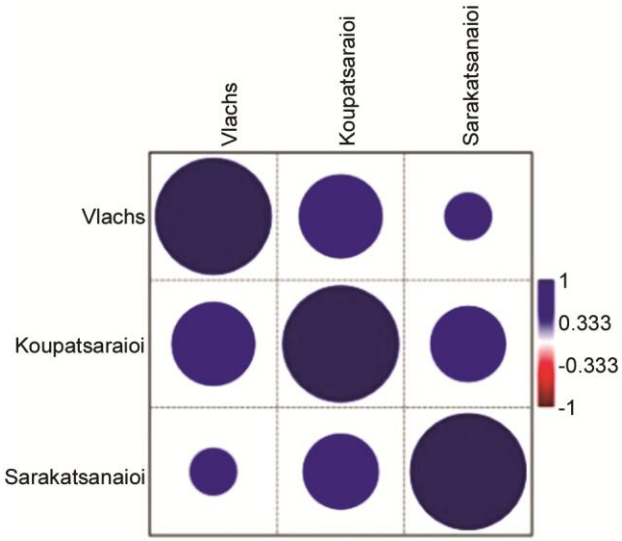


Fig. 4 — Correlation between ethnic groups.

Table 2 — Summary of Plant Parts Used.

| A/A | Palnt parts used | Number of species/taxa |
|---|---|---|
| 1 | Leaf | 4 |
| 2 | Flower | 4 |
| 3 | Fruit | 23 |
| 4 | Aerial part | 8 |
| 5 | Seeds | 1 |
| 6 | Root | 2 |

Table 3 — Similarity index between the three ethnic groups.

| | *Vlachs* | *Koupatsaraioi* | *Sarakatsanaioi* |
|---|---|---|---|
| *Vlachs* | 1 | 0.48 | 0.36 |
| *Koupatsaraioi* | | 1 | 0.45 |
| *Sarakatsanaioi* | | | 1 |

the day while grazing, a large percentage of the wild plants were consumed raw[8,34]. The most prevalent genera are *Malus, Fragaria, Cydonia, Fagus, Vaccinium, Cornus,* and *Carlina*, but the most species-rich genera that have been reported are *Rubus* (3 species), *Prunus* (3 species), *Pyrus* (2 species), and *Crataegus* (2 species). An intriguing aspect was the way they used *Carlina*. The flower was the part of the plant that was consumed, and the preparation method resembled that used for cleaning artichokes. While the use of wild plants is thought to have declined over time, the traditional practice of transhumance plays a key role in preserving this knowledge as it has been embedded into the culture[35] of transhumant herders.

According to researches[11,35], the most basic diet habits of herders are the consumption of dairy products, as recorded respectively in the three ethnic groups in Greece (*Vlachs*, *Koupatsaraioi* and *Sarakatsanaioi*). Another feature observed in the diet of transhumant herders is the consumption of raw fruits[36] and cooked vegetables, and snacks during the movement[34,37], enhancing the results found in this research. Finally, it is worth mentioning that the diet of transhumant herders in Greece is no different from the Mediterranean diet of Greeks and Italians[38]. Fruits of the genus *Rubus* (*Rubus canescens, Rubus idaeus,* and *Rubus sanctus*) are not only snacks but also the main ingredient in jam production[39], a process that they continue to carry out to this day. The consumption of transhumant livestock farmers is prevalent, primarily due to their natural availability and ease of transportation. Fruits serve as an immediate source of energy and essential vitamins, which are particularly beneficial for individuals engaged in this line of work. Additionally, their consumption requires no preparation for cooking, rendering them a practical dietary option during travel, as they are a temporary solution[40]. Finally, it is noteworthy that fruits are often plentiful in mountainous and rural regions, further facilitating their movements.

Wild edible greens, as species from the genus *Urtica*, *Sinapis*, *Rumex*, *Blitum*, and *Amaranthus,* are used as salads either raw or boiled, and furthermore, they have traditionally been part of the diet, and some of them were used as ingredients in pies[8,10,11]. On the other hand, aromatic wild plants such as *Origanum* and *Thymus*, which were documented, possess not only culinary but also broader ethnobotanical uses. Notably, *Thymus sibthorpii* was recorded as an additive for flavoring wine like *Juniperus communis*, which is widely used as a key ingredient in gin[41].

Due to their direct contact with the natural environment, they had developed knowledge about consuming wild plants as tea, as is the case in other countries[5,18,42]. Species of *Juniperus deltoides*, *Achillea millefolium*, *Matricaria chamomilla*, *Sideritis scardica*, *Stachys iva*, *Pinus heldreichii*, *Pinus nigra* subsp. *nigra*, *Orchis pallens,* and *Orchis mascula* subsp. *mascula* were consumed as herbal tea among transhumant herders. Although certain plants species continue to be used in the preparation of herbal infusions, others- previously employed for the treatment of specific ailments, such as *Achillea millefolium, Juniperus deltoides, Pinus heldreichi*, and *Pinus nigra* subsp. *nigra* is no longer widely. This decline is largely attributed to factors modernization. In contrast, several other countries[43-45] continue to promote and preserve the traditional medical uses of plants in disease management.

## Conclusion

The present study revealed that the *Rosaceae* family includes the highest number of species used in the diet of transhumant herders. Although the three ethnic groups during the interviews reported that they had enormous differences between them, regarding the nutritional sector and especially how they exploited the environment in which they lived with their families or grazed their animals, the differences presented in this research show that they are not great.

Transhumance has played and continues to play an important role in the way livestock farmers and their families' diet, and through this research, it is demonstrated that the different lifestyle of these herders represents a significant reservoir of ethnobotanical knowledge. Through this knowledge, new wild food and medicinal plants can be introduced into cultivation in the near future.

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## Conflict of Interest

The authors declare that they have no conflict of interest.

## Author Contributions

DK: conceptualization, the investigation, formal analysis, and the original draft preparation. CC: methodology, investigation, and editing, KT: methodology and supervision. MK: supervision.

## Ethics Approval

Not applicable

## Prior Informed Consent

Prior informed consent was obtained from all the respondents in the study area.

## Data Availability

The authors confirm that the data supporting the findings of this study are available within the article and also in the supplementary material. The data may also be provided by the corresponding author upon reasonable request.

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