Folk medicinal plants used for the treatment of gynecological disorders by the rural population of Zorlu village (Turkey)

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**Databases and Inventories**

**Abstract**

*Background:* This research deals with the indigenous medicinal plants used by rural population of Artvin-Borçka (Zorlu village), for the treatment of gynecological disorders. For this purpose, ethnomedicinal survey of Zorlu village in Turkey was carried out during 2008-2009.

*Methods:* In the present study, a two-part survey was made. The first part of the survey was determined the folk medicine used for treatment of gynecological disorders. Second part of the survey were determined the ethnomedicinal uses of the plant.

*Results:* Local inhabitants are extremely knowledgeable about the utilization of indigenous flora of the study area and knowledge about the treatment of gynecological disorders. As a result of the study 74 plant taxa belonging to 59 genera and 30 families were determined. These 74 plant taxa used the treatment of gynecological disorders. Information on 74 plant taxa with their botanical name, pharmacological activity, ethnomedicinal usage knowledges were provided. In addition, the pharmacological properties of these plant taxa such as antioxidant, antimicrobial, antibacterial, antitumor, antiviral, anxiolytic, antidepressant, anthelmintic, antimalarial, antidiabetic, anti-inflammatory, analgesic, tumor-inhibitory, antiallergic, antiulcer, anticandidal, antifungal, anticancer, antibiotic, anticariogenic, antigenotoxic, antirheumatic, antipruritic and antihypertensive activities are presented in this study.

*Conclusions:* Present study is about the utilization of medicinal plants in Zorlu Village, they were used the traditional knowledge for the treatment of gynecological disorders. Documentation of such ethnomedicinal data on biological resources can be used for medical and pharmaceutical science.

**Keywords:** Turkey, medicinal plants, ethnomedicine; gynecological disorders.

**Background**

Plants are used for the treatment of many illnesses since a very long time. A wide range of herbal traditional medicines are used for the treatment of gynecological disorders. Traditional ethnomedicine has advantage in treating gynecological disorders due to lack of awareness and shyness. Medicinal plants are the basis of many of the modern pharmaceuticals we used today for the treatment of various ailments (Abraham 1981, Atal & Kapur...
A large ratio of such medicinal compounds was discovered with the aid of ethnomedicinal knowledge of their traditional uses (Krishnaraju et al. 2005). And medicinal plants and plant-derived medicines are widely used in the world (Johns et al. 1990, Hamayun et al. 2003).

Ancient people mainly depend on medicinal plants for their health. Historically, all medicinal preparations such as extracts, mixtures, etc. were derived from plants. On the other hand, in the simple form of raw plant materials were also used for the treatment of some ailments. (Farnsworth & Soejarto 1991). The local people acquired the knowledge of medicinal plants by methods of trial and error. After these determinations, they became the storehouse of knowledge of useful and harmful plant taxa. Due to erosion of traditional cultures, these rich unwritten local knowledge on uses of medicinal plants would be lost, for that reason, this ethnomedicinal usage of the plants must be properly documented and preserved. (Rama Rao & Henry 1996, Qureshi et al. 2010).

In this study aim to transfer of knowledge about the traditional usage of medicinal plant taxa and their treatment of gynecological disorders in Zorlu village of Turkey. The extract, which was prepared with using medicinal plants for the treatment of gynecological disorders used by the local people of Zorlu village, was brought to light. Because the last representative (the author’s close relative) is very old and with the concern about this invaluable information will be lost, Zorlu village has been determined as a field of study. In addition, the determination of the medicinal plants, which can be used ethnomedicinal purposes, is most important issue because this information will return to contribute to the economy of the local people. In this way, migration from village to city can be prevented and the use of medicinal plants can be expanded.

Materials and Methods

Study area

Zorlu village is located in the Artvin-Borçka region of Turkey. This village has most of local inhabitants from Georgian origin, the Georgian language is still widely spoken there. Therefore, the names of some plant taxa were named as Georgian, in this survey. Zorlu village belongs to the Euro-Siberian plant geography region and falls within the A8 grid square according to the grid classification system developed by Davis (1965-1985). The geological structure of the research area consists of rocky slopes. The soil groups of research area are brown forest soils, colluvial soils and high mountain meadow soils in general. The main vegetation types in the research area are Forest, alpine, subalpine, and rocky. Forest vegetation mainly includes the tree formation of plant taxa such as Abies nordmanniana (Stev.) Spach, Picea orientalis (L.) Link, Pinus sylvestris L., Fagus orientalis Lipsky, Populus tremula L. (Atalay 1983; TKH 1990; Anonymous 1994). The climate of the region is generally cool and rainy in summer, cold and snowy in winter (Anonymous 2002; Kolayli & Şahin 2007). Climatic data were obtained from the Trabzon Agency of Meteorology. Average temperature in 2008-2009 years were 12.4°C and 12.8°C, respectively. Total precipitation in 2008-2009 years are 600.4 mm and 888.2 mm, respectively.

Material collection and statistical analysis

This study was carried out between 07.04.2008-07.04.2009 and more than 200 plant specimens were collected. Plant samples were collected in accordance with herbarium standards. At least one plant sample was prepared and deposited at Herbarium of Karadeniz Technical University Faculty of Forestry (KATO). Plant specimens were
identified using “Flora of Turkey and the East Aegean Islands” (Davis 1965-1985). The Turkish names of plant specimens were given according to Güner et al. (2012). Information on the uses of these plants was obtained by face-to-face interviews with local people and was recorded using a survey form. In the survey form was included some information such as age, gender, education level, and occupation of the persons. In addition, it was determined that which plants selected by local people and how they used these plants for the treatment of disorders. While providing information about plants by local people, it was provided that to show the plant samples in the nature by them. In the study, a two-part survey was done total of 58 informants. The first part of the survey was determined the folk medicine used for treatment of gynecological disorders. Second part of the survey were determined the ethnomedicinal uses of the plants. Table 1 is showed the information about the informants.

Table 1. Characteristics of informants

| Features          | Number of informants | Percentage (%) |
|-------------------|----------------------|----------------|
| Gender            |                      |                |
| Male              | 17                   | 29.31          |
| Female            | 41                   | 70.68          |
| Educational level |                      |                |
| Illiterate        | 7                    | 12.06          |
| Primary school    | 28                   | 48.47          |
| Secondary school  | 6                    | 10.34          |
| High school       | 12                   | 20.68          |
| University        | 5                    | 8.62           |
| Age groups        |                      |                |
| 25-35             | 4                    | 6.89           |
| 35-45             | 10                   | 17.24          |
| 45-55             | 31                   | 53.44          |
| >55               | 13                   | 22.41          |
| Occupation        |                      |                |
| Worker            | 7                    | 12.06          |
| Farmer            | 9                    | 15.51          |
| Artisan           | 4                    | 6.89           |
| Retired           | 8                    | 13.79          |
| Housewife         | 23                   | 39.65          |
| Student           | 2                    | 3.44           |
| Self-employment   | 5                    | 8.65           |

The Factor of Informant Consensus (FIC) was used for the determining the homogeneity of information about the ethnomedicinal usage of the plants. And for determining the Use Value (UV), the number of plants usage and the number of informants was evaluated. FIC value ranges from 0 to 1 and 1 indicates the highest level (Trotter & Logan 1986; Camejo-Rodrigues et al. 2003; Tardío & Pardo-de-Santayana 2008; Giday et al. 2009:

\[
\text{FIC} = \frac{\text{Nur} - \text{Nt}}{\text{Nur} - 1} \quad \text{and} \quad \text{UV} = \frac{\text{U}}{\text{N}}
\]

Nur: the number of use reports of the plants by informants
Nt: the number of taxa which were used any disease or disease group
U: the number of usage reports for any plant
V: the number of informants

Extract preparation

Gynecological treatment method, which is used for pregnancy, was explained by Pakize Altuntas (author’s grandmother). Her mother (1940-1965 years) and her grandmother (1900-1930 years) were used this method for generations. But the last one to implement this method is her. She is explained that “Collected the 74 plant taxa, which is the scope of the study, are boiled in a barrel. The water must be lukewarm. The same water is used the next three days morning and the water is being used by heating. Patient should stay in the water for at least 1 hour”. She was application this method between 1978-1992 years. As a result of this method, 10 patients had been cured and this method resulted pregnancy for them.

A literature survey was carried out about the pharmacological properties of determined plant taxa, such as antioxidant, antimicrobial, antibacterial, antitumor, antiviral, anxiolytic, antidepressant, anthelmintic, antimalarial, antidiabetic, anti-inflammatory, analgesic, tumor-inhibitory, antiallergic, antineoplastic, antulcer, anticandidal, antifungal, anticancer, antibiotic, anticariogenic, antigenotoxic, antirheumatic, antipruritic and antihypertensive activities. Because it is believed that the curative effect of these properties on extract.
Results and Discussion

This study showed that the combination (extract) of 74 medicinal plant taxa used for the gynecological disorders were recorded and documented. These plant taxa are; *Achillea bisserrata, Acinos arvensis, Agrostemma githago, Ajuga reptans, Alyssum murale* subsp. *murale var. murale, Anagallis arvensis var. arvensis, Aristolochia pontica, Astragalus caucasicus, Bellis perennis, Buglossoides arvensis* subsp. *sibthorpiana, Cardamine hirsuta, Cichorium intybus, Cists creticus, C. salvifolius, Convolvulus cantabricus, Echium vulgare* subsp. *vulgare, Fragaria vesca, Genista tectoria, Geranium columbinum, G. molle, G. purpureum, Hedera helix, Hypericum orientale, Juglans regia, Medicago lupulina, Onosma sericeum, Papaver lateritium* subsp. *lateritium, Plantago major* subsp. *major, Potentilla argentea, P. crantzii var. crantzii, P. recta, P. thuringiaca, Primula acaulis* subsp. *rubra, Ranunculus cappadocicus, Reseda lutea* var. *lutea, Rhododendron luteum, Rubus idaeus* subsp. *idaeus, Sambucus ebulus, Scabiosa columbaria* subsp. *columbaria var. columbaria, Sedum hispanicum, Senecio vernalis, Stachys annua* subsp. *anna var. annua, Stellaria media, Teucrium flavum* subsp. *hellenicum, T. polium* subsp. *polium, Thymus nummularius, T. praecox* subsp. *grossheimii, T. praecox* subsp. *skorpiili var. skorpiili, T. vulgaris, Trifolium dubium, Trifolium pratense* var. *pratense, Urtica dioica* subsp. *dioica* and *Vaccinium arctostaphylos*. The usage plant parts are generally above ground, only the roots of *Aristolochia pontica* were used in prepared extract for the treatment of gynecological disorders.

The most applied sections of plants are above ground (73) and root (1) for the treatment of inflammatory (2), antirheumatic (1), antipruritic (1) and antihypertensive (1). Some plant taxa (21) have neither pharmacological activity nor ethnomedicinal usage. These plant taxa are antioxidant, antibacterial and antimicrobial etc. properties of these plant taxa did not have ethnomedicinal importance. Many studies have been conducted to investigate the chemical composition of these plant taxa. Table 2 showed that the list of ethnomedicinal usage of these plant taxa.

As a result of the study, it was determined that the highest use value (UV) is found in *Bellis perennis* (0.68) followed by *Cardamine hirsuta* (0.43), *Vaccinium arctostaphylos* (0.43), *Rubus idaeus* subsp. *idaeus* (0.41), *Fragaria vesca* (0.36) and *Hedera helix* (0.34, Table 2).

The FIC values in the study varies between 0.40 to 0.85. Rheumatism had the highest FIC value 0.85 with 15 use-reports for 3 plant taxa. The plant taxa accountable for the high consensus (0.34) was *Hedera helix* out of the 58 reported cases. The taxa reported for rheumatism are *Thymus vulgaris, Ranunculus cappadocicus* and *Urtica dioica* subsp. *dioica*. These are followed by cold and flu (0.82) and gynecological diseases (0.71). The lowest FIC values are for hemorrhoid (0.50) and stomach ailments (0.40, Table 3). Gürdal & Kültür (2013) were determined that the rheumatism had the highest FIC (0.72) value in their study, similar results were found about the FIC (0.85) value of rheumatism in the present study. Tetik et al. (2013) examined the disease in 10 categories, and they were found that the FIC values range between 0.27 and 0.72. In addition, their results showed that rheumatism had has the second highest FIC value (0.65).

Ethnomedicinal results showed that the most commonly used parts of plants included leaves, flowers and aboveground, respectively (Figure 2).

The antioxidant, antibacterial and antimicrobial etc. properties of 74 plant taxa, which were identified in the research area, were investigated. Because the pharmacological properties of these plant taxa did not know how the effected on the prepared extract, the contents of the pharmacological activity of these plant taxa have been tried to present with this research according to the previous studies. Within the scope of the study, determined 42 plant taxa had have pharmacological importance with a large percentage as 56.75% (Table 4).

The numerical distribution of pharmacological properties of these plant taxa are antioxidant (51), antimicrobial (34), antibacterial (19), antitumor (9), antiviral (2), angiotyptic (1), antidepressant (1), anthelmintic (1), antimalarial (2), antidiabetic (2), anti-inflammatory (3), analgesic (2), tumor-inhibitory (1), antiallergic (1), antihepatotoxic (1), antiulcer (3), anticandidial (1), antifungal (3), anticancer (1), antioxidant (1), anticariogenic (1), antigenotoxic (1), antirheumatic (1), antipruritic (1) and antihypertensive (1). It was seen that antioxidant, antimicrobial, antibacterial and antitumor properties had the highest value than other pharmacological properties (Figure 3).

Some plant taxa (21) have neither pharmacological activity nor ethnomedicinal usage. These plant taxa are *Aegonchon purpurocaeruleum, Dorycnium graecum, Gymnocarpium dryopteris, Gypsophila tenuifolia, Lathyrus laxiflorus* subsp. *laxiflorus, Linum austriacum* subsp. *austriacum, Lythrum maritimum, Oxytropis pilosa, Parentucellia latifolia* subsp. *latifolia, Pilosella cymosa, Polysgala major, Potentilla kotschyana, Saxifraga rotundifolia* subsp. *rotundifolia, Securigera orientalis* subsp. *orientalis, Symphytum ibericum, Trifolium aureum* subsp. *aureum, Tripleurospermum fissurale, Veronica anagalis-aquatica, Veronica filliformis, Veronica multifida, Vicia peregrina*.
Table 2. The Ethnomedicinal plants used by local individuals, in Zorlu Village

| Family          | Botanical name             | Local names          | Plant parts       | Preparations | Utilization method | Ethnomedicinal Usage                        | Herbarium No (KATO) | UV |
|-----------------|----------------------------|----------------------|-------------------|--------------|--------------------|---------------------------------------------|---------------------|----|
| Araliaceae      | *Hedera helix* L.          | Duvar sarmaşıği      | Leaves            | Infusion     | Drinking           | Rheumatism and cold                        | 16717               | 0.34 |
| Aristolachaeae  | *Aristolochia pontica* Lam.| Loğusa otu           | Roots             | Decoction    | Drinking           | Skin diseases and stomach ailments, gynecological disorders | 16747               | 0.29 |
| Asteraceae      | *Bellis perennis* L.       | Papatya              | Flowers and leaves| Infusion     | Drinking           | Cold                                        | 16737               | 0.68 |
| Asteraceae      | *Cichorium intybus* L.     | Mavi hindiba         | Above ground      | The above ground are crushed | Compress | Wound                                     | 16716               | 0.08 |
| Asteraceae      | *Senecio vernalis* Waldst. & Kit. | Kanarya otu | Above ground | The above ground are crushed | Compress | Wound                                     | 16738               | 0.10 |
| Boraginaceae    | *Buglossoides arvensis* L. subsp. *sibthorpiana* R. Fern | Taşkesen          | Leaves            | Infusion     | Drinking           | Diuretic diseases                           | 16746               | 0.06 |
| Boraginaceae    | *Echium vulgare* subsp. *vulgare* L. | Engerek otu | Leaves and flowers | Infusion     | Drinking           | Diuretic diseases                           | 16719               | 0.18 |
| Boraginaceae    | *Onosma sericeum* Wild.    | Emzik otu            | Roots             | Decoction    | Externally         | Hemorrhoid                                  | 16743               | 0.22 |
| Brassicaceae    | *Alyssum murale* Walds. & Kit. subsp. *murale* var. *murale* | Kuduz otu           | Flowers           | Infusion     | Drinking           | Urinary disorders                           | 16740               | 0.10 |
| Brassicaceae    | *Cardamine hirsuta* L.     | Act tere             | Above ground      | Decoction and cooking | Drinking and eating | Strangury                                   | 16708               | 0.43 |
| Caprifoliaceae  | *Sambucus ebulus* L.       | Mürver               | Leaves            | The leaves are crushed | Compress | Hemorrhoid                                | 16721               | 0.10 |
| Caryophyllaceae | *Stellaria media* (L.) Vill | Kuşotu              | Leaves            | Decoction    | Drinking           | Cough                                       | 16761               | 0.15 |
| Cistaceae       | *Cistus creticus* L.      | Pembe laden          | Leaves and flowers| Infusion     | Drinking           | Constipation                                | 16707               | 0.20 |
| Cistaceae       | *Cistus salviifolius* L.  | Beyaz laden          | Leaves and flowers| Infusion     | Drinking           | Gynecological disorders                    | 16715               | 0.13 |
| Family               | Species                          | Part Used | Method       | Preparation          | Use                          | Item ID | Strength |
|----------------------|----------------------------------|-----------|--------------|----------------------|------------------------------|---------|----------|
| Convolvulaceae       | Convolvulus cantabricus L.        | Above ground | Infusion   | Drinking             | Stomach ailments             | 16763   | 0.12     |
| Crassulaceae         | Sedum hispanicum L.              | Leaves    | The leaves are crushed | Compress | Wound             | 16724   | 0.06     |
| Dipsacaceae          | Scabiosa columbaria subsp. columbaria var. columbaria | Roots | Infusion | Drinking | Constipation and diuretic diseases | 16762   | 0.12     |
| Ericaceae            | Rhododendron luteum Sweet         | Leaves    | The leaves are crushed | Compress | Foot infections | 16713   | 0.22     |
| Ericaceae            | Vaccinium arctostaphylos L.       | Leaves, flowers and fruits | Infusion, jam and syrup | Drinking and eating | Kidney diseases | 16718   | 0.43     |
| Guttiferae           | Hypericum orientale L.            | Flowers   | Olive oil mixed with flowers | Compress | Hemorrhoid, gynecological disorders | 16774   | 0.05     |
| Juglandaceae         | Juglans regia L.                 | Seeds     | Fresh | Eating | Cholesterol       | 16744   | 0.10     |
| Lamiaceae            | Stachys annua (L.) L. subsp. annua var. annua | Above ground | Infusion | Drinking | Cough             | 16731   | 0.05     |
| Lamiaceae            | Teucrium flavum L. subsp. hellenicum Rech. f. | Leaves | Infusion | Drinking | Diabetes         | 16767   | 0.10     |
| Lamiaceae            | Teucrium polium L. subsp. polium | Leaves    | Infusion | Drinking | Hemorrhoid        | 16750   | 0.10     |
| Lamiaceae            | Thymus nummularius M. Bieb.       | Leaves and flowers | Infusion | Drinking | Stomach ailments | 16764   | 0.18     |
| Lamiaceae            | Thymus praecox Opitz subsp. grossheimii (Ronniger) Jalas | Above ground | Infusion | Drinking | Stomach ailments | 16726   | 0.17     |
| Lamiaceae            | Thymus praecox subsp. skorpilii var. skorpilii | Above ground | Infusion | Drinking | Stomach ailments | 16729   | 0.17     |
| Lamiaceae            | Thymus vulgaris L.                | Leaves and flowers | Infusion | Drinking | Rheumatism and stomach ailments | 16736   | 0.22     |
| Leguminosae          | Astragalus caucasicus Pall.       | Roots     | Decoction | Drinking | Diabetes         | 16711   | 0.10     |
| Family                  | Species                          | Part(s)            | Preparation | Use(s)                               | Code   | Value |
|-------------------------|----------------------------------|--------------------|-------------|--------------------------------------|--------|-------|
| Leguminosae             | *Genista tinctoria* L.           | Above ground      | Infusion    | Drinking, Urinary disorders           | 16757  | 0.15  |
| Leguminosae             | *Trifolium pratense* L. var. pratense | Above ground      | Decoction   | Drinking, Sore throat, diarrhea       | 16723  | 0.29  |
| Papaveraceae            | *Papaver lateritium* C. Koch subsp. lateritium | Leaves            | Decoction   | Drinking, Cough                       | 16712  | 0.13  |
| Plantaginaceae          | *Plantago major* L. subsp. major | Leaves            | The leaves are crushed | Compress, Inflamed wounds               | 16710  | 0.29  |
| Primulaceae             | *Anagallis arvensis* L. var. arvensis | Above ground      | Infusion    | Externally, Wounds and pimples        | 16751  | 0.25  |
| Primulaceae             | *Primula acaulis* L. subsp. rubra | Leaves and flowers | Infusion    | Drinking, Cough                       | 16725  | 0.22  |
| Ranunculaceae           | *Ranunculus cappadocicus* Willd. | Flowers            | The flowers are crushed | Compress, Rheumatism                   | 16775  | 0.22  |
| Resedaceae              | *Reseda lutea* L. var. lutea     | Young leaves      | Fresh       | Eating, Stomach ailments              | 16756  | 0.18  |
| Rosaceae                | *Fragaria vesca* L.             | Fruits             | Jam and syrup | Drinking and eating, Renal diseases and diuretic diseases | 16709  | 0.36  |
| Rosaceae                | *Potentilla recta* L.           | Flowers            | The flowers are crushed | Compress, Wound                       | 16732  | 0.12  |
| Rosaceae                | *Rubus idaeus* L. subsp. idaeus  | Fruits and leaves | Fresh and decoction | Drinking and eating, Diuretic diseases | 16706  | 0.41  |
| Urticaceae              | *Urtica dioica* L. subsp. dioica | Leaves and above ground | Decoction, cooking and the above ground are crushed | Drinking, eating and compresses, Rheumatism | 16720  | 0.25  |
Table 3. Factor Informant Consensus (FIC) for each disease

| Ailment categories       | Number of use report (Nur) | Number of taxa (Nt) | FIC  |
|--------------------------|-----------------------------|---------------------|------|
| Rheumatism               | 15                          | 3                   | 0.85 |
| Cold and flu             | 35                          | 7                   | 0.82 |
| Gynecological disorders  | 8                           | 3                   | 0.71 |
| Diabetes, Cholesterol    | 6                           | 3                   | 0.60 |
| Skin diseases            | 17                          | 8                   | 0.56 |
| Kidney diseases          | 25                          | 12                  | 0.54 |
| Hemorrhoid               | 7                           | 4                   | 0.50 |
| Stomach ailments         | 11                          | 7                   | 0.40 |

Figure 2. The highest number of usage plant parts

Table 4. Pharmacological properties of the plant taxa

| Family             | Botanical name   | Turkish and *Local name | Pharmacological activity                                                                 | Herbarium no (KATO) |
|--------------------|------------------|--------------------------|-----------------------------------------------------------------------------------------|---------------------|
| Adoxaceae          | Sambucus ebulus  | Mürver otu               | Antioxidant and Antimicrobial activities (Ebrahimzadeh et al. 2009, Salehzadeh et al. 2014) | 16721               |
| Araliaceae         | Hedera helix     | Duvar sarmasıği          | Antimicrobial activity (Orhan et al. 2012)                                                | 16717               |
| Aristolachiaceae   | Aristolochia pontica | Gangirdak  *Loğusa otu | Antioxidant and Antimicrobial activities (Chawla et al. 2013)                                | 16747               |
| Asteraceae         | Achillea biserrata | Aksırikotu  *Civan perçemi | Antioxidant and Antimicrobial activities (Serdar et al. 2015, Azaz et al. 2009)           | 16734               |
| Asteraceae         | Bellis perennis  | Koyungözü  *Papatya     | Antioxidant, Anxiolytic, Antitumor and Antidepressant effects (Siatka & Kašparová 2010, Marques et al. 2012, Pehlivan Karakas et al. 2014) | 16737               |
| Asteraceae         | Cichorium intybus | Hindiba               | Antimicrobial, Anthelmintic, Antimarial, Antidiabetic, Anti-Inflammatory, Analgesic, Antioxidant, Tumor-Inhibitory, Antiallergic and Antihepatotoxic activities (Street et al. 2013, Ahmed et al. 2003) | 16716               |
| Asteraceae         | Senecio vernalis | Kanarya otu            | Antimicrobial activity (Ökach et al. 2013)                                                 | 16738               |
| Family         | Species                                      | Common Name | Activity Type                                    | Reference                                |
|---------------|----------------------------------------------|-------------|-------------------------------------------------|------------------------------------------|
| Boraginaceae  | *Buglossoides arvensis* subsp. sibthorpiana  | Tarla taşkeseni | Antioxidant activity (Tetens 2015)             |                                          |
| Boraginaceae  | *Echium vulgare* subsp. vulgare              | Engerek otu  | Antioxidant, Antibacterial and Antitumor activities (Nićiforović et al. 2010, Karakaş et al. 2012) |                                          |
| Caryophyllaceae | *Agrostemma githago*                        | Buğday karamuğu | Antimicrobial activity (Wagner et al. 2017) |                                          |
| Caryophyllaceae | *Stellaria media*                           | Kuşotu       | Antirheumatic, Anti-inflammatory and Antipruritic activities (Chandra & Rawat 2015) |                                          |
| Cistaceae     | *Cistus salviifolius*                       | Kartli       | Antioxidant, Antimicrobial and Antibacterial activities (Sayah et al. 2017, Tomás-Menor et al. 2013) |                                          |
| Dipsacaceae   | *Scabiosa columbaria* subsp. columbaria var. columbaria | Uyuzotu | Antimicrobial activity (Moteetee & Kose 2017) |                                          |
| Ericaceae     | *Vaccinium arctostaphylos*                   | Likarpa      | Antioxidant, Antimicrobial and Antihypertensive Activities (Guđer et al. 2014, Mahboubi et al. 2013, Khalili et al. 2011) |                                          |
| Fabaceae      | *Astragalus caucasicus*                      | Kaf geveni   | Antimicrobial and Antiviral activities (Li et al. 2014) |                                          |
| Fabaceae      | *Genista tinctoria*                         | Boyacikatırına | Antimicrobial and Antioxidant activities (Kumari & Prasad 2013, Antal et al. 2010) |                                          |
| Fabaceae      | *Medicago lupulina*                         | Bitçikotu    | Antimicrobial activity (Anonymous 2016, Ergül Bozkurt & Terzioğlu 2017) |                                          |
| Fabaceae      | *Trifolium dubium* var. pratense             | Çayır uçgülü | Antimicrobial activity (Dobrucka & Długaszewska 2016) |                                          |
| Geraniaceae   | *Geranium columbinum*                       | Güvercin itri| Antimicrobial activity (Radulovic et al. 2011) |                                          |
| Geraniaceae   | *Geranium molle*                            | Yumuşak itri| Antioxidant activity (Graça et al. 2016) |                                          |
| Geraniaceae   | *Geranium purpureum*                        | Ebedon       | Antioxidant and Antimicrobial activities (Proestos et al. 2006, Cardoso & Matos 2013) |                                          |
| Guttafereae   | *Hypericum orientale*                       | Sandik çiçeği| Antidepressant effects (Medina et al. 2006) |                                          |
| Juglandaceae  | *Juglans regia*                             | Ceviz        | Anticandidal, Antifungal, Antitumor, Antioxidant and Antibacterial activities (Noumi et al. 2010, Noumi et al. 2011, Santos et al. 2013, Rather et al. 2012) |                                          |
| Lamiaceae     | *Acinos arvensis*                           | *Tarla nanesi* | Antioxidant and Antimicrobial activities (Jovanovic et al. 2005, Kaya et al. 1999) |                                          |
| Lamiaceae     | *Ajuga reptans*                             | Meryemşahi  | Strong antitumor activity (Yıldırım et al. 2012) |                                          |
| Lamiaceae     | *Stachys annua* subsp. annua var. annua     | Hacıosmanotu| Antimicrobial and Antimicrobial activities (Yıldırım et al. 2013) |                                          |
| Lamiaceae     | *Teucrium polium*                           | Acıayvaşan  | Antioxidant and Antimicrobial activities (Khaled-Khodja et al. 2014, Sarac & Uğur 2007) |                                          |
| Plant Family     | Genus          | Species Description          | Activity Type                     | Reference                                      |
|-----------------|----------------|------------------------------|-----------------------------------|-----------------------------------------------|
| Lamiaceae       | Thymus         | Thymus nummularius           | Antioxidant activity              | (Ertas et al. 2015)                           |
| Lamiaceae       | Thymus         | Thymus praecox subsp. skorpiii var. skorpiii | Antioxidant activity              | (Ozen et al. 2011)                           |
| Lamiaceae       | Thymus         | Thymus vulgaris              | Antibacterial activity            | (Dorman & Deans 2000)                        |
| Plantaginaceae  | Plantago major | Plantago major subsp. major  | Antiulcerogenic, Anticancer, Antibiotic, Antifungal, Antigiardiasis, Antimalarial, Antiviral, Antioxidant activities | (Samuelsen 2000, Stanisavljević et al. 2008) |
| Primulaceae     | Anagallis arvensis | Anagallis arvensis var. arvensis | Antioxidant and Antibacterial activities | (Tawaha et al. 2007, Taye et al. 2011)         |
| Primulaceae     | Primula        | Primula acaulis subsp. rubra | Antioxidant and Antigenotoxic activities | (Ozkan et al. 2017)                          |
| Resedaceae      | Reseda         | Reseda lutea var. lutea      | Antimicrobial and Antibacterial activities | (Jafari-Sales et al. 2017)                    |
| Rosaceae        | Fragaria       | Fragaria vesca               | Antioxidant activity              | (Zugić et al. 2014)                          |
| Rosaceae        | Potentilla     | Potentilla argentea          | Antioxidant activity              | (Antal 2010)                                 |
| Rosaceae        | Potentilla     | Potentilla crantzii var. crantzii | Antioxidant activity              | (Tomczyk et al. 2010)                        |
| Rosaceae        | Potentilla     | Potentilla recta             | Antioxidant, Anti-inflammatory and Anticariogenic activities | (Tomczyk et al. 2011, Bazyliko et al. 2013) |
| Rosaceae        | Potentilla     | Potentilla thuringiaca       | Antioxidant activity              | (Grochowski et al. 2017)                     |
| Rosaceae        | Rubus          | Rubus idaeus subsp. idaeus    | Antimicrobial, Antioxidant and Antibacterial activities | (Rauha et al. 2000, Deighton et al. 2000, Cavanagh et al. 2003) |
| Urticaceae      | Urtica dioica  | Urtica dioica subsp. dioica. | Antioxidant, Antimicrobial Antiulcer, Analgesic and Antidiabetic activities | (Kukrić et al. 2012, Gülçin et al. 2004, Bahmani et al. 2014) |

Figure 3. The highest number of Pharmacological properties
As a result of the study, phytogeographic region and endemism value of the plant taxa were investigated and it was determined that 11 plant taxa had plant taxa had phytogeographic region and only 1 plant taxon was endemic. Botanical name, phytogeographic region and endemism status of these plant taxa showed in Figure 4.

![Phytogeographic region](image)

Figure 4. Botanical name, phytogeographic region and endemism status of the plant taxa

At the end of the study, the most common species are found from the families of Fabaceae with 11 taxa, Lamiaceae with 9 taxa, Rosaceae with 7 taxa, Asteraceae with 6 taxa and Boraginaceae with 6 taxa (Figure 5). Similarly, Saraç et al. (2013) found that the largest five families were qualified as follows: Asteraceae family with 14 taxa, Rosaceae family with 11 taxa, Lamiaceae family with 10 taxa, Ericaceae and Fabaceae with 4 taxa in each.

![Family](image)

Figure 5. The families of the highest number of plant taxa

Ethnopharmacology involves the investigation of plant taxa use in traditional communities, for that reason the research of this issue is quite important (Bhatia et al. 2014). Because herbal medicines are relatively safer than synthetic drugs (Jagatheeswari 2012). In most developing countries, women are generally reluctant to subject themselves to gynecological examination, particularly when they have no apparent symptoms of disease due to lack of awareness and shyness (Bhatia & Cleland 1995). Similarly, Shrivastava (2013) determined that the ethno-medicinal plants used for the treatment of gynecological disorders by the tribes of Dindori district. These people do not prefer the doctors, due to lack of awareness and shyness or hesitation. Jan et al. (2020) stated that the indigenous community of district Buner, Pakistan was more sensitive and careful about gynecological diseases. Rahman et al. (2014) investigated the plants, which would be good for gynecological diseases in the region of Dinajpur, Bangladesh and they determined that which parts of the plants had have the healing effects on local people. An ethnobotanical survey of medicinal plants used in the treatment of gynecological disorders was carried
out by Buragohain (2008) among the rural people in Tinsukia district, Assam, India. As a result of that study, he was suggested that the scientific validation and clinical proof with these folk herbal medicines might lead to potential drugs. Yadav et al. (2006) suggested that documentation of ethnomedicinal data on biological resources will be steps for bioprospecting. Similar results have been obtained in many previous studies about traditional treatment of gynecological diseases (Abu-Irmaleh & Afifi 2003; Steenkamp 2003; Behera 2006; Vidyasagar & Prashantkumar 2007; Zhou & Qu 2009; Chaurasia 2011; Singh & Mall 2011; Wadankar et al. 2011; Gupta & Solanki 2013; Das et al. 2015; Ögenler et al. 2018; Balamurugan et al. 2018). Therefore, studies on traditional treatment of gynecological diseases should be increased. And a scientific link should be established between traditional treatment methods and modern medical methods.

**Conclusion**

As a result of the study, 74 plant taxa under 30 families were determined. 41 plant taxa (55.40%) had ethnomedicinal importance and 42 plant taxa had pharmacological importance with a large percentage as 56.75%.

The results showed that pharmacological properties (antioxidant, antimicrobial, antibacterial etc. activities) play an effective role on the preferred plants (74) extract, which is used by the rural population of Zorlu village in Turkey.

The present study focused on the utilization of plants available with the people of Zorlu Village, they were used the traditional knowledge for the treatment of gynecological disorders. Because of the urgent need for systematic documentation of this knowledge by using scientific tools, I want to share this knowledge. In order to understand the potential of the treatment in traditional medicine on gynecological disorders, there is a need for more studies related to the pharmacological and clinical research.

**Declarations**

**Ethics approval and consent to participate:** All participants provided prior informed consent before any interviews were conducted. And they were informed about the aim of this study.

**Consent for publication:** Not applicable.

**Competing interests:** Author declares that there is no conflict of interest.

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