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## SOME SHRUB AND TREE TAXA IN THE GRASSLAND-PASTURE AND NATURAL VEGETATION OF TURKEY

*Mehmet BASBAG<sup>1\*</sup>, Erdal CACAN<sup>2</sup>, Mehmet Salih SAYAR<sup>3</sup>, Halil KARAN<sup>4</sup>*

<sup>1</sup>Dicle University, Faculty of Agriculture, Department of Field Crops, Diyarbakir, Turkey

<sup>2</sup>Bingol University, Vocational School of Genc, Department of Crop and Animal Production, Bingol,  
Turkey

<sup>3</sup>Dicle University, Vocational School of Bismil, Department of Crop and Animal Production,  
Diyarbakir, Turkey

<sup>4</sup>Firat University, Vocational School of Sivrice, Department of Crop and Animal Production, Elazig,  
Turkey

\*Corresponding author; [mbasbag@dicle.edu.tr](mailto:mbasbag@dicle.edu.tr)

**Abstract:** *Some shrub and tree taxa identified by different researchers in the meadow-pasture and natural vegetation of Turkey have been summarized in paper. Total 108 genus and 227 taxa were identified from 49 plant families. Although the vast majority of these taxa (165 taxa-72.7%) had shrub formation and the numbers of taxa in tree formation was only 27 taxa (11.9%). The other 35 plant taxa (15.4%) had a transitional formation between shrub and tree formations. When plants were ordered in terms of family, genus and taxa; Rosaceae was the first number family in 14 genus and 38 taxa (16.7%), Leguminosae in 12 genus and 35 taxa (15.9%), and Labiatae family in 11 genus and 25 taxa (11.0%) followed it. Even though the most taxa possessing families for shrub formation were Leguminosae (36 taxa), Labiatae (25 taxa) and Rosacea (21 taxa), for tree formation the ranking was as Fagaceae (5 taxa), Anacardiaceae (3 taxa), Ericaceae, Cupressaceae and Moraceae (2 taxa). Fagaceae (5 taxa), Anacardiaceae (3 taxa), Ericaceae, Cupressaceae ve Moraceae (2 taxa) families respectively had the most taxa belonging to transitional formation between shrub and tree formations. The results showed that the Kermes oak (*Quercus coccifera*) (in 11 studies), Black shrub (*Paliurus spina-christi*) (in 9 studies) and Murt shrub (*Myrtus communis*) (in 7 studies) were the most cited and frequently encountered shrub taxa by researchers in Turkey. Additionally, among the taxa were identified seven taxa as "endemic" and five taxa as "rare" plants.*

Key words: *Grassland, pasture, shrub, tree, taxa*

## 1. Introduction

In Turkey, the grassland-pasture area is 14.611.920 hectare (ha) and this accounts for 18.8% of the country's land [37]. Total size of pasture lands in-forests, side forests and top forests in Turkey are 3.450.736 ha, which accounts for 21% of total pasture size of the country [1]. There are about 8.3 million hectares of shrubs area in Turkey. Most of the shrubs consist of the maquis, which is natural vegetation of mediterranean climate. With a legal arrangement, these shrub areas were included in the forest area in 1969 [3]. Generally, due to over, untimely and non-uniform grazings, the amount of quality forage plant species are reduced and even disappeared in rangelands of Turkey [26]. Instead of the quality species, the rangelands are filled with other species, weeds and shrubs whose feed quality is low. Shrubs and trees are commonly seen in meadow and pasture lands that close to forests. Shrubs and trees in grassland-pasture areas are generally accepted as weed. This is due to the following reasons. They reduce the yield and quality of the forages, and they prevent comfortably animal grazing on rangelands [27]. Accordingly, the struggle with them is one of the important topics of pasture improvement programs. The pasture law numbered 4342 comes into force in 1998 in Turkey, pasture breeding studies started to gain speed in the Ministry of Food, Agriculture and Livestock, in Turkey [27]. In the control management with shrubs and tree taxa in the improvement of grassland-pasture, generally mechanical control, chemical control [11, 13, 15, 19, 22, 23 and 39] and biological control methods are used. Furthermore, usually goats are used in the method of biological control [40]. However, some shrubs and tree taxa in the grassland-pasture areas are the source of feed for domestic animals such as goats and sheep. They also contribute to the conservation of biodiversity by creating areas of nutrition and shelter for wild animals.

According to Gokkus *et al.* (2013), there are a great deal amount dry matter productions from herbaceous plants in the maquis areas. Especially they emphasized that amount of the forage varied depending on the frequency of the shrubs in the area [21]. The most of the sloping lands of in the Cukurova region are widely covered with maquis-shrub vegetation. The altitude of these lands extends up to 500-600 m higher than sea level. These shrubs generally are grazed with sheep and goat herds in winter period. The commonly found shrub species in these maquis are *Catycotome infesta*, *Cistus satviaefolius*, *Genista* sp., *Quercus coccifera* etc... [36]. Shrubs and small tree taxa are widely encountered in Mediterranean and Aegean Sea coasts up to 500 m height from sea level. Among the species the widely ones are wild olive (*Olea europea* L.), arbutus (*Arbutus unedo* L.), common myrtle (*Myrtus communis* L.), phillyrea, gum tree (*Pistacia lentiscus* L.), Laden (*Cistus erectus* L.), Kermes oak (*Quercus coccifera* L.) and holy oak (*Quercus ilex* L.) [10]. In Kuredagi pasture land, a forest inside rangeland, rate of *Thymus sipyleus* species in botanical composition was 0.90% [1]. In Araplari village pastureland, Turkoglu district, Kahramanmaraş the rate of *Paliurus spina-christi* was 1.15% [38].

Babalık and Fakir (2007) investigated the effects goats grazing on leaf morphology of some shrub species (*Quercus coccifera*, *Crataegus orientalis* var. *orientalis* and *Cotoneaster nummularia*) in Kozagacı plateau, Davraz Mountain, Isparta province. They were reported that the fragrant Juniper (*Juniperus foetidissima*) and the Greek Juniper (*Juniperus excelsa*) taxa converted their formation from tree formation into shrub formation due to intensive grazing [9]. In Kilis province, *Quercus coccifera*,

*Ziziphora clinopodioides* and *Thymus sipyleus* covered rate of 0.81-2.09%, 0.43-1.34% and 3.21%, respectively, in botanical composition of some pasture lands [31]. Weed species amount in rangelands of transitional zone of Cukurova region was % 58.7. Among the weed species, Murt shrubs (*Myrtus communis*) ratio was in 8.1% [13]. *Serbus eria* shrub taxa were covered 2.5% in Samsun province [41]. *Rubus sanctus* shrub species was covered 1.9% of flat rangelands in Kirikhan district, Hatay province [14].

Gokkus *et al.* (2009) determined protein ratio of green biomass in *Phillyrea*, *Quercus coccifera* shrub taxa 5.56-7.61% to 5.63-7.25%, respectively in Canakkale province, Turkey [20]. In Isparta province, 1 hectare shrub area, covered with *Quercus coccifera*, is sufficient for 4 goats during a grazing period [35].

Alaturk *et al.* (2014) as result of their study conducted in Canakkale with 9 different shrub species, *Phillyrea*, Kermes oak, Cyprus oak, Gorse, Genista, Sea grape, Pseudoacacia, Goat bilberry and Prickly juniper, they reported that some important traits were ranged as followings; crude protein content 5.34-16.31%; crude oil content 4.46-7.57%; tannin content 0.11-2.18%; NDF ratio 35.22-53.87%; ADF ratio 23.77-44.15% and ADL ratio 8.54-16.98% [2].

Çetiner *et al.* (2015) reported that pre-improvement and management studies, 20-50% of the rangeland were covered with shrubs in Gerlengec village, Biga district, Canakkale province, Turkey [12].

*Astragalus microcephalus* and *Astragalus macrocephalus* species were found in high parts of Karacadag Mountains, located in the Southeast Anatolia. Moreover, these *Astragalus* species had shrub form and they were main feed sources for goat and sheep herds in the zone [27]. *Alhagi pseudalhagi*, shrub taxa, covers in 0.6-0.8% in the botanical composition of the pasture lands of Bismil district, Diyarbakir province [30]. The Kermes oak (*Quercus coccifera*), having a shrub or small tree form and predominant species, was used in feeding of goats due to its low input by people of Aegean and Mediterranean regions of Turkey [39]. The most economical control can be done against weed species in the pasture lands of Turkey with using goats in grazing. In this context, the most problematic species are *Centaurea*, *Cirsium* and *Rumex* having herbaceous formation, and *Rubus*, *Rosa* and *Genista* having shrub formation [40].

In this review study some shrub and tree taxa found in the grassland-pasture lands and natural vegetation of Turkey were examined.

## 2. Plant Growth Forms and Status of the Taxa

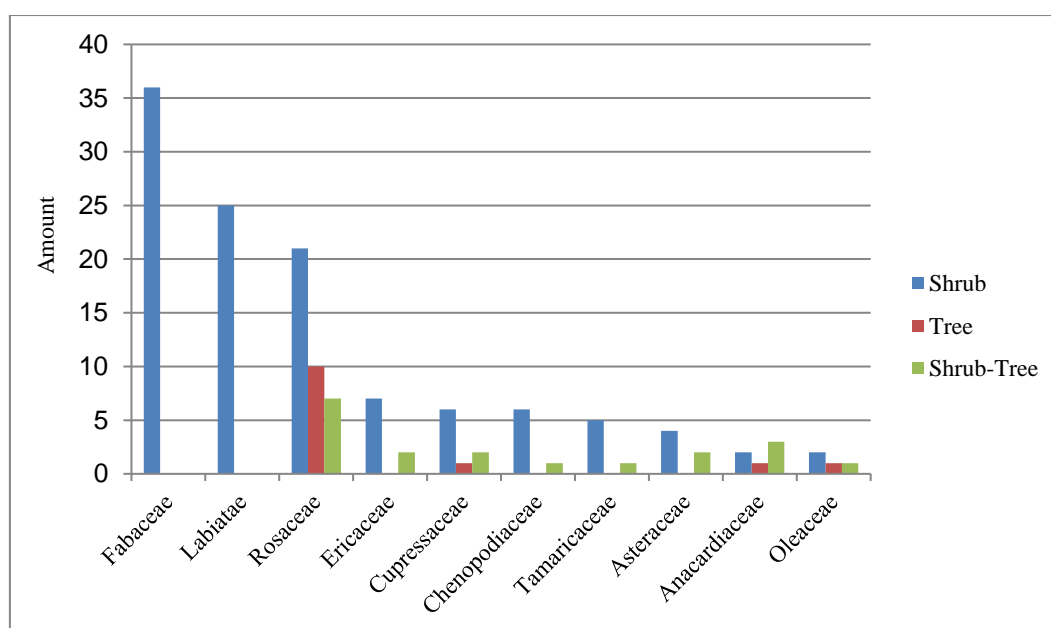
In this study, some species of shrub and tree taxa which have been determined by different researchers in the grassland-pasture areas and natural vegetation of Turkey have been summarized. In the study, Latin, Turkish, English names, growth habitus and taxa for each family are given in the Table 1 cited by previous studies [1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 22, 23, 24, 25, 27, 28, 29, 30, 31, 33, 34, 36, 37, 39, 40, 41 and 42]. Total 108 genus and 227 taxa belonging to 49 families in the grassland-pasture and natural vegetation of Turkey were determined (Table 1).

Detailed groupings were made by growth patterns of plant taxa (Table 1). The numbers of plant taxa in shrub forming were 107, and this indicated as the shrub (107). The other growth forms and taxa numbers were as followings; shrubby (17), half-shrubby (11), shrub or shrubby (6), half-shrub (4), scrub

shrub (2), shrub, half-shrub (2), shrub, dwarf-shrub (1), shrub, small shrub (1), shrub, aquatic shrub (1), shrub, half-shrubby (1), shrubby or half-shrubby (1), shrubby, shrub or woody-herb (1), small shrubby (1), small shrubby, herb or shrub (1), herb or half-shrub (1), herb or shrub (1), herb or shrubby (1), herbaceous-shrubby, half-shrub (1), wrapping shrub (1), creeping shrub (1), half-shrubby, shrubby (1), half-shrubby, herb or half-shrub (1) as "Shrub"; tree (17), shrub-tree (7), small tree (2), small shrub-tree (1) as "Trees" and shrub or tree (14), shrub or small tree-shrub (6), shrub or tree-shrub (3), shrub or tree (2), shrub or small tree (2), tree or shrub (1), tree or tall shrub (1), small shrub or shrub (1), shrub or scrub tree (1), shrub or small shrub-tree (1), shrub or rarely tree (1), shrub or rarely small tree (1), shrubby or woody (1).

The plant taxa were mainly grouped for three plant formations (Table 2). Plant taxa grouped; 165 taxa (72.7%) in shrub formation, 27 taxa (11.9%) in tree formation and 35 taxa (15.4%) in a transitional formation between shrub and tree formations.

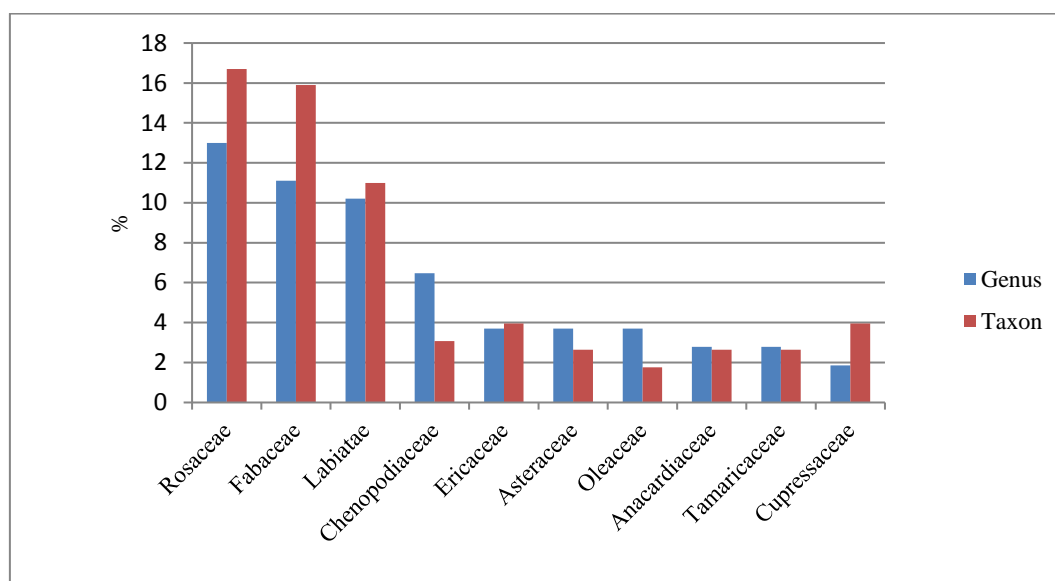
*Leguminosae (Fabaceae)* family is the first number family with 36 taxa. It was followed by *Labiatae (Lamiaceae)* and *Rosaceae* families with 25 and 21 shrub taxa, respectively. Even though 7 shrub taxa found in *Ericaceae* and *Rhamnaceae* families, 6 taxa found with shrub formation in *Chenopodiaceae* and *Cupressaceae* families. *Rosaceae* family (8 taxa) was the most numbers tree formation found taxa. It was followed by *Fagaceae*, *Salicaceae*, *Cannabaceae* families with 2 taxa, and *Cupressaceae*, *Anacardiaceae*, *Oleaceae*, *Cornaceae*, *Pinaceae* ve *Ulmaceae* with 1 taxa having tree formation and transitional formation between shrub and tree formations. The most taxa found in *Fagaceae* family with 5 taxa, it was followed by *Anacardiaceae* family with 3 taxa and *Ericaceae*, *Cupressaceae* and *Moraceae* families with 2 taxa (Table 2). Furthermore, the status of the 10 families in terms of numbers of taxa belonging to 3 formations, shrub, tree and shrub-tree is indicated in Figure 1.



**Figure 1.** Numbers of plant taxa for shrub, tree and shrub-tree formations in the the most 10 common plant Families

### 3. Important Shrubs Taxa and Families in Turkey

Among 49 plant family, *Rosaceae* family was found as possessing the most numbers in 14 genus (13.0%) and 38 taxa (16.7%). *Rosaceae* family was followed by *Leguminosae* (*Fabaceae*) in 12 genus (11.1%) and 36 taxa (15.6%), *Labiatae* (*Lamiaceae*) in 11 genus (10.2%) and 25 taxa (11.0%), *Chenopodiaceae* in 7 genus (6.48%) and 7 taxa (3.08%) and *Ericaceae* in 4 genus (3.70%) and 9 taxa (%3.96) (Table 2). In addition, the first 10 family, possessing the most number genus and taxa, were given in the Figure 2.



**Figure 2.** Numbers (%) of taxa and genus in the the most 10 common plant families, including shrub and tree forms plants

Among the taxa having shrub formation, the most found taxa is Kermes oak (*Quercus coccifera*) in Turkey. It was cited in 11 studies. It was followed by Black shrub (*Paliurus spina-christi*) (cited in 9 studies), Murt shrub (*Myrtus communis*) (cited in 7 studies), Thornburnet (*Sarcopoterium spinosum*), Blackberry (*Rubus sanctus*), Small-headed astragalus (*Astragalus microcephalus*) (cited in 6 studies), Hairy germander (*Teucrium polium*), Chaste (*Vitex agnus-castus*) and Common camel thorn (*Alhagi pseudalhagi*) (cited in 5 studies).

Also, one of the most remarkable points of this work was that 7 shrub taxa were found as endemic (END LR 1c). The endemic taxa were *Astragalus acicularis*, *Astragalus baibutensis*, *Astragalus condensatus*, *Astragalus cymbostegius*, *Genista aucheri*, *Rhamnus hirtellus* and *Veronica multifida*. On the other hand, 5 shrub taxa were found as non-endemic rare plants (NB VU) [16]. These non-endemic rare plants taxa were *Alhagi mannifera*, *Galium incanum*, *Globularia cordifolia*, *Salvia fruticosa*, *Thymus transcausicus* (Table 1) [16].

#### 4. Conclusions

Totally, 108 genus and 227 taxa were identified from 49 plant families in the scope of this study. It was also revealed that shrub, tree and transitional formation between shrub and tree formations had respectively 165 (72.7%) taxa, 27 taxa (11.9%) and 35 plant taxa (15.4%). Among all of the shrub taxa, the Kermes oak (*Quercus coccifera*), Black shrub (*Paliurus spina-christi*), Murt shrub (*Myrtus communis*), Thornburnet (*Sarcopoterium spinosum*), Blackberry (*Rubus sanctus*) and Small-headed astragalus (*Astragalus microcephalus*) have been the most reported taxa by the researchers in Turkey. In conclusion, long as uncontrolled and overgrazing continues in the grassland and pasture lands, quality forage crop species will disappear from these areas. The weeds and shrub taxa will continue to take the place of the quality forage plants.

**Table 1.** Some of the shrub and tree taxa found in the grassland-pasture and natural areas of Turkey (1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 22, 23, 24, 25, 27, 28, 29, 30, 31, 33, 34, 36, 37, 39, 40, 41 and 42)

Species Name	Life Forms	Turkish Name	English Name	Family
<i>Acantholimon acerosum</i> (Willd.) Boiss.	Shrubby	Sert kar dikenı, Çobanyastığı		Plumbaginaceae
<i>Acantholimon acerosum</i> (Willd.) Boiss. var. <i>acerosum</i>	Shrubby	Pisik geveni		Plumbaginaceae
<i>Acantholimon ulicinum</i> (Willd. Ex Schultes) Boiss.	Shrub, Small shrub	Pisik geveni, Çobanyastığı, Kurak kar dikenı	Prickly thrift	Plumbaginaceae
<i>Acantholimon venustum</i> Boiss.	Shrubby	Kar dikenı	Agrimony, Churchsteeples	Plumbaginaceae
<i>Acer monspessulanum</i> L.	Shrub or Scrub tree	Fransız akçağacı	Montpellier maple	Aceraceae
<i>Alhagi mannifera</i> Desv. (NB VU)	Shrub or Shrubby	Deve dikenı	Camelthorn	Leguminosae (Fabaceae)
<i>Alhagi pseudalhagi</i> (M.Bieb.) Desv.	Shrub or Shrubby	Adi deve dikenı, Kara yandık	Camelthorn	Leguminosae
<i>Amygdalus communis</i> L.	Shrub or Tree	Acıbadem ağacı	Almon Tree	Rosaceae
<i>Amygdalus orientalis</i> Miller	Shrub	Keçi bademi	Goad almond	Rosaceae
<i>Arbutus andrachne</i> L.	Shrub	Sandal ağacı, Hartlap	Strawberry tree	Ericaceae
<i>Arbutus unedo</i> L.	Shrub	Dağ çileği, Kocayemiş	Strawberry tree	Ericaceae
<i>Artemisia absinthium</i> L.	Half shrubby	Pelin otu, Acı yavşan, Ak pelin, Büyük yavşan otu	Absinthium	Compositae (Asteraceae)
<i>Artemisia santonicum</i> L.	Half shrubby, Shrubby	Yavşan otu, Deniz yavşanı, Deniz pelini, Kokulu yavşan	Sagebrush	Compositae
<i>Asparagus acutifolius</i> L.	Shrubby	Çıtır, Tilkişen, Acı ot, Dikenli acı ot, Kırgın otu, Yabani kuşkonmaz,		Liliaceae
<i>Astragalus acicularis</i> Bunge (END LR lc)	Shrub			Leguminosae
<i>Astragalus andrachneifolius</i> Fenzl	Shrub	Geven	Astragale	Leguminosae
<i>Astragalus aureus</i> Willd.	Shrub	Sarıççekli geven, Altın geveni	Astragale	Leguminosae
<i>Astragalus baibutensis</i> Bunge (END LR lc)	Shrub	Geven	Milk-vetch	Leguminosae
<i>Astragalus condensatus</i> Ledeb. (END LR lc)	Shrub	Yastıklı geven		Leguminosae
<i>Astragalus cymbostegius</i> Bun. (END LR lc)	Shrub	Geven	Astragale	Leguminosae
<i>Astragalus gummifer</i> Lab.	Shrub or Shrubby	Geven, Ak geven, Sakız geveni, Püs geveni, Zamk geveni	Gum tragacanth	Leguminosae
<i>Astragalus lagurus</i> Willd.	Shrub	Tüy başlı geven	Astragale	Leguminosae
<i>Astragalus macrocephalus</i> Willd.	Shrub or Shrubby	Küçükbaşlı geven, Boz geven, Kara geven	Astragale	Leguminosae
<i>Astragalus microcephalus</i> Willd.	Shrub or Shrubby	Küçükbaşlı geven, Boz geven, Kara geven	Astragale	Leguminosae
<i>Astragalus ponticus</i> Pallas	Half shrubby	Karadeniz geveni, Laz geveni	Pontic milk-vetch, Astragale	Leguminosae
<i>Astragalus prusianus</i> Boiss.	Shrub			Leguminosae
<i>Astragalus trojanus</i> Stev.	Shrub, Half shrubby	Truva geveni		Leguminosae
<i>Astragalus wiedemannianus</i> Fischer	Shrub			Leguminosae
<i>Atriplex halimus</i> L.	Shrub	Yabani pazı, Parlak karapazı	Orache	Chenopodiaceae
<i>Berberis crataegina</i> DC.	Shrub	Adi hanımtuzluğu, Siyah meyveli hanımtuzluğu, Karamuk	Barberry, Cretan barberry	Berberidaceae
<i>Berberis cretica</i> L.	Shrub	Siyah meyveli hanımtuzluğu	Barberry	Berberidaceae
<i>Berberis integerrima</i> Bunge	Shrub	Hanımtuzluğu, Karamuk	Barberry	Berberidaceae
<i>Berberis vulgaris</i> L.	Shrub	Dağ kadımtuzluğu, Anberparis, Karamuk, Zibike	Common barberry, European barberry	Berberidaceae
<i>Buxus sempervirens</i> L.	Shrub	Şimşir	Common box, European box	Buxaceae
<i>Calicotome infesta</i> (C. Presl) Guss.	Shrub			Leguminosae
<i>Calicotome villosa</i> (Poiret) Link	Shrub			Leguminosae
<i>Camphorosma monspeliaca</i> L.	Shrub			Chenopodiaceae
<i>Capparis ovata</i> Desf.	Half shrub	Kapari, Kebere, Gebele	Caper bush, Common caper	Capparaceae
<i>Capparis ovata</i> Desf. var. <i>canescens</i>	Shrub, Half shrub	Kebere, Gebre otu, Kapari	Caper bush	Capparaceae
<i>Capparis ovata</i> Desf. var. <i>herbaceae</i>	Shrub, Half shrub	Kebere, Kapari	Caper bush	Capparaceae



<i>Capparis spinosa</i> L.	Shrub	Kapari, Gebere, Kedi tırnağı	Caper	<i>Capparaceae</i>
<i>Capparis spinosa</i> L. var. <i>spinosa</i>	Half shrub	Kebere, Kapari	Caper	<i>Capparaceae</i>
<i>Caragana grandiflora</i> (Bieb.) DC.	Shrub			<i>Leguminosae</i>
<i>Carpinus betulus</i> L.	Tree	Karagürgen, Orsit	European hornbeam	<i>Betulaceae</i>
<i>Celtis glabrata</i> Steven ex Planchon	Tree	Çitlenbik, Dardağan		<i>Cannabaceae</i>
<i>Celtis tournefortii</i> Lam.	Tree	Çitlenbik, Dardağan		<i>Cannabaceae</i>
<i>Cerasus microcarpa</i> (C.A. Meyer) Boiss. subsp. <i>tortuosa</i> (Boiss. & Hausskn.) Browicz	Small tree			<i>Rosaceae</i>
<i>Chamaecytisus pygmaeus</i> (Willd.) Rothm.	Shrub			<i>Leguminosae</i>
<i>Cistus creticus</i> L.	Shrub	Karağan	Cretan rockrose	<i>Cistaceae</i>
<i>Cistus erectus</i> L.	Tree	Laden		<i>Cistaceae</i>
<i>Cistus salviifolius</i> L.	Shrub	Adaçayı yapraklı laden		<i>Cistaceae</i>
<i>Clematis orientalis</i> L.	Wrapping shrub		Clematis	<i>Ranunculaceae</i>
<i>Colutea cilicica</i> Boiss. & Balansa	Shrub	Patlangaç	Blander senna	<i>Leguminosae</i>
<i>Coridothymus capitatus</i> (L.) Rchb. Fil.	Small shrubby	Bal kekiği		<i>Labiatae (Lamiaceae)</i>
<i>Cornus sanguinea</i> L.	Small shrub-Tree	Kızılçik	Common dogwood	<i>Cornaceae</i>
<i>Cotinus coggyria</i> Scop.	Shrub	Boyacı sumağı, Duman ağacı	Red smoke bloom, Smoke brush	<i>Anacardiaceae</i>
<i>Cotoneaster integerrimus</i> Medik.	Shrub	Dağ muşmulası	Cotoneaster	<i>Rosaceae</i>
<i>Cotoneaster nummularia</i> Fisch. & C.A. Mey.	Shrub or Tree	Dağ muşmulası		<i>Rosaceae</i>
<i>Crataegus aronia</i> (L.) Bosc. ex DC. var. <i>aronia</i>	Small tree	Alıç	Hawthorn	<i>Rosaceae</i>
<i>Crataegus curvisepala</i> Lindm.	Shrub or Tree			<i>Rosaceae</i>
<i>Crataegus microphylla</i> C. Koch	Shrub			<i>Rosaceae</i>
<i>Crataegus monogyna</i> Jacq.	Small tree	Alıç, Adi alıç, Akdiken, Adi akdiken, Yemişen	Oriental Thorn - large yellow/red haw, Hawthorn	<i>Rosaceae</i>
<i>Crataegus monogyna</i> Jacq. subsp. <i>monogyna</i>	Small tree	Alıç	Hawthorn	<i>Rosaceae</i>
<i>Crataegus orientalis</i> Pallas ex Bieb. var. <i>orientalis</i>	Small tree	Alıç	Hawthorn	<i>Rosaceae</i>
<i>Crataegus orientalis</i> Pallas ex M. Bieb.	Small tree	Alıç	Hawthorn	<i>Rosaceae</i>
<i>Crataegus pentagyna</i> Waldst. et Kit. ex Willd.	Shrub or Shrub-tree			<i>Rosaceae</i>
<i>Cytisopsis dorycnifolia</i> Jaub. et Spach	Shrub			<i>Leguminosae</i>
<i>Cytisus triflorus</i> L'Hérit.	Shrub			<i>Cistaceae</i>
<i>Daphne glomerata</i> Lam.	Shrub, Dwarf shrub	Kurtbağı, Sırımbağı	Daphne	<i>Thymelaeaceae</i>
<i>Daphne gnidioides</i> Jaub. et Spach.	Shrub	Defne, Develik, Havaza	Daphne	<i>Thymelaeaceae</i>
<i>Daphne oleoides</i> Shreber	Shrub	Zeytin defnesi, Havadana	Garland-flowered mezereon	<i>Thymelaeaceae</i>
<i>Daphne pontica</i> L.	Shrub	Karadeniz yabani defnesi, Kurtbağı	Twin-flowered daphne	<i>Thymelaeaceae</i>
<i>Daphne sericea</i> Vahl.	Shrub	İpeksi defne		<i>Thymelaeaceae</i>
<i>Ditrichia viscosa</i> (L.) Greuter	Shrubby	Andız otu		<i>Compositae</i>
<i>Dorycnium graecum</i> (L.) Ser.	Her or Half shrub	Tüylü yanık üçgülü, Kaplan otu	Canary clover, Trefoil	<i>Leguminosae</i>
<i>Dorycnium hirsutum</i> (L.) Ser.	Herb or Shrub	Ege yanık üçgülü	Gray brom, Hairy canary clover	<i>Leguminosae</i>
<i>Dorycnium pentaphyllum</i> Scop.	Small shrubby, Herb or Shrub	Zehirli yonca, Sarılık yonca	Dorycnium, Socarrillo	<i>Leguminosae</i>
<i>Elaeagnus angustifolia</i> L.	Shrub-Tree or Shrub	İğde	Russian olive	<i>Eleagnaceae</i>
<i>Ephedra campylopoda</i> C.A. Meyer	Creeping Shrub	Deniz üzümü	Ephedra	<i>Ephedraceae</i>
<i>Ephedra majör</i> Host.	Shrub, Aquatic shrub	Deniz üzümü, Hum	Ma huang	<i>Ephedraceae</i>
<i>Erica arborea</i> L.	Shrub	Süprüge ağ		<i>Ericaceae</i>
<i>Erica manipuliflora</i> Salisb.	Shrub	Funda	Heather	<i>Ericaceae</i>
<i>Eriolobus trilobatus</i> (Poiret) Roemer	Small tree	At elması, Ateş diken, Ateş yaprağı	Wild apple tree	<i>Rosaceae</i>
<i>Ficus carica</i> L.	Shrub or Tree	İncir	Fig tree	<i>Moraceae</i>
<i>Ficus carica</i> L. subsp. <i>rupestris</i> (Hausskn.) Browicz	Shrub or Tree	İncir	Fig tree	<i>Moraceae</i>
<i>Frankenia hirsuta</i> L.	Herb or Shrubby	Tüylü deniz fundası	Sea heathweed	<i>Frankeniaceae</i>
<i>Fraxinus angustifolia</i> Vahl. subsp. <i>angustifolia</i>	Tree	Dışbudak		<i>Oleaceae</i>
<i>Galium incanum</i> Sibth. & Sm. (NB VU)	Half shrubby, Herb or Half shrub	Yarı çalı yoğurtotu	Bedstraw	<i>Rubiaceae</i>
<i>Genista albida</i> Willd.	Shrub	Katırtırnağı	Soap wort	<i>Leguminosae</i>
<i>Genista anatolica</i> Boiss.	Shrub	Boyacı katırtırnağı		<i>Leguminosae</i>
<i>Genista aucheri</i> Boiss. (END LR lc)	Shrub	Anadolu katırtırnağı, Anadolu boya çalısı	Petty whin, Anatolian needle furze	<i>Leguminosae</i>
<i>Genista carinalis</i> Gris.	Shrub	Katırtırnağı		<i>Leguminosae</i>
<i>Genista lydia</i> Boiss.	Shrub	Lıdya katırtırnağı	Lydian needle furze	<i>Leguminosae</i>
<i>Genista sessifolia</i> DC.	Shrub	Katırtırnağı, Boyacı katırtırnağı	Greenweed, Needl Furze	<i>Leguminosae</i>
<i>Genista tinctoria</i> L.	Shrub	Boyacı katırtırnağı		<i>Leguminosae</i>
<i>Genista vuralii</i> A. Duran & H. Dural	Shrub	Katırtırnağı	Greenweed, Needl Furze	<i>Leguminosae</i>
<i>Globularia cordifolia</i> L. (NB VU)	Shrub			<i>Globulariaceae</i>
<i>Halimione portulacoides</i> (L.) Aellen	Shrub	Çorak otu, Tuzlu yalancı palı	See purslane	<i>Chenopodiaceae</i>
<i>Halocnemum strobilaceum</i> (Pall.) Bieb.	Scrub shrub	Çuvan, Acı ot		<i>Chenopodiaceae</i>
<i>Halostachys belangeriana</i> (Moq.) Botsch.	Shrub or Small tree			<i>Chenopodiaceae</i>
<i>Hippophae rhamnoides</i> L.	Shrub	Yabani iğde	Seabuckthorn, Sanddorn	<i>Eleagnaceae</i>
<i>Hypericum scabrum</i> L.	Shrubby	Kaba kuzu kıran	St. Jonswort	<i>Guttiferae (Hypericaceae)</i>
<i>Ilex colchica</i> Poj.	Shrub or Tree	Çobanpüskülü	English holly	<i>Aquifoliaceae</i>
<i>Jasminum fruticans</i> L.	Shrub	Yabani yasemen, Boruk, Borumuk, Karaporuk	Wild jasmine	<i>Oleaceae</i>
<i>Juniperus communis</i> L.	Shrub	Adi ardıç, Bodur ardıç	Common juniper	<i>Cupressaceae</i>
<i>Juniperus communis</i> L. subsp. <i>nana</i> Syme	Shrub	Adi ardıç, Bodur ardıç	Common juniper	<i>Cupressaceae</i>
<i>Juniperus excelsa</i> M. Bieb.	Shrub	Boylu ardıç		<i>Cupressaceae</i>
<i>Juniperus foetidissima</i> Willd.	Shrub	Kokulu ardıç		<i>Cupressaceae</i>
<i>Juniperus irombinus</i>	Shrub			<i>Cupressaceae</i>
<i>Juniperus oxycedrus</i> L.	Shrub or Small tree	Katran ardıcı	Prickly juniper, Prickly cedar	<i>Cupressaceae</i>

<i>Juniperus phoenicia</i> L.	Shrub-Tree	Finike ardıcı	Juniper	<i>Cupressaceae</i>
<i>Juniperus sabina</i> L.	Scrub shrub	İtalyan ardıcı, Sabin ardıcı	Savin, Savine	<i>Cupressaceae</i>
<i>Kochia prostrata</i> (L.) Schrad.	Shrubby or Half shrubby	Süprüge otu, Adi bozkır otu	Summer cypress, Mock cypress, fireweed	<i>Chenopodiaceae</i>
<i>Laurus nobilis</i> L.	Shrub or Tree	Defne, Har, Nehtel, Tahnal, Tefrün, Tehnel, Tenel		<i>Lauraceae</i>
<i>Linum aronianum</i> Boiss. et Orph.	Half shrub			<i>Linaceae</i>
<i>Lonicera xylosteum</i> L.	Shrub	Hanımeli	Fly honeysuckle	<i>Caprifoliaceae</i>
<i>Malus communis</i> L.	Tree	Elma	Apple	<i>Rosaceae</i>
<i>Myricaria germanica</i> (L.) Desv.	Shrub	Alman ılgını, Yalancı ılgın	False tamarisk	<i>Tamaricaceae</i>
<i>Myrtus communis</i> L.	Shrub	Mersin, Murt, Murt çalısı	Myrtle	<i>Myrtaceae</i>
<i>Nerium oleander</i> L.	Shrub	Zakkum	Oleander	<i>Apocynaceae</i>
<i>Nitraria schoberi</i> L.	Shrub			<i>Zygophyllaceae</i>
<i>Noaea mucronata</i> (Forssk.) Aschers. et Sch.	Shrub	Dikenli ölmez otu	Goosefoots	<i>Chenopodiaceae</i>
<i>Oenanthe silaifolia</i> Bieb.	Shrub	Damla otu	Narrow-leaved water-dropwort, Sulpherwort	<i>Umbelliferae</i>
<i>Olea europaea</i> L.	Shrub	Yabani zeytin, Delice	Wild olive	<i>Oleaceae</i>
<i>Onobrychis cornuta</i> (L.) Desv.	Shrub or Shrubby	Boynuzlu korunga, Dağ çöveni		<i>Leguminosae</i>
<i>Origanum onites</i> L.	Herbaceous-Shrubby, Half shrub	İzmir kekiği, Kaba tüylü mercanköşk	Cretan oregano, Rhigani, Pot marjoram	<i>Labiatae</i>
<i>Origanum sipyleum</i> L.	Half shrub	Bayır Çayı, Güvey otu		<i>Labiatae</i>
<i>Origanum syriacum</i> L.	Shrubby	Dağ kekiği	Syrian oregano	<i>Labiatae</i>
<i>Paliurus spina-christi</i> Miller	Shrub	Karaçalı, Çalı diken, Çaltı diken, Çeşmezen, İsa diken, Kara çaltı, Kara diken, Kışla diken, Kunar,	Jarusalem thorn, Garland thorn	<i>Rhamnaceae</i>
<i>Phillyrea latifolia</i> L.	Shrub or Small tree	Kesme, Akçakesme, Akçe kesme		<i>Oleaceae</i>
<i>Phlomis kotschyana</i> Hub. -Mor.	Shrubby	Kudüs adaçayı	Jarusalem sage	<i>Labiatae</i>
<i>Pinus nigra</i> Arn. subsp. <i>pallasiana</i> (Lamb.) Holmboe	Tree	Anadolu karaçamı		<i>Pinaceae</i>
<i>Pinus nigra</i> J. F. Arnold	Tree	Çam ağacı		<i>Pinaceae</i>
<i>Pistacia atlantica</i> Desv.	Tree or Shrub	Atlas sakız ağacı	Atlas mastic tree	<i>Anacardiaceae</i>
<i>Pistacia khinjuk</i> Stocks	Tree	Melengiç		<i>Anacardiaceae</i>
<i>Pistacia lentiscus</i> L.	Shrub or Shrub-Tree	Sakız ağacı, Akçakesme, Sakızağacı	Mastic tree	<i>Anacardiaceae</i>
<i>Pistacia terebinth</i> L.	Shrub or Small tree	Çitlenbik, Melengiç	Terebinth, Terebinth Tree	<i>Anacardiaceae</i>
<i>Polygala comosa</i> Schkuhr	Shrubby	Sütotu	Tufted milkwort	<i>Polygalaceae</i>
<i>Polygala pruinosa</i> Boiss.	Half shrubby	Anadolu süt otu, Haç çiçeği, Yılan yoncası	Milkwort	<i>Polygalaceae</i>
<i>Populus tremula</i> L.	Tree	Titrek kavak	Trembling poplar	<i>Salicaceae</i>
<i>Potentilla fruticosa</i> L.	Shrub	Parmak otu		<i>Rosaceae</i>
<i>Prasium majus</i> L.	Shrub			<i>Labiatae</i>
<i>Prosopis farcta</i> (Banks et Sol.) Macbride	Shrub	Çeti, Çedi		<i>Leguminosae</i>
<i>Prunus amygdalus</i> Batsch	Shrub or Tree	Badem ağacı		<i>Rosaceae</i>
<i>Prunus cerasus</i> L.	Shrub or Small tree	Vişne ağacı	Cherry	<i>Rosaceae</i>
<i>Prunus divaricata</i> Ledeb.	Shrub	Yunus eriği		<i>Rosaceae</i>
<i>Prunus domestica</i> L.	Shrub or Tree	Erik ağacı	Plum tree	<i>Rosaceae</i>
<i>Prunus spinosa</i> L.	Shrub	Çakaleriği, Güvem	Blackthorn	<i>Rosaceae</i>
<i>Ptilostemon chamaepeuce</i> (L.) Less.	Shrub	Pembe tüyercik		<i>Compositae</i>
<i>Pyrus elaeagnifolia</i> L.	Tree	Ahlat	Wild pear	<i>Rosaceae</i>
<i>Pyrus syriaca</i> Boiss. var. <i>syriaca</i>	Tree	Ahlat, Yabani armut		<i>Rosaceae</i>
<i>Quercus brantii</i> Lindley	Tree	Meşe		<i>Fagaceae</i>
<i>Quercus cerris</i> L.	Shrub or Small tree	Türk meşesi, Saçlı meşe	Turkey oak	<i>Fagaceae</i>
<i>Quercus coccifera</i> L.	Shrub or Small tree	Kermes meşesi	Kermes oak	<i>Fagaceae</i>
<i>Quercus ilex</i> L.	Tree or Tall shrub	Çalı meşesi, Karagan, Pırnal meşesi, Pırnar		<i>Fagaceae</i>
<i>Quercus infectoria</i> Olivier subsp. <i>boissieri</i> (Reuter) O. Schwarz	Tree	Meşe		<i>Fagaceae</i>
<i>Quercus macrolepis</i> Kotschy	Shrub or Tree	Palamut, Pullu meşe	Valonia oak	<i>Fagaceae</i>
<i>Quercus petraea</i> (Matt.) Lieb.	Shrub or Small tree	Sapsız meşe	Durmast oak, Sessile oak	<i>Fagaceae</i>
<i>Quercus pubescens</i> Willd.	Small tree	Tüylü Meşe		<i>Fagaceae</i>
<i>Quercus robur</i> L.	Shrub or Tree	Saplı meşe, Adi meşe	Common oak, English oak	<i>Fagaceae</i>
<i>Quercus trojana</i> P.B. Webb	Tree	Makedonya Meşesi		<i>Fagaceae</i>
<i>Reaumuria alternifolia</i> (Lab.) Britten	Shrub	Kör diken		<i>Tamaricaceae</i>
<i>Rhamnus hirtellus</i> Boiss. (END LR lc)	Shrub	Cehri, Karaçalı		<i>Rhamnaceae</i>
<i>Rhamnus oleoides</i> L.	Shrubby	Kör diken		<i>Rhamnaceae</i>
<i>Rhamnus pallasii</i> Fisch. & C.A. Mey.	Shrub	Cehri	Buckthorn	<i>Rhamnaceae</i>
<i>Rhamnus rhodopeus</i> Velenovsky	Shrub			<i>Rhamnaceae</i>
<i>Rhamnus saxatilis</i> Jacq.	Shrub		Rock buckthorn	<i>Rhamnaceae</i>
<i>Rhamnus tomentella</i> Benth.	Shrub			<i>Rhamnaceae</i>
<i>Rhododendron caucasicum</i> Pallas	Shrub	Komar, Orman gülü	Rhododendron	<i>Ericaceae</i>
<i>Rhododendron luteum</i> Sweet	Shrub	Komar, Orman gülü	Rhododendron	<i>Ericaceae</i>
<i>Rhododendron ponticum</i> L.	Shrub or Tree	Ağu, Komar, Orman gülü, Kafıl, Kafıl, Kara ağ, Zelenika	Rhododendron	<i>Ericaceae</i>
<i>Rhododendron ungerii</i> Trautv.	Shrub or Small tree	Komar, Orman gülü	Rhododendron	<i>Ericaceae</i>
<i>Rhus coriaria</i> L.	Shrub	Adi sumak	Sicilian sumac	<i>Anacardiaceae</i>
<i>Ribes aureum</i> Prush	Shrub	Frenk üzümü, Sarı bektasıüzümü	Golden currant	<i>Glossulariaceae</i>
<i>Rosa canina</i> L.	Shrub	Yabani gül, Kuşburnu, İtburnu, Köpekgülü	Dog rose, Wild rose, Heprose	<i>Rosaceae</i>
<i>Rosa dumalis</i> Bechst.	Shrub	Yabani gül, Kuşburnu,	Glaucous Dog rose	<i>Rosaceae</i>
<i>Rosa hemisphaerica</i> J. Herrm.	Shrub	Sarıçiçekli yaban gülü	Yellow flowers wild rose	<i>Rosaceae</i>
<i>Rosa micrantha</i> Sm.	Shrub	Kuşburnu	Smallflower sweetbrier	<i>Rosaceae</i>
<i>Rosa montana</i> Chaix	Shrub	Dağ gülü		<i>Rosaceae</i>



<i>Rosa pulverulenta</i> Bieb.	Shrub	Yabani gül	Wild rose	<i>Rosaceae</i>
<i>Rosa sempervirens</i> L.	Shrub	Deli gül, Yabani gül		<i>Rosaceae</i>
<i>Rubus caesius</i> L.	Shrub			<i>Rosaceae</i>
<i>Rubus canescens</i> DC.	Shrub	Böğürtlen	Blackberry	<i>Rosaceae</i>
<i>Rubus discolor</i> Weihe et Nees.	Shrub	Himalaya böğürtleni	Himalayan blackberry, Himalayaberry	<i>Rosaceae</i>
<i>Rubus fruticosus</i> L.	Shrub	Böğürtlen		<i>Rosaceae</i>
<i>Rubus sanctus</i> Schreber	Shrub	Böğürtlen, Kutsal böğürtlen, Mora diken	Blackberry	<i>Rosaceae</i>
<i>Ruscus aculeatus</i> L.	Shrub	Tavşan kirazı	Butcher's brome	<i>Rosaceae</i>
<i>Ruta chalepensis</i> L.	Half shrubby	Sedef otu, Kokarsedef		<i>Rutaceae</i>
<i>Salix alba</i> L.	Tree	Aksöğüt	White willow	<i>Salicaceae</i>
<i>Salix triandra</i> L.	Shrubby or Shrub-Tree	Badem yapraklı söğüt	Almond willow	<i>Salicaceae</i>
<i>Salvia fruticosa</i> Miller (NB VU)	Shrubby	Adaçayı	Triloba sage	<i>Labiatae</i>
<i>Salvia pachystachys</i> Trautv.	Shrubby, Shrub or Woody-herb	Kalın başaklı adaçayı	Rough-spike sage	<i>Labiatae</i>
<i>Sarcopoterium spinosum</i> (L.) Spach	Shrub	Aptesbozan		<i>Rosaceae</i>
<i>Satureja juliana</i> L.	Shrubby	Çalimsı geyik otu	Savory, Micromeria	<i>Labiatae</i>
<i>Satureja parnassica</i> Heldr.& Sart. ex Boiss.	Shrubby	Sipil geyik otu		<i>Labiatae</i>
<i>Satureja spicigera</i> (C. Koch) Boiss.	Shrubby	Trabzon kekiği	Savory	<i>Labiatae</i>
<i>Satureja thymbra</i> L.	Shrubby	Pembe geyikotu	Pink savory, Barrel sweetener	<i>Labiatae</i>
<i>Sorbus aria</i> (L.) Crantz	Shrub	Kocakarı yemişi	Common whitebeam	<i>Rosaceae</i>
<i>Spartium junceum</i> L.	Shrub	Katırtırnağı, Saz kaytanotu Borcak, Borçoh, Boruk, Kuş çubuğu	Spanish brom, Weaver's broom	<i>Leguminosae</i>
<i>Stachys iberica</i> Bieb.	Half shrubby	Dağ çayı	Woundwort, Lamb's Ear	<i>Labiatae</i>
<i>Stachys iberica</i> Bieb. subsp. <i>stenostachya</i> (Boiss.) Rech.	Half shrubby			<i>Labiatae</i>
<i>Stachys lavandulifolia</i> Vahl.	Half shrubby	Mor çiçekli karabaş otu, Eşek otu, Tokalı çay, Tüylü çay	Woundwort, Lamb's Ear	<i>Labiatae</i>
<i>Styrax officinalis</i> L.	Shrub or Rarely tree	Ayı fındığı, Çakıldak, Tespih ağacı	Styrax tree	<i>Styracaceae</i>
<i>Tamarix articulata</i> Vahl.	Shrub or Tree		Athel tamarisk	<i>Tamaricaceae</i>
<i>Tamarix parviflora</i> DC.	Shrub	İlgün	Tamarisk	<i>Tamaricaceae</i>
<i>Tamarix smyrnenis</i> Bunge.	Shrub	İlgün	Tamarisk	<i>Tamaricaceae</i>
<i>Tamarix tetrandra</i> Pallas ex M. Bieb.	Shrub	İlgün	Tamarisk	<i>Tamaricaceae</i>
<i>Tanacetum abrotanifolium</i> (L.) Druce	Shrub or Tree	Ala renkli solucan otu		<i>Compositae</i>
<i>Tanacetum armenum</i> (DC.) Schultz Bip.	Shrub or Tree	Gümüşdüğme	Feverfew, Featherfew, Flirtwort	<i>Compositae</i>
<i>Teucrium chanaedrys</i> L.	Half shrubby	Yer meşesi, Bodur meşe	Germander, Wall germander	<i>Labiatae</i>
<i>Teucrium pollium</i> L.	Half shrubby	Mayasıl otu, Taş kekiği, Acı ot, Ak sedef otu, Anababa kekiği	Hairy germander	<i>Labiatae</i>
<i>Thuja orientalis</i> L.	Shrub or Tree	Doğu mazısı	Morpankhi, Thujone	<i>Cupressaceae</i>
<i>Thymbra spicata</i> L.	Shrub	Karabaş kekik	Spiked thyme	<i>Labiatae</i>
<i>Thymus fallax</i> Fisch. et C.A. Mey.	Shrub			<i>Labiatae</i>
<i>Thymus kotschyanus</i> Boiss. et Hohen.	Shrub			<i>Labiatae</i>
<i>Thymus leucotrichus</i> Hal.	Shrub			<i>Labiatae</i>
<i>Thymus sipyleus</i> Boiss.	Shrubby	Yastıklı kekik		<i>Labiatae</i>
<i>Thymus transcaucasicus</i> Ronniger (NB VU)	Shrub			<i>Labiatae</i>
<i>Thymus zygoides</i> Griseb.	Shrub			<i>Labiatae</i>
<i>Ulmus minor</i> Miller	Tree	Ova karaağacı, Gürgen yapraklı karaağaç	Smooth leaved elm, English elm	<i>Ulmaceae</i>
<i>Vaccinium arctostaphylos</i> L.	Shrub	Yaban mersini, Ayı üzümü	Caucasian whortleberry	<i>Ericaceae</i>
<i>Veronica multifida</i> L. (END LR lc)	Half shrubby	Yavşan otu, Ventüs çiçeği	Speedwell	<i>Scrophulariaceae</i>
<i>Viburnum lantana</i> L.	Shrub	Germişek, Germeşik, Germeşe	Wayfaring tree	<i>Caprifoliaceae</i>
<i>Viburnum opulus</i> L.	Shrub or Small shrub-Tree	Kartopu, Geleboru, Girabolu	Wayfaring tree	<i>Caprifoliaceae</i>
<i>Vincetoxicum hircundinaria</i> Medicus	Shrubby	Panzehir otu, Kırlangıç otu	Swallow wort	<i>Asclepiadaceae</i>
<i>Vitex agnus-castus</i> L.	Shrub or Rarely small tree	Hayıt, İffet ağacı, Rahip biberi	Chaste tree	<i>Verbenaceae</i>
<i>Ziziphora clinopodioides</i> Lam.	Half shrubby	Dağ reyhanı, Kır nanesi, Nane ruhu	Persian wild thyme	<i>Labiatae</i>

END LR lc: Endemic Plants, NB VU: Non-Endemic Rare Plants

**Table 2.** Numbers of families, genus and taxa with growth forms and ratios (%) of some shrub and Tree species found in the grassland-pasture and natural areas of Turkey

	Family	Genus	%	Taxa	%	Life Forms
1	<i>Rosaceae</i>	14	13.0	38	16.7	Shrub (21), Tree (10), Shrub or Tree (7)
2	<i>Leguminosae (Fabaceae)</i>	12	11.1	36	15.9	Shrub (36)
3	<i>Labiatae (Lamiaceae)</i>	11	10.2	25	11.0	Shrub (25)
4	<i>Chenopodiaceae</i>	7	6.48	7	3.08	Shrub (6), Shrub or Tree (1)
5	<i>Ericaceae</i>	4	3.70	9	3.96	Shrub (7), Shrub or Tree (2)
6	<i>Compositae (Asteraceae)</i>	4	3.70	6	2.64	Shrub (4), Shrub or Tree (2)
7	<i>Oleaceae</i>	4	3.70	4	1.76	Shrub (2), Tree (1), Shrub or Tree (1)
8	<i>Anacardiaceae</i>	3	2.78	6	2.64	Shrub (2), Tree (1), Shrub or Tree (3)
9	<i>Tamaricaceae</i>	3	2.78	6	2.64	Shrub (5), Shrub or Tree (1)
10	<i>Cupressaceae</i>	2	1.85	9	3.96	Shrub (6), Tree (1), Shrub or Tree (2)
11	<i>Rhamnaceae</i>	2	1.85	7	3.08	Shrub (7)
12	<i>Cistaceae</i>	2	1.85	4	1.76	Shrub (3), Tree (1)
13	<i>Caprifoliaceae</i>	2	1.85	3	1.32	Shrub (2), Shrub or Tree (1)

14	Salicaceae	2	1.85	3	1.32	Tree (2), Shrub or Tree (1)
15	Eleagnaceae	2	1.85	2	0.88	Shrub (1), Shrub or Tree (1)
16	Fagaceae	1	0.93	10	4.41	Tree (4), Shrub or Tree (6)
17	Capparaceae	1	0.93	5	2.2	Shrub (5)
18	Thymelaeaceae	1	0.93	5	2.2	Shrub (5)
19	Berberidaceae	1	0.93	4	1.76	Shrub (4)
20	Plumbaginaceae	1	0.93	4	1.76	Shrub (4)
21	Cannabaceae	1	0.93	2	0.88	Tree (2)
22	Ephedraceae	1	0.93	2	0.88	Shrub (2)
23	Moraceae	1	0.93	2	0.88	Shrub or Tree (2)
24	Pinaceae	1	0.93	2	0.88	Tree (2)
25	Polygalaceae	1	0.93	2	0.88	Shrub (2)
26	Aceraceae	1	0.93	1	0.44	Shrub or Tree (1)
27	Apocynaceae	1	0.93	1	0.44	Shrub (1)
28	Aquifoliaceae	1	0.93	1	0.44	Shrub or Tree (1)
29	Asclepiadaceae	1	0.93	1	0.44	Shrub (1)
30	Betulaceae	1	0.93	1	0.44	Tree (1)
31	Buxaceae	1	0.93	1	0.44	Shrub (1)
32	Cornaceae	1	0.93	1	0.44	Tree (1)
33	Frankeniaceae	1	0.93	1	0.44	Shrub (1)
34	Globulariaceae	1	0.93	1	0.44	Shrub (1)
35	Glossulariaceae	1	0.93	1	0.44	Shrub (1)
36	Guttiferae (Hypericaceae)	1	0.93	1	0.44	Shrub (1)
37	Lauraceae	1	0.93	1	0.44	Shrub or Tree (1)
38	Liliaceae	1	0.93	1	0.44	Shrub (1)
39	Linaceae	1	0.93	1	0.44	Shrub (1)
40	Myrtaceae	1	0.93	1	0.44	Shrub (1)
41	Ranunculaceae	1	0.93	1	0.44	Shrub (1)
42	Rubiaceae	1	0.93	1	0.44	Shrub (1)
43	Rutaceae	1	0.93	1	0.44	Shrub (1)
44	Scrophulariaceae	1	0.93	1	0.44	Shrub (1)
45	Syracaceae	1	0.93	1	0.44	Shrub or Tree (1)
46	Ulmaceae	1	0.93	1	0.44	Tree (1)
47	Umbelliferae	1	0.93	1	0.44	Shrub (1)
48	Verbenaceae	1	0.93	1	0.44	Shrub or Tree (1)
49	Zygophyllaceae	1	0.93	1	0.44	Shrub (1)
	<b>Total</b>	<b>108</b>	<b>100</b>	<b>227</b>	<b>100</b>	<b>227</b>

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