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Research Article

The Plant Sociology and Ecology of The Upper Göksu Catchment Area (Hadim-Konya) and Environs

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Abstract: The Taurus mountains area is one of the most interesting areas of Turkey as regards flora and vegetation. The region is situated on a transition zone between the Mediterranean and continental climate and contains many microclimate areas because of its topographic character. Therefore, studies on the flora and vegetation of the Taurus mountains give quite different results.

The studies on the catchment area of Göksu valley and environs which exhibit Mediterranean climate and is a part of the central Tauruses were ccarried out in 1995-1996. In this study, Braun-Blanquet's floristic system principle was used and six associations (five of them new) were determined. As a result, the ecological relationship between plant, climate and soil was explained.

A- Steppe Vegetation

1. *Scutellario-Astragaletum microcephalii* Ass. Nov.

2. *Fritillario-Marrubietum globosii* Ass. Nov.

B- Forest Vegetation

1. *Micromerio-Juniperetum excelsae* Ass.

2. *Cochleario-Pinetum nigrae* Ass. Nov.

3. *Mycelido-Abietum cilicicae* Ass. Nov.

4. *Rhamno-Quercetum pubescentii* Ass. Nov.

Key Words: Göksu, Microclimate, Vegetation, Environment, Turkey

Yukarı Göksu Havzası (Hadim-Konya) ve Çevresinin Bitki Sosyolojisi ve Ekolojisi

Özet: Toros, dağları, flora ve vejetasyon bakımından Türkiye'nin en ilginç bölgelerinden biridir. Bölgenin bu özelliği, şüphesiz karasal ve akdeniz iklimi arasında geçiş halinde olmasının yanısıra, topoğrafik karakteri nedeniyle de çok sayıda mikroklimatik sahalar içermesidir. Bu nedenle, Toroslar'da yapılan vejetasyon araştırmalarının sonuçları da büyük ölçüde farklı oluyor.

Orta Toroslar'ın Akdeniz iklimiyle irtibatli olan Göksu vadisinin yukarı havzası ve çevresi 1995-1996 yıllarında çalışıldı.

Braun-Blanquet'nin floristik sistem esasına göre yapılan çalışmada aşağıdaki 6 bitki birliği (bunlardan 5 tanesi yeni) belirlendi ve ekolojik olarak da bitki-iklim-toprak ilişkileri izah edildi.

A- Step Vejetasyonu

1. *Scutellario-Astragaletum microcephalii* Ass. Nov.

2. *Fritillario-Marrubietum globosii* Ass. Nov.

B- Orman Vejetasyonu

1. *Micromerio-Juniperetum excelsae* Ass.

2. *Cochleario-Pinetum nigrae* Ass. Nov.

3. *Mycelido-Abietum cilicicae* Ass. Nov.

4. *Rhamno-Quercetum pubescentii* Ass. Nov.

Anahtar Sözcükler: Göksu, Mikroklima, Vejetasyon, Çevre, Türkiye.

Introduction

The Taurus Mountains form the basis of the studies on the natural resources in terms of their past and configuration. For this reason, even on the same subject, there have been a great number of studies in this large region and the majority of these studies have produced different results. The reason for this is the Taurus Mountains are a chain of mountains located in the transitory belt between two microclimates. Moreover, these microclimates (terrestrial and tropical climates) cause a large spectrum in terms of aspect and altitude on the Taurus Mountains.

There have also been some vegetation studies near the same investigation area. The nearest study to our area had been done by M. Serin and B. Eyce near Aladağ (Hadim) district (1). In this study, the authors determined a total of seven associations. Again, H. Ocakverdi and A. R. Çetik classified and explained the syntaxa of the area in their vegetation studies in the mining region of Seydişehir and in some parts of the Sultan Mountains, Doğanhisar (2, 3).

In our study, we explained and classified the ecologial properties of steppe and forest associations. The plant associations were classified according to the Syntaxonomic Nomenclatural Rules (4).

Materials and Method

The studies in the region were conducted during field trips in the months of March-September in 1995-1996. Since there is a high rate of difference in height and microclimate at various spots in the region, the work done had the characteristics of both botanic trips as well as ecological observations. The conditions of the land lead to many different ecological observations. The conditions of the land lead to many different ecological structures of the associations (5, 6). The present data on climate, which are closely related to the structure of the land, on the other hand, were provided from the archives of the General Directorate of State Metorological Affairs and prepared accordingly. The climatic data were assessed according to Akman (7).

Naming of the species which form the floristic composition of the associations to be defined was done using the key books (8). Furhermore, soil samples were taken from various spots and were analyzed at the Study Laboratories of Urban Services in Konya. Consequently, the framework of the ecological relations to be established among the plant-climate-soil factors was completely formed.

A total of 52 sample plots were taken at the spots homogeneous in terms of habitat and vegetation, in the periods when each association developed optimally on the basis of the Braun-Blanquet (9) method. The distribution of the floristic composition to the syntaxonomic categories in the tables designed on the basis of the method used in Ketenoglu et al. (10) and Akman et al. (11).

In the association tables, we have also illustrated the life forms, which are not favoured much by some other studies but which form structural complexities to lead the habitats to reach climax in a shorter period of time. Because habitat choices of the plants in the direction of their ecological demands and their competition here is an eco-physiological phenomenon related directly to the life forms.

General Conditions of The Region

The study area is located in the northern section of the Central Taurus Mountains phytogeographically between the Mediterranean and Irano-Turanian regions, and between Yerköprü, Sinat Tepe, Eyiste valley and Gölyatağı hill, which are known as the Göksu Basin. This land which is approximately 160 km^2 has a complex status and is extremely heterogenous in terms of topographic characteristics (Figure 1). Here, it is possible to see both the Göksu Basin and the Eyiste valley and the other valleys and a great number of depressions, which all include very different ecological conditions from one another. In addition, while the height drops to 700 meters around Yerköprü, the Sinat hill in the southeast is 2127 meters. Such conditions of the land lead the agricultural activities conducted in very close even adjacent valleys and depressions to be very different from one another.

The Devonian rock units in the area are the oldest formations of slate, quartzite, marble and limestone. Since the majority of these are made of limestone, the

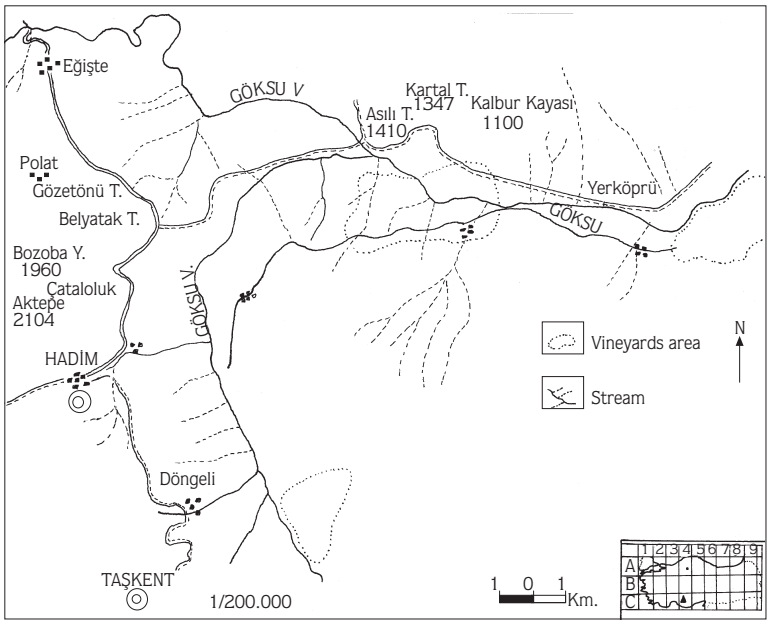

Figure 1. Topographic map of the study area.

rocks are rich in calcium carbonate to a larger extent. On the Jura-cretaceous carbonates, the ophiolitic series are observed. On the series, there are neocene formaitons composed of pebbles, grit, mudstone and clayed limestone. These are clays and since they are not crystallized densely and can be torn into pieces easily, they are subject to erosion. Although there is basalt and schist in the area, the characteristic red Medditerenean soil is dominant, which formed on the hard crystal limestone.

Of course, the most significant factor which affects life in the living media is, first of all, the macroclimate of the region and secondly, the microclimate of the habitat which they prefer. The conditions of nearly 50 valleys and depressions, in particular, due to the location of the study area have added a different dimension to the medium. Because in these formations whose topographic structure and locations are different, we can see that culture plants very different from one another are fertile. But for the microclimates and the general vegetation of the region affected by the macroclimate, here, data from the Hadim Meteorology station was assessed (Figure 2).

The rainfall regime, which has an important place in the classification of the climates and the lives of the plants, reflects the character of the macroclimate of the region. The rainfall regime of the study area is K.I.S.Y. of Mediterranean origin on the basis of data on 17 years of heat and 36 years of rainfall of Hadim. In the region, it is observed that in line with the drought index formula of De Martonne-Gottmann, I=18, semi-arid humid, and in line with the rainfall-heat similar formula, Q=74 Little Rainy Very Cold Mediterranean climate is dominant.

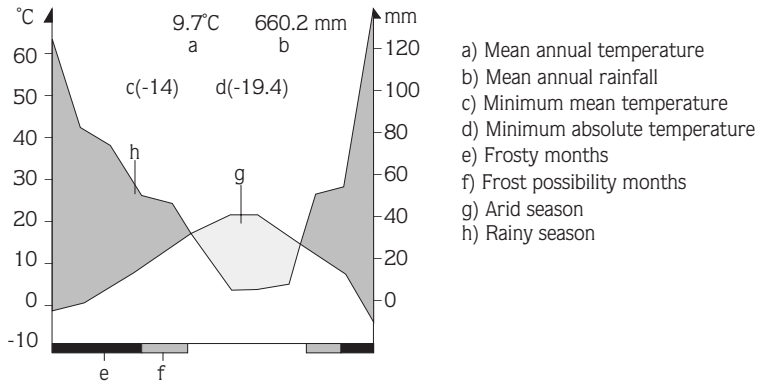

Figure 2. Climatic diagram of Hadim

a) Mean annual temperature
b) Mean annual rainfall
c) Minimum mean temperature
d) Minimum absolute temperature
e) Frosty months
f) Frost possibility months
g) Arid season
h) Rainy season

If we assess the rainfall in terms of the microclimate, the diversity of the valleys and depressions in the area will have been perceived once more. While the arid period is over 200 days in the lowest location of Yerköprü at 700 meters in the region, it is 120 days in Kartal Tepe at 1347 meters and 100 days in Hadim at 1200 meters. On the other hand, no arid period is observed in Aktepe at 2104 meters.

Vegetation

There are various reasons for the complex ecological medium of this section of the upper Göksu basin. In this large area where there is no plain, the Mediterranean heat which penetrates from the Göksu valley and the existence of a large number of small valleys and sediment areas (depressions) can be counted as the most important reason. Although all of the associations have grown on limestone bedrock, the fact that the valleys and depressions here are used for agriculture has led to a disintegration in the general natural vegetation of the region. Although the valleys and depressions located in the forests have been badly damaged, the pre-climax vegetation of these must be the continuation of these forests.

In spite of the fact that the closed depressions, in particular, in the north and northwest of the region contain large amounts of soil, it has been observed that no success has been achieved in the agriculture of the cultural plants. Because the cold and humid weather, which penetrates into the depression, as seen in the depression at one edge or in the valleys, does not leave the region and settles down on to the base by turning like a whirlpool. This situation creates an effect like the one of freezing cold at the top of the hills in the forest.

Almost every part of the region is under the influence of intensive wood cutting. The most intensive cutting is observed in the slopes of the Göksu valley. which is very suitable for fruit growing, and in the depressions in the shape of small valleys located in the mountainous part. In spite of this, more than half of the land is forested. The remaining portion is composed of steppe vegetation, where there is a low rate of erosion and bare hills created by erosion and cultural vegetation.

Associations

A- Steppe Vegetation

As mentioned above, there is only a small amount of steppe vegetation in the study area. Because, since the land has an ecological structure well suited to the land, it could keep the regressive development caused by damage for a long time.

1. **Scutellario-Astragaletum microcephalii** OCAKVERDİ & OFLAS Ass. Nov. (Table 1).

Astragalus microcephalus Willd., which starts at 1700 meters in the east of Mount Sinat near the mountainous and settlement area of the region, goes up to a height of some 1900 meters covering the northern slopes and small hills. Although the incline is not very steep in the Burunkoz hill where it extends most densely, the floristic composition is individually rich instead of the species, for this area is under the constant influence of the cold northern winds. Since the morphological structure of the *Astragalus microcephalus* plant is not suitable for grazing, the fact that it protects various species against grazing (some *Poaceae* families being the primary ones) and cold winds is clearly seen.

This association continues without any interruption in land of 5-40% incline from the east of Mount Sinat and the north of Aktepe where it starts to extend. In general, it is more homogenous in the shallow soil with small gravel. Because *Astragalus microcephalus* is a species whose ecological tolerance is more than the power of competition. Plants such as *Festuca,* whose competitive power in the steppe is more than its ecological tolerance, do not prefer such a medium and the dominance of the *Astragalus* plant is inevitable. The characteristics of the soils of the association is of the limestone sandy-granular structure as well as of medium level calcareous and slightly basic. Although the *Astragalus microcephalus* grasps the soil and leaves out abundant organic waste, at the locations where its incline is high, the amount of organic material is insufficient. This situation reduces the capacity of the habitat to retain water.

Ten sample plots were received from the homogenous locations where the association keeps its sociability. In the plots, the species whose rate of repetition is high, such as *Scutellaria rubicunda* Hornem. subsp. *subvelutina* (Rech. fil.) Edmondson and *Euphorbia isaurica* M.S. Khan character has been illustrated (Table 1). This association is widespread in Turkey and it has been recorded almost everywhere in many studies. But even in neighbouring regions, particularly their character and participatory species are different. This situation is the result of first of all, the land morphology and secondly the climate and soil difference which originate from this. The *Astragalus microcephalus* has a very high ecological tolerance to aridity and grazing and the *Astragalus microcephalus* association has a xerophytic floristic composition in general. In this association, hemicryptophytes (H) and terophytes (T) are 79% and 16% of life forms, respectively. Because of the dominance of only 2 kinds of life forms, the complexity of the association is low. In a

Table 1. Scutellario-Astragaletum microcephalii OCAKVERDİ & OFLAS Ass. Nov. Type: Quadrat 6.

Life Form												Presence
	Quadrat No	1	2	3	4	5	6	7	8	9	10	
	Size of quadrat (m2)	100	100	100	100	100	100	100	100	100	100	
	Altitude (m)	185	180	187	170	170	183	185	191	175	190	
	Exposure	NE	E	SE	N	S	S	N	N	N	NW	
	Inclination (%)	20	15	35	40	40	30	20	5	40	45	
	Coverage total (%)	85	80	95	75	75	85	95	90	85	80	
	Characteristics species of association											
Ch	Astragalus microcephalus	34	33	44	34	33	43	54	44	43	43	V
H	Scutellaria rubicunda ssp. subvelutina	11	+1	.	+1	+1	+1	.	+1	+1	A	
H	Euphorbia isaurica	11	11	+1	.	+1	+1	+1	+1	.	.	IV
	Characteristic species of Phlomido armeniacae-Astragalion microcephali											
H	Phlomis armeniaca	+1	+1	+1	+1	+1	+1	+1	11	.	+1	V
H	Teucrium chamaedrys	+1	+1	+1	.	+1	+1	+1	.	+1	+1	V
H	Paronychia kurdica ssp. kurdica	.	+1	.	+1	+1	+1	+1	+1	.	+1	IV
	Characteristic species of Onobrycho armeni-Thymetalia leucostomi											
T	Ziziphora taurica ssp. taurica	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	V
H	Stachys cretica ssp. anatolica	+1	.	+1	+1	+1	+1	+1	+1	+1	.	V
Ch	Asperula lilaciflora	+1	+1	+1	+1	+1	+1	.	+1	.	+1	V
H	Onobrychis armena	+1	+1	.	.	+1	+1	+1	+1	+1	.	IV
H	Centaurea virgata	+1	+1	+1	+1	.	+1	+1	.	+1	.	IV
H	Onosma tauricum	.	+1	+1	+1	.	+1	+1	+1	.	+1	IV
T	Minuartia hamata	+1	+1	+1	.	+1	+1	.	+1	.	+1	IV
H	Lappula barbata	+1	.	+1	+1	+1	+1	+1	.	.	+1	IV
H	Linum hirsutum ssp. anatolicum	+1	+1	+1	+1	.	+1	+1	.	+1	.	IV
H	Astragalus lydius	+1	.	+1	+1	+1	+1	+1	.	+1	.	IV
G	Allium scorodoprassum ssp. rotundum	.	+1	+1	+1	.	+1	.	+1	+1	.	IV
H	Helianthemum nummularium ssp. nummularium	.	.	+1	+1	.	+1	.	+1	.	+1	III
	Characteristic species of Astragalo-Brometea											
H	Stipa pulcherrima ssp. epilosa	12	12	12	12	12	12	.	12	12	12	V
H	Bromus tomentellus	+1	+1	+1	+1	+1	+1	+1	+1	+1	.	V
H	Stachys lavandulifolia ssp. lavandulifolia	+1	+1	+1	.	+1	+1	.	.	+1	+1	V
H	Eryngium campestre	+1	+1	+1	+1	+1	+1	+1	.	+1	+1	V
H	Minuartia hirsuta ssp. falcata	+1	+1	.	+1	+1	+1	+1	+1	.	+1	V
H	Centaurea urvillei ssp. stepposa	+1	+1	+1	.	+1	+1	.	+1	+1	+1	V
H	Euphorbia kotschyana	+1	+1	.	+1	+1	+1	+1	.	+1	+1	V
H	Anthemis cretica ssp. albida	+1	+1	+1	+1	+1	+1	+1	+1	.	.	V
H	Nepeta nuda var. nuda	+1	.	+1	+1	+1	.	+1	+1	+1	+1	V
H	Veronica multifida	+1	+1	+1	+1	.	+1	+1	+1	.	+1	V
N	Sanguisorba minor ssp. muricata	+1	+1	.	+1	+1	+1	+1	+1	.	.	IV
H	Teucrium polium	+1	+1	+1	+1	+1	.	+1	+1	.	.	IV
H	Asyneuma limonfolium ssp. pebtalozzae	+1	+1	.	+1	+1	+1	.	+1	+1	.	IV
H	Dianthus zonatus var. zonatus	+1	.	+1	+1	+1	+1	+1	.	.	+1	IV
H	Scutellaria orientalis	+1	.	+1	.	+1	.	+1	+1	+1	.	IV
T	Minuartia anatolica var. anatolica	.	+1	+1	.	.	+1	.	+1	+1	+1	IV
H	Koeleria cristata	+1	+1	.	.	+1	.	+1	+1	.	+1	IV
H	Leontodon asperrimus	.	+1	+1	+1	+1	.	.	+1	+1	.	IV
T	Alyssum minus var. micranthum	+1	+1	.	+1	+1	.	.	+1	+1	.	IV
H	Cruciata taurica	.	+1	+1	.	+1	+1	.	+1	.	+1	IV
H	Helichrysum plicatum ssp. plicatum	+1	0	+1	+1	.	.	+1	+1	+1	.	IV
	Others											
H	Linaria iconica	+1	+1	+1	+1	.	+1	+1	+1	+1	.	V
H	Poa bulbosa	+1	+1	+1	.	+1	.	+1	+1	+1	+1	V
H	Pilosella echioides ssp. procera	+1	.	+1	+1	+1	+1	.	+1	+1	+1	V
T	Onopordum bracteatum	+1	+1	.	+1	+1	+1	+1	.	+1	+1	V
HL	Vinca herbacea	+1	+1	+1	+1	+1	+1	+1	+1	.	.	V
T	Rochelia disperma var. disperma	+1	+1	.	+1	+1	+1	+1	+1	.	+1	V
H	Phleum montanum	+1	+1	+1	+1	+1	+1	+1	.	+1	.	V
T	Cerastium dichotomum ssp. dichotomum	+1	.	+1	+1	+1	.	+1	+1	+1	.	IV
H	Erysimum crassipes	.	+1	+1	+1	.	+1	+1	.	+1	+1	IV
H	Centaurea bourgaei	+1	+1	.	.	+1	+1	+1	+1	.	+1	IV
T	Minuartia hybrida ssp. hybrida	.	+1	+1	+1	.	+1	+1	+1	+1	.	IV
T	Galium bracteatum	+1	+1	+1	+1	+1	.	+1	+1	.	.	IV
H	Euphorbia szovitsii ssp. szovitsii	.	+1	+1	.	.	+1	+1	+1	+1	.	IV
H	Cirsium lappaceum ssp. anatolicum	+1	+1	.	+1	+1	.	.	+1	.	+1	IV
H	Carlina oligocephala	+1	+1	+1	.	.	+1	.	.	+1	.	III
H	Scariola viminea	.	+1	+1	+1	.	.	+1	+1	.	.	III
H	Verbascum sinuatum var. sinuatum	+1	.	.	+1	+1	+1	.	.	.	.	II

Not: The heights and size of quadrat were reduced by a factor of10.

transitory region phytogeographically, while the Irano-Turanian elements have a rate of 30% for such reasons as the north slopes being under the effect of the cold winds from Central Anatolia, the Mediterranean elements have a rate of 15%. Furthermore, most of the endemics, which have a richness at the rate of some 28%, are again Irano-Turanian rooted.

The association process which was carried out meticiously through a sample plot selection on the basis of minimal spot application, have been characterized by the *Astragalo-Brometea Quézel,* 1973 class and related to it, with *Onobrycho armeni-Thymetalia leucostomi* Akman Ketenoğlu, Quézel, 1985 order and by the alliance of *Phlomido armeniacae-Astragalion microcephalii* Akman, Ketenoğlu, Quézel, Demirörs, 1984.

The localities and dates of quadrats which represent the association are as follows:

Quadrat No:	Locality and date
1-2-3	East of Akdağ, 24.06.1996
4-5-6	North of Akdağ, 28.06.1996
7-8-9-10	Çataloluk environs, 29.06.1996

2. **Fritillario-Marrubietum globosii** OCAKVERDİ & OFLAS Ass. Nov. (Table 2).

It starts at the location where the *Scutellario-Astragaletum microcephalii* associations ends on Çaldağ's northern slopes and extends towards the west from the north of Aktepe. Here, the *Marrubium globosum* Montbret & Aucher subsp. *globosum* plant continues as far as the west of the Büyüköba plateau following the northern slopes west at 1750-1980 meters. In the terraces created by the alluvial soil, composed of organic humus waste that came down the mountain, in particular, through erosion, this association is well developed. The association, which is composed of the same dominant species, has a similar structure in Karadağ (Karaman), also (9). This association loses this characteristic gradually as you go towards the other plateaus in a westerly direction from the Büyüköba Plateau through the additional effect of grazing among others and its soil gets gradually poorer in terms of organic substance. For the northern slopes of Çaldağ, which extend towards the west and are open to the dry cold winds that come from Central Anatolia, the soil has a low water retention rate, in particular, where the organic substance is low. This situation leads a physionomic weakness in the *Marrubium* plant under the effect of damage when you go towards the plateaus. The habitat, in general, has limeless clayed-granular alkali soil on the calcerous bedrock of the terraces.

Since most of the association, where it has extended is on a plateau, excessive grazing is the main cause of damage. For this reason, the floristic composition is not at the expected level on the one hand and at the spot where the rate of incline is high, there is rapid erosion, on the other. But the extension on the terraces and on the other plains is more homogeneous. Efforts have been made to define the association with 8 samples found in this area. Because the fact that the homogeneous spots are very close to one another leads to repetition of the same species in the sample plots. Therefore, the fidelity of the sample plots in terms of a community to be defined is determined via the repetition of the majority of the species in the floristic compositions. *Fritillaria crassifolia* Boiss. & Huet subsp. *crassifolia* and *Galium subuliferum* Somm. & lev. which occur consistently, were selected as the character species of the association (Table 2). Moreover, *Fritillaria crassifolia* Boiss. & Huet subsp. *crassifolia* is an endemic species to Turkey. The life form structure of the association, which has a xerophytic habitat and floristic composition, is made up of hemicryptophytes (H) 63% and terophytes (T) 29% and it does not exhibit any structural complexity.

Since the association of *Fritillario-Marrubietum* globosii is an adjacent ecosystem to the previous association and they are under the influence of the same environment, they have phytogeographically a similar structure. Here, 29% of the elements are Irano-Turanian and 13% are Mediterranean. Again, most of the endemics, up to 26%, are Irano-Turanian rooted. This has made it possible for the association, which is represented in the region in a large scale syntaxonomically, to be included in the alliance of the *Astragalo-Brometea* Quézel, 1973 class and *Onobrycho armeni-Thymetalia leucostomi* Akman, Ketenoğlu, Quézel, 1985 order and related to this, *Phlomido armeniacae-Astragalion microcephali.* Akman, Ketenoğlu, Quézel, Demirörs 1984.

The localities and dates of quadrats which represent the association are as follows:

Quadrat No:	Locality and date
11-12	North of Akdağ, 30.06.1996
13-14-15	North of Akdağ, 01.07.1996
16-17-18	West of Akdağ, 02.07.1996

B- Forest Vegetation

The majority of the forest vegetation, which region, has a secondary structure which has been formed as a result of regressive development. Because the *Pinus nigra* Arn. subsp. *pallasiana* (Lamb.). Holmboe and *Abies cilicica*

Table 2. Fritillario-Marrubietum globosii OCAKVERDİ & OFLAS Ass. Nov. Type: Quadrat 14.

Life Form										Presence
	Quadrat No	11	12	13	14	15	16	17	18	
	Size of quadrat (m2)	100	100	100	100	100	100	100	100	
	Altitude (m)	190	192	185	196	190	180	185	175	
	Exposure	NE	N	N	N	N	N	NW	NW	
	Inclination (%)	20	35	15	25	30	20	30	25	
	Coverage total (%)	85	80	80	85	75	75	70	75	
	Characteristics species of association									
H	Marrubium globosum ssp. globosum	44	43	44	43	44	34	33	34	V
G	Fritillaria crassifolia ssp. crassifolia	.	+1	+1	+1	+1	.	+1	+1	IV
H	Galium subuliferum	+1	11	.	11	.	+1	11	+1	IV
	Characteristic species of Phlomido armeniacae-Astragalion microcephali									
H	Phlomis armeniaca	11	+1	+1	+1	+1	+1	+1	11	V
H	Teucrium chamaedrys ssp. chamaedrys	+1	+1	+1	+1	+1	+1	.	+1	V
	Characteristic species of Onobrycho armeni-Thymetalia leucostomi									
T	Ziziphora taurica ssp. taurica	+1	+1	+1	+1	+1	+1	+1	+1	V
H	Lappula barbata	+1	+1	+1	+1	+1	+1	.	+1	V
G	Allium scorodoprasum ssp. rotundum	+1	+1	.	+1	+1	+1	+1	.	IV
H	Achillea wilhelmsii	+1	.	+1	+1	+1	+1	+1	.	IV
H	Anthemis tinctoria ssp. tinctoria	+1	+1	+1	.	+1	.	+1	+1	IV
Ch	Astragalus microcephalus	.	12	.	12	.	12	12	.	III
	Characteristic species of Astragalo-Brometea									
H	Veronica multifida	+1	+1	.	+1	+1	.	+1	+1	IV
H	Sanguisorba minor ssp. muricata	+1	.	+1	+1	.	+1	+1	+1	IV
H	Dianthus zonatus var. zonatus	+1	+1	+1	.	+1	+1	+1	.	IV
T	Minuartia anatolica var. anatolica	+1	+1	+1	+1	+1	.	+1	.	IV
T	Alyssum minus var. micranthum	+1	+1	+1	+1	.	+1	.	+1	IV
H	Cruciata taurica	.	+1	.	+1	+1	+1	+1	+1	IV
H	Helichrysum plicatum ssp. plicatum	+1	.	+1	+1	+1	.	+1	+1	IV
H	Centaurea triumfettii	+1	+1	+1	.	.	+1	+1	+1	IV
Ch	Daphne oleoides ssp. oleoides	.	12	.	12	12	.	12	.	III
	Others									
H	Anthemis pauciloba var. pauciloba	+1	+1	+1	+1	+1	+1	+1	.	V
T	Scandix stellata	+1	+1	.	+1	+1	+1	+1	+1	V
H	Linaria iconica	+1	+1	+1	+1	+1	+1	.	+1	V
H	Poa bulbosa	+1	+1	+1	+1	.	+1	+1	+1	V
T	Cerastium dichotomum ssp. dichotomum	+1	+1	+1	+1	+1	+1	.	+1	V
H	Centaurea bourgaei	+1	+1	+1	+1	+1	+1	+1	.	V
H	Cirsium lappaceum ssp. anatolicum	11	11	.	+1	11	11	11	11	V
T	Bromus tectorum	+1	+1	.	+1	+1	.	+1	.	IV
T	Acinos rotundifolius	+1	+1	+1	.	.	+1	+1	.	IV
H	Phlomis nissolii	+1	.	+1	.	+1	.	.	+1	III
H	Euphorbia kotschyana	+1	11	+1	+1	.	.	.	.	III
T	Fumaria cilicica	+1	+1	.	+1	.	+1	.	.	III
H	Veronica dischrus	.	.	.	+1	+1	+1	+1	.	III
H	Alyssum mouradicum	+1	.	+1	.	.	.	+1	.	III
T	Anthemis rosae	.	+1	.	.	+1	.	.	.	II
T	Cynoglossum columnae	+1	.	+1	.	.	.	.	.	II

Not: The heights and size of quadrat were reduced by a factor of10.

(Ant. & Kotschy) Carr. subsp. *isaurica* Coode & Cullen forests have sheltered in the narrow fields of microclimate in the north and northwest. But in the larger fields near the settlements, we observed the extension of *Juniperus excelsa* Bieb. and *Quercus pubescens* Willd. But, in this secondary forest vegetation, in particular, in the valleys far from the settlement units, no regressive development towards the steppe vegetation is obvious. Because cutting is at a slightly lower rate due to the remoteness, and the suitable structure of the climate and the soil of the environment support the adolescent development in these forests.

1. **Micromerio-Juniperetum excelsae** OCAKVERDİ & ÇETİK, 1987. (Table 3).

The *Juniperus excelsa* Bieb. forests which form more than half of the forest vegetation in the region have lost

their community feature in the Kurudere valleys, Belyatak hill and around Gözetönü hill and at some locations outside the Kartaltepe environs. In spite of the fact that *Juniperus excelsa,* in general, extends to rocky areas, this is not connected to ecological necessity but rather, it must be the result of its high ecological tolerance and lower competitive power. Because they create coverage at a rate as high as 80% in the small rocky and soiled habitats in the valleys. At such locations where sample plots were conducted, there is adolescent development and the apical meristems form a dense physionomy by creating spring shoots in the trees and at the same time, do not allow access of the xerophyte species of steppe character. But at the rocky locations adjacent to the settlements, they have lost their sociability and no formation of synusia has occurred due to the occupation of the steppe plants since excessive cutting continues. This association is, in general, widespread from 1350-1600 m. except in the area where there is steppe and forest vegetation and the Göksu valley and Kalburkayası hill. But in spite of this situation, it can be said that it has few locations, exhibiting a characteristic ecosystem. Its general characteristics have been defined through 8 sample plots taken from such homogeneous locations (Table 3). Particularly *Micromeria myritifolia* Boiss. & Hohen. and *Leucocylus formosus* Boiss. subsp. *formosus* species, which are the character species of the association do not occur consistently only here, they are also observed in such habitats at all times.

As in all the study area of the habitat soil, limestone has developed on the bedrock. The soil is of a clay and clay-granular character, it is slightly alkaline at a medium level in terms of organic substance.

The floristic composition of the sample plots illustrates an interesting characteristic, phytogeographically and ecologically. In spite of the fact that the existence of the previous *Astragalus* and *Marrubium* associations, the Mediterranean species are 15% and those that are Irano-Turanian rooted are 3.7%. While in the previous associations, there were always twice as many Irano-Turanian elements as Mediteranean elements, there are four times as many Mediteranean elements in this association as Irano-Turanian elemnts. This situation originates from the fact that the dry and cold winds coming from Central Anatolia do not greatly affect the valleys, where the association is dense and homogeneous. In such a medium, the structural complexity is subject to increase and here the hemicryptophytes (H) are 39%, terophytes are 33%, phanerophyte group (P, NP) are 15% and geophytes (G) are 13%. The *Juniperus excelsa* association is very interesting and complex syntaxonomically. In spite of this, it is included in the *Quercetea pubescentis* Doing Kraft, 1955 class, which is characteristic of the forest vegetation in the region, and related to this class, *Querco-Cedretalia libani* Barbero, Loisel, Quézel, 1974 order and the *Abieto-Cedrion* Akman, Barbero, Quézel, 1977 alliance of this order. But the approach of the association by descending 1300 meters down from the Taurus Mountains and almost reaching Central Anatolia and because it is affected by the conditions in this area, *Astragalo-Brometea* Quézel, 1973 class and *Onobrycho armeni-Thymetalia leucostomi* Akman, Ketenoğlu, Quézel, 1985 order's elements have been easily included. If it were taken from the segments extended here to increase the number of the sample plots, then, it would be impossible to show the coverage-abundance and sociability of *Juniperus excelsa* as 44. For this reason, the majority of the floristic composition would be steppe and their number would be more than 150.

The lolalities and dates of quadrats which represent the association are as follows:

Quadrat No:	Locality and date
19-20	Asılıtepe environs, 25.06.1996
21-22	Kartaltepe environs, 26.06.1996
23-24-25-29	Kuru dere environs, 27.06.1996

2. **Cochleario-Pinetum nigrae** OCAKVERDİ & OFLAS Ass. Nov. (Table 4).

The Austrian pine-community is unique in terms of habitat and structure. It has become established in a large hollow between the Büyükoba and Polat plateaus, at altitudes of 1600-1750 meters. There is a series of large closely parallel ditches 10 m. depth, within the hollow. These ditches cause erosion in periods of heavy rainfall and snow melting. Because the association is located among the settlements, it is both grazed extensively and its lower portoins are used as heating material. Thus, the trees which develop in the shape of a poplar physiognomically cannot control the habitat sufficiently. The floristic composition which has already been damaged due to grazing, is also influenced by erosion on a large scale. The most significant characteristic of this large hollow, which is located amongst the plateaus, is that it joins the valleys in Kurudere at the eastern end and it is a valley itself. Consequently, the accumulation of the cold air coming from the higher portion of the Taurus Mountains in the south and the Polat plateau in the north is stopped and leaves the area by circulating with the aid of the valley. But this characteristic of the land has not been enough for vitality and adolescent development.

Table 3. Micromerio-Juniperetum excelsae OCAKVERDİ & ÇETİK, 1987.

Life Form										Presence
	Quadrat No	19	20	21	22	23	24	25	26	
	Size of quadrat (m2)	100	100	100	100	100	100	100	100	
	Altitude (m)	160	155	140	135	161	155	158	160	
	Exposure	S	SE	SE	E	E	S	-	W	
	Inclination (%)	30	25	15	20	45	5	-	10	
	Coverage total (%)	70	75	80	80	80	85	80	80	
	Characteristics species of association									
Ph	Juniperus excelsa	43	44	44	44	43	44	44	43	V
H	Micromeria myrtifolia	+1	+1	+1	+1	.	+1	+1	+1	V
H	Leucocylus formosus ssp. formosus	+1	+1	+1	.	+1	+1	+1	.	IV
	Characteristic species of Abieto-Cedrion									
G	Corydalis solida ssp. solida	+1	+1	.	+1	+1	+1	+1	+1	V
G	Cyclamen cilicium car. cilicium	+1	.	+1	+1	+1	+1	+1	+1	V
T	Thlaspi perfoliatum	+1	+1	+1	.	+1	+1	+1	.	IV
Ph	Abies cilicica ssp. cilicica	+1	+1	.	+1	.	+1	.	.	III
	Characteristic species of Querco-Cedretalia libani									
T	Galium peplidifolium	+1	+1	+1	+1	+1	+1	+1	+1	V
T	Alyssum strigosum ssp. cedrorum	+1	+1	+1	+1	+1	+1	+1	+1	V
T	Briza humilis	+1	+1	11	+1	+1	11	11	+1	V
T	Bunium microcarpum ssp. microcarpum	.	+1	+1	+1	.	+1	+1	+1	IV
T	Minuartia multinervis	+1	+1	+1	.	.	.	+1	+1	IV
	Characteristic species of Quercetea pubescentis									
H	Silene italica	+1	+1	+1	+1	+1	+1	.	.	IV
H	Geranium macrostylum	+1	+1	+1	+1	.	+1	.	+1	IV
T	Cerastium fragillimum	+1	+1	+1	.	+1	+1	+1	.	IV
H	Salvia cadmica	+1	+1	+1	.	+1	.	+1	+1	IV
Ph	Pinus nigra ssp. pallasiana	+1	.	+1	+1	.	+1	.	+1	IV
H	Lamium garganicum ssp. garganicum	.	+1	+1	+1	+1	.	+1	.	IV
	Characteristic species of Onobrycho armeni-Thymetalia leucostomi									
T	Ziziphora taurica ssp. taurica	+1	+1	+1	+1	+1	.	+1	+1	V
H	Anthemis tinctoria ssp. tinctoria	+1	+1	+1	.	+1	+11	+1	+1	V
G	Allium scorodoprasum ssp. rotundum	+1	.	+1	+1	+1	.	+1	+1	IV
H	Dianthus crinitus var. crinitus	+1	.	+1	+1	.	+1	+1	+1	IV
T	Linaria corifolia	+1	+1	.	+1	+1	+1	.	.	IV
T	Ziziphora tenuior	+1	+1	.	+1	.	+1	+1	.	IV
	Characteristic specise of Astragalo-Brometea									
H	Veronica multifida	+1	+1	.	+1	+1	.	+1	+1	IV
H	Sanguisorba minor ssp. muricata	+1	.	+1	+1	.	+1	+1	.	IV
H	Alyssum murale var. murale	.	+1	+1	.	+1	+1	.	+1	IV
H	Minuartia juniperina	+1	+1	+1	+1	.	.	+1	.	IV
	Characteristic species of Quercetea Ilicis									
Ph	Juniperus oxycedrus ssp. oxycedrus	+1	+1	+1	+1	+1	+1	+1	+1	V
NP	Crataegus aronia var. minuta	+1	+1	+1	+1	+1	+1	.	.	IV
Others										
H	Poa bulbosa	+1	+1	+1	+1	+1	+1	.	+1	V
H	Phleum montanum	+1	+1	+1	.	+1	.	+1	+1	IV
H	Centaurea bourgaei	+1	+1	+1	+1	.	+1	+1	.	IV
NP	Rhamnus libanoticus	+1	+1	.	+1	.	+1	+1	+1	IV
T	Galium verticillatum	+1	.	+1	+1	+1	+1	+1	.	IV
T	Viola kitaibeliana	+1	+1	+1	.	+1	+1	.	+1	IV
G	Fritillaria pinardii	+1	+1	.	+1	+1	.	+1	+1	IV
H	Ononis pusilla	+1	+1	+1	+1	+1	.	+1	.	IV
T	Crucianella latifolia	+1	+1	.	+1	+1	+1	.	+1	IV
T	Aethionema arabicum	+1	+1	+1	.	+1	+1	.	+1	IV
T	Sideretis montana ssp. remota	+1	+1	+1	+1	+1	.	+1	.	IV
H	Valerianella vesicaria	+1	+1	+1	.	+1	+1	.	+1	IV
G	Allium cassium	+1	+1	+1	+1	+1	.	+1	.	IV
T	Helianthemum salicifolium	+1	.	+1	.	+1	+1	+1	+1	IV
Ph	Juniperus foetidissima	+1	+1	.	+1	.	+1	+1	0	IV
H	Fibigia eriocarpa	+1	+1	.	.	.	+1	.	+1	III
T	Erophila verna	.	+1	+1	.	+1	.	+1	.	III
H	Myosotis refracta ssp. refracta	+1	+1	.	+1	.	.	.	+1	III
Ph	Quercus cerris var. cerris	.	.	+1	.	+1	.	.	.	II

Not: The heights and size of quadrat were reduced by a factor of10.

Table 4. Cochleario-Pinetum. nigrae OCAKVERDİ & OFLAS Ass. Nov. Type: Quadrat 29.

Life Form	Quadrat No	27	28	29	30	31	32	33	34	Presence
	Size of quadrat (m2)	100	100	100	100	100	100	100	100	
	Altitude (m)	160	165	168	170	163	160	160	160	
	Exposure	NE	-	-	-	NE	E	NE	N	
	Inclination (%)	20	-	-	-	20	10	5	10	
	Coverage total (%)	75	80	75	80	70	75	80	80	
	Characteristics species of association									
Ph	Pinus nigra ssp. pallasiana	44	44	44	43	43	44	44	44	V
H	Cochlearia sempervivum	+1	+1	+1	+1	+1	+1	.	+1	V
	Characteristic species of Abieto-Cedrion									
Ph	Abies cilicica ssp. isaurica	+1	+1	+1	+1	+1	.	+1	.	IV
T	Thlaspi perfoliatum	+1	+1	+1	.	+1	+1	.	+1	IV
	Characteristic species of Querco-Cedretalia libani									
T	Galium peplidifolium	+1	+1	+1	+1	+1	.	+1	+1	V
T	Alyssum strigosum ssp. cedrorum	+1	+1	+1	+1	+1	+1	+1	.	V
G	Bunium microcarpum ssp. microcarpum	.	22	21	11	11	12	11	11	V
G	Doronicum orientale	+1	11	+1	12	+1	11	+1	.	V
H	Turritis laxa	+1	+1	+1	+1	+1	.	+1	+1	V
T	Viola modesta	+1	+1	+1	+1	.	+1	+1	.	IV
G	Geranium tuberosum ssp. tuberosum	+1	+1	+1	+1	+1	.	+1	.	IV
H	Ranunculus reuterianus	+1	.	+1	+1	.	+1	11	+1	IV
T	Trifolium speciosum	.	+1	+1	+1	+1	..	+1	IV	
	Characteristic species of Quercetea pubescentis									
T	Cerastium fragillimum	+1	+1	+1	+1	+1	.	+1	1	IV
H	Hypericum perforatum	+1	+1	.	+1	.	+1	+1	.	IV
H	Lathyrus digitatus	+1	+1	+1	+1	+1	.	+1	.	IV
H	Coronilla varia ssp. varia	.	12	12	+1	.	12	.	12	IV
H	Pimpinella tragium ssp. lithophila	+1	+1	+1	.	.	+1	.	+1	IV
	Characteristic species of Onobrycho armeni-Thymetalia leucostomi									
H	Astragalus lydius	+1	+1	+1	+1	.	+1	.	+1	IV
T	Ziziphora taurica ssp. taurica	+1	+1	.	+1	+1	.	+1	.	IV
T	Linaria corifolia	+1	.	+1	.	.	+1	+1	+1	IV
T	Ziziphora tenuior	.	+1	+1	+1	+1	.	.	+1	IV
	Others									
H	Poa bulbosa	+1	+1	+1	+1	+1	+1	+1	+1	V
H	Pilosella echioides ssp. procera	+1	+1	+1	+1	+1	+1	+1	.	V
T	Acinos rotundifolius	+1	+1	+1	+1	+1	.	+1	.	IV
H	Alyssum mouradicum	+1	.	+1	+1	+1	+1	.	.	IV
H	Silene spergulifolia	+1	+1	+1	+1	+1	.	+1	.	IV
T	Myosotis ramoissima ssp. ramosissima	.	+1	.	+1	+1	+1	+1	+1	IV
G	Ornithogalum armeniacum	+1	+1	+1	+1	.	+1	.	.	IV
H	Iberis sempervirens	+1	+1	.	.	+-1	+1	.	.	IV
H	Dactylis glomerata	.	+1	+1	.	.	+1	+1	.	III
H	Dianthus zonatus ssp. hypochlorus	+1	.	.	+1	+1	.	.	+1	III

Not: The heights and size of quadrat were reduced by a factor of10.

Because due to extensive damage, the floristic composition and the soil are not in sufficient quantities. Furthermore, branch cutting in almost all the trees for food production and also on the soil formation for the habitat. Hence, the rarely obtained soil is of clay-granular character and it contains medium level organic material which exhibits slight acidity.

Eight sample plots have been taken from the smooth and homogeneous section of the *Pinus nigra* Arn. subsp. *pallasiana* (Lamb.) Holmboe forest. *Cochlearia sempervivum* Boiss. & Bal plant, has been selected as the character species of the association, because this species is consistent in this association (Table 4). The phytogeographic status of this association includes the same reasons which are illustrated for the *Micromerio-Juniperetum excelsae* association, and in this context, while the Irano-Turanian elements are 6%, the Mediterranean elements are 19%; and the endemics, most of which are Mediterranean are 9.4%.

It is the not suprising that the association of *Cochleario-Pinetum nigrae* is included in the *Quercetea pubescentis* Doing Kraft, 1955 class, and related to this *Querco-Cedretalia libani* Barbero, Loisel, Quézel, 1974 order and the alliance of this order, which is *Abieto-Cedrion* Akman, Barbero, Quézel, 1977. But, although the selection of the sample plot was conducted meticulously, it was impossible to avoid steppe species. This, in fact, originates from the low vitality of the trees due to the damage and erosion mentioned above.

The localities and dates of quadrats which represent the association are as follows:

Quadrat No:	Locality and date
27-28-29	Polat plateau, 04.07.1995
30-31-32	Polat plateau, 07.05.1995
33-34	Polat plateau, 06.07.1995

3. **Mycelido-Abietum cilicicae** OCAKVERDİ & OFLAS Ass. Nov. (Table 5).

The association of *Abies cilicica* (Ant. & Kotschy) Carr. subsp. *isaurica* Coode & Cullen, which is spread in the Çataloluk valley between Mount Sinat and *Pinus nigra* forest, has become established at 1700-1850 meters of the valley which is exposed to the environment from three sides. The valley base, whose climate is very suitable, is used for cherry cultivation and beekeeping. In addition, since the area around the spring is used as a picnic site, the amount of the homogeneous area to be defined lessens. As experienced in the other forests, here too, grazing takes place and shoots are cut, in particular, for winter food for the goats and cattle. On the slopes of the Çataloluk valley, which are exposed from the Kurudere direction, a small number of scattered *Cedrus libani* A. Rich are located. This area can be defined as one under the effect of cold winds at a height of 1850 meters.

Erosion is at a minimum level in the *Mycelido-Abietum cilicicae* association compared with the others, and that habitat is covered with a dense organic waste layer. While this situation leads to an insufficient floristic composition, it does not allow the establishment of steppe plants, either. For this reason, the habitat is poor in terms of floristic composition (Table 5).The habitat soil which is covered with organic waste is clayey in general in the region but it includes slightly alkaline limeless, rich organic material. This ecological feature of the valley and association habitat makes selection of the character species difficult. Therefore, only *Mycelis muralis* (L.) Dum plant could be defined. The phytogeographic conditions of the association are expected due to the ecological features of the valley. While there are no Irano-Turanian elements in the floristic composition, there are Mediterranean elements, 30%, and approximately 10% endemic species, all of which are Mediterranean in origin. Again, the fact that there is only 10% of widespread species illustrates that the association is located in a more suitable microclimate in terms of the geographical characteristics of the other forest associations. The ecological characteristic of the association indicated above has led syntaxonomically to the inclusion of the *Quercetea pubescentis* Doing Kraft, 1955 class and related to this, *Querco-Cedretalia libani* Barbero, Loisel, Quézel, 1974 order and the *Abieto-Cedrion* Akman, Barbero, Quézel, 1977 alliance of this order. The representation of the *Quercetea ilicis* Br.-Bl., 1947 class here, is another indication of this situation (Table 5).

The localities and dates of quadrats which represent the association are as follows:

Quadrat No:	Locality and date
35-36-37	North of akdağ, 07.07.1995
38-39-41	Çataloluk environs, 08.07.1995
41-42	Mount Sinat, 09.07.1995

4. **Rhamno-Quercetum pubescentii** OCAKVERDİ & OFLAS Ass. Nov. (Table 6).

Juniperus excelsa Bieb. is the most common forest, followed by *Quercus pubescens* Willd., which has an interesting ecology. While this plant goes up as much as 2000 meters and Karaman Karadağ (9), it is distributed at 800 meters in the Göksu valley. It is distributed in a

Table 5. Mycelido-Abietum ciliciace OCAKVERDI & OFLAS Ass. Nov. Type: Quadrat 35.

Life Form	Quadrat No	35	36	37	38	39	40	41	42	Presence
	Size of quadrat (m2)	100	100	100	100	100	100	100	100	
	Altitude (m)	185	180	178	185	180	176	170	180	
	Exposure	S	S	N	S	NW	N	N	W	
	Inclination (%)	35	45	30	30	50	40	30	40	
	Coverage total (%)	80	70	75	70	75	75	75	80	
	Characteristics species of association									
Ph	Abies cilicica ssp. isaurica	44	43	34	34	44	44	43	44	V
G	Mycelis muralis	+1	.	+1	+1	.	+1	+1	+1	IV
	Characteristic species of Abieto-Cedrion									
G	Corydalis solida ssp. solida	+1	+1	+1	+1	+1	+1	.	+1	V
G	Cyclamen cilicium var. cilicium	12	11	+1	12	11	+1	11	.	V
H	Arabis caucasica ssp. brevifolia	+1	+1	+1	+1	+1	.	.	+1	IV
H	Campanula involucrata	+1	.	+1	+1	.	+1	+1	.	IV
	Characteristic species of Querco-Cedretalia libani									
T	Briza humilis	+1	11	11	+1	11	+1	+1	+1	V
G	Bunium microcarpum ssp. microcarpum	+1	+1	+1	+1	11	+1	+1	+1	V
Ph	Juniperus excelsa	+1	+1	+1	+1	.	.	+1	+1	IV
T	Alyssum strigosum ssp. cedrorum	+1	+1	+1	.	+1	+1	+1	.	IV
H	Turritis laxa	+1	.	+1	+1	+1	.	+1	+1	IV
H	Potentilla kotschyana	+1	+1	+1	+1	.	+1	+1	.	IV
Ph	Cedrus libani	11	+1	+1	+1	+1	.	.	11	IV
NP	Cotoneaster nummularia	+1	+1	.	+1	+1	+1	+1	.	IV
T	Galium peplidifolium	+1	+1	+1	+1	+1	.	+1	.	IV
	Characteristic species of Quercetea pubescentis									
H	Lamium garganicum ssp. garganicum	+1	+1	+1	+1	+1	+1	+1	.	V
T	Cerastium fragillimum	+1	+1	+1	+1	+1	+1	.	+1	V
H	Silene italica	+1	+1	+1	+1	+1	+1	+1	.	V
Ph	Pinus nigra ssp. pallasiana	.	+1	+1	+1	+1	.	+1	+1	IV
H	Lathyrus digitatus	+1	+1	+1	.	+1	+1	+1	.	IV
H	Lathyrus laxiflorus ssp. laxiflorus	+1	+1	.	+1	+1	+1	.	+1	IV
H	Clinopodium vulgare ssp. vulgare	+1	+1	+1	+1	.	.	+1	+1	IV
	Characteristic species of Quercetea Ilicis									
PL	Lonicera etrusca var. etrusca	+1	+1	+1	.	.	+1	+1	.	IV
NP	Crataegus aronia var. minuta	.	+1	.	+1	+1	.	+1	.	III
Ph	Juniperus oxycedrus ssp. oxycedrus	+1	.	+1	+1	.	.	.	+1	III
	Others									
H	Dianthus zonatus var. hypochlorus	+1	+1	+1	+1	+1	+1	+1	.	V
H	Festuca heterophylla	+1	+1	+1	.	+1	+1	+1	+1	V
H	Dactylis glomerata	.	+1	+1	+1	+1	+1	+1	.	IV
H	Poa bulbosa	+1	+1	+1	+1	+1	.	+1	.	IV
H	Pilosella echioides ssp. procera	+1	.	+1	+1	+1	+1	.	+1	IV
H	Veronica dischrus	+1	+1	+1	+1	+1	+1	.	.	IV
TH	Dryopteris pallida	+1	.	+1	+1	.	+1	+1	.	IV
TH	Ceterach officinarum	+1	+1	.	.	+1	+1	+1	.	IV
H	Alyssum mouradicum	.	+1	+1	+1	+1	.	+1	.	IV
G	Orchis palustris	+1	+1	+1	+1	.	.	+1	.	IV
H	Myosotis refrecta ssp. refracta	.	+1	.	.	+1	.	.	+1	III
T	Galium verticillatum	+1	+1	.	.	.	+1	.	.	III
H	Carex divulsa ssp. coriogyne	+1	.	+1	+1	.	.	.	.	III
H	Sedum amplexicaule	.	12	.	.	12	.	.	.	II
Ch	Astragalus chamberlainianus	.	.	12	.	.	.	12	.	II

Not: The heights and size of quadrat were reduced by a factor of10.

mixed way south of Aktepe, the starting point of the Göksu basin, between 1000 and 1600 meters, and it is widely and purely distributed at 800-1200 meters up to Yerköprü from the area around Asılı. Furthermore, it is significantly damaged at the locations adjacent to the settlements around Kartaltepe, and some portion of it has become a steppe forest. Consequently, the homogeneous locations to be defined in *Rhamno-Quercetum pubescentii* association are those near the valley and under protection. But in the slopes facing the south of the Göksu valley, the oak forests have been leveled to make way for vineyards on a large scale.

The Göksu valley first extends towards the east starting from the south of Hadim and goes on to the south with a slight curve and this incline continues as far as Yerköprü. For this reason, the north slope of the valley facing south is not exposed to the dry winds coming from Central Anatolia and is influenced by the hot and humid climate of the Mediterranean to which the valley is connected. Thus, development of the cultural and natural plants in the slopes has been optimal. On fact, although the incline reaches 50%, the land becomes less uneven as you approach the settlements but the organic material in the soil decreases significantly due to damage and erosion. Whereas both sides of the slope and all the land on which the association is spread, is formed of reddish brown Mediterranean soil of clay-granular character, containing a medium level of lime. Therefore, the majority of the sample plots have been preferred from the spots and slopes close to the valley where the rate of vitality and sociability is high.

Since *Rhamnus nitidus* Davis, which is an endemic Mediterranean element and the species of another Mediterranean element, Silene *squamigera* Boiss. subsp. *squamigera* are located in the habitat consistently, they have been shown to be the characteristic of the association (Table 6). The floristic composition, is 27% Mediterranean elements and 17% Irano-Turanian. This situation is due to the fact that the sample plots were taken from the smooth areas under the effects of the Central Anatolian climate and the slopes of the Göksu valley under the effects of the Mediterranean climate. Here 11.5% are endemics and their distribution is similar to the one above between the two phytogeographic regions or two different macroclimates.

The association of *Rhamno-Quercetum pubescentii* could not be analyzed syntaxonomically because here, there are cosmopolitan elements which originate from the nature of the floristic composition and the fact that this section of the region is completely at a transitory state between the Mediterranean and Central Anatolia. This fact is illustrated in an explanatory way with the classes and orders in Table 6. When we look at the life forms of *Rhamno-Quercetum pubescentii,* we understand that it exhibits a large structural complexity because the association, which is represented easily through the *Quercetea pubescentis* Doing Kraft, 1955 class and *Querco-Cedretalia libani* Barbero, Loisel, Quézel, 1974 orders, while it is connected with the *Quercetea ilicis* Br.-Bl., 1947 class in the south, it is connected to the *Onobrycho armeni-Thymetalia leucostomi* Akman, Ketenoğlu, Quézel, 1985 orders in the north. Consequently, due to the impact of these complex factors, it was impossible to include the association in any alliance.

The lacalities and dates of quadrats which represent the association are as follows:

Quadrat No:	Locality and date
43-44-45	Göksu valley, 17.05.1996
46-47-48	Göksu valley, 18.05.1996
49-50-51-52	Yerköprü environs, 19.05.1996

Conclusion

A total of 6 associations are described from the study area: 2 from the steppe vegetation and 4 from the forest vegetation. In the description, species of non-cosmopolitan floristic composition whose associations were best characterized were selected, and a dual naming system was adopted. The plant associations defined in this study, have been defined by the other studies at different locations either far or close. I think that the associations formed by dominant species, do not cover the same floristic composition. Furthermore, even if such associations are very close to one another, they are not supposed to have even 40% floristic composition in common. Because in the formation process of the soil, the bedrock and climate are significant at the first degree. Since the least topographic difference (Site-Type) within the same area is in the microclimate situation, it exhibits a different ecological structure. In the same manner, the rate of similarity of two associations, which are adjacent to one another and whose dominant species is different, depends on the similarity of the bedrock and the soil again. While at times, the soil at the locations near one another have significant differences, the soil at the locations of far from one another may have similarities. For this very reason, although at such locations the associations are different, they may have more similarities than the same association. Therefore, the soil directly has a selective impact on the plants to acquire their habitat.

Table 6. Rhamno-Quercetum pubescentii OCAKVERDI & OFLAS Ass. Nov. Type: Quadrat 43.

Life Form	Quadrat No	43	44	45	46	47	48	49	50	51	52	Presence
	Size of quadrat (m2)	500	500	500	500	500	500	500	500	500	500	
	Altitude (m)	110	100	90	85	80	80	120	130	115	87	
	Exposure	W	S	S	S	SE	SE	SE	S	SE	SE	
	Inclination (%)	40	35	40	35	25	50	40	40	40	30	
	Coverage total (%)	70	75	70	85	85	80	75	80	80	80	
	Characteristics species of association											
Ph	Quercus pubescens	43	43	34	44	44	45	44	43	43	44	V
NP	Rhamnus nitidus	+1	.	+1	.	+1	.	.	+1	+1	+1	IV
T	Silene squamigera ssp. squamigera	+1	+1	.	+1	+1	.	+1	.	+1	.	IV
	Characteristic species of Querco-Cedretalia libani											
Ph	Juniperus excelsa	+1	+1	.	+1	+1	+1	+1	+1	+1	+1	V
T	Galium peplidifolium	+1	+1	+1	+1	+1	.	+1	+1	.	.	IV
G	Bunium microcarpum ssp. microcarpum	+1	+1	+1	+1	.	+1	.	+1	+1	.	IV
T	Alyssum strigosum ssp. cedrorum	+1	+1	.	+1	+1	.	+1	+1	.	+1	IV
T	Trifolium speciosum	+1	+1	+1	.	+1	+1	.	.	+1	+1	IV
NP	Cotoneaster nummularia	+1	+1	+1	+1	+1	+1	.	+1	.	.	IV
T	Minuartia multinervis	+1	.	+1	+1	+1	.	+1	.	+1	.	IV
	Characteristic species of Quercetea pubescentis											
H	Salvia cadmica	+1	+1	+1	+1	+1	+1	.	+1	+1	+1	V
H	Lathyrus digitatus	+1	+1	+1	+1	+1	+1	+1	+1	+1	.	V
H	Falcaria vulgaris	+1	+1	.	+1	+1	.	+1	+1	.	+1	IV
H	Melica ciliata	+1	+1	+1	+1	.	+1	+1	.	+1	.	IV
H	Campanula lyrata ssp. lyrata	.	+1	.	+1	+1	+1	.	+1	.	+1	IV
H	Coronilla varia ssp. varia	12	.	12	.	.	12	12	.	12	12	IV
H	Clinopodium vulgare ssp. vulgara	+1	+1	.	+1	+1	.	.	+1	.	.	III
	Characteristic species of Quercetea Ilicis											
Ph	Juniperus oxycedrus ssp. oxycedrus	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	V
NP	Crataegus aronia var. minuta	+1	+1	+1	+1	+1	+1	+1	+1	+1	.	V
NP	Jasminium fruticans	+1	.	+1	+1	+1	+1	.	+1	.	+1	IV
NP	Colutea cilicica	+1	+1	.	+1	+1	+1	+1	.	.	.	IV
NP	Pistacia terebinthus ssp. palaestina	.	.	+1	+1	+1	+1	.	.	+1	+1	IV
	Characteristic species of Onobrycho armeni-Thymetalia leucostomi											
H	Astragalus lydius	+1	+1	.	+1	+1	.	.	+1	+1	+1	IV
H	Euphorbia macroclada	+1	+1	+1	+1	.	+1	+1	+1	.	.	IV
T	Callipeltis cucullaria	+1	+1	.	.	+1	+1	+1	.	+1	.	IV
	Others											
T	Crucianella latifolia	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	V
H	Poa bulbosa	+1	+1	.	+1	+1	+1	.	.	+1	+1	IV
T	Minuartia hybrida ssp. hybrida	+1	+1	+1	+1	.	.	+1	+1	+1	.	IV
T	Velezia rigida	.	+1	.	+1	+1	+1	+1	.	+1	+1	IV
T	Lathyrus nissolia	+1	.	+1	.	+1	.	+1	+1	+1	+1	IV
T	Petrorhagia cretica	+1	+1	.	11	11	11	+1	.	11	11	IV
T	Trigonella velutina	+1	.	+1	+1	+1	.	+1	.	+1	+1	IV
T	Trigonella monspeliaca	+1	+1	.	+1	+1	+1	+1	+1	.	.	IV
T	Legousia falcata	.	+1	+1	+1	.	+1	+1	+1	+1	.	IV
T	Myrrhoides nodosa	+1	+1	+1	+1	+1	.	+1	.	+1	.	IV
G	Allium stamineum	+1	.	+1	+1	.	+1	+1	+1	+1	.	IV
T	Crupina crupinastrum	+1	+1	+1	.	+1	+1	.	+1	.	+1	IV
Ph	Quercus trojana	.	+1	.	11	11	11	.	.	+1	11	IV
T	Scandix macrorhyncha	+1	+1	.	+1	+1	+1	+1	.	.	.	IV
H	Physospermum cornubiense	+1	+1	+1	+1	.	.	.	.	+1	+1	IV
T	Campanula macrostyla	.	+1	.	.	+1	+1	.	+1	+1	.	III
T	Euphorbia arvalis	+1	.	.	+1	+1	.	.	+1	+1	.	III
T	Medicago coronata	.	.	+1	+1	.	+1	+1	.	.	.	III
H	Trigonella plicata	.	+1	.	.	+1	.	+1	+1	.	.	III
T	Camelina rumelica	+1	.	+1	+1	.	.	.	.	+1	.	III
T	Helianthemum salicifolium	+1	+1	.	.	.	+1	.	.	.	.	III
T	Rochelia disperma var. disperma	.	.	.	.	+1	.	.	.	.	+1	II
T	Aethionema arabicum	.	.	.	+1	.	.	+1	.	.	.	II

Not: The heights and size of quadrat were reduced by a factor of10.

No comparison has been made regarding the rates of similarity of the similar associations which have been previously defined by taking into account the above mentioned situatinos. Apart from this, the associations to be compared have to be chosen correctly. When we look at the work done in the very close environs, it is possible to see such a situation. If the coverage-abundance and sociability have 54 in a forest association and the floristic composition has more than 170 species most of which are composed of xerophyte plants of long day steppe origin, this study (1) will be contrary to the principle of "sample plots are taken from the homogeneous spots of the association".

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