ECOSYSTEM PROPERTIES OF THE MOUNT MANCINIK (BALIKESIR, NW TURKEY)

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Abstract

Mancınık Mountain which is located in the southern part of Balıkesir, Marmara Geographical region a distinct habitat depending on its notably altitudinal and exposure properties. Ecologically most part of Marmara Geographical Region is the transitional ecological region (zonoecotone) between mild-humid Black Sea Region and semiarid Mediterranean climate. The topographic, climatic, parent material properties of the Mancınık Mountain support the growth of different vegetation communities and lead to the increase of biodiversity as compared its vicinity area.

Mount Mancınık is a place showing orobiome characteristics which have some differences in terms of geological, geomorphological and edafic ways. It also shelters many kinds of biogeographic values. Mount Mancınık is an orographic unit extending in an east-west direction, which is partially massy and has high hillsides. Thus, there are important biogeographic, edafic, geomorphologic, and climatic differences between the northern and southern parts because of this exposure factor. The fact that the mountain is in the transition zone of the Mediterranean and Black Sea Regions' climate areas plays an important role in this asymmetry. Relative elevation differences of the mountain mass in relation to its environment enable the formation of vegetation zones. Its geologic and geomorphologic properties, soil types, rich flora and fauna, water resources, and recreational richness show typical orobiome characteristics. To carry out this research, field trips have been conducted and climatic maps including precipitation and temperature, soil maps, geology, geomorphology, and elevation levels were prepared in GIS environment. These maps are prepared by analysis of Landsat ETM+ images from 2006. The gathered data was converted to related thematic maps in order to produce required maps such as rainfall, geomorphology, geology, vegetation, etc.

Key words: *Mancınık mountain, ecosystem, orobiome, vegetation, land use*

Introduction

One way of understanding relations between individuals and their environment is to study the structure the ecosystem and also identify occurring human activities. This approach allows environmental authorities to focus their attention to conservation priority areas or by developing models that can explain future scenarios (Gaston 1998, Hunter 2002, Walter 1985, 2002). The study of biodiversity on a regional or landscape scale has the ecosystem as the unit from which structure and composition are analyzed. The ecosystem serves as the base for a monitoring programme (Josse et al. 2003).

Species and ecosystem diversity is also known to vary with altitude Walter (1985) and Gaston and Williams (1996: 214-215). Mountainous environments, also called orobiomes, are subdivided vertically into altitudinal belts, such as montane, alpine and nival, that have quite different ecosystems. Climatic conditions at higher elevations (e.g., low temperatures, high aridity) can create environments where relatively few species can survive. Similarly, in oceans and freshwaters there are usually fewer species as one moves to increasing depths below the surface. However, in the oceans there may be a rise in species richness close to the seabed, which is associated with an increase in ecosystem heterogeneity.

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The Mount Mancınık is one of the interesting orobiome due to not only its biological richness but also because it is being in transition position on the northwest of Turkey. Studies carried out in this region show that the region has high rates of landscape transformation mostly caused by deforestation and fragmentation (Sönmez 1988, Efe 1999, Atalay 2000, 2002). However few studies are available that combine geographical data on the dynamics of ecosystem disturbance and fragmentation with socio-economic indicators. Some brief information is given about this area's geological, geomorphological, soil, climate, flora, hydrology and settlement properties in the studies of Akyürek (1978), Ercan (1984), Kızılçaoğlu (2002), Mutaf (2003) and Efe (2004). Relative elevation differences of the mountain mass compared to its environment enable the formation of vegetation zones. Its geologic and geomorphologic structure, soil types, rich flora and fauna, water resources and recreational richness show typical orobiome characteristics.

Study area

Mount Mancınık (957 m) is 20 kms south of Balıkesir (Figure 1), and on the unity of volcanic mountain complex which constitutes a part of the Manisa-Balıkesir province border. This volcanic complex never reaches a height of 1000meters on any point of the mountain. Mount Mancınık (957m) and Davulludağ (955m) are the chief peaks and they are the heights taking place on the central part of the zone. This volcanic mass captures all the attention by having a radial drainage system on large scale maps and is bordered by Bakırçay in the southeast and south, and with Yağcılı in the west. The north end is bordered by Kocadere, and the east is bordered by the Kille River.

Figure 1: Location of Mount Mancınık

Material and Method

Thus, the previous studies cover a wider area. There is no detailed study about Mount Mancınık. From the studies constituting the basis of Mount Mancınık orobiome, there is general information about this area's geological, geomorphological, soil, climate, flora, hydrology, and settling properties in the studies of Ramsey (1960), Tolun (1970), Akyürek (1978), Ercan (1984), Sönmez (1988), Kızılçaoğlu (2002), and Mutaf (2003). A 1/25,000 scaled topography map and 1/ 100,000 scaled geology map and climate data were used in this study. Moreover, it was supported by area studies. In the area studies phase of the Mount Mancınık research, physical and human factors were analyzed on the spot and plant, soil, and rock samples were taken. Photos were also taken for details. As a result of this, the area's 1/25,000 scaled geological, geomorphologic, soil, and flora maps were drawn and the ecological factors which form the orobiom of Mount Mancınık are considered in detail.

To carry out this research; several field investigations have been conducted and; data collected during the field trips and other data gathered and mapped. Soil samples which collected during the field investigations and they were analyzed at the soil laboratory in order to determine physical and chemical properties. Climatic map including precipitation and temperature, soil map, geology, geomorphology, elevation levels maps were prepared in GIS environment. These maps are prepared by analysis of Landsat ETM+ images of 2006. The gathered data were converted to related thematic maps to produce of required maps such as rainfall, geomorphology, geology, vegetation. This information has been used to find out the relationship and results of this relationship of the ecosystem properties of the study area as an orobiome.

Gathered data allows ecosystem mapping is based on the general assumption that ecosystems are delimited by properties of the landscape, and the scale of work. Using remote sensing and GIS tools, the ecosystems were identified by a supervised interpretation Landsat ETM+ images, on a scale of 1:250.000. The units were complemented by field investigation. The information was processed using ERDAS imagine v 8.3, ArcGis v 8.2, and was incorporated in a Microsoft Access database. The visualization was done with ESRI Map Objects.

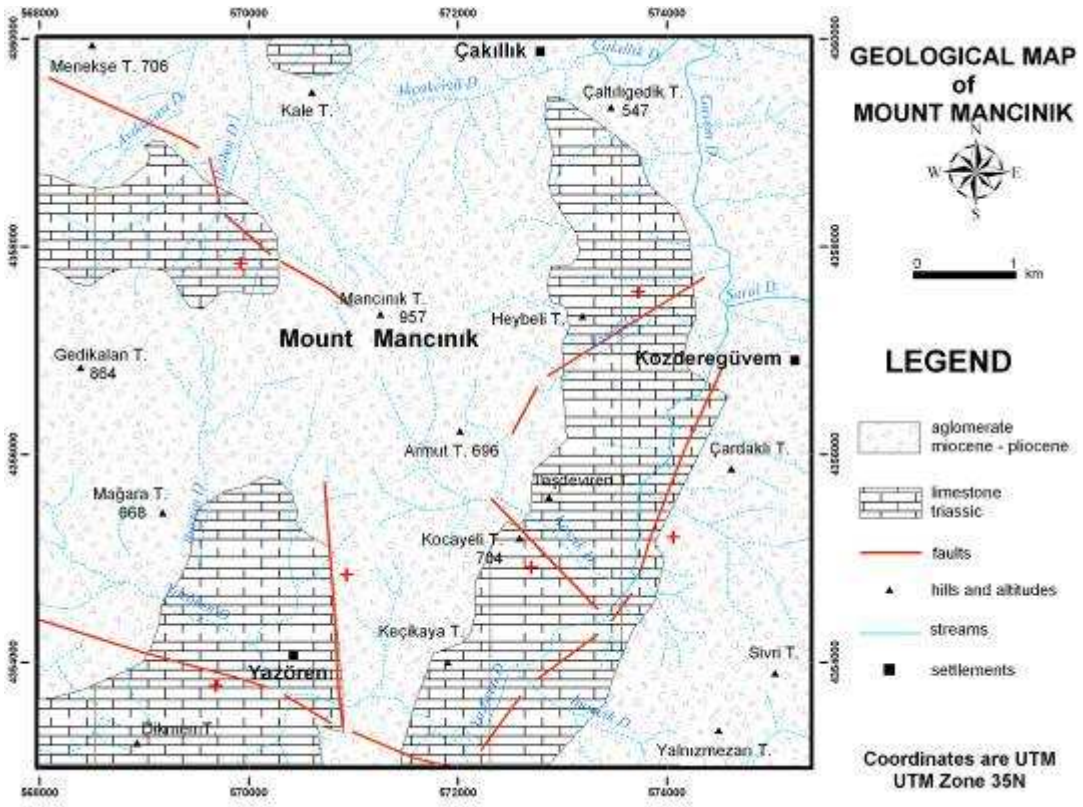

Figure 1: Geological map of the Mt. Mancınık

General Geographical Properties

This mountain mass is distinguishable from its surroundings in regard to geological and geomorphological ways. Although the zones around the mass are formed from Neogene sedimentary rocks, the mass consists of mostly volcanic rocks like andesite, dacite, and basalt. In addition to this, Mesozoic old limestones (Triassic) which cover wide areas and are all the advanced karsts topography on this Mesozoic stand out (Ercan 1984; Kızılçaoğlu, 2002). Although Mountain Mancınık mass shows a formation in the shape of a cone going down from the center to its sides, faults resulting from the last tectonic movements, divide it

into a certain number of blocks. When it is generally thought of, we can see that Mount Mancınık is nearly an ellipse and is open to northern air masses adding to its special geomorphology. The mountain masses higher than 900meters like Mount Tuzla, Mount Koy, and Mount Kop close off Mount Mancınık to southern air masses, namely The Mediterranean effect. Therefore, The Mediterranean elements are not dominant on the flora components of Mount Mancınık. Because of the mountains being very open to the effect of northern air masses, we can see the Black Sea phytogeographical region elements like hornbeam, nut, handless oak, and maple on the northern hillsides, but practically none of these species exist on the southern hillsides (Sönmez 1988). In the study area, entisols, inceptisols and alfisols are spread out. Entisols consist of a thin A horizon whose horizons are not processed on main rock and a B stage under it. Most of the time, B stage is not processed completely. It makes a point that inceptisols have a more developed profile structure compared to entisols. But in general, A and C stages are more processed. Because of human effect's being dense; the soils abrade largely and have lost their depth. The soils having shallow profile structures get deeper on forest areas where flora became densely massed. Because of overgrazing on regions where livestock is produced, degradation is observed on the texture and structure of the soils. The most effective anthropogenic factor is transhumance actions on this area. After the conquest of Anatolia, Turkomen groups called the Yörük started to use these mountains as summer resorts. By using the passes over the mountains, they migrated rhythmically between the Aegean champagnes and these mountains. The forestless zone called Dumanlı Yayla (Plateau) on Mount Mancınık is evidence of those activities (Photo 2). Like this one, Yumaklı Yayla, which is in eastern of Kozdere, is also among the most favorite plateaus.

Ecosystem Features

Geology: Mount Mancınık and its environs are located in a volcanic area, which was formed in the Miocene era (Kızılçaoğlu 2002). Volcanic rocks in the foreground are in the lithologic structure of mountains. They are andesite, agglomerate, and tuffs. Although basalts are seen in nearby areas, they are not in the study area. The rocks are very important in regards to the effects on the forming of soil, porosity, and permeability features and their resistance against erosion and corrosion in the research zone. Agglomerates are widely spread out in the area. Agglomerates from the cement clastic rock group decompose when they are exposed to outside effects. Because of this, in the constitution of soils, they are forming above the agglomerates. Thus, the sand percentage in the constitution of soils forming above the agglomerates is high. Because of andesites being covered by agglomerates in Mount Mancınık, they do not give so many samples. However, in some areas, in particular the Aliölen River's upper basin, is the place where andesites take place. We can see tuffs especially in the Çakıllık Village basin and the upper parts of Akçaertil River creek catchment. The texture of these rocks is weak and their porosities are high, too. There are quartz, feldspar, and other base and ferrous magnesium mineral fragments among them. The second common rock type in the area is Mesozoic limestones (Middle and upper Triassic). We can see them in the east of the study area and throughout the Kozdere Valley in the south, around Urbut Polje and in Tepesidelik and Ağılkaya in the northwest. They are in the shape of thick stratums. Lapies have developed on these rocks.

Geomorphologic Features

There are some relations between Mount Mancınık's geomorphologic features and the distribution and vegetation formations. The first one which should be discussed pertaining to geomorphologic features is the elevation factor. Elevations approaching 1000 meters cause some changes such as increases in precipitation and low temperatures. Furthermore, the elevation of the mountain from sea level, its relative height to the environment, has an important role in obtaining an orobiome feature. In the interpolation, made by setting out from the rainfall intensities of the meteorological stations in the surroundings, it is found out that the mean annual precipitation reaches 1000mm, and moreover, it exceeds this value from time to time (Figure 3). Similarly, according to the interpolation made on temperature data, annual average precipitation decreases below 10 ℃. All of these findings show that Mount Mancınık is very adequate in vegetation and soil development, especially in forest orobiome.

Mount Mancınık gets a position of having sides on both the north and west by means of the east to west heights of its top. Besides Aliölen River, which abraded the mountain's north hillside to the sides and in depth in the receive basin, caused side factor's to grow stronger. As a result, it laid the groundwork for the constitution of a moister and cooler environment. It is really possible to associate the hornbeam *(Carpinus betulus*) union, investing the receive basin in north fall, with these environment conditions. High bevel values caused erosion and redoubled these events' efficiencies. In the bevels orientated many kinds of extant aims, in which the forest cover is abrogated not only in the hillside areas but also in champaigns of upper levels, resulted in an inability to grow upright again. The big erosion zones came into existence as a result of the destruction of forest cover near the villages of Karaçam and Hırdıbalı in the west, on the north falls of the mass and around Çakıllık Village in the east. These are the neighboring places in the research area. Unfortunately, as a result of notice not being taken of high bevel values and lithologic features, there is an erosion threat with its origins in the Aliölen River receive basin. The location of which is at the shaving parts applied by the Ministry of Forestry in the last decade, where the densest forests take place (Figure 5, 6).

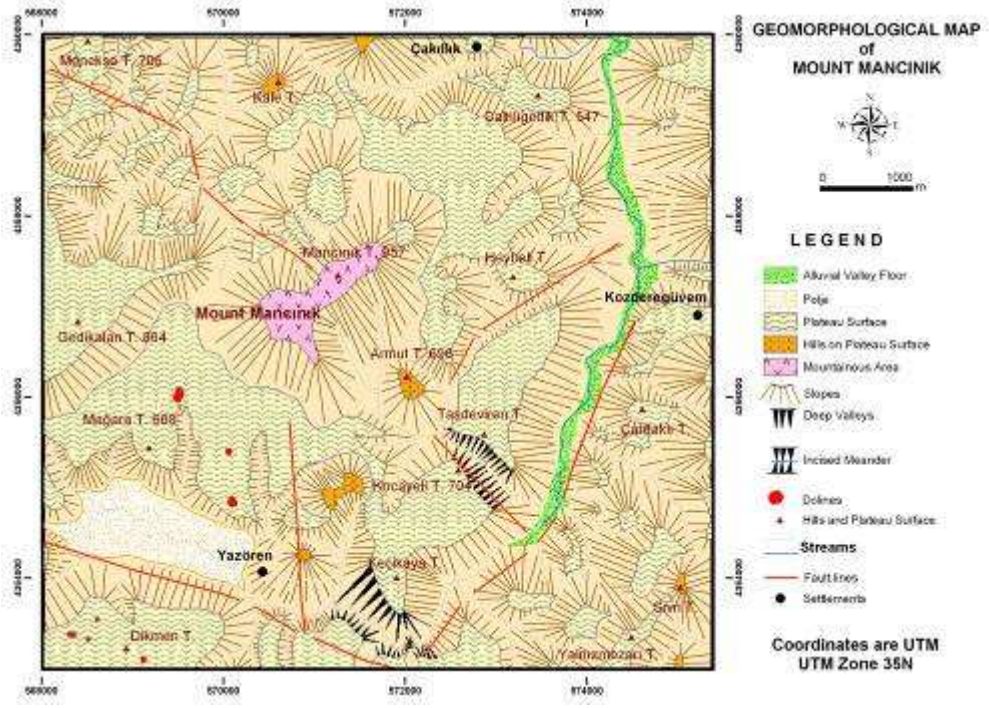

Figure 2 : Geomorphological map of Mt. Mancınık

Soil Properties

The lithological structure of the area plays a very important role in the constitution of soils that are seen. On the study area, entisols, inceptisols and alfisols occur. Entisols consist of a thin A horizon and B horizon under it on the rock. Most of the time, B horizon is not developed completely. It makes a point of that inceptisols have more developed profile structure compared to entisols. But in general, A and C horizons are more developed. High sand rated inceptisols were developed on agglomerates. This soil is very poor in reference to lime, or lacks in lime. It also absorbs and loses water in a very short time. In the sample collected from Akçaertil around Çakıllık Village, a light acid reaction was found in the soil. Only *Phyllirea latifolia* associations managed to endure on the sloping areas, the places where the vegetation was destructed, and on the eroded and thinned soils. The similar soils coincided in relation to andesites, too. As it is emphasized above, these are loamy (argillaceous-arenaceous), clayey soils. They are indeed deep in some parts. Their water

holding capacities are high, and they are cold and hardly warm soils. Because they contain moisture even during arid periods, some tree species such as *Quercus frainetto, Quercus petrea, and Corylus avellana,* whose moisture demands are high, spread. The soil constitution period is faster on tuffs and the profiles of these soils are deep. On the areas where these soils having floppy structures, erosion emphasis is getting higher with the destruction of the flora. The clearest samples of these events are around Hıdırbalı and Karaçam Villages. Compared to agglomerates and andesites, neutral reactioned or light acid soil progression is observed more on tuffs. Seeing black pine associations as the most common of these soils in the area may be related to this reason. Like this, *Cistus salvifolius* is seen on tuff rocks and on the soils developed on them. Alfisols, rich with iron oxide are seen only on Triassic limestones. The depthness of the profile of these soils reach at most 1 meter. They are non-calcareous or a little bit calcareous. They fill the cracks of limestones in patches. The laboratory analysis of the sample taken from Akçakertil location around Çakıllık village showed these soils' being neutral reactioned and rich soils in regards to inorganic and organic material. A strawberry tree association (*Arbutus andrachne*) widespread, which is dependent on the soil class in this area, is observed as an interesting situation and this situation's relationship to soil reaction is considered. Because of overuse of the land, the soils eroded largely and lost their depthness. The soils having shallow profile structure, get deeper under forested areas where flora became denser. Because of oveargrazing degradation is observed on the soils. The most effective anthropogenic factor is transhumance activities which have been done for centuries.

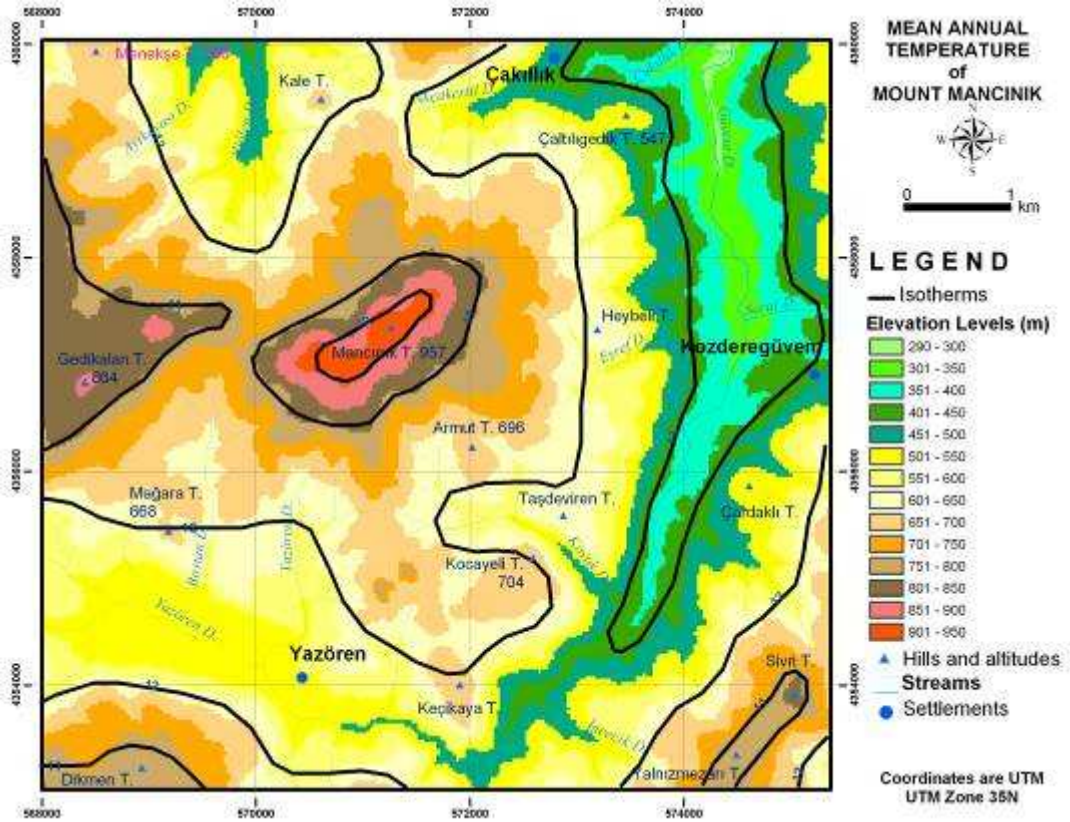

Figure 3: Mean annual temperature

Climatic Features

One of the most important features composing the ecological properties of Mount Mancınık's orobiome is climate. Data from the Balıkesir Meteorological station was taken as the basis of this relationship. Annual Average temperature is 14.3℃ and this decreases to 10℃ at the top of the mountain. This value shows that the area is appropriate for forest

formation species whose needs are medium degrees like Turkish Oak (*Quercus cerris*), Hungarian Oak, Hornbeam, and Black pine (Efe 2004). The hottest month's average is 24℃ at Balikesir, but with the effect of the elevation, it decreases to 20℃ in higher parts. In this situation, it is possible to grow tree species which do not need so much warmth like Hornbeams *(Carpinus betulus)* and Sessile oak *(Quercus petrea)* in high parts of the area. January, the coldest month's annual average is 4.7°C. Although this value is a bit lower according to the stations carrying typical features of Mediterranean climate, it shows that the winters are partly mild. If we interpole this value according to the highest part of the area, we can suppose this month's average will decrease to 0℃. In this situation, maquis elements, being very sensitive to low temperatures, can not find an appropriate environment for themselves. We can see that Strawberry tree, which is one of the typical maquis elements, is rising until 650 meters in the south, southeast and west sides of the area. *Phllyrea latifolia* associations, which are the most resistant to the lower temperatures, are everywhere on the mountain but only until this height.

The vegetation period is another important climatic feature in the study area. The vegetation period, which starts on 27th of March and ends on 25th of November, lasts for 245 days (Sönmez, 1996). According to this, it appears that the vegetation period is starting in the first week of April which is ten days later. This is another reason for not being able to see some Mediterranean elements which need a long growing time period. Precipitation around 600mm in lower parts of the area is exceeding 900mms on Mount Mancınık because of the height. Some hygrophilous species like *Carpinus betulus, Quercus petrea, Quercus frainetto, Corylus avellana and Acer campestre;* which are very common among the species of upper level, can be accepted as proof of this kind of environment.

Months	1	2	3	4	5	6	7	8	9	10	11	12	An.
Temp. ºC	4.7	6.0	7.7	12.5	17.4	21.7	24.0	23.8	20.5	15.7	11.0	6.9	14.3
Prec. (mm)	92	75	62	50	44	24	8.4	8.4	21	44	78	101	607.8

Table 1: Temperature and precipitation (Balıkesir Meteorological Station 140 m, 39º 39' N, 27º 32'

When we look at the precipitation regime of the area, we can see that winter is the rainiest season with an average of 44% of total rainfall. Opposite to this, summer is the driest season with an average of 7%. These features belong to Mediterranean climate precipitation characteristics. As a result of this precipitation regime, an efficient arid period comes out.

It is possible to connect apparent *Phllyrea latifolia* associations very commonly, especially in low level with the study area. According to the results of the Thornthwaite method, the researchers who did research about the climate, the area is "dry and low moistured, second-level mesothermal, very strong water extra and close to sea conditions (C1, B'2,S2,b'4)" (Sönmez 1988, Kızılçaoğlu 2002). This type of climate found through use of the Thornthwaite method can be accepted as another kind of expression of the Mediterranean climate. As we see on the schedule, there is a period of aridness and water deficiency comprising of June, July, August, September, and October.

This arid period is effective in the months of July, August and September and loses its efficiency in May and October. Because of this, from a level of 650 meters in this area, it shows that the dry period's being removed and the one in May's weakening. Namely, the arid period in the high levels of the area decreases to four months by shortening one month. Aridity conditions losing their efficiency means ecologic conditions' will change in a positive way, especially for flora. Because of this reason, the forest formation, which is sensitive to drought, like *Carpinus betulus, Corylus avellana, Quercus petrea, Quercus frainetto, Acer hyrcanum, Acer campestre, Sorbus torminalis, Cornus mas, Cornus sanguinea,* take their places on high levels of the area. As an abiotic factor, the wind has indirect and direct effects on flora in the area. According to the studies, the north winds are dominant in the area (Sönmez, 1988, Kızılçaoğlu, 2002). In reference to their blowing rates, north and northeasterly winds are the leading ones. The dominant wind direction is N17℄ with a 64.3% frequency. Southwesterly winds are in third place in regard to its blowing rate and gains ground by being the second leading wind with a 29.8% frequency in winter (Sönmez

1988, 1966). The fact that the north winds are leaders constitutes positive conditions for forest biome's progress. The forest is thicker, denser and more matured in the north hillsides of Mount Mancınık. At the top of the area, the direct effects of the dominant winds show themselves as the wind flags (Photo 1). It can be seen that the oak's heads are being bent towards the south-west here. Southwesterly winds are effective in winter and partly in spring. They support the increase in the temperature of the weather. They play roles in forest trees' starting their physiologic activities after the winter resting period.

Photo 1: Animal grazing has an important effect on degradation of natural vegetation in the area

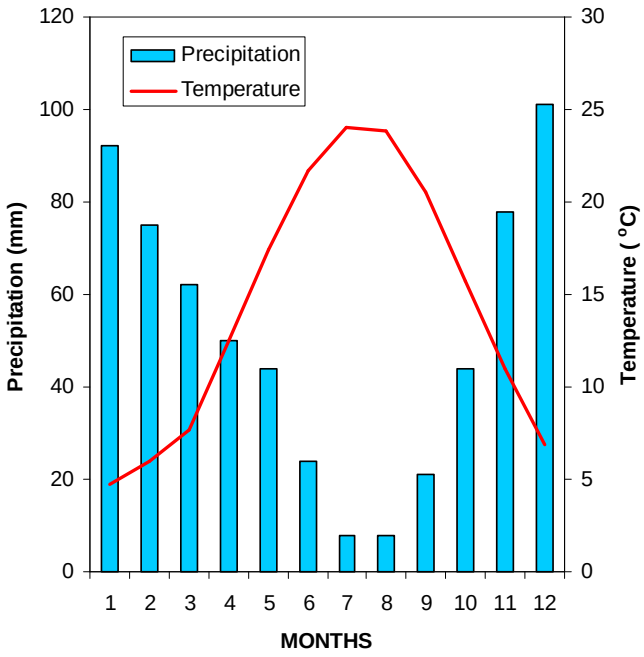

Figure 4: Climadiagram of annual temperature and precipitation

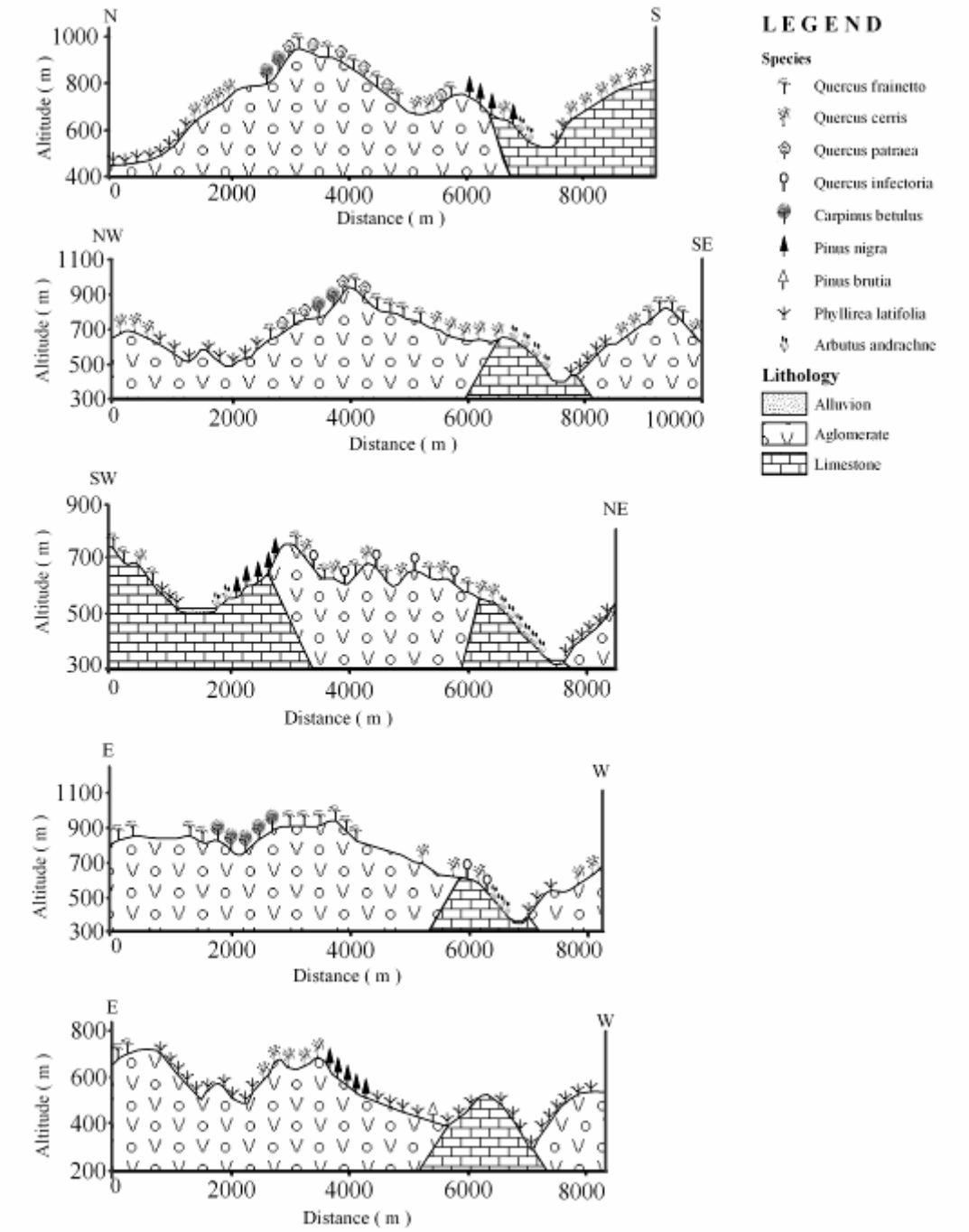

Figure 5: Vegetation cross-sections of Mancınık Mountain

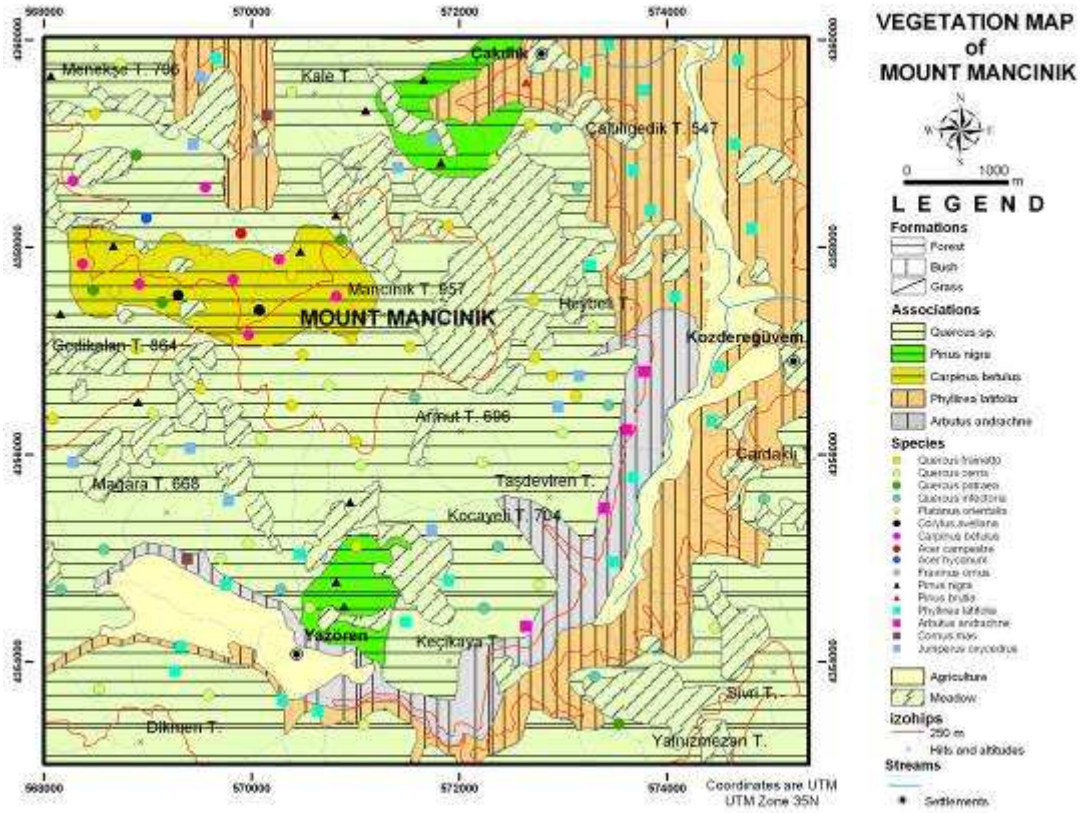

Figure 6: Vegetation formations in the Mount Mancınık

Photo 2: Land degradation is common problem on the lower slopes of the Mancınık Mountain. It occurs mostly in the vicinity of the settlements.

Photo 3: Plants and rocks are used as building material ecosystem disturbance and fragmentation with socio-economic indicators.

Hydrography

The hydrographic features around Mount Mancınık have direct and indirect effects on the existing biome. The hydrographic elements in relation to the area are rivers and underground waters. The main river of the area studied is the Aliölen River. This river flows into the north-south valley and stretches to Kocadere coming from the west. Although the Aliölen River is weak during the summer, it has a little bit of water because it gets water from the receive basin and many hillside springs towards the lower part. This river forms a very good environment with its valley open to northerly winds and deeply split for moisture species for their growth throughout the valley. Some of these species are *Carpinus betulus, Acer hyrcanum, Corylus avellana, Fraxinus ornus,* and *Sorbus torminalis.* Natural vegetation has been removed on a large scale where the floor of the valley is taken to culture. Throughout this stream, there are some moisture charactered cultural and semi-cultural species. The main ones are *Juglans regia, Populus nigra,* and *Platanus orientalis.* Agglomerates and tuffs, which are high positioned rocks, constitute an important aquifer for underground waters. There are some springs under those waterproof areas. The upper basin of the Aliölen River is an area rich with sources.

Vegetation

In an orobioume character, the vegetation formations on Mount Mancınık can be taken in hand as forest, bush, and grass.

Forests

As shown in previous chapters, according to ecological conditions, the climax vegetation of the area is forest. However, because of the height factor beginning at 650 meters, this forest association has double zone characteristics. In addition to this, with the effect of hillsides, there are differences in forest stands on the north and south hillsides. Moreover, edafic factors caused this association to be modified in relation to species and

characters, too. The north hillsides of the mountain are covered with oak forests from the foothills to the top. But with the effect of the height factor, parallel to a rise in precipitation and decreasing temperature values, the appearance of moisture hot character forest is seen from 650 meters. Thus, in a vertical direction, it is understood that the mountain's forest formation is in double characters in an up and down zone. While *Quercus cerris* is dominant in the lower zone, *Quercus frainetto* becomes dominant in the upper zone due to higher precipitation. With the coming of aspect factor into the period, there appears a new community among forest formation, and the forest becomes more varied and richer in feature and association. It is observed that there is an abundance of Sessile oak (Quercus Petrea) mixed among Hungarian Oaks on the upper zone of the hillside. The more important one is there is an important Hornbeam (*Carpinus betulus*) association which appeared at 700 meters this fall in the Aliölen River's upper basin. Besides the positive factors constituted by height and aspect factors for the Hornbeam unity's appearance with the pedologic features, this place's inclination degree, existence of argillaceous soils, Aliölen River's its own, which is moisture that can support moisture dependent specie's water needs even in dry periods and a number of hillside sources have important effects. In the north hillsides of Mount Mancınık, there is observed a mixing of many moist species' among this oak forest throughout the Aliölen river valley; such as *Corylus avellana, Cornus mas, Cornus sanguinea, Acer campestre, Acer hyrcanum, Alnus glutinosa, and Sorbus torminalis.* This situation strengthens the vegetal contrast between the north and the south slopes of the mountain. Quercus frainetto and Quercus cerris come to the foreground as the dominant elements of the forest at the higher level of the southern slopes. In addition to *Quercus cerris*, *Quercus Infectorias* are among the important species constituting the forest in the lower level (Figure 6).

In the study area there are Black pines (*Pinus nigra)* seen as being localized between 500-750 meters. Some of them are on the northeast slope of the mountain and the other ones are on the southeast side of the mountain. These associations do not completely cover the mountain by constituting a black pine zone. They are in the shape of islets, localized in the oak zone. The black pine islet along the northeast side of the mountain takes its place in the Akçaertil valley near Çalıkkık Village. The black pines mostly occur on tuffs and andesites near Yazıören (Urbut) village. There are shapely bodies 15 meters in height and nearly 1 meter diametered individuals are seen. The black pines being settled in the area like this is arising from anthropogenic factors. There are fourteen tree species among the forest formation in the area, five of which are Oak (Quercus sp.) species. *Quercus cerris and Quercus frainetto* are dominant elements in the forest formation.

Bush Formation

In the places where the forests are demolished, bush vegetation which are degraded formations, grow. The destruction is mostly effective on foothills and it effect is lessened when the height rises. Because of this, Mount Mancınık's foothills are invaded completely by bush associations until 550 meters. The bush association's dominance varies on Mount Mancınık and it is possible to categorize it in two groups as and *Arbutus andrachne*. While *Phyllirea latifolias* cover the area completely in the *Phyllirea latifolia* demolition zone, Arbutus Andrachnes Broadcast is only found on Triassic limestones. Although *Phyllirea latifolia* is in the form of pure unities at a rate of 80%, we can sometimes see other kinds of species like *Juniperus oxycedrus*, *Paliurus spina christi*, *Quercus infectoria*, *Cistus salviifolius*, and *Cretageous monogyrna* among them. An interesting fitosociological feature in relation with the unity of Phyllirea Latifolias is an abundance of Clematis Infectoria, which is a rare climbing type among the ones on the southern part (Photo). Although not very often, thorny myrtles (*Ruscus aculetaus*) being a comfit, are among the others. Bush formations have the qualifications of degraded unities, constituted with humanic reasons (1226 ha). With the destruction starting from the foothills, the forest association was removed until 550 meters. The bush formation can be categorized under two groups as *Phllyrea latifolia* and *Arbutus Andrachne*. Phyllirea Latifolias are more common (918 ha) and they cover the mass. *Arbutus andrachne* is in the east and southeast (308 ha) and has an edafic character. Because these are special to this association, they are estimated on Mesozoic limestones. Shrubs and

bushes have fourteen species but the ones constituting formations are only *Phyllirea Latifolias* and *Arbutus Andrachnes*. Among them, there are great numbers of *Juniperus oxycedrus* and *Quercus infectoria*. Among the bush association, *Clematis cirrhosa*, which is a twinning, attracts all the attention as a rare species in Turkey.

Grass Formation

Inside the study area, which is a natural forest zone, grass formations are encountered. This is especially evident in the forest felling areas, where they are used as plateaus. In these open areas, which are created by mostly thorny grass species and become degraded because of exaggerated pasturage, there are some physiognomic groups constituted from some species of hemycriptofites and a bit graminea. These come to the foreground during the spring and autumn months. Despite the area being very rich in grass species, no special studying is done on them, but cyclamen (*Cyclamen europium*), being greeted during the area studies is a noteworthy kind.

Anthropogenic Factors

Mount Mancınık, being close to historical places like Balıkesir, Bigadiç, and Savaştepe, has been under the anthropogenic effect for thousands of years. For this reason, the forests, being the climax flora of the region, undoubtedly suffer from the area construction. In addition to this, the natural covering underwent changes in this structure and floristic combination. The first of the humanic factors affecting the flora of the studying area are agriculture and livestock activities. The inhabitants of the region have been removing the natural cover on every slope and reclaimable area for thousands of years. The destruction, which had been started from savannas, went through the plateaus surfaces and then to the mountain falls over time. Livestock and agriculture are accepted as the main reasons for the destruction. The agriculture and livestock activities on the low parts caused the destruction of the natural flora here. The higher places, where no agriculture is done, were destroyed by goat crews. The history of livestock in the area goes back many thousand years. It is known that feeding goats had been a common economical activity before Turkish people came to Anatolia (Mansel 1999). Since goats were nourished with fresh seedlings from the upper sides of the young plants, their growth was stunted and caused the degradation of the flora (Photo 4). Migratory livestock activity came to Anatolia along with Turkish people in the 11th century. In these kinds of activities, it was very characteristic to use the upper zones as plateaus or mountain pastures. There are some plateaus named Dumanlı Yayla and Kapaklı Yayla in the study area. As explained before, these plateaus are the open areas constituted as a result of demonstration of the present forests beginning from the upper zone. As it is known, Yörüks, who are Turkish migrants, went from the Bakırçay Valley to plains and mountains which they used as plateaus in summers. They used this as a shelter place for a hundred years. During this time, they constituted open areas by destructing the forests on fertile and straight zones which are along their routes. The road passing near the study area and going to Balıkesir through to the northeast from Gelenbe is one of those lines. Mount Mancınık and its surroundings have been influenced by livestock activities throughout history. The pasturage cones, especially in the *Phyllirea latifolia* unities in the area, are very common. The oak trees, whose arms were cut back to use as animal feed during the arid summer season, show this effect is progressing very quickly in the present (Photo). As a result, human activities became effective on Mount Mancınık orobiome on the ways of the area, floristic cognation and vegetation structure.

Conclusions

Mount Mancınık shows orobiome features in its climate, geology, soil, hydrology, and vegetation specialties. The flora of the area is constituted by Mediterranean and Black Sea phytogeographical species. The climate features show the Mediterranean's effect being more dominant. Agglomerates, limestones, and tuffs affected the structure of soil and indirectly affected flora. Ecological conditions show that the climax cover of the area is forest.

This forest, invading a 2818ha area, is an oak forest (*Quercus* sp.) in general. Because of the proportional height difference, there are two zones categorized as the upper zone and lower zone on Mount Mancınık. With the effects of hillside factor on mountain, the forest covers of the northern and southern slopes indeed differentiate from each other. On Mount Mancınık, where there is a natural occurrence area of oak due to the anthropogenic effects, the bush formation appeared in wide areas. Because of the anthropogenic effects, the Black pines, covering more places in the past, are seen in the shape of little unities in a few places. The bush formations have the feature of degraded associations, constituted with anthropogenic reasons. With the destruction beginning from the foothills, the forest cover was removed until 550 meters. The area, being a thousand year housing place, underwent an important change and this change affected the plant associations.

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