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Research Article

WETLAND BIOTOPES OF GANOS MOUNTAIN (TEKIRDAĞ/ TURKEY)

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ABSTRACT. In our day, the tendency for natural resources has increased due to the increase in industrialization. Accordingly, this tendency results in an increase in environmental pressure groups over ecosystems. Biological and ecological diversity is under threat, especially due to incorrect and intense land use. Therefore, the importance of habitat conservation is increasing and potential solutions are being explored to support environmental conservation in the world. Biotope mapping plays a key role in making protection- usage decisions in ecological planning. In this research, wetland biotopes of Ganos Mountain are mapped using representative mapping method. In this context, previous studies related to the field and the research subject are collected and evaluated. After determining and identifying the area according to the land use types, floristic researches are started by checking the existence of biotopes in the area, which can represent the whole area or region and enable generalization for that region. As a result of the analysis, 12 woody and 48 herbaceous plant taxa are determined in the mapped biotopes. According to the Braun- Blanquet Method (1964), the dominant taxon of biotopes, whose plant densities are determined, is *Scirpus sylvaticus*. Within the scope of the research, the flora presence of the area is determined and the problems arising from land use are revealed.

Keywords: N*atural areas, Ecological mapping, Ganos Mount, Tekirdağ.*

INTRODUCTION

Efficient and balanced use of natural resources is based on ecological planning. The conservation of species and nature can be possible by determining the characteristics and value of the natural potential in the presence of different land use demands. Thus, it will also contribute to decision- making which can redress the balance between conservation and usage in planning.

In developing countries like ours, many land use policies in force do not provide ecological sustainability, which ends up in deterioration of habitats. In conserving ecosystems and fulfilling the expectations of societies from the ecosystem, sustainable use approach should be adopted by matching land types and land uses. Holistic approaches are necessary to determine conservation strategies for biodiversity. Vegetation classification and ecological classification are required for a broad assessment of ecosystem health and continuity of endangered habitats and wildlife [1]. The area planning based on ecological data determines how existing land uses affect one another and accordingly, the ecological criteria for land use.

It is recommended to work with biotopes in order to maintain the features of flora and fauna and to ensure the functionality of ecosystems because biotope is the first unit that reveals the changes caused by field use. Besides, biotopes are areas that can be represented and bordered in mapping and they can easily be handled in planning [2]. As

one of the modern nature convervation components, biotope mapping is vital to protect endangered, rare and valuable biotopes [3].

Classification and mapping of biotope types lay the groundwork for the following applications;

- Ecological activation of planning and management strategies for conservation, development and renewal,
- Creating a base to ensure wildlife management,
- Concretization of an ecosystem knowledge base for risky analysis and assessments of environmental impact assessments and environmental protection applications. Contributing to the characterization and mapping of the functions to be provided by forests on a field basis in the functional forestry management approach,
- Classification of natural and cultured areas by characterizing land use patterns,
- Contributing to the creation of national databases for environment and nature protection by implementing GIS and remote sensing supported digital maps [4].

In this research, the natural potential of Ganos Mountain was revealed by mapping the wetland biotopes in the area. Wetlands are ecosystems that are of interest to social scientists as well as natural scientists and they shape cultural processes due to their ecological importance as well as their relationship with human communities throughout history [5]. According to the Ramsar Convention, of which Turkey also became a party in 1994, the definition of wetlands is; "Natural or artificial, continuous or seasonal, sweet, bitter or salty, stagnant or flowing water bodies, marshes, peatlands and sea waters with a depth not exceeding six meters during ebb tide" [6]. Wetlands, which constitute a significant place among our natural resources, are of great importance in terms of protecting and maintaining biodiversity and ecological balance. Like the rest of the world, the need for water also increases in our country, and our water resources are rapidly diminishing due to contamination and misuse. In the last 40 years, 1 300 thousand hectares of wetlands in Turkey have been destroyed as a result of inefficient management and use of water resources [7]. For this reason, as wetlands are areas have visual value and enable ecological and recreational activities, they need to be protected and rehabilitated.

In the research area, which is of great importance in terms of natural resources, rugged topography, frequent changes in elevation, aspect and slope conditions in narrow and deep river valleys created different living environments. Differentiation of topography provides an increase in the diversity of species compared to flat areas. The area is chosen as the research field as its habitat and ecosystem richness increases the biodiversity and is exposed to anthropogenic pressure due to its rural tourism potential. The fact that the natural and cultural values of the region are not recognized sufficiently prevents performing necessary and adequate studies for nature conservation.

The research aims to reveal the changes in the biotope structure caused by land use during spatial planning to ensure the continuity of flora and fauna and the functionality of ecosystems. These maps will enable to determine the suitability and differences of the area according to different usages when evaluating the area. When research results are used by planning authorities, economic and ecological benefits in terms of resource use will be provided, which can contribute to reduction or prevention of environmental pressures.

MATERIALS AND METHODS

The research material consists of wetland habitats in Ganos Mountain. The Ganos Mountain is located in northwestern part of Turkey, in Tekirdağ province in the Marmara Region and has the geographic coordinates of 27º 00'- 27º 30' E longitude and 41º 00'- 40º 30' N latitude. Ganos Mountain, which is a northeast- southwestern trending mountain, is the highest mountain of Thrace after Istranca Mountains with 945m height [8].

This research covers mapping of Ganos Mountain wetland biotopes by evaluating maps, making literature review and making observations in the area. The study consists of three phases;

- Analysis and evaluation of existing data related to the field and research subject and determination of biotope types,
- Field study in the research area,
- Analysis and evaluation of the date obtained by field study.

In the first phase, written and visual materials related to natural and cultural structure of the research area are obtained and examined in order to reveal the physiological and ecological characteristics of the region. Natural and cultural data of the area reveal the characteristics that enable classification of biotopes. Mapping studies are started by determining biotope types in the area. Representative mapping is used in this research. Representative mapping is mapping of areas with same characteristics or same area usage types according to certain categories [9]. Accordingly, 3 research areas; Yeniköy, Yazır and Işıklar (Figure 1) are selected.

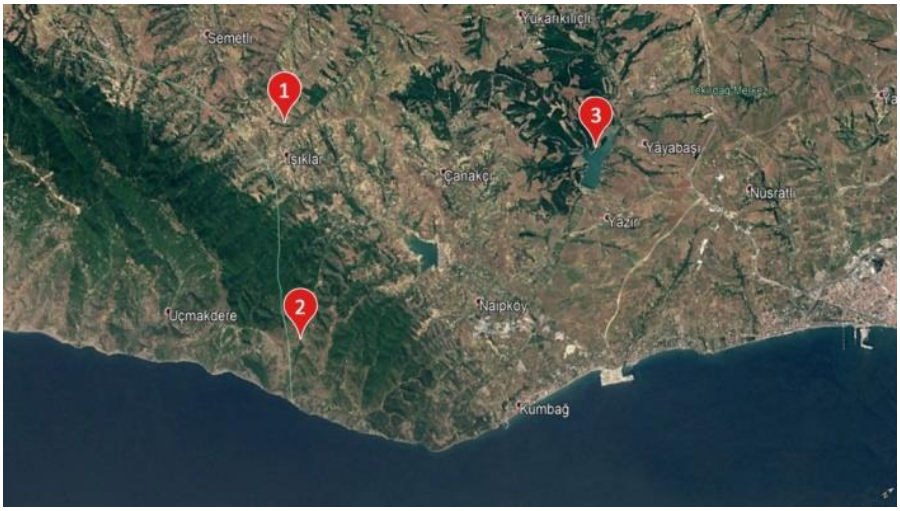


Fig. 1. *Research areas (Area 1: Işıklar, Area 2: Yeniköy, Area 3: Yazır) (Google Earth 2020).*

Following the identification of biotopes, the examination is started in the research area. During the field studies, field study forms refilled for each sample area to provide information about vegetation coverage, amount, combination, and dominancy of species and habitat value of the area. Braun- Blanquet method is used to determine the amount of the species [10]. With this method, the amount of existing plants in the area is determined by observation and their coverage ratio (%) in the area is revealed (Table 1).

Table 1. *The coverage amount of plant species [10].*

Area covered by a plant species (%)	Ranking
Very scarce, sparse (1-5 individuals)	r
Covering a small area	+
Abundant but covering less than 5% of the area, or rather scarce but with greater coverage	1
Covering 5%- 25% of the area regardless of the number of individuals	2
Covering 25%- 50% of the area regardless of the number of individuals	3
Covering 50%- 75% of the area regardless of the number of individuals	4
Covering more than 75% of the area regardless of the number of individuals	5

During the field study, plant samples are collected from biotopes for diagnostic purposes. These plants are dried according to herbarium standards and conditions and stored. Some references are used in the identification of plants accepted as herbarium material [11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26].

RESULTS AND DISCUSSION

The wetland biotopes in the area are determined by interpretting the maps of Ganos Mountain and its vicinity and information gathered through literature review. Following the classification of living environments, biotopes in the area are checked and their floristic compositions are determined. As a result, 12 woody and 48 herbaceous plant taxa are determined in 3 biotope areas.

Wetland biotopes in the research area consist of ponds and streams around Yeniköy, Yazır, and Işıklar. In these areas, where the bedrock contains non- calcareous brown forest soil, plants with high moisture need are observed. *Platanus orientalis, Salix alba, Phillyrea latifolia* and *Rubus sanctus*, which have a humid character, form trees and shrubs along the plains around the streams. In sunny openings on the edge of wetlands, *Lamium purpureum* var. *maculatum, Ranunculus constantinopolitanus, Rumex crispus* and *Scirpus sylvaticus* herbaceous vegetations are intensely noticeable. These species are partly accompanied by *Arundo donax, Clematis vitalba, Convolvulus arvensis* and *Lycopus europaeus*. The dominant species in the biotopes is *Scirpus sylvaticus* (Figure 2) (Table 2).



Fig. 2. *An example of moist vegetation; Scirpus sylvaticus.*

Table 2. *Vegetation analysis of wetland biotopes.*

Research area number	**Area 1**	**Area 2**	**Area 3**	**Availability**
Dimensions of the area (m^2)	200	200	200	
Geological structure	Eocene	Eocene	Eocene	
Soil structure	Brown forest soil	Non-calcareous brown forest soil	Brown forest soil	
Tree species				
Cercis siliquastrum		r	r	2
Pinus brutia			+	1
Platanus orientalis		+	+	2
Quercus robur		r		1
Salix alba			1	1
Shrub species				
Cornus mas			+	1
Paliurus spina- christii	+		1	2
Phillyrea latifolia			+	1
Rosa canina			1	1
Rubus sanctus	2	1	2	3
Ruscus aculeatus			+	1
Spartium junceum			+	1
Herbaceous species				
Agrostis gigantea	+			1
Alisma aquatica			+	1
Ammi visnaga		+		1
Anagallis arvensis		+		1
Anthemis cretica		+		1

Anthemis tinctoria			+	1
Arundo donax		+	2	2
Avena barbata subsp. *barbata*	+			1
Ballota nigra		+		1
Brachypodium syvaticum		1		1
Centaurea salonitana	r	+		2
Chenopodium album		+		1
Chenopodium botrys		+		1
Cichorium intybus	+		+	2
Clematis vitalba	+		1	2
Convolvulus arvensis		2	1	2
Crepis foetida			+	1
Daucus carota	r			1
Eryngium creticum	r	+	+	3
Festuca gigantea		+		1
Gastridium phleoides	+			1
Hordeum murinum ssp. *glaucum*	+	1		2
Hypericum perforatum	+			1
Lagurus ovatus	+			1
Lamium purpureum var. *maculatum*		+	2	2
Leontodon tuberosus	+			1
Lolium perenne	1			1
Lycopus europaeus	2	+		2
Lythrum salicaria		+		1
Malva sylvestris	+			1
Onopordum tauricum	+		r	2
Papaver argemone		r		1
Plantago lagopus	+	+		2
Plantago lanceolata		+		1
Pulicaria dysenterica		+		1
Ranunculus constantinopolitanus	+	+	1	3
Rumex crispus	1	+		2
Rumex tuberosus ssp. *tuberosus*	+			1
Salvia virgata		1		1
Scabiosa atropurpurea	+	+	+	3
Scirpus sylvaticus	4	2	3	3
Scolymus hispanicus	+			1
Solanum alatum			+	1
Torilis arvensis	1	1	+	3
Trifolium echinatum	1			1
Trifolium repens	+			1

Verbena officinalis	+			1
Xanthium spinosum		+		1
Xanthium strumarium			+	1
Dominant species	*Scirpus sylvaticus*			

Coordinates of research areas; Area 1; X: 526006- Y: 4528985, Area 2; X: 532893- Y: 4518784, Area 3 no'lu alan; X: 532095- Y: 4518319.

CONCLUSION

Today, environmental problems -especially in urban areas- occur and biotopes are seriously damaged due to the plans made without considering the ecological and functional integrity of natural assets. For the continuity of biodiversity and natural processes, management decisions need to be integrated with ecological knowledge.

In this research, detailed information about flora presence of the area and their habitats are collected. In this way, it will be possible to determine the natural resources of the region, to use by protecting, to minimize the environmental effects that threaten its immediate environment, and to pass natural values to future generations in a healthy way. The results of the research, which is a preliminary study, are significant in terms of protecting ecological and biological diversity and being an example for the studies to be carried out in other regions with similar characteristics.

Pollution caused by recreational activities is noticeable in wetlands of the research area. This is seen intensely especially around Yazır (Figure 3). However, these biotopes provide a living environment for moist vegetation examples such as; *Alisma aquatica*, *Arundo donax* and *Scirpus sylvaticus*, which are not seen in other biotopes in the research area. These biotopes should be protected together with their habitats in order to maintain and sustain biodiversity.



Fig. 3. *Pollution caused by uncontrolled recreational activities, Yazır Pond.*

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