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Coastal Dunes Features of Endemic *Ipomoeo – Elymetumfarcti* Association, East Mediterranean

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Abstract

Ipomoeo – Elymetumfarcti (Géhu, Uslu et Costa 1989) association is endemic for coastal dunes of East Mediterranean of Turkey. This association is identified in Patara, Kumluca, Side of Antalya province, in Anamur and Taşucu, in Atakent-Narlıkuyu between Silifke-Erdemli, of İçel province and in Karataş-Innaplihoçuk of Adana province. Mediterranean floristic region of about 60 vascular plants have been identified within the study area. The association consists of grasses whose lengths vary between 5-50cm. This association has embryo and mobile dune vegetation is perennial. Samples of soil which are mostly representative were obtained from the depths of 0-30 cm. The relationship of the plant associations with soil were determined by physical (water saturation %, humidity %, Wilting Point %, usable water %, grain size) and chemical (pH, CaCO₃ content %, total salt) analysis. The association's dominant species are *Elymusfarctus ssp. farctus*, *Ipomoea stolonifera*, *Cyperuscapitatus*, *Eryngiummaritimum*, *Medicago marina*, *Euphorbia paralias*, *Otanthusmaritimus* and *Sporobolusvirginicus*. Most of the work place is filled with quaternary type of land. Stations in the study area, The central Mediterranean (WASS) and the Eastern Mediterranean I. Type (WSAS) precipitation regimes show and the work place has "Rainy Sub Soft, Rainy Sub Hot, A Little Rainy Warm, A little Rainy Soft" Mediterranean Bioclimate.

1. Introduction

The research area, which lies at C3, C4, C5 square according to Davis's flora of Turkey [1], is located within the boundary of the delta where rivers (in Turkey) flow into the Mediterranean (Figure 1). The relationship between coastal dunes vegetation and soil was investigated on East Mediterranean coastal dunes (TURKEY). This study was conducted in order to find out the relationship between endemic *Ipomoeo – Elymetumfarcti* plant association and soil, which were discovered by Géhu and Uslu [2] on coastal dunes of East Mediterranean of Turkey. Samples of soil such as in Patara, Kumluca, Side of Antalya province, in Anamur and Taşucu, in Atakent-Narlıkuyu between Silifke- Erdemli, of İçel province and inKarataş-Innaplihoçuk of Adana province from coastal dunes were picked up. *Ipomoeo – Elymetumfarcti* plant association is identified regarding to Braun-Blanquet [3] Method in the research areas. The association consists of grasses whose length vary between 5-50 cm. The association's dominant species are *Elymusfarctus ssp. farctus*, *Ipomoea stolonifera*, *Cyperuscapitatus*, *Eryngiummaritimum*, *Medicago marina*, *Euphorbia paralias*, *Otanthusmaritimus* and *Sporobolusvirginicus*. This association has embryo and mobile dune vegetation is perennial.

Coastal dune habitats are important ecosystems all over the world. Coastal dunes contain have high value habitat richness and vegetation [4, 5, 6, 7, 8, 9]. Coastal dune environments are affected by abiotic and biotic factors. These factors change from the shoreline to the inland areas and effect characteristic zonation of plant communities [8, 9].

Many researches have conducted insights into the relationships between plant communities and soil in coastal dunes [7, 10, 11]. Turkey has many coastal dunes in 110 different locations almost 845 km length [12]. Several researchers reported some characteristics of costal dunes such as dune-vegetation interaction and soil properties of sands [4, 5, 6, 13, 14].

This research has been conducted to identify the relationship of *Ipomoeo – Elymetumfarcti* plant association with soil on Mediterranean coastal dunes, Mediterranean-Turkey. Several researches on the subject of Mediterranean coastal dunes, its environment and environmental

management have been conducted, and possible measures against the problem have been identified by Rural Services General Directorate (Köy Hizmetleri Gn. Md.) [15, 16, 17], General Directorate of Meteorology (D.M.İ.) [18], General Directorate of Mineral Research and Exploration (M.T.A.) [19], Géhu and Uslu [2], Uslu [20], vegetation-soil relationship Serteser[6].

Geological structure as being a quaternary field, it contains alluvial substances. The research area has a rainfall regime like the Central Mediterranean climate type and humid climate. About 60 plant species have been noted in the research area. In the identification of the plants “Flora of Turkey” of Davis [1], Davis et al., [21] and Güner et al., [22] have been essentially used and herbariums of Ankara University (ANK) and Gazi University (GAZİ) have been utilized. Plant associations are identified regarding to Braun-Blanquet[3] Method in the research area.

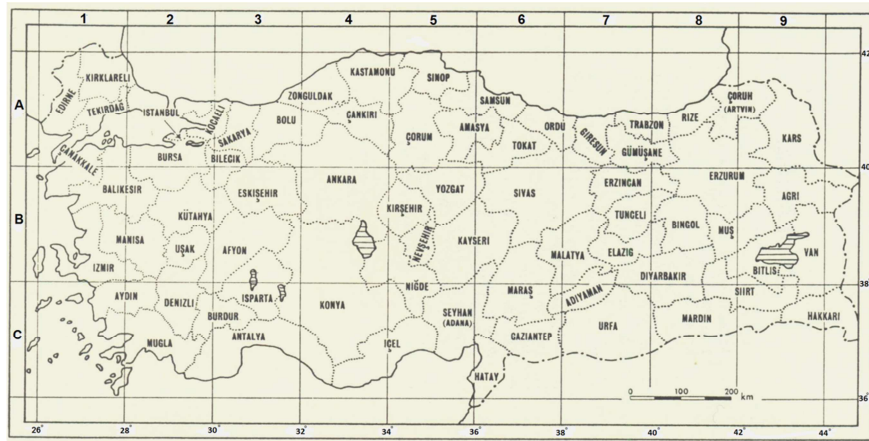


Fig. 1. The research areas (C3,C4,C5) on Mediterranean coastal dunes according to grydsystem (Davis)[1].

Samples of soil which are mostly representative were obtained from the depts. of cm 0-30 to establish the relationship of the plant associations with soil and the physical and chemical analysis of these samples were done with related method in Soil Fertilizer and Water Resources Central Research Institute Laboratories (Ankara-Turkey). The relationship between plant associations and environment, especially soil was investigated. Plant associations were found out to have displayed not only peculiarities of soil, but also the way soil had been dealt with. This study has been a continuation of previous studies conducted to determine the vegetation and soil relationship in various regions.

2. Materials and Methods

“Flora of Turkey” of Davis [1] Davis et al., [11] and Güner et al., [12] are essentially used in the identification of the plants. The vegetation of the region has been categorized according to Braun-Blanquet [3]. Climate data supplied from General Directorate of Meteorology (D. M. İ., Ankara-Turkey) [18] and geological information from General Directorate of Mineral Research and Exploration (M. T. A.,

Ankara-Turkey) [19]. Map General Directorate (Harita Gn. Md. Ankara-Turkey) [23] 1: 100 000 and 1: 25 000 scale topographic maps were used in field studies. Each sample was obtained from the depts. of 0-30 cm and subsequently analyzed for pH [24], Total salt % [15], CaCO₃ % [25]. Both pH and EC were measured in aqueous extracts (in 1:5 weight/volume). CaCO₃ was determined using Scheiblercalcimeter. The water saturation (%) and humidity (%) of soils were determined according to Richards [24] The field capacity and wilting point of all samples measured by pressure plate apparatus [24]. Grain-size distribution of sand determined by the hydrometer [26].

3. Results and Discussion

The work area is coastal dunes as the type of land. Mediterranean floristic region of about 60 vascular plants have been identified within the study area. Most of the work place is filled with quaternary type of land. Stations in the study area, The central Mediterranean (WASS) and the Eastern Mediterranean I. Type (WSAS) precipitation regimes show and the work place has “Rainy Sub Soft, Rainy Sub

Hot, A Little Rainy Warm, A little Rainy Soft” Mediterranean Bioclimate [27]. Soil analysis results are given in Table 1.

Soil pHs were low alkali in coastal dunes samples, at between 7.80 and 8.80 which supports the results of Uslu [20]. Uslu [20] reported alkali pH for soil located in Göksudelta (İçel, Turkey) close to Adana. However, Antalya-Kumluca soil samples were found to be higher pH. In addition to Özcan et al. [13] and Avcioglu et al. [14] reported 7.07-7.67; 7.92-8.18 pH values for Saros Gulf (Turkey) and Bozcaada (Turkey), respectively.

The samples were measured from coastal dunes rich in calcium carbonate. CaCO₃ contents were between 15.51% and 28.01%. Mersin province (İçel-Turkey) had the highest CaCO₃ content. Similarly, Çakan [28] and Karaömerlioglu [29] reported various CaCO₃ content (medium to highly calcareous) for Göksu Delta (Silifke-İçel, Turkey). Contrary, Avcioglu et al. [14] reported low CaCO₃ content on coastal dunes Bozcaada (Turkey). The salt contents of soil were measured as trace. Similarly Serteser [6] reported very low salt content for Akyatan (Adana, Turkey) provinces' soil. However, high salt content was reported for Bozcaada, increase with depth of soil [14].

Water saturation percentage were between 21% and 36% on East Mediterranean coastal dunes. Water saturation ratio was the highest on İçel-Taşucu (Turkey) coastal dunes. Serteser [6] concluded that the water saturation percentage of Seyhan Delta (Adana, Turkey) varied 20% to 30%. The humidity of coastal dunes were changes from 1.98% to 4.91% (Table 1). The results of humidity contents of coastal dunes were similar to Uslu [21] and Serteser [6].

It is important that grain sizes on vegetation on coastal dunes. The form of sand grain sizes were varied to 100-150

µm, 150-200 µm, 200-250 µm, 250-500 µm, 500-1000 µm, 1000-2000 µm. Similarly, in their study Avcioglu et al. [14] reported different grain size distribution for Bozcaada's (Turkey) coastal dunes. The researchers were measured more than 82% of dune materials belong to grain sizes ranging between 0.5 mm and 0.163 mm.

4. Conclusions

The association consists of grasses whose lengths vary between 5-50cm. The association's dominant species are *Elymus farctus* ssp. *farctus*, *Ipomoea stolonifera*, *Cyperus capitatus*, *Eryngium maritimum*, *Medicago marina*, *Euphorbia paralias*, *Otanthus maritimus* and *Sporobolus virginicus*. This association has embryo and mobile dune vegetation is perennial. In the group's study field, Alluvial exist in the soils. Water saturation percentage is lower than of 36% of the sand soils structure. Humidity percentage is high Adana-Akyatan (Turkey) coastal dunes.

The soil samples taken from the group are very little salty, very highly calcareous on Antalya-Side and İçel-Silifke-Erdemli (Turkey) coastal dunes, pHs lightly alkaline on İçel-Taşucu (Turkey) coastal dunes and other coastal dunes are strongly alkaline.

It is important that grain sizes on vegetation on coastal dunes. The grain size is 100-150 µm on Antalya-Side coastal dunes (Turkey). It is between 200 and 250 µm on Antalya-Patara (Turkey) coastal dunes. The grain sizes on İçel-Taşucu (Turkey) coastal dunes is 250-500 µm. Coastal dunes are no clay and silt. Sand grain sizes is 100-150, 200-250 and 250-500 µm.

Table 1. Soil analysis results on East Mediterranean coastal dunes.

Locality	Physical Analysis					Sand Grain Sizes, µm								Chemical Analysis		
	Water sat., %	Humidity, %	Field cap., %	Wilt. Point, %	Usable water, %	>2000	2000-1000	1000-500	500-250	250-200	200-150	150-100	<100	pH	CCaCO ₃ %	Total Salt %
Antalya-Patara	23	1,98	1,87	1,36	0,51			1,08	1,08	2,28	48,88	25,20	2,48			
Antalya-Kumluca	21	2,01	1,50	1,20	0,30	0,08	0,20	9,96	21,12	33,60	22,56	12,48	8,80	22,24	Trace	
Antalya-Side	29	2,13	1,90	1,50	0,40	3,20	7,60	6,04	15,28	16,84	49,08	1,96	8,30	27,98	Trace	
İçel-Anamur	33	3,99	2,45	1,47	0,98	0,12	2,00	9,84	11,04	12,24	63,76	1,00	8,40	16,30	Trace	
İçel-Taşucu	36	4,02	6,08	1,33	4,75		1,48	16,73	19,54	22,99	37,44	1,82	7,80	20,44	Trace	
İçel-Silifke-Erdemli	32	4,27	5,44	1,36	4,08			6,88	17,25	25,12	44,69	6,06	8,75	28,01	Trace	
Adana-Akyatan	30	4,91	2,22	1,25	0,97	0,89	16,66	23,39	26,74	30,97	1,35	8,54	15,51	Trace		

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