Vegetation of Grasslands in Spil Mountain: A first Preliminary Assesment Based on Field Observations

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Introduction

Grasslands in Aegean region are located in the Mediterranean climate zone in Anatolia. These grasslands dominated by annual plants and have considerable species diversity and ecosystem functions. Grasslands in Spil mountain are mostly distributed patcy along elevation gradient. Therefore, it keeps structural heterogeneity. In this study, we performed a vegetation study in grasslands of Spil mountain. According to the literature Duman (1985) has been carried out phytosociological study and found two plant associations in the grassland system. Various researches have also been performed near the study area (e.g. Seçmen, 1982; Şenol et al., 2011).

Fig 1. Vegetation sampling during field work and some species in Spil mountain.

Methods

We collected 99 releves on the grassland system of Spil mountain. Releve area ranged between 10 m^2 and 100 m^2. We collected to the data during April-June on 2019 by considering flowering season carefully. Releves were chosen visually homogenous areas avoiding by ecotones. Vegetation-plot data was entered into TURBOVEG and therefore JUICE programs. We performed ordination analysis for vegetation-environment relationship using Non-metric multidimensional scaling – NMDS.

Results and Discussion

Some common species in the study system were *Verbascum glomeratum* Boiss, *Paeonia peregrina* Mill., *Poa bulbosa* L., *Avena barbata* subsp. *barbata* Pott ex Link, *Bromus diandrus* Roth, *Bromus hordeaceus* subsp. *hordeaceus* L., *Hordeum murinum* subsp. *glaucum* (Steud.) Tzvelev.'dır. Some dominant non-legume forb species were *Crepis foetida* subsp. *rhoeadifolia* (M.Bieb.) Čelak., *Eryngium campestre* var. *campestre* L.

Table 1. The most common families and genus.

	Family	Number of taxa
1	Fabaceae	54
2	Asteraceae	49
3	Poaceae	37
4	Brassicaceae	22
5	Lamiaceae	16
6	Apiaceae	15
7	Caryophyllaceae	14
8	Plantaginaceae	14
9	Boraginaceae	9
10	Rubiaceae	9

	Genus	Number of taxa
1	Trifolium	20
2	Bromus	10
3	Galium	7
4	Medicago	7
5	Vicia	6
6	Crepis	5
7	Geranium	5
8	Plantago	5
9	Veronica	5
10	Aegilops	4

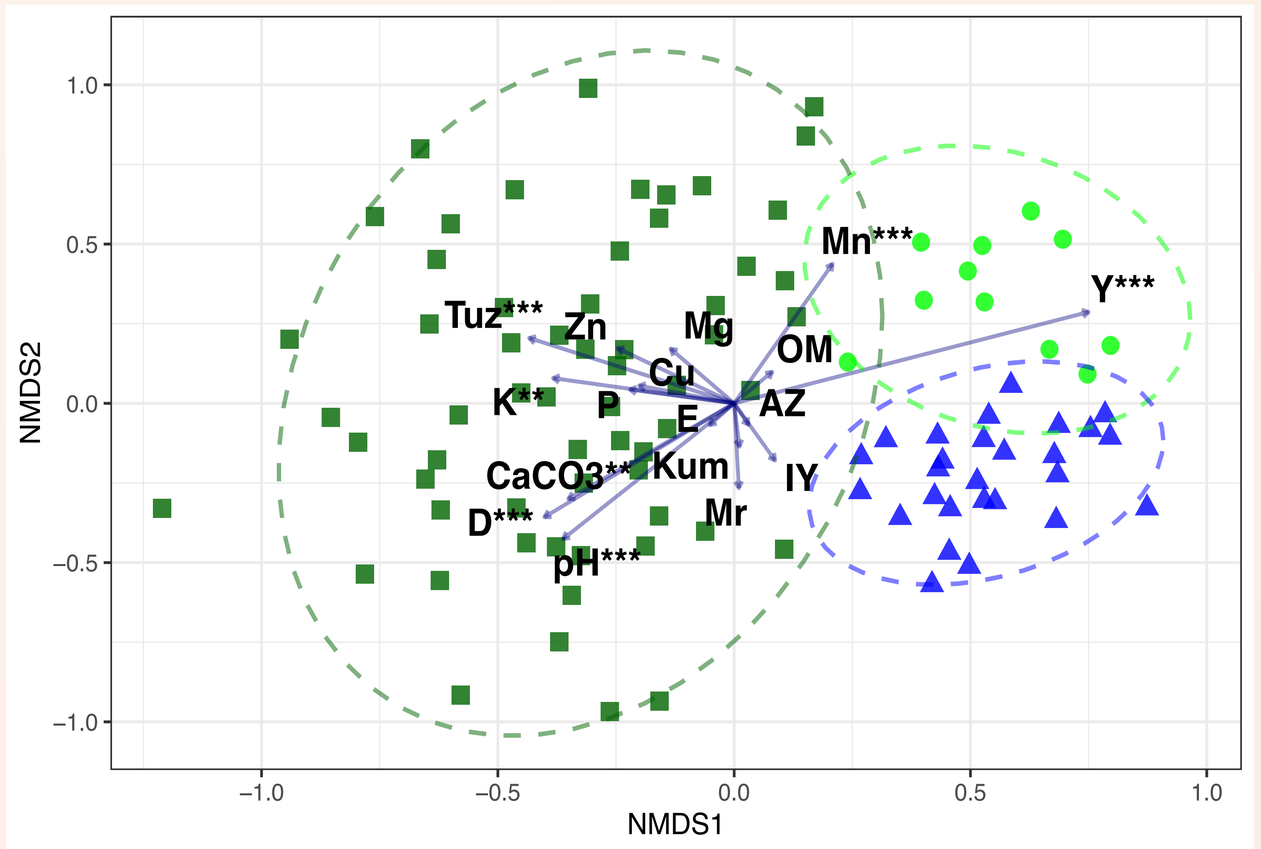

Fig 2. NMDS ordination of species composition and environmental variables. (Green is Group 1, blue is Group 2 and darkgreen is Group 3. Abbreviations; Tuz: Soil salt, Mg: Magnesium, K: Potassium, Kum: Amount of sand in the soil, P: Phosphorus, OM: Organic matter, Mn: Manganese, IY: Heat load index, Y: Altitude, AZ: Open ground, $CaCO_3$: Calcium carbonate, D: Litter, Mr: Microrelief, E: Slope, Cu: Copper, Zn: Zinc. (Abbreviations were presented in Turkish).

Grassland vegetation was divided into three groups according to modified TWINSPAN analysis (Fig 2). These groups; Group 1 (green): mixed grasslands in higher altitudes, Group 2 (blue): grasslands on higher altitudes which were dominated by Verbascum glomeratum in most cases, Group 3 (darkgreen): mixed grasslands in lower altitudes. Group 1 and 2 were distributed in the upper levels of the mountain. Based on the results of ordination analysis, altitude, manganese, soil salt, potasium, $CaCO_3$, pH, litter played an important role as explanatory variables. Species accumulation curve was also differed among the groups (Fig 3).

These results revealed that altitude was the most important predictor and clearly divided species composition into three. This result could also be generalised for Mediterranean grasslands which were mostly distributed in lowlands.

Our study highlights to the importance of Mediterranean grasslands in terms of biodiversity and vegetation-environment relationships studies.

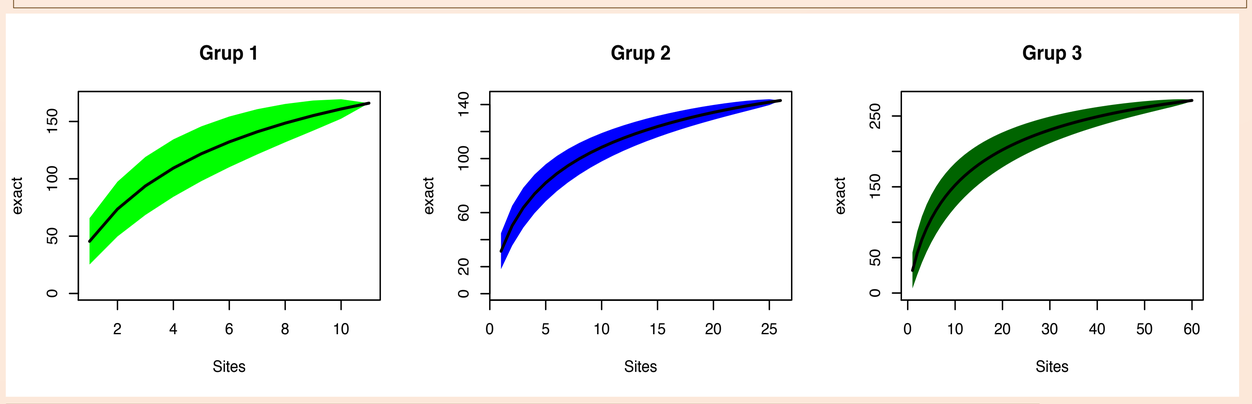

Fig 3. Species accumulation curve of three different groups. (Colors represent same groups with Fig. 2).

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