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The Mosses of Ankara University Beşevler 10. Yıl Campus Area (Ankara-Turkey)

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Abstract

The present study is based on moss specimens collected from several urban habitats in Ankara University Beşevler 10. Yıl Campus in the year 2019. As a result of identifications of 94 bryophyte specimens collected from the campus area, a total of 28 species belonging to 7 families and 17 genera were determined. Six of them are new record for B7 grid-square. Pottiaceae (9 species) and Orthotrichaceae (6 species) are the two largest families in the campus area.

Keywords: Biodiversity, Campus, Flora, Mosses.

Ankara Üniversitesi Beşevler 10. Yıl Kampüs Alanı Karayosunları (Ankara-Türkiye)

Öz

Bu çalışma, 2019 yılında Ankara Üniversitesi Beşevler 10. Yıl Kampüsü'ndeki çeşitli kentsel habitatlardan toplanan karayosunu örneklerine dayanmaktadır. Kampüs alanından toplanan 94 briyofit örneğinin teşhis çalışmaları sonucunda 7 familya ve 17 cinse ait toplam 28 tür tespit edilmiştir. Bunlardan altısı B7 karesi için yeni kayıttır. Pottiaceae (9 tür) ve Orthotrichaceae (6 tür), kampüs alanındaki en büyük iki familyadır.

Anahtar kelimeler: Biyoçeşitlilik, Kampüs, Flora, Karayosunları.

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1. Introduction

Bryophytes have a wide geographical distribution in the world from the poles to the equator and spread almost everywhere where water and moisture are present (Shaw, 2001). Nevertheless, they have been ignored by many botanists because of their primitive structures and small sizes. Turkey is one of the richest countries among the European and Asian countries in bryo-floristic diversity. A total of ±1042 bryophyte taxa have been determined from Turkey so far. Among them, ±843 are mosses, ±195 are liverworts and ±4 are hornworts (Özdemir and Batan, 2014; Batan et al., 2014, 2016, 2019; Ezer, 2016; Erdağ and Kürschner, 2017; Yücel and Ezer, 2018; Ursavaş and Işın, 2019; Kürschner and Frey, 2020; Erata and Batan, 2020).

Urban areas have many ecological factors that differ from each other. Urban areas that have many microhabitats provide suitable shelters for small size plants like mosses that are widely adapted to such areas. Therefore, mosses of the urban areas form one of the primary members of the city ecosystems and vegetation (Sabovljevic and Grdovic, 2009).

The campus areas of universities have the characteristics of natural laboratories especially for applied sciences and important biodiversity. Especially, campus areas of universities with a deep-rooted and established structure can be considered as areas where biodiversity is protected. In this context, many floristic studies have been carried out to reveal the plant biodiversity of campus areas in Turkey (Alataş et al., 2011; Erata et al., 2017; Abay, 2018; Akata et al., 2019a; Başköse et al., 2020).

The present study was aimed to explore the moss flora in the urban area of Ankara University Beşevler 10. Yıl campus (formerly known as Tandoğan Campus).

2. Materials and Methods

2.1. Study area

Ankara University Beşevler 10. Yıl Campus, which is formerly known as Tandoğan Campus, is situated in Beşevler neighborhood of Çankaya district, at an elevation between 850 and 870 meters above the sea level (Akata et al., 2019a). Geographically, it is located between the parallels 39.936800º N in the south and 39.937350º N in the north, and the meridians 32.826330° E in the west and 32.835720° E in the east (Figure 1).

The climate type of the study area is semi-arid sub-Mediterranean, with a severe frost period in winter (Akman, 2011).

The campus covers a total surface area of approximately 20 hectares and contains 166 fungi, 28 lichens, and 445 vascular plant species (Akata et al., 2019a,b; 2020; Altuntaş et al., 2019; Başköse et al., 2020; Halıcı and Akata, 2020). The study area falls within the square of B7 according to Henderson's (1961) grid square system (Figure 2).

Figure 1. Ankara University Beşevler 10. Yıl Campus area and the points of study localities (developed from Google Earth)

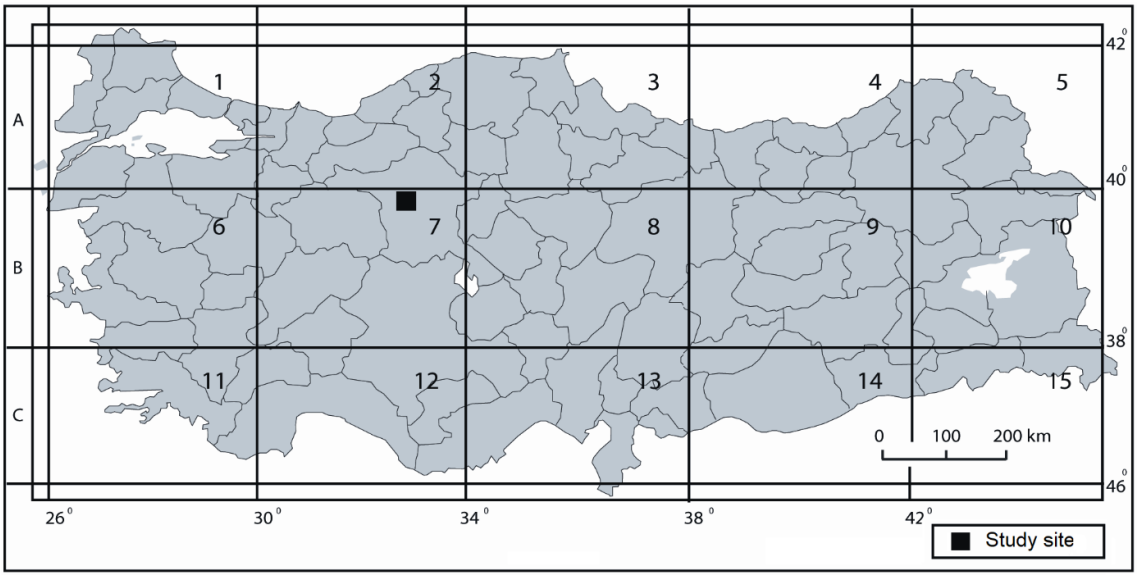

Figure 2. The location of the study site according to the grid system of Turkey (Henderson, 1961)

2.2. Data source

The moss specimens, materials of the present study, were collected from various localities, habitats, and substrates in Ankara University Beşevler 10. Yıl Campus area in the year 2019 (Table 1).

Table 1. Localities (L.N.: locality number).

L.N.	Location	L.N.	Location
1	Rectorate building and its surroundings 1	8	Faculty of Science D Block front garden 1
2	Rectorate building and its surroundings 2	9	Faculty of Science D Block front garden 2
3	Faculty of Science B Block and its surroundings 1	10	Faculty of Science C and F Blocks surroundings
4	Faculty of Science B Block and its surroundings 2	11	Olympic swimming pool surroundings
5	Faculty of Science D Block and its surroundings	12	Recreation area
6	The between A and B Blocks of Faculty of Science	13	Science Faculty A Block surroundings
7	Back of Faculty of Science A Block		

The collected moss specimens were identified using relevant literatures (various flora and revisional studies) (Zander, 1993; Greven, 1995; 2003; Muñoz, 1999; Cortini Pedrotti, 2001, 2006; Heyn and Herrnstadt, 2004; Smith, 2004). Voucher specimens are deposited into the Herbaria of Ankara University and Niğde Ömer Halisdemir University. The latest taxonomic status of the moss taxa in Turkey were determined according to the recent literature (Erdağ and Kürschner, 2017; Ros et al., 2013; Hodgetts et al., 2020). Nomenclature of the floristic list was arranged according to Hodgetts et al. (2020).

3. Results and Discussion

As a result of identification studies of bryophyte specimens, a total of 28 species, belonging to 7 families and 17 genera were determined (Table 2).

Table 2. Floristic list (*: new records for B7, r: rock, s: soil, t: tree).

Families	**Genera**	**Species**	**L.N.**	**Substrate**		
				r	**s**	**t**
BRYOPSIDA						
Funariaceae	*Funaria*	*Funaria hygrometrica* Hedw.	5,12	+	+	
Pottiaceae	*Barbula*	*Barbula unguiculata* Hedw.	3,4,10		+	
	Gymnostomum	**Gymnostomum aeruginosum* Sm.	6,12		+	
	Pseudocrossidium	*Pseudocrossidium hornschuchianum* (Schultz) R.H.Zander	6		+	
	Syntrichia	*Syntrichia princeps* (De Not.) Mitt.	1,3		+	
		Syntrichia ruralis (Hedw.) F.Weber & D.Mohr	1,3,9		+	
		**Syntrichia virescens* (De Not.) Ochyra	3			+
	Tortula	*Tortula inermis* (Brid.) Mont.	4,6		+	
		Tortula muralis Hedw.	2,3,5,11	+		
		Tortula subulata Hedw.	1,3		+	
Grimmiaceae	*Grimmia*	*Grimmia pulvinata* (Hedw.) Sm.	1,3,5,12	+		
	Schistidium	*Schistidium apocarpum* (Hedw.) Bruch & Schimp.	1,2,6	+		
Bryaceae	*Bryum*	*Bryum argenteum* Hedw.	5,8,13	+	+	
	Gemmabryum	*Gemmabryum caespiticium* (Hedw.) J.R.Spence	3,4		+	
	Rosulabryum	*Rosulabryum capillare* (Hedw.) J.R.Spence	1,2,4,5,10	+	+	
Orthotrichaceae	*Orthotrichum*	*Orthotrichum anomalum* Hedw.	4,6	+		
		Orthotrichum diaphanum Brid.	1,2,3,6,7			+
		Orthotrichum pallens Bruch ex Brid.	6,7			+
		**Orthotrichum patens* Bruch ex Brid.	1,3,6			+
		Orthotrichum stramineum Hornsch. ex Brid.	7			+
		**Orthotrichum tenellum* Bruch ex Brid.	1,3			+
Amblystegiaceae	*Amblystegium*	*Amblystegium serpens* (Hedw.) Schimp.	1,2		+	
	Pseudoamblystegium	**Pseudoamblystegium subtile* (Hedw.) Vanderp. & Hedenäs	9,10			+
Brachytheciaceae	*Brachytheciastrum*	*Brachytheciastrum velutinum* (Hedw.) Ignatov & Huttunen	7,9			+
	Brachythecium	*Brachythecium glareosum* (Bruch *ex* Spruce) Schimp.	6		+	
		**Brachythecium mildeanum* (Schimp.) Schimp.	1,2,6		+	
		Brachythecium rutabulum (Hedw.) Schimp.	6		+	
	Oxyrrhynchium	*Oxyrrhynchium hians* (Hedw.) Loeske	3,6	+	+	

The acrocarpous moss family Pottiaceae is the most species-rich family with 9 species, while Orthotrichaceae (6 species) and Brachytheciaceae (5 species) are the other common families of mosses in the campus area. Pottiaceae, contains many drought-tolerant species, which is the richest and the most prevalent moss family both in the study area and in Turkey. Therefore, it was not surprising that Pottiaceae is the most species-rich family with nine species in the campus area.

The acrocarpous moss genus *Orthotrichum*, which has generally epiphytic members, is the most species-rich genus with 6 species and, abundant on the trunks of Pinaceae and Fagaceae members in the Ankara University Beşevler 10. Yıl Campus area.

The genera *Tortula* and *Brachythecium* are represented by 3 taxa in this study. Six species are new to B7 square in the grid system of Turkey adopted by Henderson (1961).

The relatively high moss diversity (28 species) in the study area where is just 20 hectares showed that the campus areas are well-protected areas, although under the anthropogenic pressure. Because, such urban areas like campus areas have many microhabitats provide suitable shelters for mosses which are primitive and small size plants.

The results of the present study will contribute to the Ankara province, B7 square and bryoflora of Turkey.

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