

# Lichen Records from the Alpine Region of Uludağ (Olympus) Mountain in Bursa – Turkey

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**Abstract:** In this paper, 66 taxa belonging to 37 genera were determined from the alpine region of Uludağ (Bursa). *Buellia leptoclina* (Flot.) A.Massal. and *Lecanora rupicola* (L.) Zahlbr. ssp. *subplanata* (Nyl.) Leuckert & Poelt are new records for Turkey.

**Key Words:** Flora, Lichen, Biodiversity.

## Uludağ'ın Alpin Bölgesinden Liken Kayıtları

**Özet:** Bu çalışmada, Uludağ'ın alpin bölgesinden 37 genusa ait 66 liken taksonu tespit edilmiştir. *Buellia leptoclina* (Flot.) A.Massal. ve *Lecanora rupicola* (L.) Zahlbr. ssp. *subplanata* (Nyl.) Leuckert & Poelt Türkiye için yeni kayıttır.

**Anahtar Sözcükler:** Flora, Liken, Biyoçeşitlilik.

## Introduction

Uludağ, formerly known as Olympus Misius, Bithynian Olympus and Keşiş Dağı, is the highest mountain of the Marmara region of Turkey, and is situated to the south of Bursa. Its highest point is 2543m. The highest summits of the mountain have glacial lakes such as Aynalı, Kara and Kilimli, above 2000 m (Özhatay & Çırpıcı, 1987). Geologically, it consists of Palaeozoic granite, gneiss and Mesozoic ophiolite. Essentially, the NW of Uludağ is granite while the SE of Uludağ is marble (Rehder et al., 1994).

The mountain is influenced by a Mediterranean climate with cold winters. The mean annual temperature is 4.6 °C. The mean annual rainfall is 1484 mm between 2000 and 2500 m, with the majority of rainfall in December and the minimum in August. It was made a National Park in 1961 to protect a large part of plant cover.

There are 5 vegetation zones of Uludağ; *Lauretum* (up to 350 m), *Castanetum* (350–700 m), *Fagetum* (700–1500 m), *Abietum* (1500–2100 m) and *Alpinetum* (2000 m and above). The higher plants of Uludağ are represented by 791 taxa belonging to 93 families: 104 of

the taxa are endemic to Turkey and 28 taxa to Uludağ (Özhatay & Çırpıcı, 1987).

Previous studies on the lichen flora of Uludağ and Bursa were undertaken by Steiner (1916), Szatala (1940) and Verseggy (1982). Four taxa were recorded from the alpine region of Uludağ (Verseggy, 1982) and about 50 taxa by Öztürk (1992) from different vegetation zones of Uludağ.

## Materials and Methods

The samples were collected from 9 stations in the alpine region of Uludağ (Bursa) on 22 June and 26 July, 2000 and on 2 September, 2001 (Figure 1). The samples were identified with the aid of Poelt (1974), Purvis et al. (1994) and Wirth (1995). The specimens are kept at the Herbarium (BULU) of the Faculty of Science and Art, Uludağ University, Bursa.

## Results

Genera and species are listed alphabetically. Two new records for Turkey are indicated by an asterisk. The

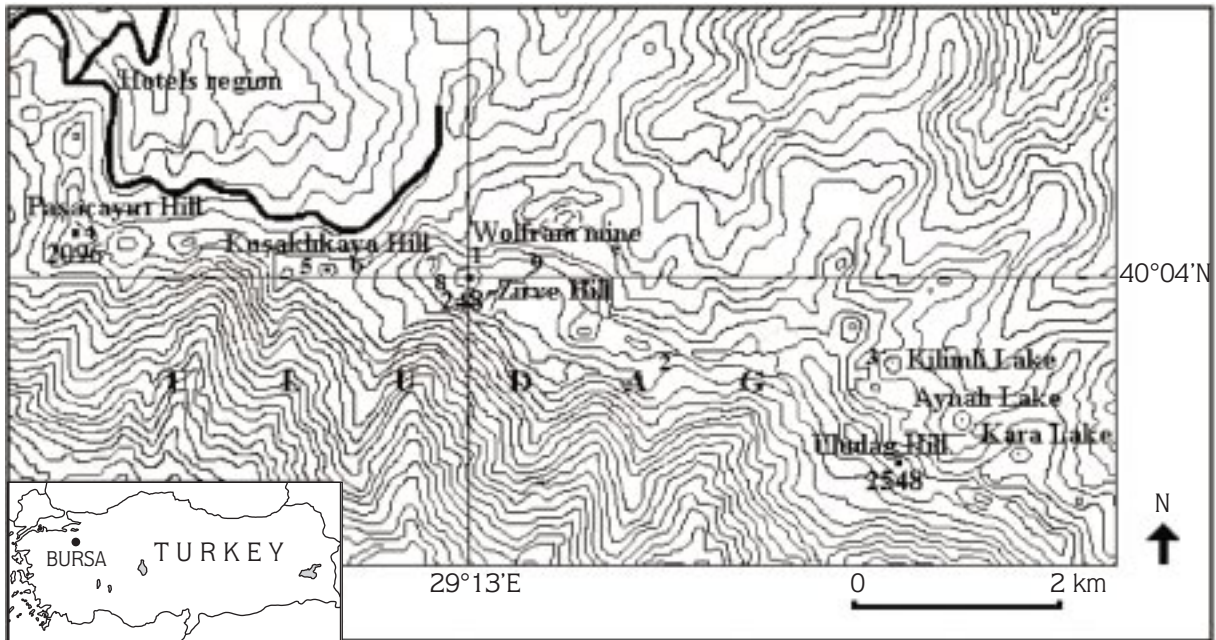


Figure 1. Localities of the collected lichens.

author names are abbreviated according to Brummitt & Powell (1992).

*Aspicilia caesiocinerea* (Nyl. ex Malbr.) Arnold

Bursa: Uludağ; between Zirve Tepe and Uludağ Tepe, alt. 2250–2270 m, on siliceous rock, lat 40° 03' N, long 29° 15' E, 22.06.2000, BULU 2581; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2602; in the vicinity of Paşacıyırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2625.

*A. calcarea* (L.) Mudd

Bursa: Uludağ; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120–2150 m, on calcareous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2657.

*A. cinerea* (L.) Körb.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2559; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2591; in the vicinity of Kuşaklıkaya

Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2635; the east of the Wolfram mine, alt. 2100 m, on siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2688.

*A. desertorum* (Kremp.) Mereschk.

Bursa: Uludağ; the east of the Wolfram mine, alt. 2100 m, on calcareous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2684.

*Bellemeria alpina* (Sommerf.) Clauzade & Cl.Roux

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2586.

*B. cinereorufescens* (Ach.) Clauzade & Cl.Roux

Bursa: Uludağ; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2630.

*Brodoa intestiniformis* (Vill.) Goward

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2568; the north of Uludağ

Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2585; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2624.

\* *Buellia leptoclone* (Flot.) A.Massal.

Bursa: Uludağ; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2623.

*Caloplaca biatorina* (A.Massal.) J.Steiner

Bursa: Uludağ; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120–2150 m, on calcareous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2656.

*C. cerina* (Ehrh. ex Hedw.) Th.Fr. var. *muscorum* (A.Massal.) Jatta

Bursa: Uludağ; the northern slopes in the west of Zirve Tepe, alt. 2150 m, on mosses, lat 40° 04' N, long 29° 13' E, 25.07.2000, BULU 2663.

*C. crenularia* (With.) J.R.Laundon

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2560; the east of the Wolfram mine, alt. 2100 m, on siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2691.

*C. holocarpa* (Hoffm. ex Ach.) Wade

Bursa: Uludağ; the northern slopes to the east of Kuşaklıkaya Tepe, alt. 2120–2150 m, on calcareous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2646.

*C. lactea* (A.Massal.) Zahlbr.

Bursa: Uludağ; the northern slopes in the west of Zirve Tepe, alt. 2150 m, on calcareous rock, lat 40° 04' N, long 29° 13' E, 25.07.2000, BULU 2660.

*Candelariella aurella* (Hoffm.) Zahlbr.

Bursa: Uludağ; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120–2150 m, on calcareous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2651.

*Cn. coralliza* (Nyl.) H.Magn.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2561; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E,

22.06.2000, BULU 2600; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on mosses, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2642; the southern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous soil, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2675.

*Cn. vitellina* (Hoffm.) Müll.Arg.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock and mosses, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2569, 2567; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock and mosses, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2592, 2609; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2621; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2641; the southern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous soil, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2672.

*Carbonea vitellinaria* (Nyl.) Hertel

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, parasite on *Candelariella coralliza*, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2574; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, parasite on *Candelariella vitellina*, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2610; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, parasite on *Candelariella coralliza*, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2634.

*Catapyrenium rufescens* (Ach.) Breuss

Bursa: Uludağ; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120–2150 m, on calcareous soil, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2655.

*Cetraria islandica* (L.) Ach.

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2590; the northern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous soil, lat 40° 04' N, long 29° 13' E, 25.07.2000, BULU 2659.

*Cladonia pyxidata* (L.) Hoffm.

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous soil, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU

2606; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120-2150 m, on calcareous soil with mosses, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2643; the east of the Wolfram mine, alt. 2100 m, on siliceous soil, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2687.

*Cd. subcervicornis* (Vain.) Kernst.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous soil, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2566; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120-2150 m, on calcareous soil with mosses, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2658.

*Collema coccophorum* Tuck.

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous soil, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2604.

*Cl. flaccidium* (Ach.) Ach.

Bursa: Uludağ; the northern slopes in the west of Zirve Tepe, alt. 2150 m, on mosses, lat 40° 04' N, long 29° 13' E, 25.07.2000, BULU 2665.

*Cl. undulatum* Laurer ex Flot. var. *granulosum* Degel.

Bursa: Uludağ; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120-2150 m, on calcareous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2654.

*Dermatocarpon intestiniforme* (Körb.) Hasse

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2613.

*Ephebe lanata* (L.) Vain.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous soil, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2564; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2605; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2622; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2633; the

southern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2676.

*Fulgensia fulgens* (Sw.) Elenkin

Bursa: Uludağ; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120-2150 m, on calcareous soil, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2649.

*F. schistidii* (Anzi) Poelt

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on mosses, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2570; the southern slopes in the west of Zirve Tepe, alt. 2150 m, on mosses, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2668; the east of the Wolfram mine, alt. 2100 m, on mosses, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2686.

*Lecanora cenisia* Ach.

Bursa: Uludağ; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2617; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2631.

*L. crenulata* Hook.

Bursa: Uludağ; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120-2150 m, on calcareous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2650.

*L. muralis* (Schreb.) Rabenh.

Bursa: Uludağ; between Zirve Tepe and Uludağ Tepe, alt. 2250–2270m, on siliceous rock, lat 40° 03' N, long 29° 15' E, 22.06.2000, BULU 2583; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2607; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2638; the east of the Wolfram mine, alt. 2100 m, on siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2693.

*L. polytropa* (Ehrh. ex Hoffm.) Rabenh.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2571; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2637.

\* *L. rupicola* (L.) Zahlbr. ssp. *subplanata* (Nyl.) Leuckert & Poelt

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2595; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2620; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2640; the southern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2669.

*L. sulphurea* (Hoffm.) Ach.

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2599; the east of the Wolfram mine, alt. 2100 m, on siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2683.

*Lecidea atrobrunnea* (Lam. & DC.) Schaer.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2557; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2587; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2639; the east of the Wolfram mine, alt. 2100 m, on siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2678.

*Lc. promiscens* Nyl.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2563; between Zirve Tepe and Uludağ Tepe, alt. 2250–2270 m, on siliceous rock, lat 40° 03' N, long 29° 15' E, 22.06.2000, BULU 2579; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2589; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2619; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2632; the east of the Wolfram mine, alt. 2100 m, on

siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2690.

*Lecidella carpathica* Körb.

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m., on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2598; the east of the Wolfram mine, alt. 2100 m, on siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2689.

*Lepraria neglecta* (Nyl.) Lettau

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on mosses, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2558.

*Lobothallia radiosa* (Hoffm.) Hafellner

Bursa: Uludağ; the southern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2673.

*Megaspora verrucosa* (Ach.) Hafellner & V.Wirth

Bursa: Uludağ; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120–2150 m, on mosses, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2644; the northern slopes in the west of Zirve Tepe, alt. 2150 m, on mosses, lat 40° 04' N, long 29° 13' E, 25.07.2000, BULU 2664.

*Melanelia stygia* (L.) Essl.

Bursa: Uludağ; the east of the Wolfram mine, alt. 2100 m, on siliceous rock with *Umbilicaria cylindrica*, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2685.

*Micarea melaena* (Nyl.) Hedl.

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on mosses, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2611; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120–2150 m, on mosses, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2645.

*Peltigera polydactylon* (Neck.) Hoffm.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous soil with mosses, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2565.

*P. rufescens* (Weiss) Humb.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous soil with mosses, lat 40° 04' N,

long 29° 13' E, 22.06.2000, BULU 2562; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous soil with mosses, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2603; the northern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous soil with mosses, lat 40° 04' N, long 29° 13' E, 25.07.2000, BULU 2661.

**Physcia caesia** (Hoffm.) Fűrnr.

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous soil with mosses, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2612.

**Ph. dubia** (Hoffm.) Lettau

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2556.

**Protoparmelia badia** (Hoffm.) Hafellner

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2588; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2615; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120–2150 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2648; the east of the Wolfram mine, alt. 2100 m, on siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2692.

**Pseudephebe minuscula** (Nyl. ex Arnold) Brodo & D.Hawksw.

Bursa: Uludağ; the southern slopes to the west of Zirve Tepe, alt. 2150 m, on siliceous rock with *Melanelia stygia*, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2670; the east of the Wolfram mine, alt. 2100 m, on siliceous rock with *Melanelia stygia*, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2679.

**Psora decipiens** (Hedw.) Hoffm.

Bursa: Uludağ; between Zirve Tepe and Uludağ Tepe, alt. 2250–2270 m, on calcareous soil, lat 40° 03' N, long 29° 15' E, 22.06.2000, BULU 2584; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous soil with mosses, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2614; the northern slopes in the east

of Kuşaklıkaya Tepe, alt. 2120–2150 m, on calcareous soil, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2652.

**Ramalina capitata** (Ach.) Nyl.

Bursa: Uludağ; the southern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2674.

**Rhizocarpon geographicum** (L.) DC.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2578; between Zirve Tepe and Uludağ Tepe, alt. 2250–2270 m, on siliceous rock, lat 40° 03' N, long 29° 15' E, 22.06.2000, BULU 2582; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2593; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2616; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2629; the southern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2677; the east of the Wolfram mine, alt. 2100 m, on siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2682.

**Rhizoplaca chrysoleuca** (Sm.) Zopf.

Bursa: Uludağ; between Zirve Tepe and Uludağ Tepe, alt. 2250–2270 m, on siliceous rock, lat 40° 03' N, long 29° 15' E, 22.06.2000, BULU 2580.

**R. melanophthalma** (Ramond) Leuckert & Poelt

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2576; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2627; the southern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2666.

**Rinodina milvina** (Wahlenb.) Th.Fr.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2572.

**Schaereria fuscocinerea** (Nyl.) Clauzade & Cl.Roux

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2608.

**Sporastatia testudinea** (Ach.) A.Massal.

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2596; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2626; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2636.

**Tephromela atra** (Huds.) Hafellner

Bursa: Uludağ; in the vicinity of Paşaçayırı Tepe, alt. 2020 m, on siliceous rock, lat 40° 04' N, long 29° 10' E, 25.07.2000, BULU 2618.

**Toninia sedifolia** (Scop.) Timdal

Bursa: Uludağ; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120–2150 m, on calcareous soil, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2653.

**Umbilicaria cylindrica** (L.) Delise ex Duby

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2577; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2594; in the vicinity of Kuşaklıkaya Tepe, alt. 2050 m, on siliceous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2628; the southern slopes in the west of Zirve Tepe, alt. 2150 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2671; the east of the Wolfram mine, alt. 2100 m, on siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2681.

**U. decussata** (Vill.) Zahlbr.

Bursa: Uludağ; the southern slopes in the east of Zirve Tepe, alt. 2150 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 02.09.2001, BULU 2667; the east of the Wolfram mine, alt. 2100 m, on siliceous rock, lat 40° 04' N, long 29° 14' E, 02.09.2002, BULU 2680.

**U. nylanderiana** (Zahlbr.) H.Magn.

Bursa: Uludağ; in the vicinity of the Wolfram mine,

alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2575.

**U. polyphylla** (L.) Baumg.

Bursa: Uludağ; in the vicinity of the Wolfram mine, alt. 2130 m, on siliceous rock, lat 40° 04' N, long 29° 13' E, 22.06.2000, BULU 2573.

**U. proboscidea** (L.) Schrad.

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on siliceous rock with *Umbilicaria cylindrica*, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2597.

**Xanthoria calcicola** Oxner

Bursa: Uludağ; the northern slopes in the west of Zirve Tepe, alt. 2150 m, on calcareous rock, lat 40° 04' N, long 29° 13' E, 25.07.2000, BULU 2662.

**X. elegans** (Link) Th.Fr.

Bursa: Uludağ; the north of Uludağ Tepe, in the vicinity of Kilimli lake, alt. 2130–2200 m, on calcareous rock, lat 40° 03' N, long 29° 17' E, 22.06.2000, BULU 2601.

**X. parietina** (L.) Th.Fr.

Bursa: Uludağ; the northern slopes in the east of Kuşaklıkaya Tepe, alt. 2120–2150 m, on calcareous rock, lat 40° 04' N, long 29° 11' E, 25.07.2000, BULU 2647.

**Discussion**

In the study area, a total of 66 taxa belonging to 37 genera were determined. According to the literature, *Buellia leptocline* (Flot.) A.Massal. and *Lecanora rupicola* (L.) Zahlbr. ssp. *subplanata* (Nyl.) Leuckert & Poelt are new taxa for the lichen flora of Turkey (John, 1992; 1995). According to Galun (1988), *Lecidea promiscens* and *Rhizocarpon geographicum* are the most resistant lichens to snow cover in alpine regions. Similarly, these species have been found in almost all of the localities in the alpine region of Uludağ.

According to Wirth (1995), the following species are only known from alpine regions: *Bellemerea alpina*, *B. cinereorufescens*, *Brodoa intestiniformis*, *Lecanora polytropia*, *Lecidea promiscens*, *Pseudephebe minuscula*, *Schaereria fuscocinerea* and *Umbilicaria decussata*. The other species we determined are distributed in a wide range of altitudes.

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