

Lichenized fungi of Karadağ Mountain (Karacabey-Bursa)

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ABSTRACT

In this study, 134 taxa belonging to 60 genera were determined from 30 localities in Karadağ Mountain located within the boundaries of the Karacabey district in Bursa province. 27 of 134 taxa is new record for Bursa, and 63 taxa is new for Karacabey districts.

Keywords: Lichen, Biodiversity, Karadağ Mountain, Karacabey, Bursa, Turkey

INTRODUCTION

Bursa province is one of the most well studied provinces on the lichen diversity in Turkey. The first lichen records in Bursa province has started with 14 lichen species records given by Steiner (1916) at the beginning of the year of 1900 and then the studies have been continued by Szatala (1927, 1940, 1960). Many lichenized and lichenicolous fungi from Bursa province are gained as contribution to the lichen flora of Turkey (Doğru and Güvenç 2007, Yazıcı 2007, Yazıcı et al. 2007, Arslan et al. 2011). Numerous studies on lichens in the province of Bursa have been done in Uludağ Mountain (Öztürk 1992, Güvenç and Öztürk 2004), as the highest point of province, and the districts of Gemlik-Mudanya which located on the shores of Marmara Sea (Özdemir and Öztürk 1992, Öztürk 1997, Oran and Öztürk 2006a), and Karacabey (Yazıcı 1999) and Mustafakemalpaşa districts (Yazıcı and Aslan 2006). A total of 42 studies on lichens in Bursa have been done until now. A total of 550 taxa is given in the previous studies in Bursa province.

In this study, we aimed to contribute to the knowledge of the lichenized and lichenicolous fungi of Turkey.

MATERIALS AND METHODS

Lichen samples were collected from a total of 30 stations including 16 localities in the south and 14 localities in the north of Karadağ Mountain located within the boundaries of the Karacabey district in Bursa province between 07 May 2012 and 10 September 2012. The specimens were examined with a Leica EZ4 model stereomicroscope, and an Olympus CH-2 light microscope for external morphology and anatomical observations. Ascospore measurements were carried out in water. Identifications were determined according to the literatures (Nash III et al. 2007, Smith et al. 2009, Wirth et al. 2013) and papers (Giralt 2001, Mayrhofer 1988). The specimens were stored in BULU (Herbarium of Faculty of Sciences and Arts in the Uludağ University, Bursa, Turkey).

The study area

This study was conducted at thirty localities from the Karadağ Mountain at Karacabey district in the Marmara sea coast of Bursa province. Karadağ, selected as the study area, is located between 40-40.5°N and 28-29°E in the southeast of the Marmara region of Turkey. The highest point of Karadağ Mountain is Karatepe (Alt. 833 m). Bursa is usually dominated by a Mediterranean climate and is a transitional region between Mediterranean climate and the Black Sea climate (Öztürk 2010). The mean annual temperature (1992-2012) at Karacabey (Alt. 15 m) is 14.7°C and the mean annual rainfall is 585.1 mm (Anonymous 2015).

The north-facing parts of Karadağ are similar to intensive broadleaf forests in the Atlantic coast of Europe. At the broadleaf forests starting from the Marmara coast ranging from the Mountain tops is dominant by

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the European-Siberian species such as *Castanea sativa* Mill., *Carpinus betulus* L., and *Tilia argentea* Desf. ex DC. This broad-leaved forests around the Boğaz village near to Bayramdere at the Northeast of Karacabey starts and extends westward. This forest is located in a large number of the species occurring in the North Anatolian. These species are *Mespilus germanica* L., *Corylus avellana* L., *Acer campestre* L. ssp. *campestre*, *Alnus glutinosa* (L.) Gaertn., *Clematis alba* L., *Smilax excelsa* L., *Hedera helix* L., and *Fraxinus ornus* L. ssp. *ornus*. Additionally, in this forest, shrubs which spread in the Mediterranean region in general, but often observed in almost all coast of Anatolia are also available. The commonly found mediterranean species in the broad-leaved forests are *Laurus nobilis* L., *Quercus cerris* L., *Styrax officinalis* L., *Erica arborea* L., *Phillyrea latifolia* L., and *Ruscus aculeatus* L. (Övünç 1997).

Lichen samples were collected from a total of 30 stations including 16 localities in the south and 14 localities in the north of Karadağ Mountain located within the boundaries of the Karacabey district in Bursa province (Figure 1).

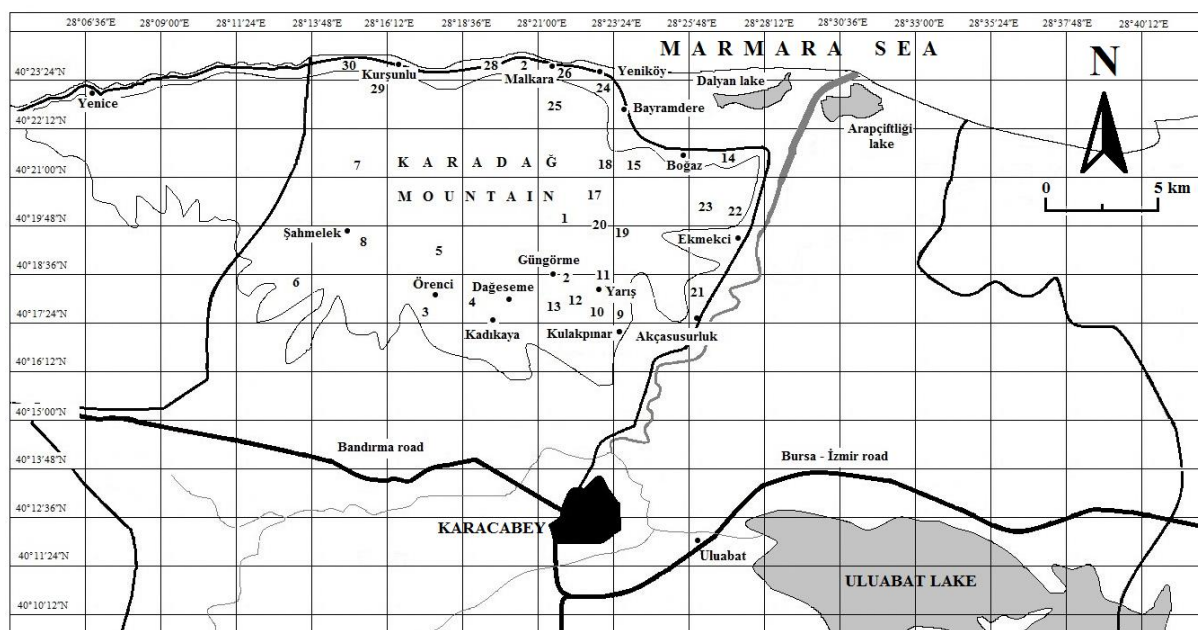


Figure 1. The localities in the study area.

The collected localities of lichen samples

1. Güngörmez village, 2 km north of the village, *Fagus* sp. and *Querrcus* sp. forest, Alt. 515 m, 40°19'56"N - 28°21'20"E, 07.05.2012.
2. Güngörmez village, 1 km to the village, *Fagus* sp. and *Querrcus* sp. forest, Alt. 435 m, 40°18'30"N - 28°21'25"E, 13.06.2012.
3. Örencik village, 2 km southwest of the village, edge of stream, Alt. 216 m, 40°17'51"N - 28°16'52"E, 08.05.2012.
4. Örencik village, entrance of the village, the southern slope of the hill, old oak forest, Alt. 340 m, 40°18'08"N - 28°17'21"E, 08.05.2012.
5. Örencik village, 4 km north of the village, mixed forest formed by *Castanea* sp., *Platanus* sp., *Quercus* sp., and *Tilia* sp. in the valley, Alt. 315 m, 40°19'12"N - 28°17'29"E, 08.05.2012.
6. Şahmelek village, 1.5 km to the village, *Pinus* sp. forest, Alt. 255 m, 40°18'33"N - 28°13'01"E, 09.05.2012.
7. Şahmelek village, 3 km north of the village, mixed forest formed by *Castanea* sp., *Fagus* sp., *Populus* sp., and *Quercus* sp., Alt. 670 m, 40°21'22"N - 28°15'15"E, 09.05.2012.
8. Şahmelek village, 1 km east of the village, oak forest, Alt. 500 m, 40°19'32"N - 28°15'05"E, 09.05.2012.
9. Kulakpınar village, Kulakpınar-Yarış road, exit of the Kulakpınar village, the shrubs and rocky areas, Alt. 270 m, 40°17'40"N - 28°22'52"E, 14.6.2012.

10. Yarış village, Kulakpınar-Yarış road, 1 km to the Yarış village, oak forest, Alt. 360 m, 40°17'50"N - 28°22'36"E, 13.6.2012.
11. Yarış village, 1 km northeast of the village, oak forest exposed to north winds, Alt. 405 m, 40°18'34"N - 28°22'44"E, 27.08.2012.
12. Yarış village, Yarış-Güngörmez road, 1 km after the village of Yarış, oak forest exposed to north winds, Alt. 416 m, 40°17'58"N - 28°21'40"E, 13.6.2012.
13. Dağesemen village, 1 km east of the village, oak forest, Alt. 360 m, 40°18'01"N - 28°21'04"E, 14.6.2012.
14. Boğazköy village, the back of Boğazköy, sea-facing slopes, mixed forest formed by *Castanea* sp., *Quercus* sp., and *Tilia* sp., Alt. 80 m, 40°21'35"N - 28°26'44"E, 28.08.2012.
15. Bayramdere village, 1 km to the village, after 1 km from Bayramdere pond crossroads, edge of stream, mixed forest formed by *Fagus* sp., *Platanus* sp., and *Quercus* sp., Alt. 90 m, 40°21'27"N - 28°23'52"E, 28.08.2012.
16. Bayramdere village, mixed forest formed by *Quercus* sp. and *Tilia* sp. in the southwest of the village, Alt. 53 m, 40°22'10"N - 28°23'20"E, 07.09.2012.
17. Bayramdere village, 2 km to the Bayramdere pond, mixed forest formed by *Castanea* sp., *Fagus* sp., *Quercus* sp., and *Tilia*, Alt. 320 m, 40°20'35"N - 28°22'59"E, 27.08.2012.
18. Bayramdere village, in the vicinity of Erikli plateau crossroads in the Bayramdere pond road, mixed forest formed by *Castanea* sp., *Fagus* sp., *Quercus* sp., and *Tilia* sp., Alt. 230 m, 40°21'25"N - 28°23'23"E, 28.08.2012.
19. Bayramdere village, Bayramdere - Gölet road, entrance of the Bayramdere pond, edge of pond, oak forest, Alt. 330 m, 40°19'50"N - 28°22'55"E, 28.08.2012.
20. Bayramdere village, Bayramdere - Gölet road, the south of the Bayramdere pond, edge of pond, beech forest, Alt. 350 m, 40°19'47"N - 28°22'38"E, 27.08.2012.
21. Akçasusurluk village, 2 km north of the village, in the vicinity of Marble quarry, maquis, Alt. 130 m, 40°18'15"N - 28°25'43"E, 05.09.2012.
22. Ekmekçi village, 2 km north of the village, the north-facing slopes inside the valley, mixed forest formed by *Castanea* sp., *Quercus* sp., and *Tilia* sp., Alt. 147 m, 40°20'13"N - 28°27'22"E, 05.09.2012.
23. Ekmekçi village, 4 km north of the Ekmekçi village, the north-facing slopes inside the valley, mixed forest formed by *Castanea* sp., *Quercus* sp., and *Tilia* sp., edge of stream, Alt. 240 m, 40°20'23"N - 28°26'21"E, 05.09.2012.
24. Yeniköy village, 1 km south of the village, the north-facing slopes, mixed forest formed by *Laurus* sp. and *Quercus* sp., Alt. 83 m, 40°23'16"N - 28°23'00"E, 07.09.2012.
25. Yeniköy village, 4 km south-easterly direction of Yeniköy village, mixed forest formed by *Castanea* sp. and *Quercus* sp., Alt. 375 m, 40°22'52"N - 28°21'24"E, 07.09.2012.
26. Malkara village, the north-facing slopes of behind the village of Malkara, mixed forest formed by *Castanea* sp., *Laurus* sp., *Quercus* sp., and *Tilia* sp., Alt. 28 m, 40°23'42"N - 28°21'43"E, 10.09.2012.
27. Malkara village, between Malkara and Kurşunlu villages, 1 km after the Malkara village, mixed forest formed by *Castanea* sp., *Laurus* sp., *Quercus* sp., and *Tilia* sp., Alt. 56 m, 40°24'01"N - 28°20'34"E, 10.09.2012.
28. Kurşunlu village, between Malkara and Kurşunlu villages, 1 km to the Kurşunlu village, mixed forest formed by *Castanea* sp., *Laurus* sp., *Quercus* sp., and *Tilia* sp. in the north-facing slopes, Alt. 50 m, 40°23'49"N - 28°19'20"E, 10.09.2012.
29. Kurşunlu village, the north-facing slopes at 4 km south side of the village, mixed forest formed by *Castanea* sp., *Laurus* sp., *Quercus* sp., and *Tilia* sp., Alt. 416 m, 40°23'07"N - 28°16'09"E, 10.09.2012.
30. Kurşunlu village, mixed forest formed by *Castanea* sp., *Quercus* sp., and *Tilia* sp. in the north-facing slopes after 2 km from the village, Alt. 60 m, 40°24'00"N - 28°15'19"E, 10.09.2012.

RESULTS

The taxa were listed in alphabetical order, followed by locality, substrate and herbarium number. An alphabetical list of taxa names was created based on the latest current names in Index Fungorum (<http://www.indexfungorum.org/names/names.asp>). Lichen taxa new to Bursa province is indicated by (*), and new to Karacabey district by (+).

***Acarospora fuscata* (Nyl.) Th. Fr.**

3, 7: On siliceous rock (15904, 16043).

(+) ***Alyxoria culmigena* (Lib.) Ertz**

15: On *Tilia* sp. (16200); **16:** On *Quercus* sp. (16341); **17:** On *Fagus* sp. (16179); **18:** On *Quercus* sp. and *Tilia* sp. (16218, 16208).

(*) ***Alyxoria ochrocheila* (Nyl.) Ertz & Tehler**

26: On *Tilia* sp. (16350).

(+) ***Alyxoria varia* (Pers.) Ertz & Tehler**

14: On *Tilia* sp. (16236); **30:** On calcareous rock (16413).

(+) ***Amandinea punctata* (Hoffm.) Coppins & Scheid.**

6: On *Pinus* sp. and *Robinia pseudoacacia* (15992, 16001); **10, 13:** On *Quercus* sp. (16083, 16138); **12:** On *Fagus* sp. (16104); **29:** On *Tilia* sp. (16388).

(*) ***Arthonia atra* (Pers.) A. Schneid.**

10: On *Quercus* sp. (16079); **14, 27:** On *Tilia* sp. (16233, 16370); **29:** On *Junglans* sp. (16393); **30:** On *Fagus* sp. and *Tilia* sp. (16401, 16403).

(+) ***Arthonia lapidicola* (Taylor) Branth & Rostr.**

9: On calcareous rock (16153).

(+) ***Arthonia radiata* (Pers.) Ach.**

3: On *Fagus* sp. (15890); **5:** On *Quercus* sp. (15952); **28:** On *Tilia* sp. (16374).

***Aspicilia cinerea* (L.) Körb.**

4, 21: On siliceous rock (15987, 16268).

***Aspicilia contorta* subsp. *hoffmanniana* S. Ekman & Fröberg ex R. Sant.**

15: On calcareous silicate rock (16191).

(+) ***Athallia cerinella* (Nyl.) Arup, Frödén & Söchting**

3: On *Quercus* sp. (15919).

***Athallia holocarpa* (Hoffm.) Arup, Frödén & Söchting**

5: On *Pistacia* sp. and *Tilia* sp. (15940, 15962); **6:** On *Robinia pseudoacacia* (15999); **7, 10:** On *Quercus* sp. (16024, 16076); **9, 21, 27:** On calcareous rock (16149, 16259, 16358).

(+) ***Bacidia arceutina* (Ach.) Rehm & Arnold**

18: On *Quercus* sp. (16222).

(+) ***Bacidia laurocerasi* (Delise ex Duby) Zahlbr.**

18: On *Tilia* sp. (16210).

(+) ***Bacidia rubella* (Hoffm.) A. Massal.**

17: On *Fagus* sp. (16183).

(+) ***Blennothallia crispa* (Weber ex F.H. Wigg.) Otálora, P.M. Jørg. & Wedin**

3: Together with the moss on surface of siliceous rock (15905); **9:** On calcareous rock (16145).

(+) ***Buellia disciformis* (Fr.) Mudd**

4, 23: On *Quercus* sp. (15981, 16304).

(+) ***Buellia griseovirens* (Turner & Borrer ex Sm.) Almb.**

5: On *Pistacia* sp. (15938).

(*) ***Buellia schaeferi* De Not.**

30: On *Tilia* sp. (16408).

(+) ***Buellia spuria* (Schaer.) Anzi**

19: On siliceous rock (16248).

(*) *Callome multipartita* (Sm.) Otálora, P.M. Jørg. & Wedin

22: On siliceous rock (16273).

(+) *Caloplaca alociza* (A. Massal.) Mig.

9: On calcareous rock (16147).

Caloplaca aractina (Fr.) Häyrén

3: On siliceous rock (15912).

(+) *Caloplaca crenularia* (With.) J.R. Laundon

19: On siliceous rock (16246).

Circinaria caesiocinerea (Nyl. ex Malbr.) A. Nordin, Savić & Tibell

3: On siliceous rock (15915).

Circinaria calcarea (L.) A. Nordin, Savić & Tibell

9: On calcareous rock (16140).

Circinaria contorta (Hoffm.) A. Nordin, Savić & Tibell

1, 3, 4, 7, 19, 22: On siliceous rock (15883, 15898, 15986, 16049, 16245, 16276); 9: On calcareous rock (16141).

Candelariella aurella (Hoffm.) Zahlbr.

21, 27: On calcareous rock (16254, 16360).

(+) *Candelariella medians* (Nyl.) A.L. Sm.

26: On calcareous rock (16354).

Candelariella vitellina (Hoffm.) Müll. Arg.

1: On *Erica* sp. (15877); 3, 4, 7: On siliceous rock (15903, 15988, 16044).

(+) *Catillaria chalybeia* (Borrer) A. Massal.

3: On siliceous rock (15906).

(+) *Catillaria lenticularis* (Ach.) Th. Fr.

7: On siliceous rock (16047); 9, 27, 28: On calcareous rock (16152, 16361, 16378).

(+) *Chrysothrix candelaris* (L.) J.R. Laundon

23: On *Fagus* sp. (16290).

(+) *Cladonia coniocraea* (Flörke) Spreng.

29: On *Tilia* sp. (16392).

(*) *Cladonia glauca* Flörke

26: On wood of *Tilia* sp. (16349).

Cladonia pyxidata (L.) Hoffm.

1: On *Quercus* sp. and together with the moss on surface of siliceous rock (15874, 15878); 3, 5, 7, 22, 23: Together with the moss on surface of siliceous rock (15897, 15965, 16050, 16279, 16286); 19: Together with the moss at the base of the trunk of *Prunus avium* (16250).

Cladonia rangiformis Hoffm.

3: Together with the moss on surface of siliceous rock (15896).

(+) *Cladonia squamosa* var. *squamosa* (Scop.) Hoffm.

22: The soil on the surface of siliceous rock (16280).

(*) *Cladonia squamosa* var. *subsquamosa* (Nyl. ex Leight.) Vain.

5: The soil on the surface of siliceous rock (15964).

(+) *Diplotomma chlorophaeum* (Hepp ex Leight.) Szatala

3: On siliceous rock (15899).

Diplotomma epipolium (Ach.) Arnold

9, 21: On calcareous rock (16142, 16255).

(+) *Dirina massiliensis* f. *sorediata* (Müll. Arg.) Tehler

15: On calcareous silicate rock (16192).

(*) *Dirina massiliensis* f. *massiliensis* Durieu & Mont.

26: On calcareous rock (16357).

(+) *Enchylium polycarpon* (Hoffm.) Otálora, P.M. Jørg. & Wedin

9: On calcareous rock (16146).

(+) *Eopyrenula leucoplaca* (Wallr.) R.C. Harris

3: *Fagus* sp. (15891); 10, 13: *Quercus* sp. (16078, 16130).

Evernia prunastri (L.) Ach.

3: On *Platanus* sp. and *Quercus* sp. (15895, 15916); 2, 5, 8, 10, 11, 12, 13, 18, 23, 24, 25: On *Quercus* sp. (16118, 15943, 16059, 16073, 16157, 16099, 16136, 16219, 16305, 16317, 16325).

Flavoparmelia caperata (L.) Hale

5: On *Tilia* sp. (15957); 18, 19, 25: On *Quercus* sp. (16214, 16241, 16326); 16: On *Quercus* sp. and *Tilia* sp. (16340, 16344).

(*) *Flavoparmelia soledians* (Nyl.) Hale

3: On *Platanus* sp. (15892).

Flavoplaca citrina (Hoffm.) Arup, Frödén & Søchting

21: On calcareous rock (16256).

(*) *Graphis elegans* (Borrer ex Sm.) Ach.

30: On *Fagus* sp. (16402).

Hypogymnia physodes (L.) Nyl.

5: On *Erica* sp. (15933); 8: On *Quercus* sp. (16080); 12: On *Erica* sp. and *Quercus* sp. (16098, 16102).

(*) *Hypotrachyna laevigata* (Sm.) Hale

3: On *Platanus* sp. (15893).

(+) *Lecania cyrtella* (Ach.) Th. Fr.

3: On *Quercus* sp. (15921).

(+) *Lecanora argentata* (Ach.) Röhl.

5: On *Pistacia* sp. (15939).

Lecanora campestris (Schaer.) Hue

27: On calcareous rock (16364).

(+) *Lecanora carpinea* (L.) Vain.

1, 10: On *Quercus* sp. and *Fagus* sp. (15870, 15886; 16075, 16089); 2, 3, 4, 8, 13, 21, 23: On *Quercus* sp. (16108, 15922, 15982, 16055, 16125, 16265, 16302); 5: *Pistacia* sp. and *Quercus* sp. (15941, 15947); 6: On *Robinia pseudoacacia* (15996); 7: On *Quercus* sp., *Populus alba*, *Malus* sp. and *Fagus* sp. (16023, 16031, 16035, 16039); 18: On *Laurus nobilis* (16212); 20, 30: On *Fagus* sp. (16171, 16396).

(+) *Lecanora chlarotera* Nyl.

3, 10: On *Fagus* sp. and *Quercus* sp. (15888, 15923; 16087, 16066); 5: On *Quercus* sp. and *Tilia* sp. (15949, 15961); 2, 4, 8, 12, 13, 16, 21, 22, 24: On *Quercus* sp. (16115, 15983, 16054, 16094, 16126, 16335, 16266, 16282, 16316); 6: On *Robinia pseudoacacia* (16002); 7: On *Fagus* sp., *Populus alba* and *Quercus* sp. (16041, 16030, 16020); 14, 18, 27, 28, 29: On *Tilia* sp. (16234, 16209, 16365, 16372, 16391); 23: On *Platanus* sp. and *Quercus* sp. (16300, 16301); 27: On siliceous rock (16368); 30: On *Fagus* sp. (16395).

Lecanora dispersa (Pers.) Röhl.

21, 27: On calcareous rock (16257, 16363).

(*) *Lecanora gangaleoides* Nyl.

5, 16, 22: On siliceous rock (15968, 16331, 16274).

(*) *Lecanora jamesii* J.R. Laundon

21: On *Quercus* sp. (16262).

(*) *Lecanora orosthea* (Ach.) Ach.

5: On siliceous rock (15966).

(*) *Lecanora rugosella* Zahlbr.

23, 26, 29, 30: On *Tilia* sp. (16297, 16352, 16383, 16405).

(+) *Lecanora saligna* (Schr.) Zahlbr.

6: On *Pinus* sp. (15991).

(*) *Lecanora subcarnea* (Lilj.) Ach.

5: On siliceous rock (15969).

(+) *Lecanora symmicta* (Ach.) Ach.

7: On *Quercus* sp. and *Malus* sp. (16025, 16033); **2, 8, 11, 13:** On *Quercus* sp. (16110, 16062, 16161, 16131);

10: On *Fagus* sp. and *Quercus* sp. (16085, 16077).

(+) *Lecanora umbrina* (Ach.) A. Massal.

10: On *Quercus* sp. (16082).

(+) *Lecidea fuscoatra* (L.) Ach.

7: On siliceous rock (16046).

(*) *Lecidea nylanderii* (Anzi) Th. Fr.

18: On *Quercus* sp. (16216).

(+) *Lecidella carpathica* Körb.

8: On siliceous rock (16065).

***Lecidella elaeochroma* (Ach.) M. Choisy**

1, 3, 7, 10, 12: On *Fagus* sp. and *Quercus* sp. (15887, 15868; 15889, 15918; 16042, 16021; 16084, 16069; 16105, 16095); **2:** On *Pyrus* sp. and *Quercus* sp. (16120, 16116); **4, 8, 13, 21, 24:** On *Quercus* sp. (15985, 16056, 16133, 16264, 16314); **5:** On *Pistacia* sp., *Quercus* sp. and *Tilia* sp. (15937, 15948, 15960); **6:** On *Robinia pseudoacacia* (15998); **11:** On *Acer* sp. and *Quercus* sp. (16166, 16156); **13, 16:** On *Quercus* sp. and *Tilia* sp. (16226, 16235; 16336, 16342); **15:** On *Fagus* sp. and *Tilia* sp. (16201, 16195); **17, 19, 30:** On *Fagus* sp. (16175, 16180, 16398); **18, 26, 27, 28:** On *Tilia* sp. (16206, 16351, 16366, 16376); **23:** On *Platanus* sp., *Quercus* sp. and *Tilia* sp. (16299, 16307, 16298).

***Lepraria incana* (L.) Ach.**

1: On *Fagus* sp. and *Quercus* sp. (15885, 15869); **2, 12, 13, 16, 20, 25:** On *Quercus* sp. (16114, 16092, 16129, 16337, 16176, 16319); **11:** On *Acer* sp. and *Quercus* sp. (16163, 16159); **14, 18:** On *Quercus* sp. and *Tilia* sp. (16228, 16230; 16213, 16205); **17:** On *Fagus* sp. (16187); **23:** On *Castanea* sp., *Fagus* sp., siliceous rock and *Tilia* sp. (16287, 16289, 16284, 16295); **29:** On *Tilia* sp. (16387); **30:** On *Fagus* sp. and *Tilia* sp. (16399, 16407).

(+) *Lepraria lobificans* Nyl.

2, 12, 25: On *Quercus* sp. (16112, 16091, 16328); **14:** On *Pinus* sp. (16229); **17:** On *Tilia* sp. (16188).

(*) *Lepraria membranacea* (Dicks.) Vain.

22: On siliceous rock (16272).

(+) *Lobothallia farinosa* (Flörke) A. Nordin, Savić & Tibell (as *Aspicilia farinosa*)

9, 21: On calcareous rock (16144, 16258).

***Lobothallia radiosa* (Hoffm.) Hafellner**

9, 21: On calcareous rock (16143, 16251).

(+) *Melanelia subaurifera* (Nyl.) Essl.

2, 3, 8, 11, 13, 14: On *Quercus* sp. (16109, 15928, 16052, 16160, 16128, 16097); **7:** On *Populus alba* (16027); **10:** On *Fagus* sp. and *Quercus* sp. (16088, 16067); **19:** On *Prunus avium* (16249); **20:** On *Fagus* sp. (16172).

(+) *Melanelixia glabratula* (Lamy) Sandler & Arup

1, 7, 16, 19, 24, 25: On *Quercus* sp. (15872, 16015, 16339, 16244, 16309, 16327); **5:** On *Erica* sp., *Quercus* sp. and siliceous rock (15932, 15953, 15971); **11:** On *Acer* sp. (16164); **17:** On *Fagus* sp. and *Tilia* sp. (16184, 16186); **20:** On *Fagus* sp. (16173); **22:** On siliceous rock (16277); **29, 30:** On *Tilia* sp. (16379, 16411).

(+) *Ochrolechia turneri* (Sm.) Hasselrot

3: On *Platanus* sp. (15894); **17:** On *Tilia* sp. (16189).

***Parmelia sulcata* Taylor**

1, 4, 8, 10, 13, 18, 19, 24, 25: On *Quercus* sp. (15871, 15977, 16053, 16070, 16134, 16215, 16239, 16313, 16321); **2:** On *Pyrus* sp. and *Quercus* sp. (16121, 16117); **5:** On *Erica* sp., *Pistacia* sp. and *Quercus* sp. (15930, 15935, 15942); **7:** On *Populus alba* and *Fagus* sp. (16029, 16038); **11:** On *Acer* sp. and *Quercus* sp. (16165, 16158); **12:** On *Erica* sp. and *Quercus* sp. (16101, 16100); **16, 29:** On *Tilia* sp. (16343, 16386); **20:** On *Fagus* sp. (16169); **23:** On *Quercus* sp. and *Tilia* sp. (16303, 16292).

(+) *Parmelina carporrhizans* (Taylor) Hale

4: On *Quercus* sp. (15974); **5:** On *Erica* sp. (15931).

***Parmelina quercina* (Willd.) Hale**

1, 3, 7, 14, 18, 24: On *Quercus* sp. (16063, 15920, 16017, 16227, 16223, 16315); **6:** On *Pinus* sp. and *Robinia pseudoacacia* (15994, 15995); **15:** On *Tilia* sp. (16194).

***Parmelina tiliacea* (Hoffm.) Hale**

4, 18, 24: On *Quercus* sp. (15973, 16220, 16312); **5:** On *Quercus* sp. and *Tilia* sp. (15945, 15958).

(+) *Parmotrema tinctorum* (Despr. ex Nyl.) Hale

25: On *Quercus* sp. (16323).

(+) *Peltigera praetextata* (Flörke ex Sommerf.) Zopf

15: On *Platanus* sp. (16204).

(+) *Pertusaria albescens* (Huds.) M. Choisy & Werner

29: On *Tilia* sp. (16381).

***Pertusaria amara* (Ach.) Nyl.**

29: On *Tilia* sp. (16385).

(*) *Pertusaria flavicans* Lamy

3: On siliceous rock (15908).

(*) *Pertusaria hymenea* (Ach.) Schaer.

4: On *Quercus* sp. (15975); **17:** On *Tilia* sp. (16185).

(*) *Pertusaria lactea* (L.) Arnold

22: On siliceous rock (16275).

(+) *Pertusaria leioplaca* DC.

1, 24: On *Quercus* sp. (15876, 16311); **14, 16, 26, 28, 29, 30:** On *Tilia* sp. (16232, 16345, 16353, 16369, 16384, 16404); **17:** On *Fagus* sp. (16177).

(*) *Pertusaria multipuncta* (Turner) Nyl.

14: On *Quercus* sp. and *Tilia* sp. (16224, 16231); **18, 23:** On *Tilia* sp. (16207, 16293).

***Pertusaria pertusa* (L.) Tuck.**

4: On *Quercus* sp. (15976); **5:** On *Quercus* sp. and *Tilia* sp. (15946, 15956); **29:** *Tilia* sp. (16380).

(+) *Phlyctis agelaea* (Ach.) Flot.

15: On *Fagus* sp. and *Tilia* sp. (16203, 16196); **29, 30:** On *Tilia* sp. (16382, 16412).

(+) *Phlyctis argena* (Ach.) Flot.

13, 16, 18, 23, 25: On *Quercus* sp. (16137, 16334, 16217, 16306, 16322); **15, 17:** On *Fagus* sp. and *Tilia* sp. (16202, 16198; 16181, 16190); **29:** On *Tilia* sp. (16389).

***Physcia adscendens* (Fr.) H. Olivier**

1, 3, 5, 8, 10, 13, 24, 25: On *Quercus* sp. (15875, 15929, 15944, 16051, 16074, 16132, 16310, 16320); **2:** On *Pyrus* sp. and *Quercus* sp. (16123, 16111); **6:** On *Pinus* sp., *Pyrus* sp. and *Robinia pseudoacacia* (15990, 16007, 15997); **7:** On *Populus alba*, *Pyrus* sp. and *Quercus* sp. (16026, 16037, 16012); **11:** On *Acer* sp. and *Quercus* sp. (16168, 16155); **12:** On *Fagus* sp. and *Quercus* sp. (16106, 16096); **15, 27, 28, 30:** On *Tilia* sp. (16197, 16367, 16373, 16409); **19:** On *Quercus* sp. and siliceous rock (16243, 16247); **20:** On *Fagus* sp. (16170); **21:** On calcareous rock (16252); **23:** On *Fagus* sp. and *Tilia* sp. (16288, 16296); **26:** On *Castanea sativa* (16347); **29:** On *Hedera* sp. and *Tilia* sp. (16394, 16390).

***Physcia aipolia* (Ehrh. ex Humb.) Fürnr.**

13, 16: On *Quercus* sp. (16127, 16338).

***Physcia caesia* (Hoffm.) Hampe ex Fürnr.**

3: On siliceous rock (15914).

(+) *Physcia leptalea* (Ach.) DC.

7: On *Quercus* sp. (16011).

***Physcia stellaris* (L.) Nyl.**

3, 4, 7: On *Quercus* sp. (15927, 15979, 16016); **6:** On *Olea* sp. and *Robinia pseudoacacia* (16010, 16003).

(+) *Physconia enteroxantha* (Nyl.) Poelt

1: On *Quercus* sp. (15873).

Physconia grisea (Lam.) Poelt

4: On *Quercus* sp. (15984).

Pleurosticta acetabulum (Neck.) Elix & Lumbsch

5, 8, 10, 11, 12: On *Quercus* sp. (15950, 16057, 16068, 16162, 16090); 7: *Populus alba* and *Quercus* sp. (16032, 16013).

(+) *Porina aenea* (Wallr.) Zahlbr.

28: On *Tilia* sp. (16375).

Porpidia crustulata (Ach.) Hertel & Knoph

1: On siliceous rock (15882).

(+) *Porpidia macrocarpa* (DC.) Hertel & A.J. Schwab

3, 5, 23: On siliceous rock (15913, 15967, 16285).

(*) *Porpidia platycarpoides* (Bagl.) Hertel

3: On siliceous rock (15907).

Protoparmeliopsis muralis (Schreb.) M. Choisy

3, 16, 22: On siliceous rock (15900, 16332, 16278)

(*) *Pyrenula chlorospila* (Nyl.) Arnold

28: On *Tilia* sp. (16371); 30: *Fagus* sp. (16400).

(*) *Pyrenula macrospora* (Degel.) Coppins & P. James

14, 15, 18, 30: On *Tilia* sp. (16238, 16199, 16211, 16406).

Ramalina farinacea (L.) Ach.

3, 8, 12, 13, 19: On *Quercus* sp. (15925, 16060, 16093, 16139, 16242).

Ramalina fastigiata (Pers.) Ach.

18: On *Quercus* sp. (16221).

(+) *Ramalina fraxinea* (L.) Ach.

3, 4, 5, 7, 10, 13, 19, 22, 24, 25: On *Quercus* sp. (15926, 15978, 15936, 16018, 16071, 16135, 16240, 16281, 16318, 16329); 23: On *Tilia* sp. (16294).

(+) *Rhizocarpon distinctum* Th. Fr.

22: On siliceous rock (16267).

(*) *Rhizocarpon postumum* (Nyl.) Arnold

1: On siliceous rock (15880).

(+) *Rhizocarpon reductum* Th. Fr.

3, 5, 7: On siliceous rock (15909, 15970, 16048).

(+) *Rhizocarpon viridiatrum* (Wulfen) Körb.

22: On siliceous rock (16269).

(+) *Rinodina exigua* (Ach.) Gray

4, 5, 8: On *Quercus* sp. (15980, 15954, 16058); 6: On *Olea* sp., *Pinus* sp., *Pyrus* sp. and *Robinia pseudoacacia* (16009, 15993, 16005, 16000); 7: On *Malus* sp. and *Quercus* sp. (16022, 16034).

(+) *Rinodina interpolata* (Stirt.) Sheard

3, 22: On siliceous rock (15910, 16270).

(+) *Rinodina sophodes* (Ach.) A. Massal.

3, 21: On *Quercus* sp. (15924, 16261); 5: On *Tilia* sp. (15959).

(+) *Rinodinella controversa* (A. Massal.) H. Mayrhofer & Poelt

27: On calcareous rock (16362).

(+) *Rufoplaca arenaria* (Pers.) Arup, Søchting & Frödén

1: On siliceous rock (15881).

(+) *Scoliciosporum umbrinum* (Ach.) Arnold

1: On *Fagus* sp. and siliceous rock (15884, 15879); 2: On *Pyrus* sp. and *Quercus* sp. (16122, 16119); 3: On siliceous rock (15911); 5, 8, 10, 14, 16, 21, 24: On *Quercus* sp. (15951, 16061, 16081, 16225, 16346, 16263,

16308); **7**: On *Fagus* sp. and *Quercus* sp. (16040, 16019); **12, 17, 20, 30**: On *Fagus* sp. (16103, 16178, 16174, 16397); **26**: On *Castanea sativa* (16348).

(+) *Trimmatothelopsis smaragdula* (Wahlenb.) Cl. Roux & Nav.-Ros.

3: On siliceous rock (16045).

Variospora flavescens (Huds.) Arup, Frödén & Søchting

9: On calcareous rock (16150).

(+) *Verrucaria baldensis* A. Massal.

9, 30: On calcareous rock (16154, 16414).

(*) *Verrucaria caerulea* DC.

27, 28: On calcareous rock (16359, 16377).

Verrucaria muralis Ach.

9, 21, 26: On calcareous rock (16151, 16260, 16355).

Verrucaria nigrescens Pers.

9, 21: On calcareous rock (16148, 16253).

Xanthoparmelia conspersa (Ehrh. ex Ach.) Hale

15, 16, 22: On siliceous rock (16193, 16333, 16271).

Xanthoparmelia pulla (Ach.) O. Blanco et al.

16: On siliceous rock (16330).

(+) *Xanthoparmelia somloënsis* (Gyeln.) Hale

3: On siliceous rock (15902).

Xanthoparmelia verruculifera (Nyl.) O. Blanco et al.

3: On siliceous rock (15901).

Xanthoria parietina (L.) Th. Fr.

2, 3, 4, 13, 22, 25: On *Quercus* sp. (16113, 15917, 15972, 16124, 16283, 16324); **5**: On *Populus alba* (15963);

6: On *Olea* sp., *Pinus* sp., *Pyrus* sp. and *Robinia pseudoacacia* (16008, 15989, 16006, 16004); **7**: On *Populus alba*, *Pyrus* sp. and *Quercus* sp. (16028, 16036, 16014); **10**: On *Fagus* sp. and *Quercus* sp. (16086, 16072); **11**:

On *Acer* sp. (16167); **12**: On *Pyrus* sp. (16107); **23**: On *Tilia* sp. (16291); **26**: On calcareous rock (16356).

(*) *Zwackhia viridis* (Ach.) Poetsch & Schied.

14: On *Tilia* sp. (16237); **17**: On *Fagus* sp. (16182).

DISCUSSION

In this study is aimed to determine the lichen flora of Karadağ Mountain located within the boundaries of the Karacabey district in Bursa province. 545 lichen samples were collected from 30 localities between 07.05.2012 - 10.09.2012. The lichen samples detected from the study area is consists of 13 orders, 28 families, 60 genera and 134 taxa in the Ascomycetes.

27 of 134 taxa is new record for Bursa, and 63 taxa is new for Karacabey districts. New records for Bursa province are *Alyxoria ochrocheila*, *Arthonia atra*, *Buellia schaeferi*, *Callome multipartita*, *Cladonia glauca*, *Cladonia squamosa* var. *subsquamosa*, *Dirina massiliensis* f. *massiliensis*, *Flavoparmelia soledians*, *Graphis elegans*, *Hypotrachyna laevigata*, *Lecanora gangaleoides*, *L. jamesii*, *L. orosthea*, *L. rugosella*, *L. subcarnea*, *Lecidea nylanderii*, *Lepraria membranacea*, *Pertusaria flavicans*, *P. hymenea*, *P. lactea*, *P. multipuncta*, *Porpidia platycarpoides*, *Pyrenula chlorospila*, *P. macrospora*, *Rhizocarpon postumum*, *Verrucaria caerulea* and *Zwackhia viridis*.

The most common species with occurrence frequency in the study area are *Lecidella elaeochroma* (25), *Physcia adscendens* (23), *Lecanora chlarotera* (21), *Parmelia sulcata* (18), *Scoliciosporum umbrinum* (16), *Lecanora carpinea* (15), *Lepraria incana* and *Xanthoria parietina* (14), *Evernia prunastri* and *Melanelixia glabratula* (13).

The percentages of epiphytic, saxicolous and terricolous lichens are 79 %, 19 % and 2%, respectively. The percentage of the epiphytic lichen species growing on broad-leaves trees is 96,5 %, on pin-leaves trees is 1,6 % and on shrubs is 1,8 %. For the saxicolous lichen species, the percentage of growing on the calcareous rocks is

38,5 %, on siliceous rocks is 61,5 %. All of the terricolous lichens are found on siliceous sand. Lichen samples collected on 24 different substrata from the study area. Maximum species number is 49 species on oak. The number of species on other substrata is 41 on siliceous rock, 37 on *Tilia* sp, 26 on calcareous rock, and 24 on *Fagus* sp.

A total of 100 taxa in Karacabey district has been recorded in previous studies. 44 of 134 taxa in this study has already been registered from Karacabey district. The number of taxa at Karacabey has reached 190 taxa together with additional records in this study. The first lichen record from Karacabey was *Hyperphyscia adglutinata* (Flörke) H. Mayrhofer & Poelt given by Pisut (1970). In another study, 77 species was recorded from Karacabey (YAZICI 1999). Additionally, *Arthopyrenia cinereopruinosa* (Schaer.) A. Massal. and *Arthopyrenia salicis* A. Massal. were given as new record for Turkey from Karacabey district (Yazıcı 2007). The distribution of 28 species from Halilbey Island in Uluabat Lake in Karacabey district are given (Oran and Öztürk 2006b).

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