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Lichens and Lichenicolous Fungi of Kızıldağ (Derebucak, Konya)

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Abstract: Herein 152 taxa of lichens and lichenicolous fungi belonging to 68 genera are reported from Kızıldağ (Derebucak district, Konya province). Of these, 149 taxa are reported from the study area for the first time and 96 taxa are new for Konya province. *Lecanora perpruinosa* Fröberg and *Toninia submexicana* de Lesd. are new records for Turkey and Asia.

Key Words: *Ascomycota*, lichens, lichenicolous fungi, biodiversity

Kızıldağ (Derebucak, Konya) Liken ve Likenikol Fungusları

Özet: Kızıldağ'dan (Derebucak, Konya) 68 cinse ait 152 takson listelenmiştir. Bu taksonlardan 149'u çalışma alanından ilk kez kaydedilmektedir. Rapor edilen taksonlardan 96'sı Konya ilinden ilk kez rapor edilmiştir. *Lecanora perpruinosa* Fröberg, *Toninia submexicana* de Lesd. taksonları Türkiye ve aynı zamanda Asya için yeni kayıttır.

Anahtar Sözcükler: *Ascomycota*, likenler, likenikol fungus, biyoçeşitlilik

Introduction

In the last 2 decades lichenological research in Turkey has improved remarkably. Nevertheless, it is obvious that the composition of lichens and lichenicolous fungi in some provinces is not well known. One of these provinces is Konya, the largest province in Turkey, located in south central Anatolia. Previously, 160 taxa of lichens and lichenicolous fungi were reported from Konya province. *Lichenostigma triseptata* Halici & D.Hawksw. was described from material collected at Kızıldağ (Halıcı & Hawksworth, 2007).

For the master's thesis authored by M.Kocakaya, [*Lichenised and Lichenicolous Fungi of Kızıldağ (Derebucak, Konya)*], numerous lichens and lichenicolous fungi were collected. Herein we provide a list of lichenised and lichenicolous fungi identified from the collections from Kızıldağ.

Materials and Methods

Lichen and lichenicolous fungus specimens were collected from 24 localities in 2007 and 2008. Specimens are stored in the herbarium of the Biology Department, Science and Arts Faculty, Erciyes University, Kayseri, Turkey. The taxa are listed in alphabetical order, followed by the collection locality numbers, and substrata. The specimens were examined with an Olympus SZ60 stereo microscope and an Olympus CHK microscope. Specimens were examined in water, 10% KOH, and Lugol's solution.

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In general, spot tests were made to determine the compounds in the lichens necessary for identification. TLC was carried out to determine the compounds in Solvent System C (Orange et al., 2001) when spot test results were unreliable. Some of the identified specimens were compared with specimens deposited in the Lichen Section of The Natural History Museum, London (BM) and MAF (Departamento de Biologia Vegetal II, Facultad de Farmacia, Universidad Complutense de Madrid). The nomenclature used follows Hafellner & Türk (2001) and other contemporary resources (e.g. Blanco et al., 2004). Abbreviations of author names are according to Kirk & Ansell (1992). The collection localities are given in Table 1.

Study Area

Kızıldağ is located 142 km south of Konya, in Derebucak district. It is an extension of the Middle Taurus range. Kızıldağ is located between 37°20 -37°22 N and 31°39 -31°42 E, and between 1300 and 2000 m a.s.l. (Figure 1). The area is bordered by Kır Mountain to the north and Kara Mountain to the south.

Kızıldağ was formed in the Upper Cretaceous. Kızıldağ ultramafics stand surrounded by old Mesozoic limestone belonging to the Taurus range. There is a considerably thin alluvium layer in the south, especially in Dumdum and Kuyuboğazı. The limestone groups in these alluviums give samples in patches. The ultramafics composed of dunite generally start at the 50th kilometre of the Beyşehir-Akseki road. The ultramafics observed in the research area, an area of nearly 10 km^2, are composed of dunite. The ultramafics in Kızıldağ are at altitudes between 1450 and 1977 m (Zedef & Döyen, 2001).

Unfortunately, there is no meteorological station in the study area. The nearest station is located in Beyşehir, which is north of the study area and at an altitude of 1144 m. According to measurements from this station, the area has a Mediterranean climate characterised by dry and warm summers, and cold and snowy winters. This is the typical first variant of the East Mediterranean climate (Akman, 1990). In Beyşehir mean annual precipitation is 447 mm, mean annual temperature is 10.9 °C, mean minimum temperature of the coldest month is –3.9 °C, and mean maximum temperature of the hottest month is 37.6 °C (Figure 2).

Table 1. Collection localities.

Locality	Date of collection	GPS co-ordinates	Locality	Altitude (m)
1	24.05.2007	37°21′N, 31°40′E	Konya Derebucak, Çamlık village, Akçeşme	1380
2	24.05.2007	37°20′N, 31°39′E	Konya Derebucak, Çamlık village, Kirazbükü	1470
3	24.05.2007	37°20′N, 31°39′E	Konya Derebucak, Çamlık village, Kirazbükü	1550
4	24.05.2007	37°21′N, 31°39′E	Konya Derebucak, Çamlık village, Üçoluk	1400
5	25.05.2007	37°21′N, 31°39′E	Konya Derebucak, Çamlık village, Üçoluk	1600
6	25.05.2007	37°21′N, 31°40′E	Konya Derebucak, Çamlık village, around summit	1750
7	25.05.2007	37°20′N, 31°39′E	Konya Derebucak, Çamlık village, Akçeşme, under Hayvanoluğu	1600
8	25.05.2007	37°20′N, 31°41′E	Konya Derebucak, Çamlık village, Kızılbel	1550
9	25.05.2007	37°20′N, 31°41′E	Konya Derebucak, Çamlık village, transmitter climbing from Kızılbel	1560
10	22.06.2007	37°21′N, 31°40′E	Konya Derebucak, Çamlık Village, transmitter climbing from Kızılbel	1635
11	22.06.2007	37°21′N, 31°40′E	Konya Derebucak, Çamlık village, around summit	1885
12	22.06.2007	37°20′N, 31°40′E	Konya Derebucak, Çamlık village, around summit	1915
13	23.06.2007	37°20′N, 31°40′E	Konya Derebucak, Çamlık village, summit, around transmitter	1960
14	23.06.2007	37°20′N, 31°40′E	Konya Derebucak, Çamlık village, around summit	1925
15	23.06.2007	37°20′N, 31°40′E	Konya Derebucak, Çamlık village, around summit, east slope	1950
16	24.06.2007	37°21′N, 31°41′E	Konya Derebucak, Çamlık village, north slope of Kızıldağ	1760
17	24.06.2007	37°21′N, 31°40′E	Konya Derebucak, Çamlık village, north slope of Kızıldağ	1650
18	29.05.2008	37° 20′N, 31°40′E	Konya Derebucak, Çamlık village, around valley	1772
19	29.05.2008	37°20′N, 31°40′E	Konya Derebucak, Çamlık village, around valley	1631
20	29.05.2008	37°20′N, 31°41′E	Konya Derebucak, Çamlık village, around river in valley	1541
21	30.05.2008	37°20′N, 31°41′E	Konya Derebucak, Çamlık village, Kızılbel	1509
22	30.05.2008	37°21′N, 31°41′E	Konya Derebucak, Çamlık village, Gevik Pass	1400
23	30.05.2008	37º20′N, 31°41′E	Antalya Akseki, Bademli village, Karanlıkdere, Maden Fountain	1625
24	30.05.2008	37º20′N, 31°41′E	Antalya Akseki, Bademli village, Karanlıkdere, Maden Fountain	1430

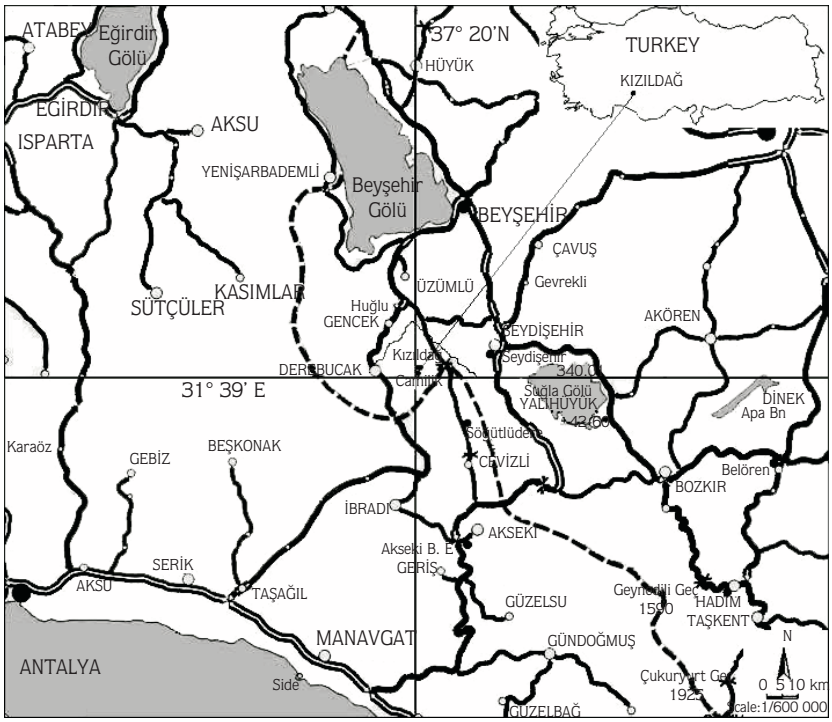
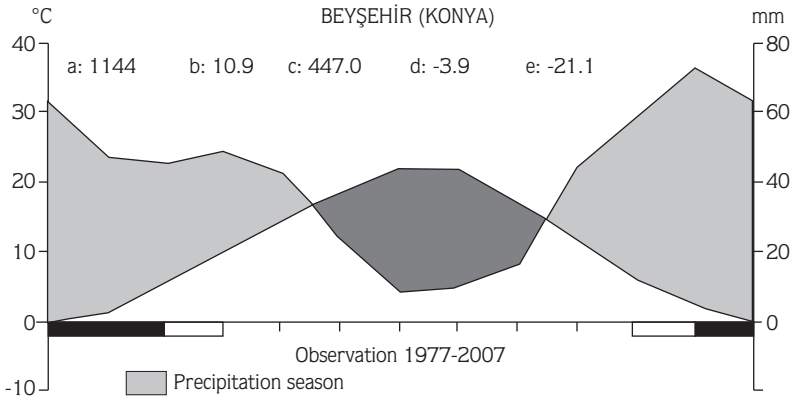


Figure 1. Map of the study area.



a) Altitude (m)
b) Average annual temperature (°C)
c) Average annual precipitation (mm)
d) Average annual temperature of the coldest month (°C)
e) The lowest temperature (°C)

Figure 2. Climatic diagram of Beyşehir (Konya).

Results

The taxa are listed in alphabetical order, followed by their collection site numbers and substrata. Lichen taxa new to Turkey are indicated by ✶, and lichenicolous fungi by ♠.

♠*Abrothallus parmeliarum* (Sommerf.) Arnold 24 on *Parmelia saxatilis* (L.) Ach.

Acarospora cervina A.Massal. 2, 14, 21 (calcareous rocks)

Acarospora fuscata (Nyl.) Arnold 15 (siliceous rocks)

Acarospora laqueata Stizenb. 7, 11, 19 (siliceous rocks)

Acarospora macrospora (Hepp) A.Massal. ex Bagl. 23 (calcareous rocks)

Anaptychia ciliaris (L.) Körb. 2, (*Juniperus* sp.) 5, 6, 8, 15 (*Pinus nigra* J.F.Arnold)

Anaptychia setifera (Mereschk.) Räsänen 20 (mosses)

♠*Arthonia epiphyscia* Nyl. 15 on *Physcia dubia* (Hoffm.) Lettau

♠*Arthonia hertelii* (Calat., Barreno & V.J.Rico) Hafellner & V.John 13 on *Aspicilia contorta* subsp. *hoffmanniana*

Arthonia lapidicola (Taylor) Branth & Rostr. 14, (siliceous rocks) 16, 21 (calcareous rocks)

♠*Arthonia varians* (Davies) Nyl. 5 on *Lecanora bicincta* and *Lecanora rupicola*

Aspicilia calcarea (L.) Mudd 2, 21 (calcareous rocks)

Aspicilia cinerea (L.) Körb. 13, 21 (calcareous rocks)

Aspicilia contorta (Hoffm.) Kremp. subsp. *hoffmanniana* S.Ekman & Fröberg 1, 2, 3, 7, (calcareous rocks) 8, 10, 13, 20, 21, 14, 15,16, 18, 19 (siliceous rocks) 23 (mosses)

Aspicilia farinosa (Flörke) Motyka 2, 5, 14, 21 (calcareous rocks)

Aspicilia intermutans (Nyl.) Arnold 8 (siliceous rocks)

Bryoria fuscescens (Gyeln.) Brodo & D.Hawksw. 13 (*Pinus nigra*)

Buellia badia (Fr.) A.Massal. 9 (lichenicolous lichen on *Lecanora rupicola*)

Caloplaca agardhiana (A.Massal.) Clauzade & Cl. Roux 14 (calcareous rocks)

Caloplaca aractina (Fr.) Häyrén 2, 3, 5, 7, 15 (siliceous rocks)

Caloplaca cerina var. *cerina* (Ehrh. ex Hedw.) Th.Fr. 1, 2,15 (*Pinus nigra*) 11 (*Juniperus* sp.)

Caloplaca cerina var. *muscorum* (A.Massal.) Jatta 13 (mosses)

Caloplaca chlorina (Flot.) Sandst. 21 (calcareous rocks)

Caloplaca crenularia (With.) J.R.Laundon 1 (siliceous rocks)

Caloplaca cretensis (Zahlbr.) Wunder 10 (siliceous rocks)

Caloplaca diphyodes (Nyl.) Jatta 10 (siliceous rocks)

Caloplaca dolomiticola (Hue) Zahlbr. 7 (calcareous rocks)

Caloplaca ferruginea (Huds.) Th.Fr. 2 (*Pinus nigra*)

Caloplaca flavorubescens (Huds.) J.R.Laundon 1, 22 (*Pinus nigra*)

Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth. 20 (calcareous rocks)

Caloplaca holocarpa (Hoffm.) A.E.Wade 14 (siliceous rocks)

Caloplaca lactea (A.Massal.) Zahlbr. 2, 3 (calcareous rocks)

Caloplaca tiroliensis Zahlbr. 19, 20 (mosses)

Caloplaca variabilis (Pers.) Müll.Arg. 2, 3, 24 (calcareous rocks)

Candelariella aurella (Hoffm.) Zahlbr. 2, 3, 8 (calcareous rocks)

Candelariella coralliza (Nyl.) H.Magn. 15 (siliceous rocks)

Candelariella vitellina (Hoffm.) Müll.Arg. 1, (siliceous rocks) 5, 7, (calcareous rocks) 16 (mosses)

Candelariella xanthostigma (Pers.) Lettau 2 (*Pinus nigra*) 15 (*Juniperus* sp.)

♠*Carbonea vitellinaria* (Nyl.) Hertel 5 on *Candelariella vitellina*

♠*Cercidospora epicarphinea* (Nyl.) Grube & Hafellner 2 on *Caloplaca aractina*

♠*Cercidospora macrospora* (Uloth) Hafellner & Nav.-Ros. 15 on *Protoparmeliopsis muralis*

♠*Cercidospora solearispora* Calatayud, Nav.-Ros. & Hafellner 17 on *Aspicilia* sp.

Cladonia fimbriata (L.) Fr. 4, (mosses) 8 (*Pinus nigra*)

Cladonia pyxidata (L.) Hoffm. 8, 11 (mosses)

Collema crispum (L.) Weber ex F.H.Wigg. 1 (calcareous rocks)

Collema polycarpon Hoffm. 2 (calcareous rocks)

Collema tenax (Sw.) Ach. 18 (mosses)

♠*Dactylospora homoclinella* (Nyl.) Hafellner 6 on *Aspicilia contorta* (Hoffm.) Kremp. subsp. *hoffmanniana* (Halıcı et al., 2007a)

Dermatocarpon intestiniforme (Körb.) Hasse 5, 7, 13, 14, 17 (siliceous rocks)

Dermatocarpon miniatum (L.) W.Mann 2, 3, 14 (calcareous rocks)

Diploschistes scruposus (Schreb.) Norman 14 (siliceous rocks)

Diplotomma alboatrum (Hoffm.) Flot. 2 (*Pinus nigra*)

Diplotomma epipolium (Ach.) Arnold 21 (calcareous rocks)

♠*Endococcus macrosporus* (Arnold) Nyl. 7, 12 on *Rhizocarpon geographicum*

♠*Endococcus rugulosus* (Borrer ex Leight.) Nyl. 5, 9, 18, 21 on *Aspicilia contorta* subsp. *hoffmanniana*

Evernia divaricata (L.) Ach. 2 (*Pinus nigra*)

Flavoparmelia caperata (L.) Hale 22 (*Pinus nigra*)

Fulgensia schistidii (Anzi) Poelt 2 (mosses)

Hypocenomyce scalaris (Ach. ex Lilj.) M.Choisy 22 (*Pinus nigra*)

Hypogymnia farinacea Zopf 2, 8, 22 (*Pinus nigra*)

Hypogymnia tubulosa (Schaer.) Hav. 2 (*Pinus nigra*)

♠*Intralichen christiansenii* (D.Hawksw.) D.Hawksw. & M.S. Cole 2 on *Caloplaca variabilis*

Lecanora agardhiana Ach. 21 (calcareous rocks)

Lecanora bicincta Ramond 5 (siliceous rocks)

Lecanora bolcana (Pollich) Poelt 5, 7, 8, 9, 13, 14, 15, 17, 19 (siliceous rocks)

Lecanora campestris (Schaer.) Hue 3 (calcareous rocks)

Lecanora cenisia Ach. 8 (siliceous rocks)

Lecanora chlarotera Nyl. 3, 5 (*Juniperus* sp.) 6, 11 (*Pinus nigra*)

Lecanora dispersa (Pers.) Röhl. 2, 7 (siliceous rocks)

Lecanora flotowiana Spreng. 10, 14 (calcareous rocks)

Lecanora gangaleoides Nyl. 5 (siliceous rocks)

Lecanora hagenii (Ach.) Ach.var. *hagenii* 2 (*Quercus* sp.)

Lecanora horiza (Ach.) Linds. 2, 15, 20 (*Pinus nigra*)

Lecanora intumescens (Rebent.) Rabenh. 2 (*Abies cilicica*)

✴ *Lecanora perpruinosa* Fröberg 2 (calcareous rocks)

Lecanora polytropa (Hoffm.) Rabenh. 8, 13 (siliceous rocks)

Lecanora rupicola (L.) Zahlbr. 5, 7, 13 (siliceous rocks)

Lecanora varia (Hoffm.) Ach. 11 (*Pinus nigra*)

Lecidea atrobrunnea (Ramond) Schaer. 14 (siliceous rocks)

Lecidea auriculata Th.Fr. 6 (siliceous rocks)

Lecidea confluens (Weber) Ach. 2 (siliceous rocks)

Lecidea fuscoatra (L.) Ach. 1, 8 (siliceous rocks)

Lecidella carpathica Körb. 1, 2, 7, 8, 9, 15, 16, 18, 20, 21 (siliceous rocks)

Lecidella elaeochroma (Ach.) M.Choisy 1, 3, 11, 12, 15, 24, (*Pinus nigra*) 2 (*Quercus* sp.)

Lecidella stigmatea (Ach.) Hertel & Leuckert 2, 7, 11, 23 (siliceous rocks) 12, 14, 15

(calcareous rocks)

Letharia vulpina (L.) Hue 6, 8 (*Pinus nigra*) 23 (*Juniperus* sp.)

♠*Lichenoconium pyxidatae* (Oudem.) Petr. & Syd. 4 on *Cladonia pyxidata*

♠*Lichenodiplis lichenicola* Dyko & D.Hawksw. (Halıcı, 2008)

♠*Lichenostigma triseptata* Halici & D.Hawksw. 3 on *Aspicilia contorta* subsp. *hoffmanniana* (Halıcı & Hawksworth, 2007)

Lobothallia alphoplaca (Wahlenb.) Hafellner 1, 5, 9 (siliceous rocks) 17 (calcareous rocks)

Lobothallia radiosa (Hoffm.) Hafellner 2, 3, 17 (calcareous rocks) 12, 16, 24 (siliceous rocks)

Megaspora verrucosa (Ach.) Hafellner & V.Wirth 2. 13, 17 (mosses)

Melanohalea exasperatula (Nyl.) O.Blanco et al. 1, 2 (*Pinus nigra*)

Miriquidica deusta (Stenh.) Hertel & Rambold 8 (siliceous rocks)

♠*Muellerella lichenicola* (Sommerf.) D.Hawksw. 3, 5, 21, 24 on *Caloplaca aractina, Aspicilia contorta* subsp. *hoffmanniana* and *Aspicilia calcarea*

♠*Muellerella pygmaea* (Körb.) D.Hawksw. 1, 3, 10, 21 on *Aspicilia contorta* subsp. *hoffmanniana, Lecidea fuscoatra, Lecanora agardhiana* and *Aspicilia calcarea*

♠*Muellerella ventosicola* (Mudd) D.Hawksw. 9 on *Rhizocarpon geminatum*

Mycobilimbia lurida (Ach.) Hafellner & Türk 2 (soil)

Ochrolechia pallescens (L.) A.Massal. 2 (*Cedrus libani*)

Ochrolechia turneri (Sm.) Hasselrot 8 (*Pinus nigra*)

Parmelia saxatilis (L.) Ach. 1, 2, 8, 22 (*Pinus nigra*)

Parmelina pastillifera (Harm.) Hale 2 (*Pinus nigra*)

Pertusaria coronata (Ach.) Th.Fr. 8 (*Pinus nigra*)

Pertusaria hemisphaerica (Flörke) Erichsen 2 (*Pinus nigra*)

Pertusaria leioplaca DC. 2 (*Juniperus* sp.)

Phaeorrhiza nimbosa (Fr.) H.Mayrhofer & Poelt 19 (soil)

Physcia adscendens (Th.Fr.) H.Olivier 11 (*Pinus nigra*)

Physcia aipolia (Ehrh. ex Humb.) Fürnr. 2, 6 (*Juniperus sp.*) 15 (*Quercus* sp.)

Physcia dubia (Hoffm.) Lettau 8, 11, 13 (calcareous rocks) 12, 18 (siliceous rocks)

Physcia magnussoni Frey 15 (siliceous rocks)

Physcia semipinnata (J.F.Gmel.) Moberg 2 (*Pinus nigra*)

Physcia stellaris (L.) Nyl. 5, 7, 19, 24 (*Pinus nigra*)

Physcia tenella (Scop.) DC. 24 (*Pinus nigra*)

Physconia distorta (With.) J.R.Laundon 22 (*Pinus nigra*)

Physconia muscigena (Ach.) Poelt 19, 22 (mosses)

Placidium rufescens (Ach.) A.Massal. 5 (soil)

Placidium squamulosum (Ach.) Breuss 10 (calcareous rocks)

Placynthium nigrum (Huds.) Gray 2 (calcareous rocks)

Platismatia glauca (L.) W.L.Culb. & C.F.Culb. 8 (*Pinus nigra*)

Pleurosticta acetabulum (Neck.) Elix & Lumbsch 2 (*Pinus nigra*)

♠*Polycoccum aksoyi* Halici & Atienza 16 on *Aspicilia cinerea* (Kocakaya & Aksoy, 2008)

Polysporina cyclocarpa (Anzi) Vezda 3 (calcareous rocks)

Porpidia macrocarpa (DC.) Hertel & A.J.Schwab 10, 14 (siliceous rocks)

Protoparmeliopsis muralis (Schreb.) M.Choisy 2, 14, 15, 23 (siliceous rocks)

Pseudevernia furfuracea var. *furfuracea* (L.) Zopf 1, 8, 11, 12, 21 (*Pinus nigra*) 2 (*Abies cilicica*)

Psora decipiens (Hedw.) Hoffm. 13 (soil)

Ramalina farinacea (L.) Ach. 24 (*Pinus nigra*)

Rhizocarpon geminatum Körb. 9, 10, 18, 19 (siliceous rocks)

Rhizocarpon geographicum (L.) DC. 1, 2, 3, 5, 7, 8, 9, 11, 12, 14, 15, 19 (siliceous rocks)

Rhizocarpon lecanorinum Anders 5, 18 (siliceous rocks)

Rhizocarpon viridiatrum (Wulfen) Körb. 3, 19, 20 (siliceous rocks)

Rhizoplaca chrysoleuca (Sm.) Zopf 13 (siliceous rocks)

Rhizoplaca peltata (Ramond) Leuckert & Poelt 13 (siliceous rocks)

Rimularia insularis (Nyl.) Rambold & Hertel 5 lichenicolous lichen on *Lecanora rupicola*

Rinodina calcarea (Arnold) Arnold 2 (calcareous rocks)

Rinodina immersa (Körb.) Arnold 2, 14 (calcareous rocks)

Rinodina pyrina (Ach.) Arnold 2 (*Pinus nigra*)

Rinodina rinodinoides (Anzi) H.Mayrhofer & Scheid. 13 (calcareous rocks)

Rinodina sophodes (Ach.) A.Massal. 3 (*Pinus nigra*)

♠*Scoliciosporum intrusum* (Th.Fr.) Hafellner 8 on *Lecanora cenisia*

Tephromela atra (Huds.) Hafellner 14 (siliceous rocks)

♠*Toninia subfuscae* (Arnold) Timdal 6 on *Lecanora chlarotera*

✴ *Toninia submexicana* de Lesd. 13 (mosses)

Umbilicaria leiocarpa DC. 1 (siliceous rocks)

Verrucaria calciseda DC. 2 (calcareous rocks)

Verrucaria fuscella (Turner) Winch 1, 7 (lichenicolous lichen on *Aspicilia contorta* subsp. *hoffmanniana*

Verrucaria lecideoides (A.Massal.) Trevis. 19, 21, 24 (calcareous rocks)

Verrucaria nigrescens Pers. 21 (calcareous rocks)

♠*Weddellomyces macrosporus* D.Hawksw., Renob. & Coppins (Halıcı et al., 2007b)

Xanthoparmelia pulla (Ach.) O.Blanco, A.Crespo, Elix, D.Hawksw. & Lumbsch 5, 14 (siliceous rocks)

Xanthoria elegans (Link) Th.Fr. 14 (siliceous rocks)

♠*Zwackhiomyces sphinctrinoides* (Zwackh) Grube & Hafellner 1 on *Aspicilia contorta* subsp. *hoffmanniana*

Discussion

The aim of the present study was to contribute to the knowledge of lichen and lichenicolous fungi composition in Turkey. Two species are new to Turkey and 8 species are reported from Turkey for the second time: *Arthonia epiphyscia* (Hafellner & John, 2006), *Caloplaca cretensis* (Halıcı & Cansaran Duman, 2007), *Cercidospora epicarphinea* (Halıcı et al., 2006), *C. solearispora* (Halıcı et al., 2007b), *Muellerella ventosicola* (Halıcı, 2008), *Polycoccum aksoyi* (Halıcı et al., 2007c), *Rinodina rinodinoides* (Oran & Öztürk, 2007), and *Scoliciosporum intrusum* (Halıcı et al., 2007a).

Lecanora perpruinosa, a new record for Turkey and Asia, was collected on exposed calcareous rocks. This species was previously known from Europe and North America (Sliwa, 2007). It is also reported for the first time from Asia. *Toninia submexicana*, a species previously known from only America (Timdal, 1991) was collected from mosses on exposed calcareous rocks.

Epiphytic lichens on the bark of trees, such as *Abies cilicica* Carr., *Cedrus libani* A.Rich, *Pinus nigra*, *Juniperus* spp., and *Quercus* spp. constitute 26 (31%) of the above taxa. The most common epiphytic lichen species in the study area are *Lecidella eleaochroma*, *Pseudevernia furfuracea*, and *Parmelia saxatilis*. All these species are common in the northern hemisphere (Purvis et al., 1992; Wirth, 1995).

As siliceous rocks are pre-dominant at Kızıldağ, 34% of the lichen species prefer this substratum. The most common species on siliceous rocks are *Rhizocarpon geographicum*, *Lecidella carpathica*, and *Aspicilia contorta* subsp. *hoffmanniana*. One of the most conspicuous and widespread lichen species growing on siliceous rocks at Kızıldağ is *Acarospora laqueata*, a species that normally grows on calcareous rocks and has a wide distribution range in southern Europe, Asia, and North Africa (Wasser & Nevo, 2005). Lime-loving lichen species, such as *Aspicilia farinosa*, *Candelariella aurella*, and *Acarospora cervina*, have more narrow distribution ranges in the study area, as calcareous rocks are not as common as siliceous rocks. *Physcia dubia*, a species normally found on non-calcareous rocks (Coppins, 1992), is also common on calcareous rocks in the study area.

Lichenicolous lichens in the study area are *Rimularia insularis* and *Buellia badia*, which were observed on *Lecanora rupicola* and *Verrucaria fuscella*, and begin their life cycles on other crustose lichens on calcareous rocks.

In all, 23 species of lichenicolous fungi were identified. The greatest diversity of lichenicolous fungi is seen on mature lichen communities in natural undisturbed habitats (Lawrey & Diederich, 2003). Thus, the rich biodiversity of lichenicolous fungi in the study area indicates that it is a natural undisturbed habitat. The crustose lichen genera *Aspicilia*, *Caloplaca*, *Lecanora*, and *Rhizocarpon* harbour most of the lichenicolous species, as they are predominant in the study area. *Aspicilia contorta* subsp. *hoffmanniana* hosts 6 lichenicolous fungi in the study area: *Arthonia hertelii, Endococcus rugulosus, Lichenostigma triseptata, Muellerella lichenicola, Muellerella pygmaea*, and *Zwackhiomyces sphinctrinoides*.

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