

**Lichens from the
Batman, Mardin, Osmaniye, and Sivas regions of Turkey**

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Abstract—A total of 205 lichen taxa (198 species, 2 subspecies, 4 varieties and 1 forma) and one lichenicolous fungus were identified from 25 different localities in Batman, Mardin, Osmaniye and Sivas regions of Turkey. *Cladonia metacorallifera*, *Caloplaca flavocitrina*, *C. variabilis* f. *ocellulata*, *Phaeophyscia chloantha* and *Usnea wasmuthii* are new to Turkey. 130 species and one lichenicolous fungus (*Lichenodiplis lecanorae*) are new records from Osmaniye. Moreover, 50 taxa are reported as new from Mardin, 35 from Sivas, and 23 from Batman. For every each taxon, the habitat pattern and distribution data are presented.

Keywords—*Ascomycetes*, flora, biota

Introduction

Compared to other countries, not many lichen studies have been conducted in Turkey previous to this decade, so that the lichen biota of Turkey remains poorly known. Recently, however, there has been a substantial increase in the number of lichenological papers for Turkey (Halıcı & Aksoy 2006, Yazıcı 2006, Yazıcı & Aslan 2006, 2007, Yazıcı & Aptroot 2007, Yazıcı et al. 2005). Although previous lichenological research (Breuss and John 2004, John 2002, John & Türk 2006, John et al. 2000, Hafellner & John 2006, Nimis & John 1998, Steiner 1921) has been reported for Batman,

Osmaniye and Sivas, no lichen records have thus far been reported for Mardin (Midyat). Additionally, several regions in Batman, Osmaniye, and Sivas remain still unexplored. This present paper provides information on the lichen biota in the above regions of Turkey.

Material and methods

The lichen samples were collected in 25 different localities from 15 August 2006 to 09 February 2007 (Table 1). The study area consists of four regions of Turkey: Batman, Mardin, Osmaniye and Sivas (Figure 1.) Air dried lichen samples were observed and studied using a stereo and a light microscope. Secondary metabolites were identified by usual spot tests (Clauzade and Roux 1985, Clerc 1997, Giralt 2001, Halonen et al. 1988, Mayrhofer 1988, Poelt 1974, Poelt & Vězda 1981, Purvis et al. 1992, Wirth 1995). The herbarium specimens studied were deposited in the herbarium of the Biology Department, Faculty of Sciences and Arts, Karadeniz Technical University, Turkey.

Sivas and Batman have a continental climates in which the summer seasons are hot and dry while winters are cold and snowy. Steppe vegetation is dominant in plateaux and hills. Temperatures range from a winter low of -34.6°C to a summer high of $+38.3^{\circ}\text{C}$. The mean annual humidity is 80.0% while the lowest is 55.2%. Mean annual rainfall is 420 mm (Akman 1990).

Osmaniye has a typical Mediterranean climate. Forests and shrub fields are quite large (42%). Lowlands are seen culture plants, macchia between 500–600 m and coniferous trees in upper fields. Osmaniye is bordered by the Toros mountains in the north and north–west, and the Amanos mountains in the east and south–east (Baytop et al. 1963).

Mardin (Midyat) is influenced by both mediterranean and continental climates. Mardin has rolling fields and mountains are not very high. *Quercus* communities grow in high fields of the mountains (Baytop et al. 1963). The highest precipitation is 115.8 mm in March. The lowest temperature is -2.6°C in February while the highest 42.5°C in July (Akman 1990).

Batman forests are composed of *Quercus*, *Juglans*, *Populus*, *Platanus*, *Pistacia*, *Pyrus* and *Prunus* (Baytop et al. 1963). The summer mean temperature is 28°C , and the winter mean is 3.9°C in winters. Mean annual precipitation is 713.4 mm (Akman 1990).

Results

The taxonomic survey of Batman, Mardin, Osmaniye and Sivas yielded 205 lichen taxa (198 species, 2 subspecies, 4 varieties, 1 forma) representing 70 genera in 31 families in the *Ascomycota*. Additionally, one lichenicolous fungus was identified. Of these, 146 taxa were collected in Osmaniye, 50 in Mardin, 39 in Sivas, and 24 in Batman. New records per province include 130 lichens and the lichenicolous fungus (*Lichenodiplis lecanorae*) for Osmaniye, 50 lichens for Mardin, 35 lichens for Sivas, and 23 lichens for Batman. The lichen taxa are listed alphabetically. Asterisks indicate new records for Turkey while "BA" designates Batman, "MA" Mardin, "OS" Osmaniye and "SI" Sivas.

Acarospora badiofusca (Nyl.) Th. Fr., Locality 24, on calcareous rock[MA].

Acarospora cervina A. Massal., Locality 9, 15, 23, 24, 25, on calcareous rock[BA, MA, OS, SI].

Acarospora fuscata (Nyl.) Arnold, Locality 24, 25, on calcareous rock[BA, MA].

Acarospora umbilicata Bagl., Locality 7, on siliceous rock[BA].

Acarospora veronensis A. Massal., Locality 6, on siliceous rock[MA].

Anaptychia ciliaris (L.) Körb., Locality 4, 7, 9, on *Pinus* sp., *Picea orientalis*[OS].

Anaptychia crinalis (Schleich.) Vězda, Locality 4, on *Pinus* sp. [OS].

Anaptychia setifera (Mereschk.) Räsänen, Locality 9, on *Picea orientalis*[OS].

Aspicilia calcarea (L.) Mudd, Locality 1, 7, 24, 25, on calcareous rock [BA, MA, OS].

Aspicilia cinerea (L.) Körb., Locality 7, on siliceous rock[OS].

Aspicilia contorta (Hoffm.) Kremp. subsp. *contorta*, Locality 24, on calcareous rock[MA].

Aspicilia contorta (Hoffm.) Kremp. subsp. *hoffmanniana* S. Ekman & Fröberg, Locality 24, 25, on calcareous rock[BA, MA].

Aspicilia desertorum (Kremp.) Mereschk, Locality 24, on calcareous rock[MA].

Bryoria fuscescens (Gyeln.) Brodo & D. Hawksw., Locality 9, on *Pinus* sp. [OS].

Caloplaca cerina (Ehrh. ex Hedw.) Th. Fr., Locality 1, 5, 25, on *Carpinus* sp., *Prunus* sp.[BA].

Caloplaca cerina (Ehrh. ex Hedw.) Th. Fr. var. *chloroleuca* (Sm.) Th. Fr., Locality 10, on mosses[OS].

Caloplaca citrina (Hoffm.) Th. Fr., Locality 1, on calcareous rock[OS].

- Caloplaca chalybaea* (Fr.) Müll. Arg., Locality 20, 24, on limestone[MA].
- Caloplaca crenularia* (With.) J.R. Laundon, Locality 17, 22, on siliceous rock[MA, SI].
- Caloplaca crenulatella* (Nyl.) H. Olivier, Locality 24, on limestone[MA].
- Caloplaca dalmatica* (A. Massal.) H. Olivier, Locality 24, 25, on limestone[BA, MA].
- Caloplaca decipiens* (Arnold) Blomb. & Forssell, Locality 11, 12, 15, 18, 24 on calcareous rock, limestone[MA, SI].
- Caloplaca erythocarpa* (Pers.) Zwackh, Locality 24, on calcareous rock[MA].
- **Caloplaca flavocitrina* (Nyl.) H. Olivier, Locality 1, on stone[OS].
- Caloplaca flavovirescens* (Wulfen) Dalla Torre & Sarnth., Locality 17, on siliceous rock[SI].
- Caloplaca haematites* (Chaub. ex St.-Amans) Zwackh, Locality 6, on *Prunus* sp. [OS].
- Caloplaca holocarpa* (Ach.) A.E. Wade, Locality 4, 8, 12, 15, on *Carpinus* sp., *Quercus* sp. [OS, SI].
- Caloplaca lactea* (A. Massal.) Zahlbr., Locality 15, 24, 25, on limestone, calcareous rock[BA, MA].
- Caloplaca lobulata* (Flörke) Hellb., Locality 18, 19, on *Prunus* sp., *Populus* sp. [SI].
- Caloplaca persica* (J. Steiner) M. Steiner & Poelt, Locality 18, on *Populus* sp. [SI].
- Caloplaca polycarpa* (A. Massal.) Zahlbr., Locality 1, on calcareous rock[OS].
- Caloplaca saxicola* (Hoffm.) Nordin, Locality 12, 14, 15, 24, on calcareous rock[MA, SI].
- Caloplaca teicholyta* (Ach.) J. Steiner, Locality 24, on calcareous rock, limestone[MA].
- Caloplaca variabilis* (Pers.) Müll. Arg., Locality 15, 24, 25, on limestone[BA, MA, SI].
- **Caloplaca variabilis* (Pers.) Müll. Arg. f. *ocellulata* (Ach.) Boistel, Locality 11, 24, 25, on limestone[BA, MA].
- Candelariella aurella* (Hoffm.) Zahlbr., Locality 1, 7, 12, 13, 14, 15, 18, 20, 24, 25, on *Pyrus* sp., *Salix* sp., *Populus* sp., calcareous rock[BA, MA, OS].
- Candelariella vitellina* (Hoffm.) Müll. Arg., Locality 12, 14, 15, 24, on siliceous rock[MA].
- Chrysothrix candelaris* (L.) J.R. Laundon, Locality 2, on *Quercus* sp. [OS].
- Chrysothrix chlorina* (Ach.) J.R. Laundon, Locality 7, 8, on siliceous rock[OS].
- Cladonia chlorophaea* (Flörke ex Sommerf.) Spreng., Locality 5, on decayed bark of *Pinus* sp. [OS].

- Cladonia coniocraea* (Flörke) Spreng., Locality 7, on decayed bark of *Pinus* sp. [OS].
- Cladonia fimbriata* (L.) Fr., Locality 7, on decayed bark of *Pinus* sp. [OS].
- Cladonia furcata* (Huds.) Schrad., Locality 6, on soil[OS].
- Cladonia macilenta* Hoffm., Locality 7, on mosses on *Carpinus* sp. [OS].
- **Cladonia metacorallifera* Asahina, Locality 5, on decayed bark of *Pinus* sp.[OS].
- Cladonia ochrochlora* Flörke, Locality 5, on mosses[OS].
- Cladonia pocillum* (Ach.) O.J. Rich., Locality 7, 10 on mosses, soil[OS].
- Cladonia portentosa* (Dufour) Coem., Locality 10, on soil[OS].
- Cladonia pyxidata* (L.) Hoffm., Locality 5, 7, on mosses, soil
- Cladonia rangiformis* Hoffm., Locality 1, 2, 3, 5, 8, 10, on mosses, soil[OS].
- Cladonia subcervicornis* (Vain.) Kernst., Locality 9, on mosses[OS].
- Cladonia subulata* (L.) Weber ex F.H. Wigg., Locality 4, on soil[OS].
- Collema auriforme* (With.) Coppins & J.R. Laundon, Locality 21, 25, on mosses[BA, MA].
- Collema flaccidum* (Ach.) Ach., Locality 8, on siliceous rock[OS].
- Collema subflaccidum* Degel., Locality 2, on *Carpinus* sp. [OS].
- Collema tenax* (Sw.) Ach., Locality 1, 2, 4, 14, 17, 24, 25, on mosses, calcareous rock, stone[BA, MA, OS].
- Dermatocarpon miniatum* (L.) W. Mann, Locality 1, 6, on calcareous rock[MA].
- Dimeleana oreina* (Ach.) Norman, Locality 9, on siliceous rock[OS].
- Diploschistes muscorum* (Scop.) R. Sant., Locality 7, on mosses[OS].
- Diploschistes ocellatus* (Vill.) Norman, Locality 3, on calcareous rock[OS].
- Diploschistes scruposus* (Schreb.) Norman, Locality 13, on siliceous rock[SI].
- Diplotomma epipolium* (Ach.) Arnold, Locality 24, on calcareous rock[MA].
- Evernia divaricata* (L.) Ach., Locality 9, on *Pinus* sp. [OS].
- Evernia prunastri* (L.) Ach., Locality 9, on *Pinus* sp. [OS].
- Farnoldia micropsis* (A. Massal.) Hertel, Locality 5, on calcareous rock[OS].
- Flavoparmelia caperata* (L.) Hale, Locality 2, 7, 4, 18, on *Quercus* sp. calcareous rock, *Prunus* sp. [SI].
- Fulgensia fulgens* (Sw.) Elenkin, Locality 2, 12, 14, 23, on calcareous rock, soil[MA, OS, SI].
- Fuscopannaria* cf. *praetermissa* (Nyl.) P.M.Jørg., Locality 10, on siliceous rock[OS].
- Graphis scripta* (L.) Ach., Locality 18,19, on *Populus* sp. [SI].
- Hypogymnia physodes* (L.) Nyl., Locality 3, 7, on *Pinus* sp. [OS].
- Hypogymnia tubulosa* (Schaer.) Hav., Locality 4, on *Pinus* sp. [OS].

- Immersaria athrocarpa* (Ach.) Rambold & Pietschm., Locality 5,10, on siliceous rock[OS].
- Lecania cyrtella* (Ach.) Th.Fr., Locality 5, on *Carpinus* sp. [OS].
- Lecania erysibe* (Ach.) Mudd, Locality 12, on calcareous rock[SI].
- Lecania naegelii* (Hepp) Diederich & van den Boom, Locality 6, on *Quercus* sp. [OS].
- Lecanora albescens* (Hoffm.) Branth & Rostr., Locality 25, on calcareous rock[BA].
- Lecanora argentata* (Ach.) Malme, Locality 7, *Quercus* sp., *Carpinus* sp.[OS].
- Lecanora bolcana* (Pollich) Poelt, Locality 24, on mosses[MA].
- Lecanora carpinea* (L.) Vain., Locality 6, 7, 8, on decayed bark of *Quercus* sp. [OS].
- Lecanora cenisia* Ach., Locality 1, on siliceous rock[OS].
- Lecanora crenulata* (Dicks.) Hook., Locality 12, 24, on calcareous rock[MA].
- Lecanora dispersa* (Pers.) Sommerf., Locality 4, 24, 25, on calcareous rock, *Carpinus* sp. [BA, MA, OS].
- Lecanora hagenii* (Ach.) Ach. Locality 6, on *Prunus* sp. [OS].
- Lecanora intumescens* (Rebent.) Rabenh., Locality 9, on *Quercus* sp., *Carpinus* sp. [OS].
- Lecanora rupicola* (L.) Zahlbr., Locality 5, on siliceous rock[OS].
- Lecanora strobilina* (Spreng.) Kieff., Locality 6, on *Quercus* sp.[OS].
- Lecidea fuscoatra* (L.) Ach., Locality 5, on siliceous rock[OS].
- Lecidea lithophila* (Ach.) Ach., Locality 5, on siliceous rock[OS].
- Lecidella carpathica* Körb., Locality 5, 7,10, on calcareous rock[OS].
- Lecidella elaeochroma* (Ach.) M. Choisy, Locality 1, 5, 6, on *Fagus* sp., *Carpinus* sp., *Pyrus* sp.
- Lecidella euphorea* (Flörke) Hertel, Locality 5, 6, 8, on *Carpinus* sp., *Quercus* sp. [OS].
- Lecidella patavina* (A. Massal.) Knoph & Leuckert, Locality 5, on granite rock[OS].
- Lecidella stigmatea* (Ach.) Hertel & Leuckert, Locality 5, on calcareous rock[OS].
- Lepraria caesioalba* (de Lesd.) J.R. Laundon, Locality 5, on silicolous rock, mosses[OS].
- Lepraria incana* (L.) Ach., Locality 2, 5, 7, on soil, siliceous rock, *Pinus* sp. [OS].
- Leptogium lichenoides* (L.) Zahlbr., Locality 2, 7, on mosses, soil[OS].
- Lichenodiplis lecanorae* (Vouaux) Dyko & D. Hawksw., Locality 6, on *Caloplaca* sp. [SI].
- Lobaria pulmonaria* (L.) Hoffm., Locality 9, on *Pinus* sp. [OS].
- Lobaria scrobiculata* (Scop.) P. Gaertn., Locality 9, on *Pinus* sp. [OS].

- Lobothallia praeradiosa* (Nyl.) Hafellner, Locality 14, 15, 25, on calcareous rock[BA, OS, SI].
- Lobothallia radiosa* (Hoffm.) Hafellner, Locality 2, 24, on calcareous rock[MA].
- Melanelia glabra* (Schaer.) Essl., Locality 9, on *Carpinus* sp.[OS].
- Melanelixia fuliginosa* (Fr. ex Duby) O. Blanco et al. subsp. *glabratula* (Lamy) J.R. Laundon, Locality 6, 7, on *Pinus* sp., *Quercus* sp. [OS].
- Melanohalea exasperata* (De Not.) O. Blanco et al., Locality 9, on *Pinus* sp., *Prunus* sp., *Carpinus* sp.[OS].
- Neofuscelia verruculifera* (Nyl.) Essl., Locality 8, on siliceous rock[OS].
- Nephroma parile* (Ach.) Ach., Locality 9, on mosses[OS].
- Nephroma resupinatum* (L.) Ach., Locality 9, on mosses[OS].
- Ochrolechia parella* (L.) A. Massal., Locality 7, on *Quercus* sp.
- Ochrolechia tartarea* (L.) A. Massal., Locality 5, on siliceous rock[OS].
- Opegrapha atra* Pers., Locality 8, 19, on *Quercus* sp.[OS, SI].
- Opegrapha varia* Pers., Locality 3, on *Quercus* sp.[OS].
- Pannaria leucophaea* (Vahl) P.M. Jørg., Locality 3, 4, 5, on calcareous rock, soil[OS].
- Pannaria pezizoides* (Weber ex F.H. Wigg.) Trevis., Locality 5, on soil[OS].
- Parmelia submontana* Nád. ex Hale, Locality 7, on *Quercus* sp. [OS].
- Parmelia sulcata* Taylor, Locality 8, 9, 19, on *Carpinus* sp., *Pinus* sp., mosses, *Carpinus* sp. [OS, SI].
- Parmelina quercina* (Willd.) Hale, Locality 6, 7, on *Pinus* sp., decayed bark of *Quercus* sp. [OS].
- Parmelina tiliacea* (Hoffm.) Hale, Locality 9, on siliceous rock[OS].
- Parmotrema perlatum* (Huds) M. Choisy, Locality 7, on *Carpinus* sp.
- Peltigera canina* (L.) Willd., Locality 7, on mosses
- Peltigera horizontalis* (Huds.) Baumg., Locality 9, on soil[OS].
- Peltigera polydactylon* (Neck.) Hoffm., Locality 6, on mosses[OS].
- Peltigera praetextata* (Flörke ex Sommerf.) Vain., Locality 4, 7, 8, on mosses, soil[OS].
- Peltigera rufescens* (Weiss) Humb., Locality 8, on mosses[OS].
- Pertusaria albescens* (Huds.) M. Choisy & Werner, Locality 6, on *Quercus* sp. [OS].
- Pertusaria amara* Ach.) Nyl. var. *amara*, Locality 7, 9, on *Quercus* sp., *Carpinus* sp., *Fagus* sp. [OS].
- Pertusaria coccodes* (Ach.) Nyl., Locality 7, on *Quercus* sp. [OS].
- Pertusaria hemisphaerica* (Flörke) Erichsen, Locality 6, on *Quercus* sp. [OS].
- Pertusaria lactea* L.) Arnold, Locality 7, on *Carpinus* sp. [OS].
- Pertusaria pertusa* (Weigel) Tuck., Locality 7, *Carpinus* sp. [OS].

- **Phaeophyscia chloantha* (Ach.) Moberg, Locality 19, on *Salix* sp. [SI].
Phaeophyscia nigricans (Flörke) Moberg, Locality 13, on *Salix* sp. [SI].
Phaeophyscia orbicularis (Neck.) Moberg, Locality 4, 8, 13, 19, on *Pinus* sp., *Carpinus* sp., *Salix* sp., *Populus* sp. [SI].
Physcia aipolia (Ehrh. ex Humb.) Fűrnr., Locality 1, 8, 12, 19, on *Carpinus* sp., *Salix* sp., *Pyrus* sp. [OS, SI].
Physcia adscendens (Th. Fr.) H. Olivier, Locality 8, 12, on *Salix* sp., *Prunus* sp. [OS, SI].
Physcia caesia (Hoffm.) Fűrnr., Locality 12, 23, on calcareous rock[MA, SI].
Physcia dimidiata (Arnold) Nyl., Locality 24, on siliceous rock[MA].
Physcia dubia (Hoffm.) Lettau, Locality 6, on stone[OS].
Physcia stellaris (L.) Nyl., Locality 6, 8, 9, on *Pyrus* sp., *Prunus* sp. [OS].
Physcia tenella (Scop.) DC., Locality 8, 9, 12, on *Salix* sp., *Pyrus* sp., *Prunus* sp. [SI].
Physconia distorta (With.) J.R.Laundon, Locality 4, 13, on *Populus* sp., *Quercus* sp. [OS, SI].
Physconia grisea (Lam.) Poelt, Locality 3, on *Carpinus* sp. [OS].
Placidium rufescens (Ach.) A. Massal., Locality 15, on soil[SI].
Placynthium nigrum (Huds.) Gray, Locality 1, 21, on cement, stone[MA, OS].
Pleurosticta acetabulum (Neck.) Elix & Lumbsch, Locality 4, 5, 9, on *Prunus* sp., *Pinus* sp.[OS].
Porpidia macrocarpa (DC.) Hertel & A.J. Schwab, Locality 3, on siliceous rock[OS].
Porpidia superba (Körb.) Hertel & Knoph, Locality 3, on calcareous rock [OS].
Protoblastenia incrustans (DC.) J. Steiner, Locality 22, 25, on limestone [BA, MA].
Protoblastenia rupestris (Scop.) J. Steiner, Locality 22, on limestone[MA].
Protoparmeliopsis muralis (Schreb.) M. Choisy, Locality 1, 24, on calcareous rock, mosses[MA].
Pseudevernia fufuracea (L.) Zopf var. *ceratea* (Ach.) D. Hawksw., Locality 10, on *Pinus* sp.[OS].
Pseudevernia furfuracea (L.) Zopf var. *furfuracea*, Locality 7, 9, 10, on *Pinus* sp. [OS].
Psora decipiens (Hedw.) Hoffm., Locality 2, 12, on soil[OS].
Pyrenula nitida (Weigel) Ach., Locality 9, on *Carpinus* sp.[OS].
Ramalina calicaris (L.) Fr., Locality 4, 7, 9, on *Fagus* sp., *Pinus* sp.[OS].
Ramalina farinacea (L.) Ach., Locality 5, 7, 9, on *Pinus* sp., *Picea orientalis*.
Ramalina fastigiata (Pers.) Ach., Locality 9, on *Carpinus* sp.[OS].
Ramalina fraxinea (L.) Ach., Locality 8, on *Pinus* sp.[OS].

- Ramalina pollinaria* (Westr.) Ach., Locality 6, on *Quercus* sp.[OS].
- Rhizocarpon geminatum* Körb., Locality 5, on siliceous rock[OS].
- Rhizocarpon geographicum* (L.) DC., Locality 5, on siliceous rock[OS]
- Rhizocarpon reductum* Th. Fr., Locality 5, on siliceous rock[OS]
- Rhizocarpon umbilicatum* (Ramond) Flagey, Locality 24, 25, on calcareous rock[BA, MA].
- Rinodina bischoffii* (Hepp) A. Massal., Locality 2, 15, 23, 25, on calcareous rock[BA, MA, OS, SI].
- Rinodina calcarea* (Arnold) Arnold, Locality 12, 15, 24, on calcareous rock[MA, SI].
- Rinodina guzzinii* Jatta, Locality 15, 25, on calcareous rock[BA, SI].
- Rinodina immersa* (Körb.) Arnold, Locality 15, on limestone[SI].
- Rinodina lecanorina* (A. Massal.) A. Massal., Locality 24, on calcareous rock[MA].
- Rinodina luridescens* (Anzi) Arnold, Locality 10, on siliceous rock[OS].
- Rinodina pyrina* (Ach.) Arnold, Locality 1, 18, on *Pyrus* sp, *Populus* sp
- Rinodina sophodes* (Ach.) A. Massal., Locality 1, on *Prunus* sp. [OS].
- Sarcogyne regularis* Körb., Locality 24, calcareous rock[MA].
- Sarcogyne clavus* (DC.) Kremp., Locality 24, on granite rock[MA].
- Schaereria fuscocinerea* (Nyl.) Clauzade & Cl. Roux, Locality 6, on siliceous rock[OS].
- Squamarina cartilaginea* (With.) P. James, Locality 3, 5, on soil, on calcareous rock[OS].
- Squamarina lentigera* (Weber) Poelt, Locality 3, on mosses[OS].
- Staurothele areolata* (Ach.) Lettau, Locality 22, on granite rock[MA].
- Staurothele caesia* (Arnold) Arnold, Locality 24, on limestone[MA].
- Tephromela atra* (Huds.) Hafellner, Locality 2, on siliceous rock[OS].
- Toninia sedifolia* (Scop.) Timdal, Locality 2, 12, on soil[OS].
- Toninia tristis* (Th. Fr.) Th. Fr., Locality 25, on calcareous rock[BA].
- Tornabea scutellifera* (With.) J.R. Laundon, Locality 3, 7, on *Pinus* sp.
- Trapelia coarctata* (Turner ex Sm.) M. Choisy, Locality 20, on calcareous rock[MA].
- Tuckermannopsis chlorophylla* (Willd.) Hale, Locality 7, on *Carpinus* sp. [OS].
- Xanthoparmelia conspersa* (Ehrh. ex Ach.) Hale, Locality 1, on siliceous rock[OS].
- Xanthoparmelia pulla* (Ach.) O. Blanco et al., Locality 8, 9, on siliceous rock, *Carpinus* sp.
- Xanthoparmelia stenophylla* (Ach.) Ahti & D. Hawksw., Locality 10, on calcareous rock[OS].
- Xanthoria candelaria* (L.) Th. Fr., Locality 15, 16, 19, on *Populus* sp. *Salix* sp. [SI].

- Xanthoria elegans* (Link) Th. Fr., Locality 12, 15, 16, on calcareous rock[SI].
- Xanthoria fallax* (Hepp ex Arnold) Arnold, Locality 13, 16, on *Salix* sp.[SI]
- Xanthoria fulva* (Hoffm.) Poelt & Petut., Locality 13, on *Populus* sp.[SI].
- Xanthoria parietina* (L.) Th. Fr., Locality 4, 9, on *Pinus* sp., *Prunus* sp. [OS].
- Usnea cavernosa* Tuck., Locality 9, on *Pinus* sp.[OS].
- Usnea diplotypus* Vain., Locality 9, on *Picea orientalis*[OS].
- Usnea filipendula* Stirt., Locality 9, on *Picea orientalis*[OS].
- Usnea florida* (L.) Weber ex F.H. Wigg., Locality 8, on *Pinus* sp.[OS].
- Usnea hirta* (L.) Weber ex F.H. Wigg., Locality 9, on *Pinus* sp.[OS].
- Usnea lapponica* Vain., Locality 9, on *Picea orientalis*[OS].
- **Usnea wasmuthii* Räsänen, Locality 9, on *Picea orientalis*[OS].
- Verrucaria calciseda* DC., Locality 25, on limestone
- Verrucaria compacta* (A. Massal.) Jatta, Locality 24, on hard limestone [MA].
- Verrucaria dufourii* DC., Locality 25, on hard limestone[BA].
- Verrucaria fuscella* (Turner) Winch, Locality 24, on calcareous rock[MA].
- Verrucaria lecideoides* (A. Massal.) Trevis., Locality 24, on calcareous rock[MA].
- Verrucaria macrostoma* Dufour ex DC., Locality 24, on calcareous rock[MA].
- Verrucaria muralis* Ach., Locality 10, 24, on calcareous rock[MA, OS].
- Verrucaria nigrescens* Pers., Locality 23, 24, 25, on calcareous rock[BA, MA].

Discussion

Caloplaca flavocitrina, *C. variabilis* f. *ocellulata*, *Cladonia metacorallifera*, *Phaeophyscia chloantha* and *Usnea wasmuthii* are new to Turkey.

Of the 205 taxa, 111 are crustose, 56 foliose, 26 fruticose, and 2 leprose. Further, 86 taxa were epiphytic, 88 saxicolous, eight terricolous, 4 epiphytic or saxicolous, 5 epiphytic or terricolous, and 3 terricolous or saxicolous. Substrates were varied, with 5 taxa growing on decayed barks, 9 on mosses, 10 on limestone, 21 on conifereous trees, and 29 on deciduous trees. In the study area all of the species were found on 20 different substrata.

Caloplaca, *Cladonia*, *Lecanora*, *Rinodina*, *Verrucaria* and *Physcia* are the common genera in the area researched. Among the common genera, *Caloplaca* is the most diverse (represented by 17 species), with 17 taxa occurring in Mardin and 9 in Sivas. The members of the genus *Cladonia*

were only found in Osmaniye. Foliose genera such as *Xanthoria*, *Phaeophyscia*, *Physcia*, *Melanelia*, *Parmelia*, *Melanelixia*, *Melanohalea*, were mostly found in Osmaniye and Sivas regions on mostly deciduous trees i.e. The members of *Lecanora* and *Physcia* were only found in Osmaniye. Four *Lecanora* species were growing on rocks while four *Physcia* species on deciduous trees *Carpinus*, *Prunus*, *Pyrus*, *Quercus*, and *Salix*. Saxicolous crustose lichens were found in all the stations and are very common, especially in Osmaniye (Büyük Kuyucak district), Osmaniye (Center); Zorkun high plateau (Sarıüce District), Sivas (İşhanı village), Sivas (Center); Mardin (Midyat); Acırlı village and Batman (Arıca village).

Localities 1, 7, 10, 24 and 25 are situated near a lime pit *Aspicilia calcarea*, *Verrucaria dufourii*, *V. calciseda* and *V. muralis*, which are determined as indicator species of lime and calcareous substratum, was found only in Osmaniye: Sarıüce, Yoncalı, Mardin: Midyat, Acırlı village and Batman: Arıca, which are situated near a lime pit. On the other hand, saxicolous species *Verrucaria compacta*, *V. fuscella*, *V. lecideoides*, *V. marmorea* and *V. nigrescens* were also recorded in station 24 and 25.

Crustose species were seen nearly in all stations and are very common mostly on rocks and limestones in stations 5, 7, 15, 16, 24, 25. Because rocks are abundantly in Mardin and Batman crustose species such as *Rinodina*, *Caloplaca*, *Lecania*, *Lecanora*, *Lecidea*, *Lecidella* were found to be growing mostly on rocks in these stations.

Foliose genera such as *Xanthoria*, *Phaeophyscia*, *Physcia*, *Melanelia*, *Parmelia*, *Melanelixia*, and *Melanohalea*, were mostly found in Osmaniye and Sivas provinces on deciduous trees such *Carpinus* sp., *Prunus* sp., *Pyrus* sp., *Quercus* sp. and *Salix* sp. *Peltigera* and *Pertusaria*, found only in Osmaniye, were not found abundantly and the same is true with fruticose species such as *Alectoria*, *Ramalina*.

Several sensitive species, according to Purvis et al. (1992) and Wirth (1995), such as *Lobaria pulmonaria*, *Pertusaria amara*, *Pertusaria coccodes*, *Pertusaria pertusa*, *Physcia aipolia*, *Ramalina calicaris*, *Ramalina farinacea*, *Ramalina fraxinea* and *Usnea* spp. were found in the study area, especially in Osmaniye.

Aspicilia desertorum, *Caloplaca haematites*, *Caloplaca persica*, *Fuscopannaria* cf. *praetermissa*, *Lecanora strobilina*, *Lecidea lithophila*, *Rinodina guzzini*, *Rinodina luridescens*, *Staurothele caesia*, *Usnea cavernosa*, *Verrucaria dufourii*, *Verrucaria fuscella* and *Verrucaria lecideoides* have rarely been recorded in Turkey so far.

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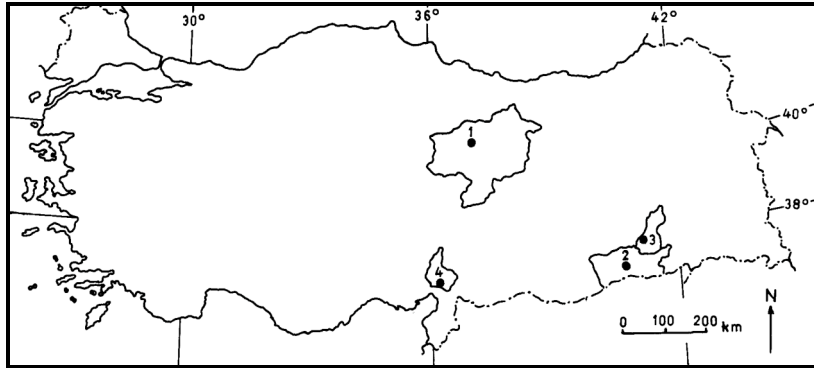


Figure 1. Map of the study area showing the four provinces dealt with in this paper. 1: Sivas, 2: Mardin, 3: Batman, 4: Osmaniye

Table 1. The collecting localities.

	Locality	Coordinate	Altitude (m)	Date
1.	Osmaniye: Center; Karaçay valley	37°01'30" N 36°17'00" E	150	10.02.2007
2.	Osmaniye: Center; Karaçay valley, upwards of electrical station	37°01'45" N 36°17'00" E	160	10.02.2007
3.	Osmaniye: Center; Zorkun high plateau, Mitis turning	37°00'00" N 36°20'00" E	250	20.08.2006
4.	Osmaniye: Center; Zorkun high plateau, Küçükkuşyucak district	37°01'10" N 36°17'10" E	1750	21.08.2006
5.	Osmaniye: Center; Zorkun high plateau, Büyük Kuyucak district	37°01'05" N 36°17'10" E	1750	21.08.2006
6.	Osmaniye: Center; Zorkun high plateau, Olukbaşı district	37°01'03" N 36°17'02" E	700	20.08.2006
7.	Osmaniye: Center; Zorkun high plateau, Sarıüce District	37°01'10" N 36°17'05" E	1350	21.08.2006
8.	Osmaniye: Center; Zorkun high plateau, Çağşırlı district	37°01'02" N 36°17'02" E	1600	20.08.2006
9.	Osmaniye: Center; Zorkun high plateau, Çağşırlı Flowing Stream district	37°01'01" N 36°17'05" E	1400-1600	20.08.2006
10.	Osmaniye: Center; Zorkun high plateau, Yoncalıdüzü district	37°01'04" N 36°17'10" E	1600	20.08.2006
11.	Sivas: Center	39°44'10" N 37°03'03" E	1200–1300	15.08.2006
12.	Sivas: Center; Karşıyaka, Çırak stream	39°44'07" N 37°03'01" E	1285	15.08.2006
13.	Sivas: Center; Paşabahçe	39°44'05" N 37°03'10" E	1200	15.08.2006
14.	Sivas: Center; Yukarı Tekke Cemetery	39°44'12" N 37°04'05" E	1300	15.08.2006
15.	Sivas : Center ; İşhanı village	39°40' 00" N 37°04' 00" E	1300	17.08.2006
16.	Sivas: Center; Campus of Cumhuriyet University	39°44'05" N 37°03'00" E	1350	17.08.2006
17.	Sivas: Center; Kardeşler Hill	39°44'05" N 39°03'05" E	1350	17.08.2006
18.	Sivas: Center; along the Kızılırmak river	39°39' 00" N 39°48' 00" E	1300	17.08.2006

Table 1. The collecting localities.

	Locality	Coordinate	Altitude (m)	Date
19.	Sivas: Center; Surroundings of Sıcak, Çermik thermal springs, Ottoman Park	39°47' 00''N 36°40' 00''E	1330-1500	16.08.2006
20.	Mardin: Midyat; Center	37°25' 00''N 41°15' 00''E	900	10.02.2007
21.	Mardin: Midyat; Center, Estel, Cemetery	37°40'05'' N 41°15'10'' E	900	09.02.2007
22.	Mardin: Midyat; Center, Estel, 20 km from center towards east	37°20'00''N 41°30' 00''E	900	09.02.2007
23.	Mardin: Midyat; Center, opposite of Government Hospital	37°20'02'' N 41°14'00'' E	900	09.02.2007
24.	Mardin: Midyat; Acırlı village, Cemetery	37°50' 00''N 41°10' 00''E	450	11.02.2007
25.	Batman: Geçüş; Arıca village	37°35'00''N 41°32'00''E	1100	13.02.2007