

New lichen records from Armenia

ARSEN GASPARYAN & HARRIE J. M. SIPMAN*

*Botanischer Garten und Botanisches Museum, Freie Universität,
Königin-Luise-Straße 6-8, Berlin 14195, Germany*

* CORRESPONDENCE TO: h.sipman@bgbm.org

ABSTRACT — Nineteen species are added to the known lichen mycota of Armenia. Three of these, *Lecanora wetmorei*, *Lecanora percrenata* and *Lecanora flowersiana*, are of particular interest because they are currently predominantly known from North America, and one, *Gyalecta truncigena*, because it represents a genus new for Armenia.

KEY WORDS — epiphytic lichens, diversity, Caucasus, forest

Introduction

The lichen diversity of Armenia has received considerable attention during recent decades, starting with Nikoghosyan (1963, 1964a, 1964b, 1965, 1966), Barchalov (1983) and Abrahamyan (1983). Harutyunyan et al. (2009) added 114 taxa and Harutyunyan et al. (2011) published a catalogue of all known lichenized fungi for Armenia, listing a total of 422 taxa.

As a contribution to the knowledge of the lichen diversity, we have started research in the forests. Armenia is one of the least forest-covered countries of the Caucasus. Only about 10% of its territory is covered by more or less intact woodlands (Anonymous 2009). About 97% of these are mixed deciduous broad-leaved forests with oriental beech (*Fagus orientalis*), hornbeam (*Carpinus betulus*, *C. orientalis*) and oak (*Quercus macranthera*, *Q. iberica*, *Q. araxina*) as the dominant species (Vardanyan 2003).

Our first observations on the lichen mycota of the forests, presented here, show that this is still very incompletely known and that further exploration is very promising.

Materials & methods

Specimens were collected in Armenia by the first author between October 2011 and September 2012 from one locality in the semi-desert area of Armavir province and 8 localities in forest areas of the provinces Ararat, Kotayk, Syunik, and Tavush (Fig. 1). The visited sites include Shikahogh State Reserve, “Khosrov Forest” State Reserve and “Dilijan” National Park. Morphological features and anatomy of the lichen thalli were studied by stereomicroscope and compound microscope. Secondary chemistry was investigated by thallus fluorescence under long-wave UV light (350 nm) and spot tests following Orange et al. (2010). Voucher specimens are deposited in the lichen herbarium of the Botanischer Garten und Botanisches Museum of the Free University in Berlin, Germany (B).

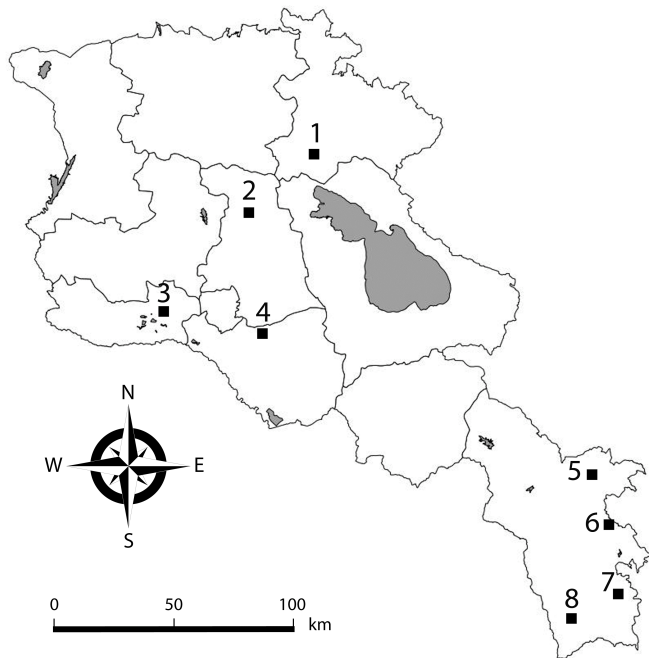


Fig.1. Map of the provinces of Armenia with our study areas. 1 – Tavush province, 2 – Kotayk province, 3 – Armavir province, 4 – Ararat province, 5–8 – Syunik province

Results and discussion

The identified samples included 19 species of lichens (15 epiphytic, 3 saxicolous, and 1 terricolous) not known before from Armenia and reported here as new for the country.

Especially notable are three species which, unlike most lichen species known from Armenia, are rare or absent in Europe and so far mainly known from North America. These include *Lecanora wetmorei* Šliwa, described from numerous collections from North America (Šliwa 2007) and recently reported also from Iran (Valadbeigi et al. 2010); this appears to be common in Armenia in temperate mixed deciduous forests and in arid open forests, as well as being widespread on twigs of *Pyrus* sp. in xerophytic areas; identification confirmed by L. Šliwa (Kraków). Two saxicolous species of the *Lecanora dispersa* group described from North America are also among the new records, namely *Lecanora percrenata* H. Magn. (originally described from Central Asia) and *Lecanora flowersiana* H. Magn. (reported from Iran by Valadbeigi et al. 2010).

Caloplaca monacensis (Leder.) Lettau is an overlooked species in the *C. cerina* group, which has become more easily recognizable by the work of Šoun et al. (2011). It is known from temperate and Mediterranean Europe, and western Asia. In Armenia, it occurs in arid, open forest areas. Another unnamed taxon in the *C. cerina* complex, namely *C. cerina* s. lat. - group B (Šoun et al. 2011), reported from Northern Iran, was also among our material but is not included in the list.

Two species in the *Graphis scripta* group were discovered, based on the recent study by Neuwirth et al. (2011), namely *G. betulina* (Pers.) Ach. and *G. pulverulenta* (Sm. & Sowerby) Leight., both occurring on *Carpinus* sp. *G. betulina* is widespread in mixed deciduous forests with hornbeam in the “Dilijan” National Park and the Shikahogh State Reserve, while *G. pulverulenta* was found only once.

Among the reported taxa is a new lichen genus for Armenia, *Gyalecta* Ach., represented by the widespread but inconspicuous species *G. truncigena* (Ach.) Hepp.

Melaspilea urceolata (Fr.) Almb. is an unusual species known from scattered localities in central and southern Europe, namely Italy, Switzerland, Rumania, Croatia, France, and the surroundings of Münster in Germany (Redinger 1938, sub *M. arthonioides* (Fée) Nyl.; herb. B). Its substrate is mainly old *Quercus* spp. trunks. In Germany, it has not been observed for a long time (Wirth et al. 2011) and is probably extinct, but there are recent records from France and Italy in herb. B and it was recently reported from Iran (Valadbeigi et al. 2010). In Armenia it was found in the Syunik region (close to the Iranian border). The species is also known from North America (Esslinger 2012), but here the old name *M. arthonioides* is still used.

Two species the genus *Rinodina* are newly reported, *Rinodina furfuracea* H. Magn. and *R. oleae* Bagl. *R. furfuracea* is a distinctive species with an entirely blastidiate thallus and a Mediterranean-Atlantic distribution (Giralt et al. 1995). The species occurred in Southern Armenia on *Quercus* sp., as is observed also in Europe. *R. oleae* is a common species in Southern Europe (Giralt 2001). In Armenia we observed this species in the mixed deciduous broad-leaved forests of the “Dilijan” National Park. H. Mayrhofer (Graz) kindly provided the identification for the first and confirmed the second species. Of the two epiphytic species reported before from Armenia (Harutyunyan et al. 2011), *R. pyrina* (Ach.) Arnold was also found by us, while the report of *R. exigua* (Ach.) Gray needs confirmation because the name has been much misapplied in the past.

The sorediate species *Megaspora rimisorediata* Valadbeigi, recently described from Iran (Valadbeigi et al. 2011), was found on *Quercus* sp. in the Syunik region. This seems to be the first record of this species outside Iran.

The further newly recorded species are *Acrocordia cavata* (Ach.) R.C. Harris, *Amandinea punctata* (Hoffm.) Coppins & Scheid., *Caloplaca flavocitrina* (Hoffm.) Th. Fr., *Lecanora valesiaca* (Müll. Arg.) Stizenb., *Leptogium hildenbrandii* (Garov.) Nyl., *Parmelina carporrhizans* (Taylor) Poelt & Vězda, *P. pastillifera* (Harm.) Hale and *Peltigera monticola* Vitik.

List of species

For each species voucher information is given: study area number on the map (Fig. 1), locality, coordinates, elevation, substrate, herbarium number and date of collecting (DD/MM/YYYY).

Acrocordia cavata (Ach.) R.C. Harris – 1, Tavush: “Dilijan” National Park; 40°45'26"N 44°54'27"E; 1173 m; on tree; B 60 0189290; 17/08/2012

Amandinea punctata (Hoffm.) Coppins & Scheid. – 5, Syunik: Goris city, near Yerevanyan highway; 39°31'07"N 46°19'31"E; 1533 m; on *Pinus sylvestris*; B 60 0189289; 02/05/2012

Caloplaca flavocitrina (Hoffm.) Th. Fr. – 3, Armavir: Tsiatsan village, near cemetery; 40°11'31"N 44°15'56"E; 892 m; on rock; B 60 0189288; 09/11/2011

Caloplaca monacensis (Leder.) Lettau – 4, Ararat: “Khosrov Forest” State Reserve; 40°06'34"N 44°46'29"E; 1325 m; on tree; B 60 0189275; 16/05/2012 – 8, Syunik: Vahravar village, near road to Lehvaz; 38°56'46"N 46°11'05"E; 1390 m; on tree; B 60 0189274; 03/05/2012

Graphis betulina (Pers.) Ach. – 1, Tavush: “Dilijan” National Park; 40°45'12"N 44°56'13"E; 1521 m; on tree; B 60 0189273; 17/08/2012 – 7, Syunik: Shikahogh State Reserve; 39°05'22"N 46°27'46"E; 1068 m; on *Carpinus betulus*; B 60 0189272; 25/07/2012

- Graphis pulverulenta* (Sm. & Sowerby) Leight. – 1, Tavush: “Dilijan” National Park, near road to Haghartsin; 40°46'59" N 44°55'15" E; 1149 m; on tree; B 60 0189290; 17/08/2012
- Gyalecta truncigena* (Ach.) Hepp – 1, Tavush: “Dilijan” National Park; 40°45'40"N 44°55'33"E; 1265 m; on tree; B 60 0189284; 17/08/2012
- Lecanora flowersiana* H. Magn. – 1, Tavush: Dilijan city, near Dilijan Composers' Creativity House; 40°41'37"N 44°50'45"E; 1599 m; on tree; B 60 0189285; 07/10/2011
- Lecanora percrenata* H. Magn. – 3, Armavir: Tsiatsan village, near cemetery; 40°11'31"N 44°15'54"E; 895 m; on rock; B 60 0189287; 09/11/2011
- Lecanora valesiaca* (Müll. Arg.) Stizenb. – 3, Armavir: Tsiatsan village, near cemetery; 40°11'30"N 44°15'56"E; 890 m; on rock; B 60 0189286; 09/11/2011
- Lecanora wetmorei* Šliwa – 2, Kotayk: Artavaz village, near Yerevan State University summer practice camp; 40°36'38"N 44°34'18"E; 1928 m; on tree; B 60 0189271; 07/07/2012 – 4, Ararat: “Khosrov Forest” State Reserve; 40°06'16"N 44°45'25"E; 1292 m; on tree; B 60 0189270; 16/05/2012 – 1, Tavush: “Dilijan” National Park; 40°45'12"N 44°56'13"E; 1148 m; on tree; B 60 0189269; 17/08/2012 – 6, Syunik: near Tatev village; 39°21'23"N 46°14'59"E; 1757 m; on *Pyrus* sp; B 60 0189268; 03/05/2012 – 8, Syunik: Vahravar village, near road to Lehvaz; 38°56'46"N 46°11'05"E; 1390 m; on tree; B 60 0189267; 03/05/2012
- Leptogium hildenbrandii* (Garov.) Nyl. – 7, Syunik: “Plane Grove” Sanctuary (Shikahogh State Reserve); 39°03'09"N 46°30'48"E; 694 m; on tree; B 60 0189279; 02/05/2012
- Megaspora rimisorediata* Valadbeigi – 8, Syunik: Vahravar village, near road to Lehvaz; 38°56'46"N 46°11'05"E; 1390 m; on *Quercus* sp.; B 60 0189265; 03/05/2012
- Melaspilea urceolata* (Fr.) Almb. – 6, Syunik: Shurnukh village, near access road; 39°22'35"N 46°23'44"E; 1460 m; on tree; B 60 0189282; 04/05/2012
- Parmelina carporrhizans* (Taylor) Poelt & Vězda – 7, Syunik: Shikahogh State Reserve; 39°05'11"N 46°27'30"E; 1119 m; on tree; B 60 0189278; 25/07/2012
- Parmelina pastillifera* (Harm.) Hale – 1, Tavush: Ijevan city; on tree; B 60 0189276; 09/2012
- Peltigera monticola* Vitik. – 7, Syunik: Shikahogh State Reserve; 39°05'10"N 46°27'27"E; 1125 m; on soil; B 60 0189277; 25/07/2012
- Rinodina furfuracea* H. Magn. – 8, Syunik: Vahravar village, near road to Lehvaz; 38°56'46"N 46°11'05"E; 1390 m; on *Quercus* sp.; B 60 0189265; 03/05/2012
- Rinodina oleae* Bagl. – 1, Tavush: “Dilijan” National Park; 40°45'42"N 44°56'03"E; 1354 m; on tree; B 60 0189281; 17/08/2012

Acknowledgments

The authors are thankful to Dr Andre Aptroot, Prof. Helmut Mayrhofer and Prof. Mark R.D. Seaward for reviewing of the manuscript. The authors are also grateful to Prof. H. Mayrhofer for kind support by the confirmation and identification of *Rinodina oleae* and *R. furfuracea* and Dr Lucyna Sliwa for confirmation of *Lecanora wetmorei*. The first author acknowledges support from the Institute of Botany NAS RA and the Ministry of Nature Protection of RA. Fieldwork assistance by Hasmik Ter-Voskanyan, Anush Stepanyan and Sergey Grigoryan contributed considerably to our results. The research was carried out in the framework of the project “Developing Tools for Conserving the Plant Diversity of the Transcaucasus” financed by the Volkswagen Foundation.

Literature cited

- Abrahamyan A. 1983. New lichen species for Armenia from the north-eastern coast of Lake Sevan. *Biological Journal of Armenia* 36: 527–529. (in Russian)
- Anonymus 2009. Fourth national report to the convention on biological diversity. Printing House “Nor Norq”, Republic of Armenia.
- Barchalov SO. 1983. Lichen flora of the Caucasus. Publishing House “ELM”, Republic of Azerbaijan.
- Esslinger TL. 2012. A cumulative checklist for the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. North Dakota State University [http://www.ndsu.edu/pubweb/~esslinge/chcklst/chcklst7.htm (viewed online on 27 Jan. 2013)]
- Giralt M, Mayrhofer H, Sheard JW. 1995. The corticolous and lignicolous sorediate, blastidiate and isidiate species of the genus *Rinodina* in southern Europe. *The Lichenologist* 27: 3–24. <http://dx.doi.org/10.1017/S0024282995000041>
- Giralt M. 2001. The lichen genera *Rinodina* and *Rinodinella* (lichenized Ascomycetes, Physciaceae) in the Iberian Peninsula. *Bibliotheca Lichenologica* 79: 1–160.
- Harutyunyan S, Mayrhofer H. 2009. A contribution to the lichen mycota of Armenia. *Bibliotheca Lichenologica* 100: 137–156.
- Harutyunyan S, Wiesmair B, Mayrhofer H. 2011. Catalogue of the lichenized fungi in Armenia. *Herzogia* 24: 265–296.
- Neuwirth, G, Aptroot, A. 2011. Recognition of four morphologically distinct species in the *Graphis scripta* complex in Europe. *Herzogia* 24: 207–230.
- Nikoghosyan VG. 1963. Representatives of the lichen flora of Armenia from the genera *Ramalina* and *Parmelia*. *Biological Journal of Armenia* 16(10): 69–76. (in Russian)
- Nikoghosyan VG. 1964a. Towards a lichen flora in Armenia. *Biological Journal of Armenia*, 17(4): 89–99. (in Russian)
- Nikoghosyan VG. 1964b. About several lichens of mountain regions in Armenia. *Biological Journal of Armenia* 17(11): 41–48. (in Russian)
- Nikoghosyan VG. 1965. Representatives of the lichen flora of Armenia from the genera *Lecanora*, *Xanthoria* and *Physcia*. *Biological Journal of Armenia* 18(5): 72–79. (in Russian)
- Nikoghosyan VG. 1966. New data on the lichen flora of Armenia. *Biological Journal of Armenia* 19(3): 106–113. (in Russian)
- Orange A, James PW, White FJ. 2010. *Microchemical methods for the identification of lichens*. British Lichen Society, London.
- Redinger K. 1938. *Arthoniaceae, Graphidaceae, Chiocetaceae, Dirinaceae, Roccellaceae, Lecanactidaceae, Thelotremaceae, Diploschistaceae, Gyalectaceae und Coenogoniaceae. Lieferung 2. Graphidaceae*. Dr. L. Rabenhorst's Kryptogamen-Flora von Deutschland, Österreich und der Schweiz. (2. Auflage) Band 9, Abteilung 2(1): 181–404.
- Śliwa L. 2007. A revision of the *Lecanora dispersa* complex in North America. *Polish Botanical Journal* 52: 1–70.
- Šoun J, Vondrák J, Søchting U, Hrouzek P, Khodosovtsev A, Arup U. 2011. Taxonomy and phylogeny of the *Caloplaca cerina* group in Europe. *The Lichenologist* 43: 113–135. <http://dx.doi.org/10.1017/S0024282910000721>
- Valadbeigi T, Nordin A, Tibell L. 2011. *Megaspora rimisorediate* (Pertusariales, Megasporaceae), a new sorediate species from Iran and its affinities with *Aspicilia* sensu lato. *The Lichenologist* 43: 285–291. <http://dx.doi.org/10.1017/S0024282911000211>
- Valadbeigi T, Sipman HJM. 2010. New records of lichens and lichenicolous fungi from Iran and their biogeographical significance. *Mycotaxon* 113: 191–194. <http://dx.doi.org/10.5248/113.191>
- Vardanyan ZhH. 2003. *The trees and shrubs of Armenia*. Institute of Botany NAS RA, Yerevan, Republic of Armenia.
- Wirth V, Hauck M, Brackel W von, Cezanne R, de Bruyn U, Dürhammer O, Eigler M, Gnüchtel A, John V, Littner B, Otte V, Schiefelbein U, Scholz P, Schulz M, Stordeur R, Feuerer T, Heinrich D (2011): Rote Liste und Artenverzeichnis der Flechten und flechtenbewohnenden Pilze Deutschlands. *Naturschutz und Biologische Vielfalt* 70(6): 7–122. Bundesamt für Naturschutz, Bonn-Bad Godesberg.