

New lichen records from Abkhazian Experimental Research Forest Station (Abkhazia)

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Abstract. The list of species comprises 25 species reported for the first time for Abkhazian Experimental Research Forest Station. Eleven species are new to Abkhazia — *Byssoloma leucoblepharum* (Nyl.) Vain., *Chrysothrix candelaris* (L.) J. R. Laundon, *Cladonia macilenta* Hoffm., *C. parasitica* (Hoffm.) Hoffm., *Hypotrachyna bahiana* (Nyl.) Hale, *H. pseudosinuosa* (Asahina) Hale, *Lecanora argentata* (Ach.) Malme, *L. chlaroothera* Nyl., *Lecidea albohyalina* (Nyl.) Th. Fr., *Xanthoria polycarpa* (Hoffm.) Th. Fr. and *Usnea cornuta* Körb. Substrates, collecting sites and herbaria are recorded for each species.

Keywords: Abkhazia, lichens, Abkhazian Experimental Research Forest Station.

Новые лихенологические находки из Абхазской экспериментальной научно-исследовательской лесной опытной станции (Абхазия)

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Резюме. Аннотированный список включает 25 новых для Абхазской экспериментальной научно-исследовательской лесной опытной станции видов лишайников. Одиннадцать видов приводятся как новые для Абхазии. К ним относятся *Byssoloma leucoblepharum* (Nyl.) Vain., *Chrysothrix candelaris* (L.) J. R. Laundon, *Cladonia macilenta* Hoffm., *C. parasitica* (Hoffm.) Hoffm., *Hypotrachyna bahiana* (Nyl.) Hale, *H. pseudosinuosa* (Asahina) Hale, *Lecanora argentata* (Ach.) Malme, *L. chlaroothera* Nyl., *Lecidea albohyalina* (Nyl.) Th. Fr., *Xanthoria polycarpa* (Hoffm.) Th. Fr. и *Usnea cornuta* Körb. Для каждого вида приведены субстраты, местонахождения и места хранения гербарных материалов.

Ключевые слова: Абхазия, лишайники, Абхазская экспериментальная научно-исследовательская лесная опытная станция.

Abkhazian Experimental Research Forest Station (AERFS) is located in the town of Ochamchyra in the Republic of Abkhazia (Fig.). AERFS was founded in 1957 by B. Mlokosevich. More than 500 unique monocultures were first grown there in Abkhazia. At present, its collection of higher plants consists of more than 900 species and varieties, which belong to 249 genera (Mlokosevich *et al.*, 2000). Climate of the AERFS territory is subtropical, warm and humid.

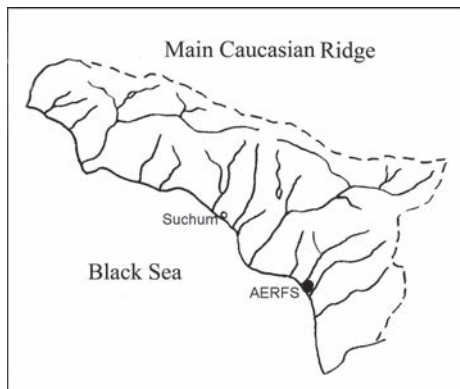


Fig. Location of the Abkhazian Experimental Research Forest Station in Abkhazia.

Расположение Абхазской экспериментальной научно-исследовательской лесной опытной станции в Абхазии.

The lichen flora of AERFS was not investigated by lichenologists earlier. The aim of the paper is to present a list of lichen species new for AERFS and Abkhazia. All the materials were collected by the author during a field trip in summer 2012. Lichens were collected from the bark of trunks and branches of different introduced tree species. On the other substrates lichens were not found. The collected material of lichens was studied with Zeiss microscopes (Stemi 2000CS, Axio Scope A1). Specimens of *Chrysothrix*, *Hypotrachyna*, *Lepraria* and *Usnea* were analyzed by using standard technique of high-performance thin-layer chromatography in solvent systems A, B and C (Orange, 2001). Collections of *Graphidaceae* species await further investigations and are excluded from the present paper. The specimens are deposited in the herbaria of Komarov Botanical Institute (LE), Botanical Museum of the University of Helsinki (H), University of Tartu (TU), Museum of Evolution, Uppsala University (UPS) and University of Turku (TUR). An asterisk (*) preceding the name indicates that the species is an addition to the known lichen flora of Abkhazia. Nomenclature of lichen species is based on Nordin *et al.* (2011).

The collecting sites are numbered from 1 to 5 in the species list: **1** — 42°44'43.5" N, 41°26'46.0" E, 14 m a. s. l., 22.08.2012, 23.08.2012, 24.08.2012; **2** — 42°45'04.0" N, 41°26'45.8" E, 41 m a. s. l., 22.08.2012; **3** — 42°45'05.2" N, 41°26'39.2" E, 35 m a. s. l., 22.08.2012; **4** — 42°45'01.2" N, 41°26'27.2" E, 12 m a. s. l., 22.08.2012; **5** — 42°45'10.0" N, 41°26'58.5" E, 10 m a. s. l., 23.08.2012.

Anisomeridium polypori (Ellis et Everh.) M. E. Barr — **1**: bark of *Phellodendron amurense* Rupr., 24.08.2012 (TU).

Arthonia spadicea Leight. — **1**: bark of *Juglans sieboldiana* Maxim., *Pinus pinea* L., *Sapindus drummondii* Hook. et Arn. (H, TU, UPS); **3**: bark of *P. pinea* (H);

4: bark of *Cryptomeria japonica* (Thunb. ex L. fil.) D. Don (LE L-11649); **5:** bark of *Quercus iberica* Stev., *Thuja plicata* Donn ex D. Don (LE L-11646, UPS).

***Byssoloma leucoblepharum** (Nyl.) Vain. — **2:** bark of *Abies alba* Mill. (H). The species was erroneously published by A. A. Elenkin (1904) from Abkhazia (Gagra). All specimens of «*B. leucoblepharum*» in LE belong to *B. subdiscordans* (Nyl.) P. James. *B. subdiscordans* has smooth, white to pale grey thallus in small irregular patches at least in peripheral part and black apothecia sometimes with a blue tinge. *B. leucoblepharum* has continuous grey to grey-green thallus and greyish brown (not black) apothecia.

Specimens examined: *Byssoloma subdiscordans*: Abkhazia, Gagra, 1903, leg. Yachevskiy, det. Elenkin as *Pilocarpon leucoblepharum* (Nyl.) Vain. (LE L-11651, LE L-11652, LE L-11653); Elenkin, Lichenes Florae Rossiae II, 1904, № 196 — as *P. leucoblepharum* (LE L-11650).

***Chrysothrix candelaris** (L.) J. R. Laundon — **1:** bark of *Cryptomeria japonica* (TU), *Pinus caribaea* (TU), *P. pinea* (H, TU); **2:** bark of *Chamaecyparis pisifera* (Siebold et Zucc.) Siebold et Zucc. (LE L-11643); **3:** bark of *Quercus lyrata* Walt. (H); **4:** bark of *Cryptomeria japonica* (UPS). Lichen substances detected by HPTLC: pinastric acid.

Cladonia coniocraea Spreng. — **4:** bark of *Cryptomeria japonica* (H, LE L-11637).

***C. macilenta** Hoffm. — **2:** bark of *Chamaecyparis pisifera* (H).

***C. parasitica** (Hoffm.) Hoffm. — **4:** bark of *Cryptomeria japonica* (H).

Coenogonium pineti (Schrad. ex Ach.) Lüicking et Lumbsch — **1:** bark of *Pinus caribaea* (LE L-11632), *P. pinea* (H); **3:** bark of *P. pinea* (H); **4:** bark of *Cryptomeria japonica* (LE L-11648, LE L-11649), *Sequoia sempervirens* (D. Don) Endl. (TU).

Collema subflaccidum Degel. — **1:** bark of *Phellodendron amurense* (H).

Evernia prunastri (L.) Ach. — **1:** bark of *Acer palmatum* Thunb. (LE L-11620); **3:** bark of *Quercus acutissima* Carruth., *Q. lyrata* (LE L-11619, TU); **4:** bark of *Cryptomeria japonica* (H).

Flavoparmelia caperata (L.) Hale — **1:** bark of *Ginkgo biloba* L. (TU), *Magnolia grandiflora* L. (LE L-11629), *Pterocarya pterocarpa* (Michx.) Kunth ex I. Iljinsk. (H, LE L-11630), *Sapindus drummondii* (H, LE, TU); **2:** bark of *Chamaecyparis pisifera*, *Liriodendron tulipifera* (H), *Quercus castaneifolia* C. A. Mey. (H, TU); **3:** bark of *Acer trautvetteri* Medw. (H, TU), *Alnus incana* (L.) Moench (LE L-11628), *Carya laciniosa* (LE L-11623, LE L-11631), *Lagerstroemia indica* L. (TU), *Metasequoia glyptostroboides* H. H. Hu et Cheng (TU), *Quercus acutissima* (LE L-11627), *Q. lyrata* (UPS); **4:** bark of *Cryptomeria japonica* (H); **5:** bark of *Liquidambar styraciflua* L. (TU), *M. glyptostroboides* (TU), *Pinus caribaea* (UPS). The species is notably widespread in Abkhazia and AERFS.

***Hypotrachyna bahiana** (Nyl.) Hale — **1:** bark of *Ulmus japonica* (Rehder) Sarg. (H). Lichen substances detected by HPTLC: atranorin, stictic acid, 2 unknown terpenoids. We have not found protocetraric acid mentioned by Hale (1975). Chemical reactions: cortex K+ yellow, P–; medulla K–, P+ orange red, C–.

***H. pseudosinuosa** (Asahina) Hale — **1:** bark of *Ulmus japonica* (H). Lichen substances detected by HPTLC: atranorin, stictic acid, constictic acid, 3 unknown terpenoids. We have not found protocetraric acid mentioned by Hale (1975). Chemical reactions: cortex K+ yellow, P–; medulla K–, P+ orange red, C–.

***Lecanora argentata** (Ach.) Malme — **5**: bark of *Quercus iberica* (LE L-11617).
***L. chlorothesa** Nyl. — **1**: bark of *Ginkgo biloba* (H, LE L-11638, LE L-11639); **2**: bark of *Fagus orientalis* Lipsky, *Liriodendron tulipifera* (H, TU); **3**: bark of *Acer trautvetteri* (TU), *Alnus incana* (LE L-11640), *Carya laciniosa* (LE L-11623, L-11641), *Castanea sativa* Mill. (TU), *Pasania edulis* (Makino) Nakai (H), *Quercus acutissima* (TU), *Q. lyrata* (LE, TU, UPS); **5**: bark of *Q. iberica* (LE L-11642). The species is notably widespread in AERFS.

***Lecidea albohyalina** (Nyl.) Th. Fr. — **4**: bark of *Sequoia sempervirens* (H).

Lecidella elaeochroma (Ach.) M. Choisy — **3**: bark of *Acer trautvetteri*, *Quercus lyrata* (H, TU).

Parmelia sulcata Taylor — **1**: bark of *Sapindus drummondii* (H); **3**: bark of *Quercus lyrata* (LE L-11636).

Parmotrema perlatum (Huds.) M. Choisy — **1**: bark of *Ginkgo biloba* (LE L-11614, L-11638, L-11639); **3**: bark of *Acer trautvetteri* (LE L-11615), *Liriodendron tulipifera* (TU), *Metasequoia glyptostroboides* (TU), *Quercus acutissima* (LE), *Q. lyrata* (UPS); **4**: bark of *Alnus incana* (TU).

Pertusaria coccodes (Ach.) Nyl. — **2**: bark of *Fagus orientalis* (H).

P. pustulata (Ach.) Duby — **3**: bark of *Carya laciniosa*, *Quercus lyrata* (LE L-11616, UPS); **4**: bark of *Alnus incana* (TU); **5**: bark of *Quercus castaneifolia* (H).

Punctelia subrudecta (Nyl.) Krog — **1**: bark of *Acer buergerianum* Miq. (LE L-11644); **3**: bark of *Metasequoia glyptostroboides* (TU).

Ramalina farinacea (L.) Ach. — **1**: bark of *Ginkgo biloba* (LE L-11638, L-11639, TU, UPS); **3**: bark of *Carya laciniosa*, *Metasequoia glyptostroboides* (LE L-11618, TU); **4**: bark of *Alnus incana* (LE L-11613).

***Xanthoria polycarpa** (Hoffm.) Th. Fr. — **3**: bark of *Acer trautvetteri* (TU).

***Usnea cornuta** Körb. — **3**: bark of *Acer trautvetteri* (TU). Lichen substances detected by HPTLC: usnic acid (cortex); stictic, norstictic, cryptostictic and salazinic acids (medulla). Although the colour of the central axis is white usually, it can be orangish in some parts of the thallus when salazinic acid is present.

Twenty-five species are new to AERFS. Eleven species are new to Abkhazia. Most of the species presented above are typical and widespread in Caucasian forests (see, e. g.: Barkhalov, 1983; Nakhutsrishvili, 1986; Otte, 2007). Totally 31 species were identified by the author from the territory of AERFS. Six of them were published earlier — *Anisomeridium biforme* (Borrer) R. C. Harris, *Leptorhaphis atomaria* (Ach.) Szatala and *Phaeophyscia ciliata* (Hoffm.) Moberg (Gagarina, 2012); *Bacidina aenea* S. Ekman (Gerasimova, Gagarina, 2013); *Lepraria lobificans* Nyl. and *L. rigidula* (de Lesd.) Tønberg (Gagarina, 2014). The poor lichen flora dominated by widespread species is probably a result of the lack of native trees in this area. In addition, the most trees are young with the age less than 100 years. It is interesting to note that almost all lichen species were partly damaged by insects and snails.

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References

- Barkhalov S. O. 1983. *Flora lichaynikov Kavkaza* [Lichen flora of Caucasus]. Baku: 338 p. (In Russ.).
- Gagarina L. V. 2012. On the study of lichens of Abkhazia. *Proc. Bot. Inst. Abkhazian Acad. Sci.* 1: 110–115. (In Russ.).
- Gagarina L. V. 2014. Two new to Abkhazia species of the genus *Lepraria* (Stereocaulaceae). *Novosti Sist. Nizsh. Rast.* 48: 226–229. (In Russ. with Engl. abstract).
- Gerasimova J. V., Gagarina L. V. 2013. The first mention of *Bacidina aenea* S. Ekman (Bacidaceae) to be found in Eurasia. *Actualnye problemy ekologii: Materialy IX Mezhdunarodnoy nauchno-prakticheskoy konferentsii* [Actual problems of ecology: Proc. of IX Intern. sci. and applied conf.]. Grodno: 21–22. (In Russ.).
- Elenkin A. A. 1904. *Pilocarpon leucoblepharum* (Nyl.) Wain., a foliicolous lichen species in the Caucasus. *Izv. Imp. S.-Peterburgsk. bot. sada.* 4(1): 1–8. (In Russ.).
- Hale M. E. 1975. A revision of the lichen genus *Hypotrachyna* (Parmeliaceae) in Tropical America. *Smithsonian Contr. Bot.* 25: 1–73.
- Mlokosevich B. V., Leiba V. D. 2000. A catalog of cultivated woody plants of the Abkhazian Experimental Research Forest Station. *Lesnaya introduktsiya v Abkhazii.* 2: 1–23. (In Russ.).
- Nakhutsrishvili I. G. 1986. *Flora sporovykh rasteniy Gruzii* [Flora of cryptogamic plants of Georgia]. Tbilisi: 888 p. (In Russ.).
- Nordin A., Moberg R., Tønberg T., Vitikainen O., Dalsätt Å., Myrdal M., Snitting D., Ekman S. 2011. *Santesson's checklist of Fennoscandian lichen-forming and lichenicolous fungi.* 29 April 2011. <http://130.238.83.220/santesson/home.php> (Accessed: 18 April 2015).
- Orange A., James P. W., White F. J. 2001. *Microchemical methods for the identification of lichens.* London: 101 p.
- Otte V. 2007. Biodiversity of lichens and lichenicolous fungi of Mt. Bol'šoj Thač and its vicinity. *Abh. Ber. Naturkundemus. Görlitz.* 79(1): 131–140.

Литература

- [Barkhalov] Бархалов Ш. О. 1983. *Флора лишайников Кавказа*. Баку: 338 с.
- [Gagarina] Гагарина Л. В. 2012. К изучению лишайников Абхазии. *Тр. Ботан. ин-та Акад. наук Абхазии.* 1: 110–115.
- [Gagarina] Гагарина Л. В. 2014. Два новых для Абхазии вида рода *Lepraria* (Stereocaulaceae). *Новости сист. низш. раст.* 48: 226–229.

- [Gerasimova, Gagarina] Герасимова Ю. В., Гагарина Л. В. 2013. Первая находка *Vacidina aenea* S. Ekman (Vacidaceae) в Евразии. *Актуальные проблемы экологии: Матер. IX Междунар. науч.-практ. конф.* Гродно: 21–22.
- [Elenkin] Еленкин А. А. 1904. *Pilocarpon leucoblepharum* (Nyl.) Wain., как эпифильный лишайник на Кавказе. *Изв. Имп. С.-Петербург. ботан. сада.* 4(1): 1–8.
- Hale M. E. 1975. A revision of the lichen genus *Hypotrachyna* (Parmeliaceae) in Tropical America. *Smithsonian Contr. Bot.* 25: 1–73.
- [Mlokozevich *et al.*] Млокозевич Б. В., Лейба В. Д. 2000. Каталог культивируемых древесных растений Абхазской научно-исследовательской лесной опытной станции. *Лесная интродукция в Абхазии.* 2: 1–23.
- [Nakhutsrishvili] Нахурцришвили И. Г. *Флора споровых растений Грузии.* Тбилиси: 888 с.
- Nordin A., Moberg R., Tønberg T., Vitikainen O., Dalsätt Å., Myrdal M., Snitting D., Ekman S. 2011. *Santesson's checklist of Fennoscandian lichen-forming and lichenicolous fungi.* 29 April 2011. <http://130.238.83.220/santesson/home.php> (Accessed: 18 April 2015).
- Orange A., James P. W., White F. J. 2001. *Microchemical methods for the identification of lichens.* London: 101 p.
- Otte V. 2007. Biodiversity of lichens and lichenicolous fungi of Mt. Bol'šoj Thač and its vicinity. *Abh. Ber. Naturkundemus. Görlitz.* 79(1): 131–140.