

New records of lichens and lichenicolous fungi from Dagestan, Russia

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Abstract: Twenty-three species of lichens and five lichenicolous fungi are reported for the first time for Dagestan. Of them, *Bellemerella polysporinae*, *Lecanora pannonica*, *Opegrapha lutulenta*, *Porpidinia tumidula* and *Verrucaria praeurpta* are new to Caucasus and Russia; *Lecanora contractula*, *Strangospora deplanata* and *Tremella candelariellae* are reported for the first time from Caucasus. *Opegrapha lutulenta* and *Tremella candelariellae* are new to Asia. The genera *Bellemerella*, *Didymocyrtis*, *Leprocaulon*, *Porpidinia*, *Protoparmelia*, *Strangospora* and *Tremella* are reported for the first time from Dagestan. *Porpidinia* and *Bellemerella* are genera new to Russia. The most noteworthy records are briefly discussed.

Keywords: distribution, lichen diversity, biogeography, Northern Caucasus.

INTRODUCTION

In contrast to the relatively well-studied lichen flora of the western part of the Russian Caucasus, its eastern part (including southern Dagestan) still remains poorly explored. Lichen flora of Dagestan stayed unexplored for a long time: about sixty lichen species are only included in the Dagestanian lichen flora (Barkhalov, 1983), the last publication before our investigations. Recent lichenological research in Dagestan started in 2009 and soon forty additional species were reported from the Dagestan State Nature Reserve (Urbanavichus et al., 2010). About fifty further species were recorded from Ersi beech forest (Ismailov & Urbanavichus, 2013). The most extensive publication reports 446 species of lichens and lichenicolous fungi from the Gunib Plateau, Inner Mountain Dagestan (Urbanavichus & Ismailov, 2013). But none of the recent studies has provided any information on lichen species of coastal lowlands, the target area of our present paper. Our list includes 28 species of lichens and lichenicolous fungi new to Dagestan; these increase the number of species known from Dagestan to about 600 which is approximately 40% of species known in whole Northern Caucasus. Most of the reported species are widely distributed, usually with distribution centres in arid to semi-arid regions, however, such species have been only rarely recorded from the Caucasian region.

STUDY AREA

The Republic of Dagestan is located at the boundary between Europe and Asia, in the eastern part of the Northern Caucasus, and is the southernmost region of Russia (Fig. 1). Bordering areas are: internally – Kalmyk Republic (N), Chechen Republic (W), and Stavropol territory (NW); internationally – Azerbaijan (S), and Georgia (SW). Area of the Republic is 50,300 square kilometres. Its southern part is mountainous covered by the Greater Caucasus Mountains (highest Bazardyuzy peak at 4466



Fig. 1. Location of the study area (Republic of Dagestan).

m), the northern part is flat with semidesert vegetation. Our studies were focused to the narrow belt of coastal lowlands between the mountains and the Caspian Sea, 3–20 km wide. These coastal lowlands are covered by marine sediments with degraded steppe vegetation. The climate is generally temperate continental and arid. The mean annual temperature on the coast is 12.7°C, ranging from 1.2°C in January to 25°C in August. The mean annual precipitation on the coast is c. 350–400 mm (Gadjieva & Solovyov, 1996).

MATERIAL AND METHODS

Records for the present paper were collected by the authors during a short field work in coastal lowlands of Dagestan in July 2015 (with an exception of one *Strangospora* which was collected by A. Ismailov in 2013). The geographical coordinates were measured with hand-held GPS navigator. Most of species were identified using a stereomicroscope or compound microscope, and the usual spot tests with standard identification methods for lichenized and lichenicolous fungi. The specimens are kept in the herbarium of the Mountain Botanical Garden, Dagestan Scientific Centre, Makhachkala (DAG), and in the private herbarium of G. Urbanavichus. The taxa are listed in alphabetical order, followed by locality with Dagestanian administrative district, coordinates, substrate type, date of collection and collectors. Collectors are abbreviated as AI – Aziz Ismailov, GU – Gennadii Urbanavichus. Genera new to Dagestan are marked with #.

LIST OF SPECIES

ACAROSPORA PELISCYPHA Th. Fr. – Karabudakhkent district, N of Taulargol village, 42°50'13"N, 47°34'58.5"E, on sandstone, 24.07.2015, leg. AI. New to Northern Caucasus. In Transcaucasia, the species was previously recorded from Azerbaijan (Barkhalov, 1983).

ACAROSPORA VERSICOLOR Bagl. & Carestia – Karabudakhkent district, S of Taulargol village, 42°49'36.5"N, 47°35'05.6"E, on sandstone, 24.07.2015, leg. GU. New to Northern Caucasus. In Transcaucasia, this species has been recently reported from Armenia (Gasparyan et al., 2015).

ALYXORIA CULMIGENA (Libert) Ertz – Karabudakhkent district, 2.5 km S of Malyj Uitash village,

42°47'19.4"N, 47°35'20"E, on *Quercus petraea*, 24.07.2015, leg. GU. In Caucasus, the species was previously reported only from the Krasnodar Area (Himmelbrant et al., 2003).

ARTHONIA VARIANS (Davies) Nyl. – Karabudakhkent district, 2.5 km S of Malyj Uitash village, 42°47'19.4"N, 47°35'20"E, lichenicolous fungus on apothecia of *Lecanora rupicola* on sandstone, 24.07.2015, leg. GU. In Caucasus, the species was previously reported from the Republic of Northern Ossetia (Vainio, 1899) and the Abrau Peninsula, Krasnodar Area (Urbanavichus & Urbanavichene, 2015a).

#BELLEMERELLA POLYSPORINAE Calat. & Nav.-Ros. – Karabudakhkent district, N of Taulargol village, 42°50'13"N, 47°34'58.5"E, lichenicolous fungus on apothecia and thallus of *Polysporina subfuscescens* on sandstone, 24.07.2015, leg. GU. New to Russia, Caucasus and Asia. This species was known only from the type locality in Spain growing on *Polysporina simplex* (Calatayud & Navarro-Rosinés, 2001). The Dagestanian specimen agrees well with the original description. This is the first report of the genus for Russia and Caucasus.

#DIDYMOCYRTIS RAMALINAE (Roberge ex Desm.) Ertz, Diederich & Hafellner – Karabudakhkent district, Malyj Uitash village, 42°48'34.1"N, 47°35'49.9"E, lichenicolous fungus on thallus of *Ramalina capitata* on sandstone, 24.07.2015, leg. GU. In Russia and Caucasus, this species has been recently reported by Urbanavichus and Urbanavichene (2015b) from the Abrau Peninsula, Krasnodar Area (as *Leptosphaeria ramalinae* (Desm.) Sacc.).

DIPLOTTOMMA CHLOROPHAEUM (Hepp ex Leight.) Szatala – Karabudakhkent district, N of Taulargol village, 42°50'13"N, 47°34'58.5"E, on sandstone, 24.07.2015, leg. AI & GU. Ibid., S of Taulargol village, 42°49'36.5"N, 47°35'05.6"E, on sandstone, 24.07.2015, leg. GU. In Northern Caucasus, this species has been recently reported by Urbanavichus and Urbanavichene (2015a) from the Abrau Peninsula, Krasnodar Area. In Transcaucasia, the species was recorded from Armenia, Azerbaijan and Georgia (Barkhalov, 1983).

GYALECTA CARNEOLA (Ach.) Hellb. – Karabudakhkent district, 2.5 km S of Malyj Uitash village, 42°47'19.4"N, 47°35'20"E, on *Quercus petraea*, 24.07.2015, leg. GU. In Caucasus, this species

was only recorded from the Krasnodar Area (Himmelbrant & Kuznetsova, 2002).

INTRALICHEN LICHENICOLA (M. S. Christ. & D. Hawksw.) D. Hawksw. & M. S. Cole – Karabudakhkent district, Malyj Uitash village, 42°48'34.1"N, 47°35'49.9"E, lichenicolous fungus on apothecia of *Candelariella vitellina* on sandstone, 24.07.2015, leg. GU. In Caucasus, this species has been recently reported from the Republic of Adygea and Krasnodar Area (Urbanavichus & Urbanavichene, 2014).

LECANIA TURICENSIS (Hepp) Müll. Arg. – Karabudakhkent district, the Caspian Sea shore, ca. 1.5 km S of sanatorium "Chajka", 42°41'08.7"N, 47°43'37.4"E, on calcareous rocks, 25.07.2015, leg. GU. In Caucasus, this species was only recorded from the Republic of Adygea (Urbanavichus & Urbanavichene, 2014), Armenia and Azerbaijan (Barkhalov, 1983).

LECANORA CENISIA Ach. – Karabudakhkent district, S of Taulargol village, 42°49'36.5"N, 47°35'05.6"E, on sandstone, 24.07.2015, leg. GU. The species is widely distributed in Caucasus: Krasnodar Area (Krivorotov, 1997), Republics of Kabardino-Balkaria (Slonov, 2002) and Karachaevo-Cherkessia (Blinkova & Urbanavichus, 2005), Stavropol Area, Abkhazia, Azerbaijan and Georgia (Barkhalov, 1983).

LECANORA CONTRACTULA Nyl. – Karabudakhkent district, S of Taulargol village, 42°49'36.5"N, 47°35'05.6"E, on sandstone, 24.07.2015, leg. GU. New to Caucasus.

LECANORA GANGALEOIDES Nyl. – Karabudakhkent district, N of Taulargol village, 42°50'13"N, 47°34'58.5"E, on sandstone, 24.07.2015, leg. AI. In Caucasus, this species has been reported from the Abrau Peninsula, Krasnodar Area (Otte, 2005) and Azerbaijan (Barkhalov, 1983).

LECANORA PANNONICA Szatala – Karabudakhkent district, N of Taulargol village, 42°50'13"N, 47°34'58.5"E, on sandstone, 24.07.2015, leg. GU. Ibid., S of Taulargol village, 42°49'36.5"N, 47°35'05.6"E, on sandstone, 24.07.2015, leg. GU. New to Russia and Caucasus. The species is known from many regions of Western Europe and southwestern North America (Ryan et al., 2004). *L. pannonica* may be similar to the sorediate *Tephromela grumosa*. However, the latter species is readily distinguished by a different chemistry (contains lichesterinic acid as major

compound, with traces of atranorin), and it has coalescing soralia.

#LEPROCAULON QUISQUILIARE (Leers) M. Choisy (*Leprocaulon microscopicum* (Vill.) Gams) – Karabudakhkent district, N of Taulargol village, 42°50'13"N, 47°34'58.5"E, among mosses at the base of dry, rather unstable, sandy cliffs, 24.07.2015, leg. AI & GU. In Northern Caucasus, this species has been recently reported by Urbanavichus and Urbanavichene (2015a) from the Abrau Peninsula, Krasnodar Area. Formerly known from Georgia and Azerbaijan (Barkhalov, 1983) and recently reported from Armenia (Gasparyan et al., 2015).

OPEGRAPHA LUTULENTA Nyl. – Karabudakhkent district, 2.5 km S of Malyj Uitash village, 42°47'19.4"N, 47°35'20"E, on steeply inclined, basic sandstone, 24.07.2015, leg. GU. New to Russia, Caucasus and Asia. The species was formerly known from Mediterranean and Macaronesia (Egea & Rowe, 1987; Hafellner, 1995).

PHYSCONIA PETRAEA (Poelt) Vězda & Poelt – Karabudakhkent district, 2.5 km S of Malyj Uitash village, 42°47'19.4"N, 47°35'20"E, over the moss on sandstone, 24.07.2015, leg. GU. In Russia and Caucasus, this species has only been recorded from the Republic of Northern Ossetia (Otte et al., 2002).

PLACOPYRENIUM BUCEKII (Nádv. & Servít) Breuss – Karabudakhkent district, S of Taulargol village, 42°49'36.5"N, 47°35'05.6"E, on sandstone (specimen was infected by *Muellerella pygmaea* (Körb.) D. Hawksw.), 24.07.2015, leg. GU. Derbent district, limestone cliffs on the right bank of the Rubas river, 41°52'16.4"N, 48°17'02.9"E, on calcareous rocks, 17.07.2015, leg. GU. This species has been reported from the Republic of Northern Ossetia and Armenia (Breuss, 2009).

#PORPIDINIA TUMIDULA (Sm.) Timdal – Derbent district, limestone cliffs on the right bank of the Rubas river, 41°52'16.4"N, 48°17'02.9"E, on calcareous rocks, 17.07.2015, leg. GU. Bujnaxsk district, Talgi gorge, 42°52'56.1"N, 47°24'23.7"E, on calcareous rocks, 26.07.2015, leg. GU. This is the first report of the genus and species for Russia and Caucasus.

#PROTOPARMELIA MONTAGNEI (Fr.) Poelt & Nimis – Karabudakhkent district, S of Taulargol village, 42°49'36.5"N, 47°35'05.6"E, on sandstone, 24.07.2015, leg. AI & GU. Ibid., 2.5 km S of

Malyj Uitash village, 42°47'19.4"N, 47°35'20"E, on sandstone, 24.07.2015, leg. AI & GU. A mainly Mediterranean-Macaronesian species of siliceous rocks, abundant in arid and open sites (Barbero et al., 2006). This is the first convincing record of the species in Caucasus. The previous report of this thermophilous species from the subnival belt of the Kabardino-Balkaria Republic (Slonov, 2002) is doubtful.

RAMALINA CAPITATA (Ach.) Nyl. – Karabudakhkent district, S of Taulargol village, 42°49'36.5"N, 47°35'05.6"E, on vertical and underhanging sandstone protected from rain, 24.07.2015, leg. AI & GU. Ibid., Malyj Uitash village, 42°48'34.1"N, 47°35'49.9"E, on vertical sandstone, 24.07.2015, leg. AI & GU. Ibid., 2.5 km S of Malyj Uitash village, 42°47'19.4"N, 47°35'20"E, on vertical and underhanging sandstone, 24.07.2015, leg. GU. The species is widely distributed in Caucasus: Krasnodar and Stavropol Areas, Republics of Northern Ossetia and Chechnya, Armenia, Azerbaijan and Georgia (Barkhalov, 1983).

RHIZOCARPON DISTINCTUM Th. Fr. – Karabudakhkent district, N of Taulargol village, 42°50'13"N, 47°34'58.5"E, on sandstone, 24.07.2015, leg. AI. In Caucasus, this species has been reported earlier from the Republics of Kabardino-Balkaria (Slonov, 2002), and from Armenia, Azerbaijan and Georgia (Barkhalov, 1983).

RINODINA CONFRAGOSA (Ach.) Körb. – Karabudakhkent district, 2.5 km S of Malyj Uitash village, 42°47'19.4"N, 47°35'20"E, on sandstone, 24.07.2015, leg. AI. In Caucasus, this species has been reported earlier from the Republics of Northern Ossetia (Vainio, 1899) and Adygea (Otte, 2007), from Armenia, Azerbaijan and Georgia (Barkhalov, 1983).

#STRANGOSPORA DEPLANATA (Almq.) Clauzade & Cl. Roux – Bujnaks district, Talgi gorge, 42°52'56.1"N, 47°24'23.7"E, on *Acer campestre*, 12.04.2013, leg. AI. New to Caucasus. This is the first report of the genus for the North-Caucasian lichen flora.

THELENELLA MUSCORUM (Fr.) Vain. – Karabudakhkent district, 2.5 km S of Malyj Uitash village, 42°47'19.4"N, 47°35'20"E, over the moss on sandstone, 24.07.2015, leg. GU. In Caucasus, this species has been reported earlier from the Republic of Kabardino-Balkaria (Vainio, 1899) and the Krasnodar Area (Krivorotov, 1997).

#TREMELLA CANDELARIELLAE Diederich & Etayo – Karabudakhkent district, 2.5 km S of Malyj Uitash village, 42°47'19.4"N, 47°35'20"E, lichenicolous fungus on thallus of *Candelariella xanthostigma* on *Quercus petraea*, 24.07.2015, leg. GU. New to Caucasus and Asia. It has been only once recorded from Russia before – in Murmansk region (Urbanavichus, 2016).

VERRUCARIA PRAERUPTA Anzi – Karabudakhkent district, the Caspian Sea shore, ca. 1.5 km S of sanatorium "Chajka", 42°41'08.7"N, 47°43'37.4"E, on calcareous rocks, 25.07.2015, leg. GU. New to Russia, Caucasus and Asia.

VERRUCARIA SCHINDLERI Servit – Karabudakhkent district, the Caspian Sea shore, ca. 1.5 km S of sanatorium "Chajka", 42°41'08.7"N, 47°43'37.4"E, on calcareous rocks, 25.07.2015, leg. GU. In Russia and Caucasus, this species has been recently reported from the Krasnodar Area (Urbanavichus & Urbanavichene, 2015b).

ACKNOWLEDGEMENTS

We thank Dr Jan Vondrák for valuable suggestions and comments on the manuscript. We are also very grateful to Dr Volker Otte and anonymous reviewer for valuable suggestions and comments on the manuscript. This work was supported by a grant from the Russian Foundation for Basic Research (no. 15-29-02396).

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