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NEW RECORDS OF *LECANORA PERCRENATA*, WITH NOTES ON OTHER MEMBERS OF *L. DISPERSA* GROUP IN RYAZAN REGION (RUSSIA)

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Abstract. *Lecanora percrenata* H. Magn. is reported as new for Europe. The species is also noted from Kazakhstan, Kyrgyzstan and Tajikistan. *Lecanora albescens* (Hoffm.) Branth & Rostr. and *L. perpruinosa* Fröberg are reported for the first time from the Ryazan region in Russia. New records of *L. dispersa* (Pers.) Sommerf. and *L. semipallida* H. Magn. in the area of Ryazan are also given.

Key words: distribution, *Lecanorales*, lichenized fungi, taxonomy

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INTRODUCTION

The *Lecanora dispersa* group is a species complex characterized by a thallus generally not visible, immersed in rock (endolithic) or bark (endophloedal), with only the apothecia on the surface. Apothecia are small, scattered to crowded, with a mostly white to grey thalline margin. Ascospores are ellipsoid, narrowly ellipsoid to broadly ellipsoid. Species of the complex produce xanthones (e.g., 2,7-dichlorolichexanthone, vinetorin), pannarin and gyrophoric acid as lichen substances, or else lacking any secondary metabolites. A few species of the complex are known as occurring worldwide, and others have various distribution ranges.

In Europe the *L. dispersa* group has been treated by Poelt *et al.* (1995) based mainly on eastern Alps representatives, by Fröberg (1997) describing species from southern Sweden, and by Laundon (2003, 2010) studying selected species in the British Isles. Much information regarding the continent was also provided by Śliwa (2007) in a systematic revision of species of the *L. dispersa* group for North America. Though there has been significant progress in knowledge of the group, some areas in Europe are not sufficiently explored. Russia, and especially some regions of the country, are very poorly investigated despite their interest in terms of biodiversity. The Ryazan region is one such area.

The saxicolous lichens of the region have not been studied until now. Only two species of the group *L. dispersa* have been reported from the area: *L. dispersa* (Pers.) Sommerf. (Zhdanov & Volosnova 2008), found in the Oksky National Biosphere Reserve, and *L. semipallida* (Muchnik *et al.* 2009, as *L. flotoviana*) in the Miloslavsky district (Kochurovka River valley).

In 2009 more than 1000 lichen specimens were collected, about 200 of them saxicolous, during a joint expedition of the Forest Science Institute of the Russian Academy of Sciences and S.A. Esenin Ryazan State University. Determination of the species yielded records of rare and interesting species of the genus *Lecanora* and especially the *L. dispersa* complex. The most interesting ones include one species new for Europe and two new regional records. We present them along with notes

on other members of the *L. dispersa* group in the region. We also give new records of *L. percrenata* from Southeast Asia, from herbarium work (see Śliwa 2007).

Study area

The Ryazan region, covering 39,600 km^2, is located in the central part of the Russian Plain (55°22′–53°19′N, 38°38′–42°31′E). The western and southwestern parts of the region are on the Central Russian Upland (elevation 170–236 m a.s.l.), the eastern part is situated in the Oksko-Donskaya Plain (140–198 m a.s.l.) and Meschers-kaya Lowland (100–136 m a.s.l.). The climate is moderately continental, with average January temperature –11°C, average July temperature +19°C, and annual precipitation from 760 mm in the northern part and high-elevation southwest to 500 mm and lower in the south. The northern part of the Ryazan region is in the mixed coniferous-broadleaved forest zone, the middle part in the broadleaved forest zone, and the southern part in the forest-steppe zone. The natural landscape of the broadleaved forest and forest-steppe zones is highly altered by human activities (Krivtsov 2004).

In the south and southeast of the region (Miloslavsky, Kasimovsky and some other districts), outcrops of limestone and sandstone occasionally occur, which are of considerable interest for lichenological research.

Material and methods

Lichens were collected by the first author (some with N. Lebedeva) in 2009 from all available habitats and substrates. Members of the *L. dispersa* group were found at the following sites (Fig. 1):

1 – Miloslavsky district, Miloslavskaya Forest-steppe National Special Nature Reserve, steppe hillslope with limestone near Loshaki village, 53°34.593′N/38°59.920′E, alt. 163 m, 27 May 2009.

2 – Miloslavsky district, Miloslavskaya Forest-steppe National Special Nature Reserve, Panika River valley, Sinie Kamni area, 53°37.261′N/39°02.729′E, alt. 152 m, 28 May 2009.

3 – Miloslavsky district, Kochurovka River valley, near Voeikovo village, Kochurovskie Skaly Natural Monument, 53°25.923′N/39°10.738′E, alt. 152 m, 28 May 2009.

4 – Kasimovsky district, Scherbatovskie Izvestnyaki Natural Monument, right bank of the Oka River near Scherbatovka village, 54°48.298′N/41°44.193′E, alt. 103 m, 9 July 2009.

5 – Kasimovsky district, Gus-Zhelezny settlement, church built of natural limestone, 55°03.410′N/41°09.770′E, alt. 124 m, 12 July 2009.

Lichens were identified by routine microscopy and laboratory techniques. Brief taxonomic notes are provided for all species. We briefly discuss the world distribution of *L. percrenata*, supplemented by new records based on revision of available herbarium material. More detailed species descriptions as well as information on their distribution are given by Śliwa (2007).

Voucher specimens are housed at RSU, with some duplicates at KRAM and LE.

Results

The following species of *Lecanora dispersa* group were noted during the survey:

Lecanora albescens (Hoffm.) Branth & Rostr.

Thallus clearly visible, often forming distinct rosettes, thick or thin, areolate, usually slightly lobate at margins, surface pruinose; white, yellowish, cream or pale grey; apothecia 0.4–1.4 mm diam., clustered in groups on thallus areoles, disc yellowish to pale brown, slightly to heavily pruinose;

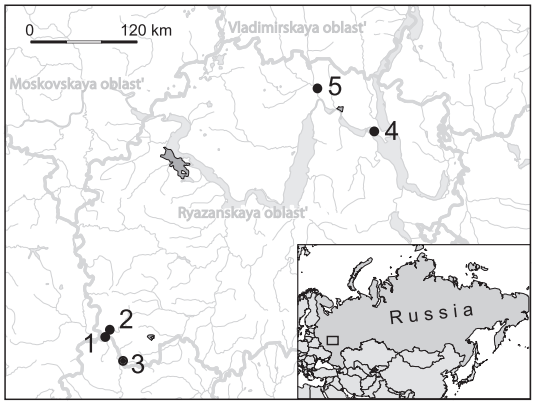

Fig. 1. Location of collection sites in Ryazan region (Russia).

granules in epithecium insoluble in K and N, also interspersed through the entire hymenium; paraphyses slender, somewhat branched throughout; spores 9–13(–15) × 4.5–7.5 µm; 2,7-dichlorolichexanthone and ±pannarin present, or lichen products lacking.

On limestone steps of church. Collection site: 5. New to Ryazan region.

Lecanora dispersa (Pers.) Sommerf.

Thallus within substrate; apothecia 0.3–0.9 mm diam., occurring singly or clustered in groups, sessile or constricted at base, concave, flat when mature or soon convex, disc yellowish grey, pale brown, dark brown or almost black, usually epruinose, margin entire, white or whitish, or concolorous with thallus or with disc; granules in epithecium insoluble in K and insoluble in N, also interspersed through the whole hymenium; paraphyses slender, somewhat branched throughout; spores 8–12 × 4.5–6 µm; 2,7-dichlorolichexanthone and ±pannarin present, or lichen products lacking.

On sandstone and on limestone. Collection sites: 2 and 4. See also Zhdanov and Volosnova (2008).

Lecanora percrenata H. Magn.

Thallus within substrate, or crustose, thin, mostly continuous, more or less smooth or rimose, pale, cream or greyish; apothecia 0.3–0.9 mm diam., sessile or base of apothecia slightly immersed in rock, disc black or almost black, epruinose, or slightly pruinose, smooth, margin prominent, cracked (with numerous fissures), white or grey; epithecium pigmented deeply (up to 1/3 of upper hymenium), shades of olive, green or blue, not at all granular; paraphyses simple, submoniliform in uppermost part; spores 12–18 × 4–6 µm; pycnidia often present, conidia filiform and curved, 16–19 µm long; lichen products lacking.

On limestone. Collection sites: 3 and 5. New for Europe.

NOTES. The species is well distinguished by the cracked apothecial margin and narrowly ellipsoid spores. These characters make *L. percrenata* superficially resemble *L. flowersiana*, but it differs from the latter by having a very dark to black apothecial disc, a brown, olive, or bluish green epithecium, and usually a more distinctive thallus. *Lecanora fowersiana* usually has a reddish brown or dark brown apothecial disc and an epithecium tinted brown or reddish. Some differences in spore shape were also observed: spores of *L. percrenata* are longer and most often narrowly ellipsoid. The production of pycnidia by the latter may also prove a significant diagnostic character. *Lecanora percrenata* may also appear similar to the saxicolous form of *L. hagenii* (Ach.) Ach., but the latter differs in having a brownish, often pruinose apothecial disc and considerably shorter spores up to 9–13(–15) µm long. For further details see Śliwa (2007).

The species grows directly on calcareous rock (sandstone, caliche, limestone) but also on solid field volcanic ash, or on wood. It was described from China where it is known from Kansu Province (Magnusson 1940). Later it was recorded in Southeast Asia, in Afghanistan (Poelt & Wirth 1968) and Iran (Valadbeigi & Sipman 2010). Based on the present study it is also shown to occur in the area also in Kazakhstan, Kyrgyzstan and Tajikistan (see below). It is also reported from North America where it is scattered in the central and western parts of the continent (Śliwa 2007). The total known distribution of the species is mapped in Figure 2.

ADDITIONAL SPECIMENS EXAMINED. KAZAKHSTAN. Mangyshlak Peninsula, Yuzhnyi Aktau range, 23 km WNW of Tauchik, alt. 175 m, 6 June 1982, *Andreev 821405* (LE). KYRGYZSTAN. Southeast slope of Fergana range, 35 km of Arpa, mouth of Ichkele-su River, alt. 2750 m, 22 July 1973, *Bredkina 1962* (LE). TAJIKISTAN. Eastern Pamir, Murgab, basin of Chechekty River, alt. 3860 m, 15 July 1965, *Golubkova 330* (LE); basin of Aksu River, Kyzyl-Rabat, 4200 m, 9 Aug. 1966, *Golubkova 762* (LE).

Lecanora perpruinosa Fröberg

Thallus superficial, ash-grey, thin, rimose or areolate, edge indefinite but mostly continuous; apothecia 0.3–0.8 mm diam, sessile, disc black

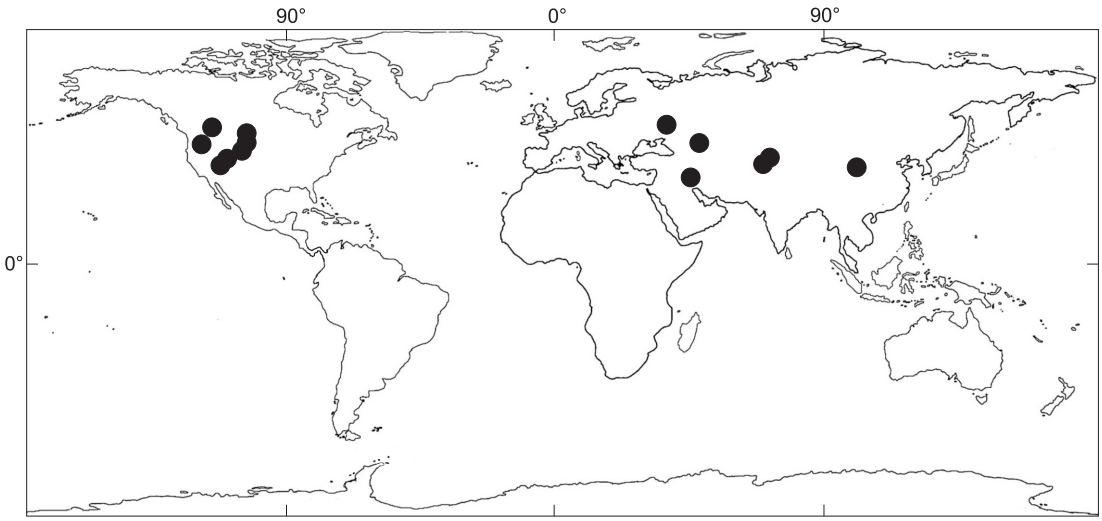

Fig. 2. Known world distribution of *Lecanora percrenata* H. Magn.

or almost black, or dark red to brown, heavily bluish-white pruinose, margin prominent, or level with the disc, pruinose, concolorous with thallus; amphithecial cortex distinctly paraplechtenchymatous; granules in epithecium absent; paraphyses simple, thick, submoniliform; spore size 10.5–12.0 × 5.0–7.5 µm; lichen products lacking.

On limestone. Collection site: 4. New for Ryazan region.

Lecanora semipallida H. Magn.

Lecanora flotoviana auct.

Thallus within substrate; apothecia 0.4–1.3(–1.4) mm diam., occurring singly or clustered in groups, sessile or constricted at base to almost raised, flat when mature or flexuose, margin prominent or level with disc, often considerably thick, smooth or rough, entire or distinctly crenate, often with bluish pigment; granules in epithecium soluble in K and insoluble in N; paraphyses simple or dichotomously branched at tips, slender or thickened; spore 7.5–13.0 × 4.5–7.5 µm; pycnidia sometimes observed, conidia filiform and curved, 10–17(–18) µm long; vinetorin present.

On limestone. Collection site: 1 and 3. See also Muchnik *et al.* (2009).

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