



Megalospora porphyritis (Tuck.) R.C. Harris, a new record for Russia

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ABSTRACT

A new finding of *Megalospora porphyritis*, previously known only from North America and Japan was registered on Sakhalin and Kuriles, Far East of Russia. The taxon is considered as a good example of an American/Asian disjunction most likely related to geological events in the Tertiary. Illustrations of lichen's morphological features and a map of finding points are provided.

Keywords: rare species, disjunction, relict, broad-leaved forest

РЕЗЮМЕ

Ежкин А.К. *Megalospora porphyritis* (Тук.) Р.С. Харрис, новый вид для России. Вид *Megalospora porphyritis*, известный с Северной Америки и Японии, был впервые обнаружен на Сахалине и Курильских островах на Дальнем Востоке России. Таксон может рассматриваться в качестве хорошего примера Американско-Азиатской дизъюнкции, вероятно возникшей в результате геологических процессов в третичном периоде. В статье представлены фотографии лишайника, а также карта с точками нахождения вида.

Ключевые слова: редкие виды, дизъюнкция, реликт, широколиственный лес

The genus *Megalospora* (Meyen) consists of 50 mainly pantropical and tropical species (<http://www.mycobank.org>, accessed: 19 September 2018). Some species extends less far into temperate areas e.g. in North America, East Asia and Europe (Sipman 1983). Megalosporaceae (Vezda ex Hafellner & Bellem.) species are generally found in humid forests locally known as “rainforest” and are common in suitable habitats. Many species with restricted distribution have become rare and might come in danger of extinction because of increasing forest harvesting (Sipman 1983). The Megalosporaceae have recently been confirmed to belong to Teloschistales D. Hawksw. & O.E. Erikss. (Helms et al. 2003). The main character identifying *Megalospora* species is the heavily interspersed hymenium and often large apothecia with big transversely septate ascospores (Lücking 2007).

Megalospora porphyritis has become the third species of the genus found in the Far East of Russia. *M. tuberculosa* (Fée) Sipman and *Megalospora atrorubicans* ssp. *sendaiensis* (Räsänen) Sipman were earlier registered in the Sakhalin Region (Inсарov & Pchelkin 1988, Konoreva et al. 2018). *M. tuberculosa* is quite common species on South Kuriles (Kunashir and Shikotan) and rare on Sakhalin. It occurs on bark of coniferous and deciduous trees and characterized by non-sorediate thallus and big 8–10(12)-celled bacillar-pluriseptate spores. *Megalospora atrorubicans* ssp. *sendaiensis* is rarer in the region and found only on Kunashir Island mostly on bark of old coniferous trees. The species is widely distributed in Japan (Sipman 1983). It differs from other two species by bicellular spores and thallus chemistry (presence of usnic acid and lack of pannarin).

M. porphyritis was previously related to *Tuberculosa* complex and was included in that species in a wide sense (Sipman 1983). But Harris (1984, 1986) reported that the eastern North American temperate populations with pannarin, sorediate thallus (mostly sterile), pruinose apothecia, smaller and fewer-celled ascospores represent a separate taxon. Later the position was adopted by other authors (Lücking 2007). According to Sipman (1983) the North American population of *M. porphyritis* has definite similarities in morphological and chemical features with Japanese and Australian populations. But it is worth noting *M. porphyritis* is still not added as a separate taxon to Japanese and Australian lichen checklists at the moment. *M. porphyritis* is also close to another recently described sorediate species – *M. galapagoensis* (Bungartz, Ziemmeck and Lücking) which is considered as a potentially endemic to the Galapagos Islands and differs from *M. porphyritis* by thallus chemistry (Lumbsch et al. 2011).

MATERIAL AND METHODS

All the material was examined using standard microscopic techniques with light microscopes MBS-10 and LOMO Mikmed 3. Identifications were done with the help of keys published by Lücking (2007). Natural compounds were characterized by high performance thin-layer chromatography (HPTLC) according to the methods standardized for lichen products (Arup et al. 1993). Spot tests were made with 10 % of KOH (K), Ca(ClO)₂ (C) and [C₆H₄(NH₂)₂] (P). Examined specimens are deposited in the Herbarium of

Institute of Marine Geology and Geophysics (SAK). Dublets of the samples were stored in Herbarium of Botanical Garden-Institute FEB RAS (VBGI).

RESULTS

Description: Thallus crustose, corticolous, 2–3 cm across, bluish grey, thick, smooth to uneven-rugulose. Soredia present, diffuse. Photobiont chlorococcoid. Apothecia are not numerous, scattered on the thallus, round, (0.5)–1.8(2.5) mm diam., disc plane, slightly convex, epruinose, margin distinct, slightly prominent, 0.1 mm wide, grey-black to black. Excipulum brownish, K–; epihymenium olive brownish; hypothecium brown, 100–130 μ m high; hymenium 150–200 μ m high, colorless, densely interspersed with small oil droplets. Ascospores single, hyaline, muriform, 77–90 \times 20–33 μ m (Fig. 1). Secondary chemistry: pannarin and zeorin. Spot tests: Cortex K–, C–, KC–, P+ yellow; medulla K–, C–, KC–, P+ yellow.

Specimens examined: the Russian Far East, Shikotan Island, Mt. Notoro, 43°46'40.9296"N 146°42'08.0495"E, alt. 92 m, riparian broad-leaved forest with *Acer pictum* Thunb., on bark of *Padus sibirii* (Fr. Schmidt) C.K. Schneid, 17 June 2017, leg. A.K. Ezhkin (SAK 1653, 1661). Sakhalin Island, Vavayskoye lake surroundings, 46°36'35.9172"N, 143°18'50.8968"E, alt. 21 m, coniferous forest, on bark of *Picea jezoensis* (Sieb. et Juss.) Carr., 1 August 2016, leg. A.K. Ezhkin (SAK 1662). Sakhalin Island, Firsovka river valley, 47°38'42.5"N, 142°34'19.3"E, alt. 18 m, coniferous forest, on bark of *Taxus cuspidata* Siebold et Zucc. Ex Endl., 1 May 2017, leg. A.K. Ezhkin (SAK 1663).

DISCUSSION

A new finding of *Megalospora porphyritis* in the Russian Far East has become one more interesting species of the

Eastern Asiatic – Western North American group with a disjunctive range that it was recently added with some remarkable species of lichens from the genus *Rinodina* ((Ach.) Gray) (Sheard et al. 2017, Galanina et al. 2018) and the family Pannariaceae (Ezhkin & Yørgensen 2018). In the Russian Far East *M. porphyritis* was occasionally found in coniferous and riparian broad-leaved forest areas in low and middle elevations not far from the coastline. North American population of *M. porphyritis* was found in very similar ecological conditions as Russian population – in moist coniferous and mixed hardwoods at different altitudes from 10 to 1500 m above sea level mostly near the coastline of the Atlantic Ocean (<http://lichenportal.org>) (Fig. 2A). Populations *M. porphyritis* of Sakhalin and Kuriles are relatively small and rare. The species was found only in three locations (Fig. 2B). The habitats of the lichen are limited by small forest areas with minimal human impact located on nature protected territories. Traces of old random wood harvesting with trees more than 120 years old were found on the studied territories so these forest areas could be considered as refugiums for the species. This suggests *M. porphyritis* to be a good example of Arcto-Tertiary relict lichen populations that were separated due to geological events in the past.

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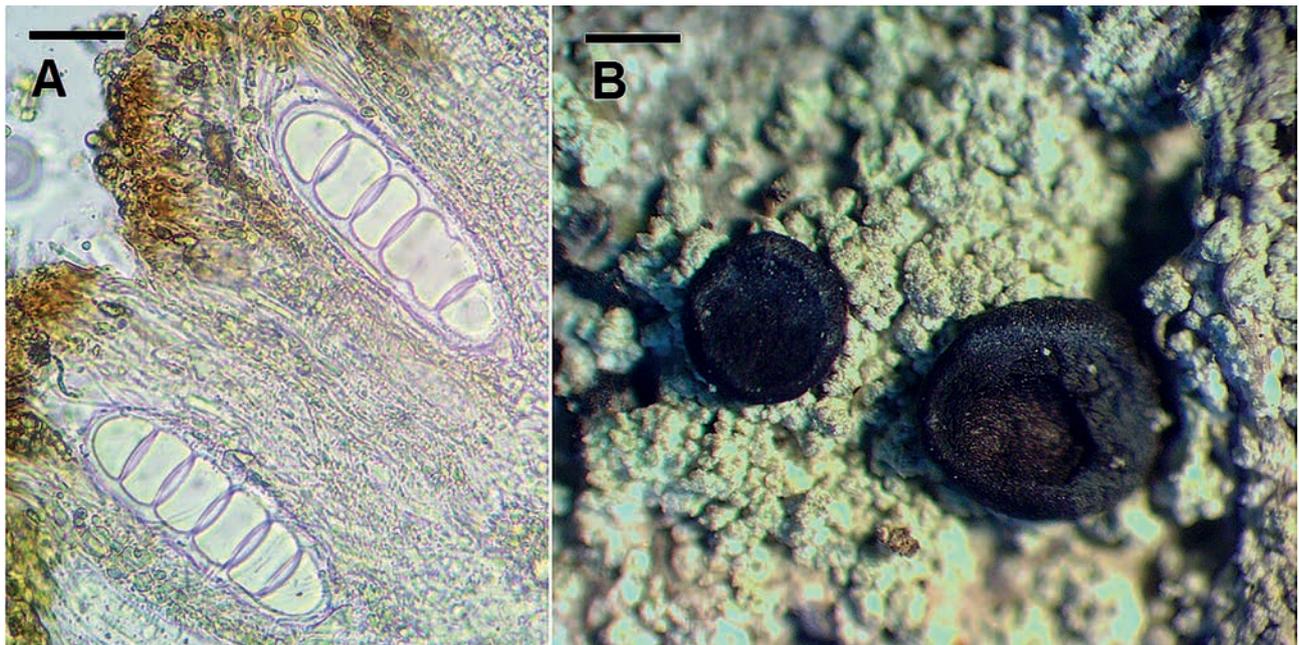


Figure 1 *Megalospora porphyritis*. A – apothecium in cross section with spores, B – thallus with apothecia. Scale bars: A = 50 μ m, B = 1 mm.

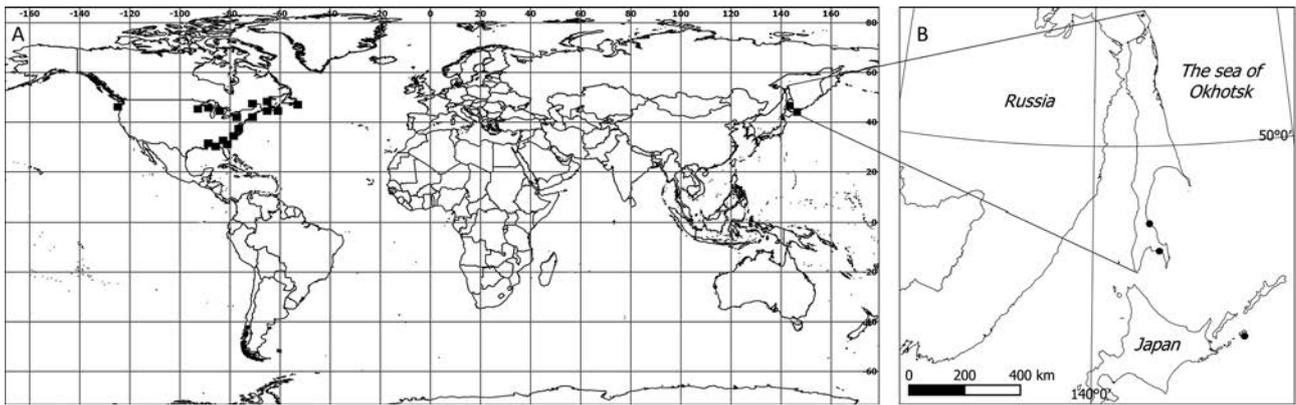


Figure 2 Distribution of *Megalospora porphyritis* in the World (<http://lichenportal.org>) (A) and the Sakhalin Region (B)

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