Rhizocarpon distinctum and R. superficiale new to the Yamal Peninsula, Russia

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Rhizocarpon distinctum and *R. superficiale* are reported new to the Yamal Peninsula, West Siberian Arctic, Russia, based on material collected in 1990 in northern subarctic tundra.

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The Yamal Penisula is situated in Yamal-Nenets Autonomous District of northwest Siberia, Russia. The Peninsula is bordered principally by the Kara Sea, Baydaratskaya Bay on the west and by the Gulf of Ob on the east. Yamal is situated in the south-eastern part of Karski (Eastern) region of the Atlantic climate zone of the Arctic. Specific for this zone are prolonged cold winters with strong winds, and short and cool summers with long daylight periods. The Peninsula consists mostly of permafrost ground and is geologically a very young place – some areas less than 10 000 years old (Czernyadjeva 2001). It is located in tundra zone.

Although species of *Rhizocarpon* are widespread in in the Yamal Peninsula they have been yet weakly recognized in that region. Papers specifically dealing with *Rhizocarpon* in the Yamal Peninsula include Andreev (1982, 1984, Pristjazhnjuk (1994, 1996a, b, 1998), Andreev et al. (1996), Golubkova et al. (2003), Magomedova et al. (2006), and Zhdanov (2009). Eight species have been reported: *Rhizocarpon cinereovirens*, *R. expallescens*, *R. ferrax*, *R. geographicum*., *R. hochstetteri*, *R. lecanorinum*, *R. oederi* and *R. polycarpum*. The species were found on pebbles, on small stones, on disturbed soil in dry tundra. The habitats recorded were usually open and sunny.

In Siberia 46 species of *Rhizocarpon* have been reported (Urbanavichus & Andreev 2010), including 35 in Siberian Arctic, 34 in Southern Siberia, 22 in Eastern Siberia and 1 in Western Siberia. *Rhizocarpon distinctum* is known from Eastern and Southern Siberia and *R. superficiale* from Siberian Arctic and Southern Siberia.

The aim of this paper is to to provide new information about *Rhizocarpon* on the Yamal Peninsula based on material that has not been previously examined.

Material and methods

The material was collected by the first author during the Russian Expedition to Yamal-Nenets Autonomous District (15 July 1990 to 13 August 1990). The specimens were collected in

the northern subarctic tundra, in the upper reaches of Mordiyakha River and Sateyakha River, to the west of the Sedaty-Tomboyto Lake (lake number 2). Coordinates are 69°45'N, 68°40'E.

The specimens were examined using standard microscopic techniques. Secondary metabolites were determined by thin layer chromatography (TLC) in solvents A and C (methods according to Orange et al. 2001). The nomenclature is in accordance with Santesson et al. (2004).

The species

Five species of *Rhizocarpon* were identified in the studied material: *R. distinctum*, *R. geographicum*, *R. lecanorinum*, *R. polycarpum*, and *R. superficiale*. Of these *R. distinctum* and *R. superficiale* are reported as new to the Yamal Peninsula Region.

Rhizocarpon distinctum

For the characteristics of the species see Ihlen (2004). Spot test reactions: thallus K+ yellow, C−, KC−, PD−; medulla I+ blue, PD–, K–, C−. Substances detected by TLC: stictic acid in thallus and apothecia. *Rhizocarpon distinctum* is a bipolar species being know from North Europe (inclusive of Novaya Zemlya), Greenland, North America, South America and, Antarctica.

The species is here reported for the first time for Yamal Peninsula Region, Russia.

Specimens examined. **Russia.** *Yamal Peninsula*: Yamal-Nenets Autonomous District, Yamal Region, northern subarctic tundra, 1.5 km from lake number 2, stones in sand, 11 August 1990, leg. Golubkov, det. Matwiejuk (MSK-L).

Rhizocarpon superficiale

For the characteristics of the species see Poelt (1988) and Thomson (1997). Spot test reactions: thallus K+ yellow, Pd+ orange; medulla K+ yellow, Pd+ brick-red, I–, C–. Substances detected by TLC: rhizocarpic - and stictic acids in thallus and apothecia. *Rhizocarpon superficiale* is a circumpolar arctic and alpine species with occurrences also in South America, New Zealand and Antarctica in the Southern Hemisphere. It is here reported the first time for Yamal Peninsula Region, Russia.

Specimens examined: **Russia.** *Yamal Peninsula*: Yamal-Nenets Autonomous District, Yamal Region, northern subarctic tundra, 3 km from lake number 2, 11 August 1990, leg. Golubkov, det. Matwiejuk (MSK-L; 2 specimens).

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