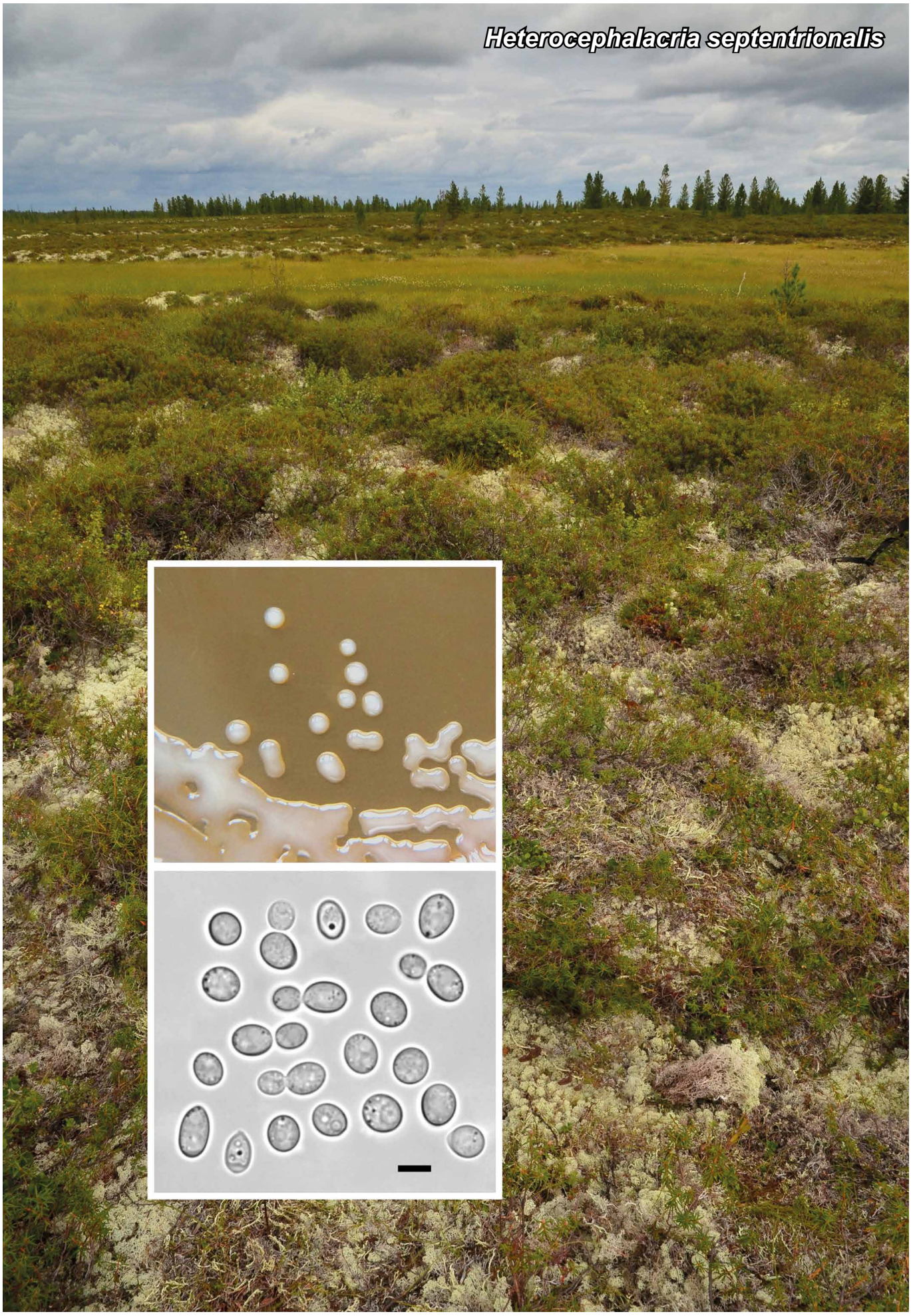

Heterocephalacria septentrionalis

Fungal Planet 1084 – 29 June 2020

Heterocephalacria septentrionalis Kachalkin, M.A. Tomashevskaya & T.A. Pankratov, *sp. nov.*

Etymology. The epithet refers to the species distribution in the northern regions of Russia.

Classification — *Filobasidiaceae*, *Filobasidiales*, *Tremellomycetes*.

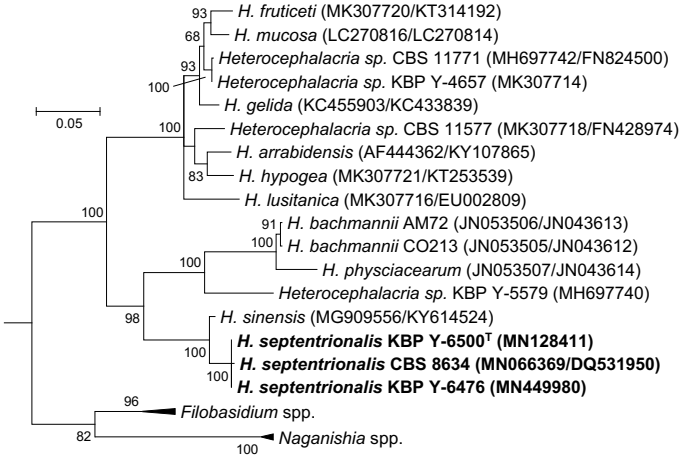
On glucose peptone yeast extract agar (GPYA) and 5 % malt extract agar (MEA), after 7 d at 20 °C, *streak* is cream-coloured, shiny and mucoid, with an entire margin, and flat profile. After a month, the colour of the streak is pinkish cinnamon. *Cells* are globose, ovoid to ellipsoid, 4–7 × 2.5–4 µm, occur singly or in pairs, dividing by polar and multilateral budding. *Sexual structures*, *pseudohyphae*, *true hyphae* and *ballistoconidia* have not been observed during 4 wk at 10 and 20 °C in culture (pure cultures and in mating test) grown on GPYA, MEA, potato dextrose agar (PDA), yeast nitrogen base with 0.5 % glucose (YNB) agar and cornmeal agar. Glucose is not fermented. Glucose, galactose, sucrose, maltose, cellobiose, trehalose, lactose, melibiose, raffinose, melezitose, soluble starch (variable and weak), D-xylose, L-arabinose, D-arabinose, D-ribose, L-rhamnose, D-glucosamine (variable and weak), ethanol (weak), glycerol (weak), ribitol (weak), galactitol, D-mannitol, D-glucitol, methyl alpha-D-glucoside, salicin, D-gluconate, succinic acid, citric acid, 2-keto-D-gluconate, *myo*-inositol and arbutin are assimilated; no growth occurs on L-sorbose, inulin, erythritol, DL-lactic acid, methanol. Nitrogen compounds: ammonium sulfate, potassium nitrate, L-lysine (variable), D-glucosamine (variable), cadaverine (variable), creatinine (variable), creatine (variable) are assimilated, and no growth occurs on ethylamine. Growth on vitamin-free medium is variable. Growth on MEA with 10 % NaCl and on 50 % w/w glucose / yeast extract (0.5 %) agar is negative. Growth with 0.01 % and 0.1 % cycloheximide is variable. Starch-like compounds are produced. Diazonium blue B colour and urease reactions are positive. Maximum growth temperature is 22–24 °C.

Typus. Russia, Nadym, as endophyte from *Cladonia rangiferina* (*Cladoniaceae*), July 2017, *T.A. Pankratov & A.V. Kachalkin*, 1126v (holotype KBP Y-6500 preserved in a metabolically inactive state, ex-type cultures VKM Y-3042 = DSM 110122 = CBS 16173; SSU, ITS-D1/D2 domains of LSU nrDNA, *TEF1* and *RPB1* sequences GenBank MN449978, MN128411, LR702004 and LR702006, MycoBank MB833504).

Additional materials examined. Russia, Nadym, as endophyte from *C. stellaris*, July 2017, *T.A. Pankratov & A.V. Kachalkin*, KBP Y-6476; ITS-D1/D2 domains of LSU nrDNA and *TEF1* sequences GenBank MN449980 and LR702005; Kandalaksha, from *Empetrum nigrum*, Sept. 1994, *I.P. Bab'eva & I.S. Reshetova*, KBP Y-3610 = CBS 8634; SSU, ITS and D1/D2 domains of LSU nrDNA sequences GenBank MN066371, MN066372 and DQ531950.

Colour illustrations. Russia, Nadym, forest-tundra zone of the Yamal Peninsula (photo provided by G.V. Matyshak). *Heterocephalacria septentrionalis* KBP Y-6500: growth of yeast colonies on MEA, yeast cells on MEA (after 7 d at 20 °C). Scale bar = 5 µm.

Notes — Analysis of the ITS-D1/D2 regions of the surveyed yeasts suggested that they were conspecific (2 subst. between strains from Nadym and Kandalaksha) and represented a hitherto undescribed species of *Heterocephalacria*. The genus *Heterocephalacria* comprises three sexual mycoparasites of lichens (*H. bachmannii* and *H. physciacearum*) and mushrooms (*H. solida*), and several asexual species of yeasts (Kachalkin et al. 2019, Kunthiphun et al. 2019, Li et al. 2019). Two new yeast strains were isolated as a minor component from *Cladonia* lichens whose thallus did not have basidioma-like structures. Although no sexual morph was discovered for new species, its mycoparasitic lifestyle cannot be excluded. Based on the NCBI GenBank database, the best hit using the **ITS** and **LSU** sequences is *H. sinensis* CBS 15417^{T} (**ITS** – GenBank MG909556; 96.21 % similar, 18 subst. and 3 gaps, **LSU** – GenBank KY614524; 98.01 % similar, 9 subst. and 2 gaps), using **SSU** it is *H. bachmannii* AM72 (GenBank JN043559; 99.34 % similar, 10 subst. and 1 gap), using ***TEF1*** and ***RPB1*** the number of nucleotide substitutions was considerable – without hits with *Heterocephalacria*. In compliance with a recent phylogenetic analysis of the genus (Kachalkin et al. 2019), the placement of the new species is demonstrated using the combined ITS and LSU rDNA phylogeny. *Heterocephalacria septentrionalis* can be differentiated from *H. sinensis* based on its ability to assimilate galactose, maltose, trehalose, melezitose, L-rhamnose, glycerol, D-mannitol, D-glucitol, citric acid, and negative growth on L-sorbose.



Maximum likelihood (ML) tree obtained from the combined analysis of ITS and LSU sequence data. Bootstrap support values above 55 % are shown at the nodes. The alignment included 980 bp and was performed with MAFFT v. 7 (Katoh et al. 2019). The General Time Reversible model (GTR) with Gamma distribution and invariant sites (G+I) was used as the best nucleotide substitution model. Phylogenetic analysis was conducted in MEGA v. 6 (Tamura et al. 2013). *Bullera alba* (AF444368/AF075500) was used as outgroup (hidden).

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