

*Clavispora reshetovae*



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## *Clavispora reshetovae* A. Yurkov, A.M. Schäfer & Begerow, sp. nov.

Cultura in striis in agarum cum dextroso et peptono et extracto levidinis (GPY) post unum mensem candida ad crema, obscura, laevis, margine integro. In agarum cum extracto malti post 3–5 dies ad 25 °C cellulae sphaeroideae ad ovoideae (1.5–2.5 × 2.5–5.0 µm), singulae, binae vel aggregatae, multilateraliter gemmantes. Post hebdomades tres in agarum cum extractis levidinis et malti (YM) vel in agarum cum extracto Solani tuberosi et dextroso (PD) ad 20–25 °C pseudohyphae vel hyphae verae desunt. Status teleomorphicus post cultivationem hebdomadam tres ad 16 °C in agarum cum extracto Solani tuberosi et dextroso (PD) observatus, homothallicus. Asci conjugatione cellularum vel conjugatione cellularum gemmarumque oriuntur, ascosporis duabus. Glucosum fermentatur. Glucosum, D-galactosum, L-sorbose, D-xylose, L-rhamnosum (exiguum, lente), sucrosus, D-maltosus, a,a-trehalosus, cellobiosus, salicinum, glycerolum, ribitolum (lente), D-glucitolum, D-mannitolum, ethanolum, acidum succinicum (exiguum, lente), acidum DL-lacticum (exiguum, lente) et acidum citricum (exiguum, lente) assimilantur at non D-glucosaminum, L-arabinosum, D-arabinosum, D-ribosum, lactosum, raffinose, melezitose, inulinum, amyllum solubile, erythritolum, galactitolum, nec inositolum. Assimilatio ethylamini et lysini ad non kalii nitrati nec kalii nitrosi. Materia amyloidea non formatur. Ureum non finditur. Vitamina externa ad crescendum necessaria. Temperatura maxima crescentiae: 30 °C.

**Etymology.** The specific epithet '*reshetovae*' is in honour of the Russian microbiologist Irina S. Reshetova for her contributions to the studies of soil yeasts.

On Glucose Peptone Yeast extract Agar (GPYA), after 1 mo at 25 °C, the streak culture is white to cream, dull and smooth. The margin is entire. After growth on malt extract agar for 3–5 d at 25 °C, cells are spheroid to ovoid (1.5–2.5 × 2.5–5.0 µm), occurring singly, in pairs or in small clusters and proliferating by multilateral budding. Pseudohyphae and true hyphae are not observed after 3 wk in plate culture on Yeast extract Malt extract malt (YM) and potato-dextrose agar (PDA, Difco) at 20–25 °C.

Teleomorphic stage was obtained on PDA after incubation for 3 wk at 16 °C. Ascospores were also observed on GPYA after replating from PDA. Ascus formation may be preceded by either conjugation between independent cells or by conjugation between a parent cell and a bud. Asci contain two ovoid ascospores with a small ring, and after maturation, ascospores are liberated from the ascus and tend to agglutinate.

Glucose is fermented. Assimilation of carbon compounds: D-galactose, L-sorbose, D-xylose, L-rhamnose (weak), sucrose,

D-maltose, a,a-trehalose, cellobiose, salicin, glycerol, ribitol (delayed), D-glucitol, D-mannitol, ethanol, DL-lactate (weak), succinate (weak) and citric acid (weak). No growth occurs on D-glucosamine, L-arabinose, D-arabinose, lactose, raffinose, melezitose, inulin, soluble starch, erythritol, galactiol, and myo-inositol. Assimilation of nitrogen compounds: potassium nitrate and nitrite (negative), L-lysine and ethylamine (positive). Starch-like compounds are not produced. Urease activity is negative. Growth on vitamin-free medium is negative. Maximal growth temperature: 30 °C.

**Typus.** GERMANY, Thuringia, National Park Hainich, soil collected at the grassland, 51.2239 N, 10.3807 E, April 2008, HEG-9-BEB; holotype, culture ex-type HEG-9-2 = CBS 11556, A. Yurkov, GenBank FN433523 (ITS-region), FN428961 (D1/D2 domain of 26S rRNA gene), FN433522 (16S rRNA gene), MycoBank MB515101.

**Notes** — During a project aimed to study yeasts in soils under different land use, several cultures representing a novel teleomorphic yeast were isolated by plating soil suspensions on a solid acidified GPYA medium. Physiological analysis and phylogenetic placement showed this species to be related to the ascomycetous genus *Clavispora* (1979), *Metschnikowiaceae*<sup>1,2</sup>. The novel species belongs to the cluster with two known *Clavispora* spp., namely *C. lusitaniae* and *C. opuntiae*, and several anamorphic *Candida* spp. *Clavispora lusitaniae* occurs in different substrates of plant and animal origin, whereas *C. opuntiae* is assumed to be associated with necrotic cacti<sup>2</sup>. Although there is no strong support for this clade, we propose the novel species to be described in the genus *Clavispora*, as it resembles many of the properties and does not contradict the current diagnosis of the genus.

For phylogenetic tree see MycoBank MB515101.

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**Colour illustrations.** Grassland in the National Park Hainich; soil core that yielded the ex-type strain; phase contrast micrographs of *Clavispora reshetovae*: vegetative cells, isogamous conjugation, pedogamous asci, asci of different origin and liberated ascospores. Scale bars = 10 µm.

**References.** <sup>1</sup>Rodrigues de Miranda L. 1979. *Clavispora*, a new yeast genus of the Saccharomycetales. *Antonie van Leeuwenhoek* 45: 479–483. <sup>2</sup>Lachance MA, Daniel HM, Meyer W, Prasad GS, Gautam SP, Boundy-Mills K. 2003. The D1/D2 domain of the large-subunit rDNA of the yeast species *Clavispora lusitaniae* is unusually polymorphic. *FEMS Yeast Research* 4: 253–258.

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