

## The arachnogenous fungus *Gibellula leiopus* – second find from the Czech Republic

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The microfungus *Gibellula leiopus* (*Clavicipitaceae*, *Hypocreales*, *Ascomycota*) known from spiders was found after a long period for the second time in the Czech Republic. The first find was recorded by O. Fassatiová in 1959. Both Czech specimens have whitish synnemata with conidiophores. The teleomorph (*Torrubiella leiopus*) was not observed. A short description of microscopic features and photographs is given. The specimens are deposited at the Herbarium of Department of Botany, Charles University, Prague (PRC).

**Key words:** micromycetes, *Ascomycota*, *Torrubiella*, anamorphic fungi, *Gibellula leiopus*

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Mikroskopická houba *Gibellula leiopus* (*Clavicipitaceae*, *Hypocreales*, *Ascomycota*) vyskytující se na pavoucích byla podruhé po delší době nalezena v České republice. První nález byl zaznamenán O. Fassatiovou v roce 1959. Oba české nálezy se vyznačují bělavým zbarvením synnemat s konidiofory. Teleomorfa (*Torrubiella leiopus*) nebyla pozorována. Položky jsou uloženy v herbáři katedry botaniky Univerzity Karlovy v Praze (PRC).

### INTRODUCTION

*Gibellula* is a hyphomycete genus belonging (after Kirk et al. 2001) to the anamorphic *Clavicipitaceae* (*Hypocreales*, *Ascomycota*). It was described by Cavares (1894). Other important publications on *Gibellula* species are those by Petch (1932), Mains (1950), Samson and Evans (1977, 1992), Kobayashi and Shimizu (1982), Humber and Rombach (1987) and Tzean et al. (1997a, 1998). A dichotomic key to 10 species based on morphological features was published by Samson and Evans (1992). In the database IndexFungorum (The CABI Bioscience and CBS Database of Fungal Names), 36 records of species and variety names were mentioned in June 2004. Currently, about 16 species are accepted (Hodge 2003). About half of *Gibellula* species are connected with a *Torrubiella* teleomorph, a pyrenomycetous ascomycete with perithecia. *Gibellula* forms usually synnemata bearing aspergilloid or penicillate conidiophores with phialidic conidiogenous cells.

Some species form a polyblastic synanamorph named *Granulomanus* (Evans and Samson 1987). All species are considered to be pathogenic for spiders.

The morphologically similar genus *Pseudogibellula* (Samson and Evans 1973, Samson et al. 1989) differs in conidial ontogeny (the conidia are produced singly and sympodially) and ecology (occurrence not only on spiders but also on ants, froghoppers and other insects).

*Gibellula leiopus* (Vuill. ex Maubl.) Mains is associated with the teleomorph *Torrubiella leiopus* (Mains) Y. Kobayasi et D. Shimizu (Kobayasi and Shimizu 1982). It is considered a common *Gibellula* species (together with *G. pulchra* (Sacc.) Cavara) in temperate regions (Hodge 2003), but compared with other microfungi it is somewhat rare. From the Czech Republic (a part of former Czechoslovakia) it was published for the first time by Fassatiová (1960). The present record of *G. leiopus* in Karlík valley (Central Bohemia) is considered to be the second one in the Czech Republic.

The aim of this brief paper is to present the morphology and ecology of our specimen.

#### MATERIALS AND METHODS

A minute cadaver of an arthropod (identification of the host was not possible) with whitish synnemata was collected on 22<sup>nd</sup> May 2002 in leaf litter in a mixed forest near the village of Karlík, c. 20 km SW of Prague, central Bohemia, Czech Republic (49°56'15"N, 14°15'30"E). The specimen is deposited in the Herbarium of the Department of Botany, Charles University, Prague (PRC).

Microscopic features were observed in lactic acid with cotton blue. Photographs were taken on an Olympus BX-51 microscope using Nomarski contrast.

#### RESULTS AND DISCUSSION

*Gibellula leiopus* (Vuill. ex Maubl.) Mains

*Gibellula arachnophila* f. *leiopus* Vuill. ex Maubl., Bull. Soc. Mycol. Fr. 36: 42, 1920

*Gibellula leiopus* (Vuill. ex Maubl.) Mains, Mycologia 42: 313, 1950

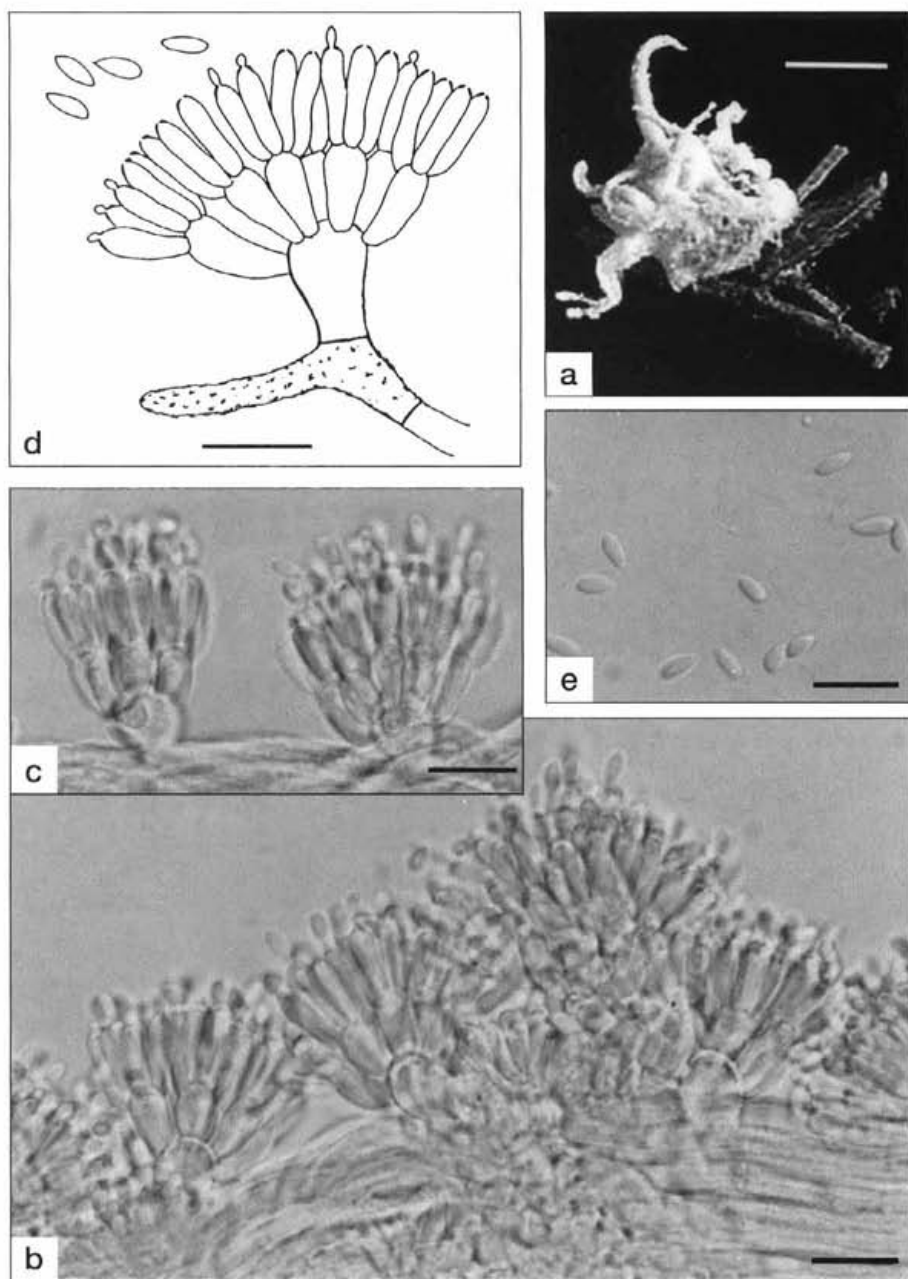


Fig. 1. *Gibellula leiopus*; a – herbarium specimen (PRC), short synnemata growing from remains of arthropod cadaver (bar = 1 mm); b – aspergilloid conidiophores densely growing from the middle part of the synnema; c – single aspergilloid conidiophores arising laterally on the terminal part of the synnema; d – conidiophore on roughened hypha; e – conidia (b-e: bar = 10  $\mu$ m).

### Morphological characteristics of our specimen and distinguishing features

The remains of the host body are covered with white mycelium from which several whitish conical to cylindrical synnemata 1–2 mm long arise (Fig. 1a). The conidiophores (Fig. 1b, c, d) are very short, septate, growing from verrucose, arched hyphae. The terminal part of the conidiophores is broadened to a vesicle, 6–10  $\mu\text{m}$  diam., bearing metulae (also prophialides) on the upper part. The metulae are broadly clavate, often swollen, 7–10  $\times$  4–6  $\mu\text{m}$ . Each metula bears several phialides. These are cylindrical, 7–11  $\times$  2–2.4  $\mu\text{m}$ , thickened at the apex. Conidia (Fig. 1e) are ellipsoidal to clavate, 4–5  $\times$  1.8–2  $\mu\text{m}$ , produced in chains. All conidiophore structures are hyaline. The teleomorph and polyblastic state were not observed.

Very short conidiophores and absence of a polyblastic state are characteristic of this species. The similar species *G. globoso-stipitata* Kobayasi et Shimizu and *G. clavata* Samson et H. C. Evans also have short conidiophores (Kobayasi and Shimizu 1982, Samson and Evans 1992), however the former forms globose metulae and the latter forms a polyblastic state in addition. Four other species lack the polyblastic state: *G. alata* Petch, *G. globosa* Kobayasi et Shimizu, *G. mainsii* Samson et H. C. Evans and *G. pulchra* (Sacc.) Cavara. They also differ from *G. leiopus* by long conidiophores (Petch 1932, Kobayasi and Shimizu 1982, Samson and Evans 1992, Tzean et al. 1997a).

The microscopic characters in our specimen are in general agreement with those seen by Fassatiová (1960), Samson and Evans (1973), Balazy (1979) and Tzean et al. (1997a,b). However, some difference was observed in the colour of the synnemata. Samson and Evans (1973) pointed at the characteristic deep lilac colour of the synnemata in this species, however Tzean et al. (1997a) mentioned a white to pale orange colour of the synnemata. For comparison we observed the specimen of Fassatiová found in south Bohemia in 1959 and deposited in PRC (Prague). It has whitish synnemata with a pale orange tint. Fassatiová (1960) considered her record as a possibly white variant of *G. leiopus*. Another explanation could be that our specimens are not fully mature; the absence of the teleomorph suggests that.

### Notes on ecology and distribution

The host of our specimen is too small, so it was not possible to determine if it belongs to a spider or an insect. Generally, *Gibellula leiopus* is considered to be an arachnogenous fungus. Due to the parasitic life style it is not able to grow on common media. An attempt of the author to cultivate this fungus failed just as in the case of Samson and Evans (1973) and Balazy (1970). Only one

strain (CBS 602.75) is known to be maintained in a culture collection (CBS Fungi database 2004).

*Gibellula leiopus* is known from many regions of the world, but it has been recorded rarely. It was found in North America: USA (Mains 1950), South America: Trinidad (Evans and Samson 1987), in Europe: Czech Republic (Fassatiová 1960), Poland (Bałazy 1970), France (in 1975, CBS Fungi database 2004), Sweden (Lundquist 1998), Greece (Scheuer 2000), in Africa: Ghana (Samson and Evans 1973), and in Asia: Kuril Islands (Koval' 1974) and Taiwan (Tzean et al. 1997a,b).

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