

New or Interesting Hyphomycetes from Hungary

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In the present paper 23 species of corticolous and other hyphomycetes are reported from Hungary. Several species of these fungi have scarcely been reported and species such as *Cephalophora muscicola*, *Cheiromyces inflatus*, *Sporidesmiella brachysporioides*, *Trimmatostroma betulinum*, *Trinacrium incurvum* were found to be new to Hungary.

Keywords: mycobiota, hyphomycetes, bark.

Preliminary studies were performed to broaden the knowledge of microscopic fungi on plants grown in suburban areas of the Hungarian capital Budapest by Magyar and Tóth (2003). The authors showed that 35% of the isolates were mitosporic fungi, however the list of the microscopic fungi from such areas is incomplete. The objective of this paper was to evaluate the mycobiota collected in the park of the Plant Protection Institute in Budapest.

Materials and Methods

The site chosen for this study was the park of the Plant Protection Institute, Hungarian Academy of Sciences. The area originally has been dedicated to vine cultivation. The plantations were changed into a park almost 20 years ago, with arboraceous and ornamental plants (*Acer*, *Aesculus*, *Betula*, *Cupressaceae*, *Elaeagnus*, *Populus*, *Robinia*, *Syringa*, *Tilia*, etc.), however remains of the orchard with vine plants and some old apple trees can still be found in untreated conditions. Samples were collected from bark as well as tree hollows and leaf-litter. The samples were examined after several (7–42) days of incubation in moist chamber or in submerged condition at room temperature. Conidia of some species were isolated on 2% water agar at 25 °C. All species were growing and sporulating. Digital photomicrographs were taken with an Olympus BX-51 microscope at

×800 magnification. For the spore morphological studies the ImageJ 1.35i image analyser programme (Rasband, 2004) was used. The material examined is deposited in the author's collection.

Abbreviations: direct examination: DE, incubation in moist chamber: MC, incubation in submerged condition: SC, isolated on 2% water agar: WA.

Results

The 34 isolates of 23 fungal species collected in the park of Plant Protection Institute in Budapest occurred on 16 host plant species (*Table 1*). The abundant mycobiota found on the bark of various hosts included 5 species from *Elaeagnus angustifolia*, 3 species from *Syringa vulgaris* and 5 species from *Vitis vinifera*. In addition, 5 species were identified from the tree hole of *Acer platanoides*, which was often filled with rainwater. Some rare taxa were recorded and 5 fungal species appeared to be new to Hungary. These and some other interesting species are discussed below.

Table 1

Number of isolated hyphomycetes on host plants

Host plants	Number of isolated fungal species
<i>Acer negundo</i> L.	1
<i>Acer platanoides</i> L.	5
<i>Acer pseudoplatanus</i> L.	1
<i>Betula pendula</i> Roth.	1
<i>Cercis siliquastrum</i> L.	2
<i>Clematis vitalba</i> L.	1
<i>Elaeagnus angustifolia</i> L.	5
<i>Glechoma hederacea</i> L.	1
<i>Malus domestica</i> Borkh.	3
<i>Populus</i> sp.	1
<i>Robinia pseudoacacia</i> L.	1
<i>Sambucus nigra</i> L.	2
<i>Syringa vulgaris</i> L.	3
<i>Tamarix</i> sp.	1
<i>Tilia cordata</i> Mill.	1
<i>Vitis vinifera</i> L.	5

Species account

Arthrotrrys oligospora Fresen. Conidiophores 3.6–4.6 µm thick, conidia 1-septate, hyaline, pyriform, 19.9–31.7 µm long (upper cell 10.9–16.9 µm long) and 7.7–9.1 µm wide; conidia width at the septum 6.7–7.2 µm, conidia radiating at an angle of 22.5–42.8°. – Collected on bark of dead branches of *Sambucus nigra*, MC, 25.10.2005. This is a common species in Hungary, which is often isolated from animal dung (Révay, 1998).

Brachydesmiella biseptata G. Arnaud ex S. Hughes. Conidia 2-septate, $34.4\text{--}41.8 \times 16.2\text{--}21.1\text{ }\mu\text{m}$, central cell large, almost black, end cells hyaline, often echinulate (upper cell $0.0\text{--}4.5 \times 4.9\text{--}6.8\text{ }\mu\text{m}$). – Collected from fallen bark of *Elaeagnus angustifolia*, MC, 20.10.2005.

Cephalophora muscicola G. L. Barron, C. Morik. and Saikawa. Vegetative hyphae $6.3\text{--}6.4\text{ }\mu\text{m}$ wide, hyaline, septate and uniform in width. Conidia hyaline, multiseptate, cylindrical and taper gradually at both ends, $112.5\text{--}135.0 \times 7.5\text{--}8.7\text{ }\mu\text{m}$. Adhesive appendages (pegs) with rounded apex are borne both along the length of the hyphae and conidia ($14.0\text{--}15.8\text{ }\mu\text{m}$ long by $4.6\text{--}5.4\text{ }\mu\text{m}$ wide). The fungus was found in a water-filled tree hole of *Acer platanoides*, SC, 09.10.2003. *C. muscicola* captures bdelloid rotifers using specialized adhesive pegs. Assimilative hyphae inside captured, encysted rotifers were also observed. This is the first record of *C. muscicola* from Hungary. *C. muscicola* is recorded in Japan and New Zealand; from wet soil and moss (Barron et al., 1990.). Fig. 1.

Cheiromyces inflatus Matsush. Conidia 2–5 armed, brown. Arms $44.0\text{--}47.0 \times 5.3\text{--}7.7\text{ }\mu\text{m}$, distance between septa $2.3\text{--}4.5\text{ }\mu\text{m}$. Each arms bear hyaline globose apical cells (diameter $4.6\text{--}8.7\text{ }\mu\text{m}$). Arms $3.8\text{--}5.3\text{ }\mu\text{m}$ wide under the globose cells. Angle between arms $15.0\text{--}32.2^\circ$. – Collected on skeletonized leaves of *Acer negundo*, MC, 20.10.2005. This is the first record of *C. inflatus* from Hungary. The fungus was recorded in Ontario, Canada; from decaying wood (Matsushima, 1983). Fig. 2, a.

Circinotrichum maculiforme C.G. Nees ex Persoon. Conidia $13.2\text{--}17.3\text{ }\mu\text{m}$ long and $1.4\text{--}1.8\text{ }\mu\text{m}$ wide. – Collected on bark of *Vitis vinifera*, MC, 07.11.2005.; on winged fruits of *Acer pseudoplatanus*, SC, 17.08.2005. Fig. 2, b.

Dictyosporium toruloides (Corda) Gueguen. Conidia $27.6\text{--}39.6\text{ }\mu\text{m}$ long and $20.8\text{--}34.4\text{ }\mu\text{m}$ wide, composed of cells characteristically in one plane. – Collected on bark of *Vitis vinifera*, DE, 07.11.2005. (Quite similar conidial sizes are given in Hughes, 1978). Fig. 2, c.

Helicodendron triglitzense (Jaap.) Linder. Conidia hyaline, coiled 0–2 times, conidial filaments $36.1\text{--}67.9\text{ }\mu\text{m}$ long, $4.2\text{--}7.5\text{ }\mu\text{m}$ thick. Direction of coiling is not constant. – Collected on fruit stalks of maple tree in a tree hole of *Acer platanoides*, MC, 06.09.2005.; on litter in a tree hole of the same tree, DE, 18.11.2005. (Similar shape is illustrated by Glen-Bott, 1955).

Humicola grisea Traaen. Hyphae $3.3\text{--}4.2\text{ }\mu\text{m}$ thick, conidia spherical, $10.6\text{--}15.4\text{ }\mu\text{m}$. – Isolated from the tree hole of *Acer platanoides*, WA, 26.07.2004.

Lylea tetracoilum (Corda) Hol.-Jech. Conidia in long chains, mostly 3–6-septate, $3.2\text{--}6.6 \times 3.7\text{--}32.1\text{ }\mu\text{m}$. – Collected on fallen bark of *Elaeagnus angustifolia*, MC,

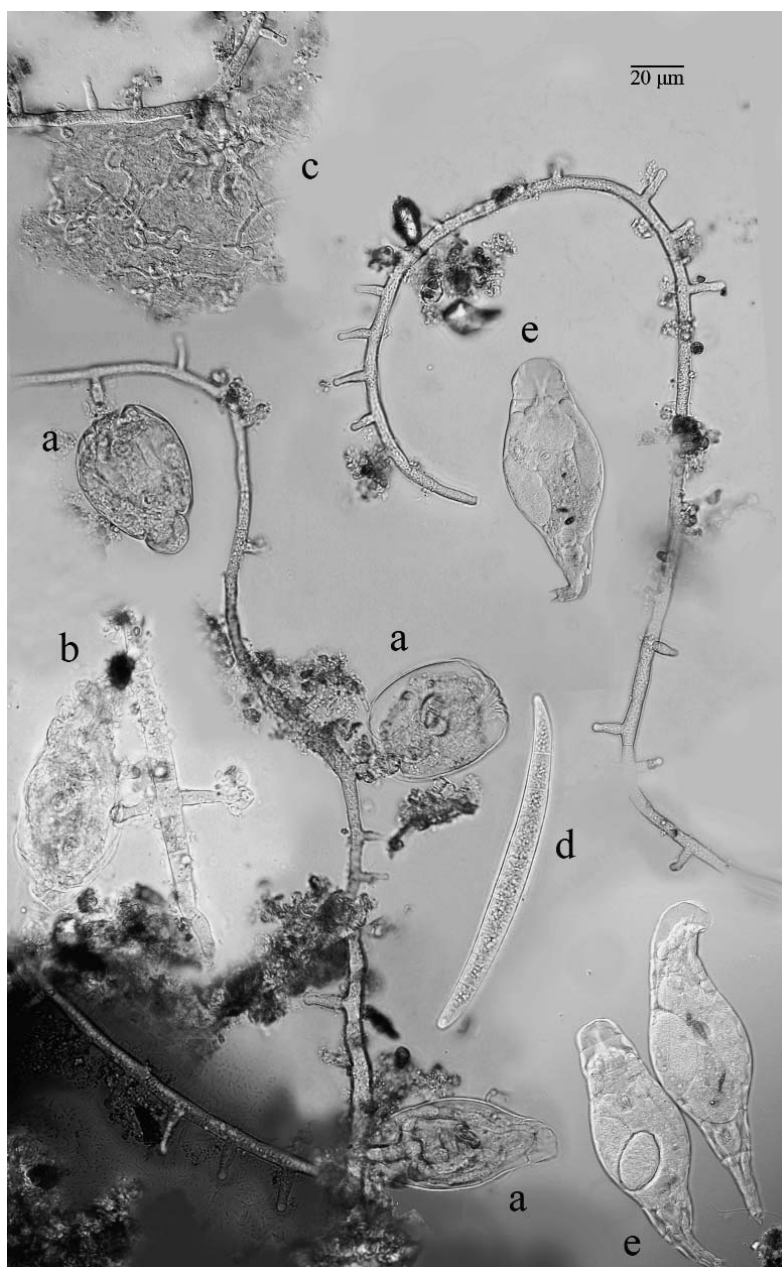


Fig. 1. Habitat of *Cephaliophora muscicola* (photomontage). This fungus captures bdelloid rotifers using specialized adhesive pegs in a water-filled tree hole of maple tree. a: captured rotifers by adhesive pegs on hyphae; b: captured rotifers by adhesive pegs on conidium; c: assimilative hyphae inside cracked rotifer; d: conidium, e: free rotifers (Bar=20 μ m)

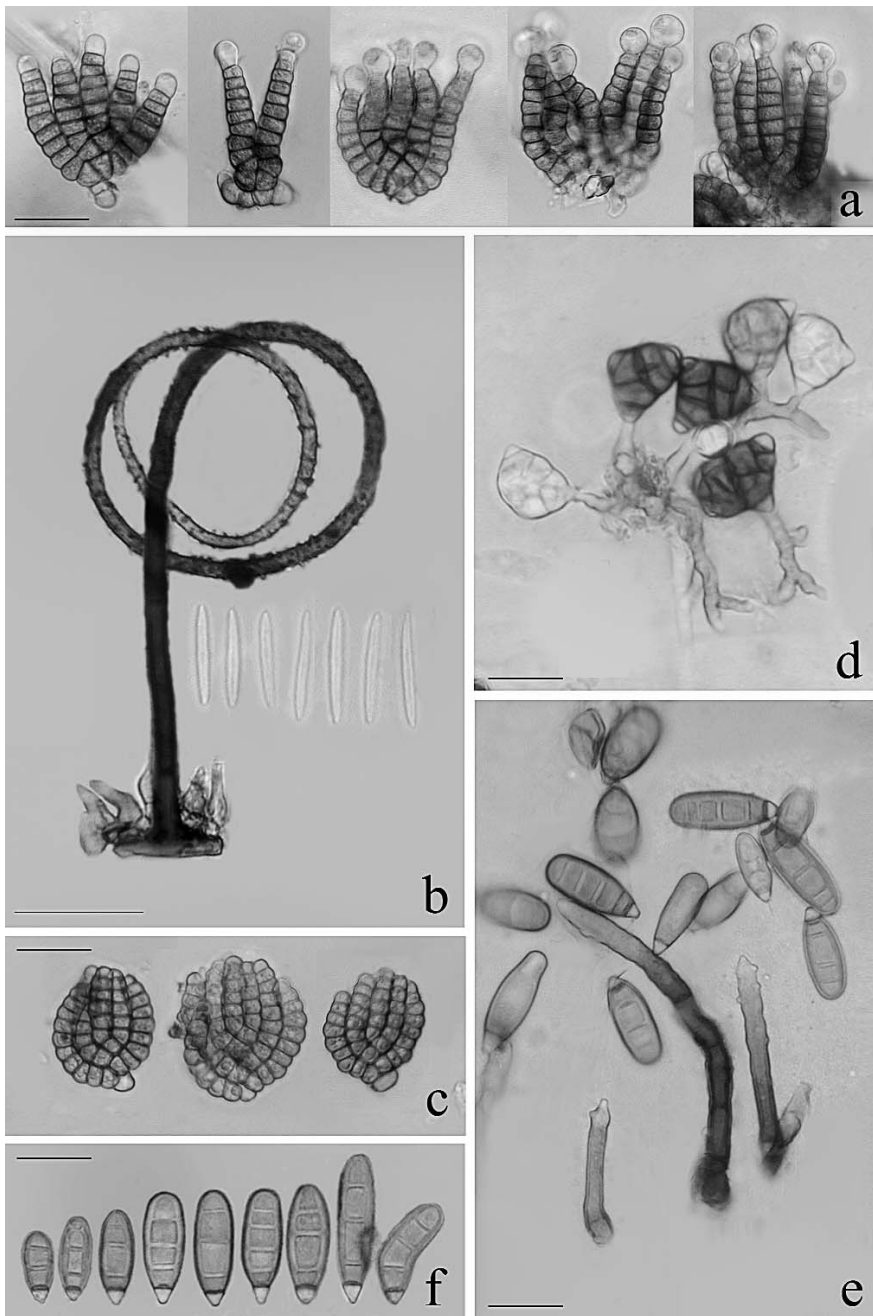


Fig. 2. a: *Cheiromyces inflatus*; b: *Circinotrichum maculiforme*; c: *Dictyosporium toruloides*; d: *Oncopodiella trigonella*; e, f: *Sporidesmiella brachysporioides* (Bar=20 μ m)

20.10.2005.; on bark of *Syringa vulgaris*, DE, 25.08.2005. This fungus was reported only one time from Hungary by Holubová-Jechová (1979).

Oncopodiella robusta Révay. Conidia brown, muriform, with hyaline conical horns, 24.1–31.2×10.0–14.3 µm. – Collected on bark of *Malus domestica*, MC, 08.11.2005. This species was described from Hungary (Kismaros), on dead twigs of *Alnus glutinosa* (Révay, 1995). The present collection differs from the holotype in the length of conidia.

Oncopodiella trigonella (Sacc.) Rifai. Colonies blackish, conidiophores subhyaline, 2.2–10.4×1.5–3.9 µm. Conidia brown, muriform, with hyaline conical horns, 13.5–15.3×10.8–13.3 µm. – Collected on bark of *Robinia pseudoacacia*, DE, 03.11.2005.; on fallen bark of *Elaeagnus angustifolia*, MC, 20.10.2005. Fig 2., d.

Phaeoisaria clematidis (Fuckel) Hughes. Synemmata up to 137 µm long, 25.0 µm thick at the base and 8.2 µm at the tip, conidiophores 1.9–2.9 µm thick with 0.9–1.9 µm long denticles. Conidia 33.7–5.8×1.2–2.1 µm. – Collected from bark of *Sambucus nigra*, MC, 25.10.2005.; on roots of *Tamarix* sp., DE, 06.07.2005.; on bark of *Vitis vinifera*, MC, 07.11.2005.

Pleurophragmium parvisporum (Presuss) Hol.-Jech. Conidiophores 74.1–156.0 µm long, 3.9–5.9 µm thick at the base and 1.4–3.6 µm at the apex, denticles 0.6–0.8 µm long. Conidia 3–4 septate, 10.3–19.3×4.5–5.0 µm. – Collected from the bark of *Malus domestica*, MC, 08.11.2005.; on bark of *Vitis vinifera*, DE, 07.11.2005. This fungus was known mainly from herbaceous plants (commonly from *Urtica*) and leaf-litter (Ellis, 1971; Gönczöl and Révay, 1983; Révay, 1998).

Pleurotheciopsis bramleyi Sutton. Conidiophores 108.4–117.4×4.3–5.3 µm, conidia 3(4) septate, 14.6–25.4×3.9×5.7 µm, tapering to 1.5–2.5 µm. – Found on fallen bark of *Elaeagnus angustifolia*, MC, 20.10.2005.

Ramularia calcea (Desm.) Ces. Conidiophores hyalina, 25.8–41.0×2.1–2.6 µm, conidia hyalina, 0–1 septate, 8.6–24.2×2.4–3.7 µm. – Causes spots with narrow brown borders on living leaves of *Glechoma hederacea*, DE, 29.09.2005.

Sporidesmiella brachysporioides T. Y. Zhang and W.B. Kendr. Conidiophores with denticles, 56.0–137.0×5.0–7.5 µm. Conidia have 2–4 septa and one additional dark coloured subbasal septum; 30.0–32.5×11.2–15.0 µm (broadest in the middle), pale incarnadine, except the basal cell which is hyaline. – Collected on dead stems of *Clematis vitalba*, DE, 08.11.2005.; on bark of *Syringa vulgaris*, DE 16.06.2005. This is the first record of *S. brachysporioides* from Hungary. Fig. 2, e, f.

Stemphylium vesicarium (Wallr.) Simmons. Conidiophores 6.2 µm wide, conidia brown, verrucose, rounded at the ends, constricted at the 3 major transverse septa,



Fig. 3. *Trinacrium incurvum* found on deposited *Pinus* pollen on the twigs of *Elaeagnus angustifolia* (Bar=20 µm)

26.2–33.7×13.7–20 µm. – Isolated from the tree hole of *Acer platanoides*, WA, 26.07.2004. This fungus was reported only one time from Hungary, near Csákvár (Révay, 1998).

Triadelphia uniseptata (Berk. and Br.) P. M. Kirk. Conidiogenous cells hyaline, globose, 4.5–6.2×3.9–5.1 µm. Conidia 1-septate, reddish-brown, 6.3–13.7×4.0–9.4 µm, apical cell longer than the basal cell. – Collected from bark of *Syringa vulgaris*, DE, 25.11.2005.; on bark of *Vitis vinifera*, MC, 07.11.2005.

Trichothecium roseum (Pers.) Link ex S. F. Gray. Conidiophores 2.4–3.3 µm thick, conidia 1-septate, pyriform, hyaline, 8.6–17.2×4.9–10.2 µm, tapering to 1.8–3.6 µm. – Collected on leaf-litter retained between branches of *Populus* sp., MC, 05.10.2005.; on bark of *Malus domestica*, MC, 08.11.2005.; on bark of *Cercis siliquastrum*, DE, 30.09.2004. This is a common species on wetted bark of trees.

Trimmatostroma betulinum (Corda) Hughes. Conidia are brown, clavate, muriform, with subspherical cells, 10.2–25.6×4.1–9.5 µm. – Collected from bark of *Betula pendula*, DE, 07.11.2005. This is the first record of *T. betulinum* from Hungary.

Trinacrium incurvum Matsush. Conidia hyaline, consisting of 2 arms which are curved downward. Arms 8.9–12.2 µm long and 2.4–5.3 µm thick (full length and width of conidia 19.1–21.7×19.5–23.6 µm). – Found on deposited *Pinus* pollen on the twigs of *Elaeagnus angustifolia*, DE, 29.06.2004. This is the first record of *T. incurvum* from Hungary. This species was described from decaying wood (Matsushima, 1993). The author supposes, that an adequate substrate for this fungus may be the so-called 'microlitter' (term used by Carroll, 1981. Microlitter is composed of pollen deposits, algal cells, microscopic fragments of plant tissues, etc.). Fig. 3.

Trinacrium subtile Riess. Conidia hyaline, Y-shaped, consisting of 2 arms. Arms 19.4–34.6 µm long and 3.4–4.0 µm thick, 4–5 septate, distance between septa 2.7–8.7 µm. – Collected on bark of *Cercis siliquastrum*, DE, 05.07.2005.

Tripospermum myrti (Lind.) Hughes. Hyaline stauroconidia have 4–5 arms, which are 1–4 septate, 12.0–20.6 µm long, 2.8–8.7 µm thick at the base, tapering to 1.8–2.9 µm. – Found in honeydew on the leaves of *Tilia cordata*, DE, 03.11.2005.

Conclusion

This publication enumerates 5 hitherto unreported and 18 known, but remarkable hyphomycete species from suburban environment in Hungary. Consequently, this study suggests that a rich harvest of these fungi can be and remains to be gathered in such environments.

Most of these collections were recorded from bark of ornamental or cultivated plants. Fibrous, cracked texture of the bark of many plant species offers a physically protected microenvironment for many hyphomycetes. Straight and erect conidiophores with conidia attached were frequently found in such habitats. The microclimate of these deep (0.01–3 cm) cavities may be strongly different from the ambient environment. The colonies of bark-inhabiting hyphomycetes are often tiny and are visible at or above $\times 25$ magnification of the microscope.

Majority of the collected fungi were saprobionts. Although saprobionts, e.g. as antagonists have an important role in the microbial ecosystem of the canopy, little attention is paid to the non-pathogenic corticolous hyphomycetes.

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