

## Forest litter Hyphomycetes from Hungary

By

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Abstract: Further observations on forest litter Hyphomycetes of Hungary and some rare or interesting species of this group found recently are reported and discussed.

Regular observations have been made in recent years on the Hyphomycetes inhabiting forest litters in Hungary. The purpose of these observations was on the one hand to obtain data about terrestrial Hyphomycetes living on litter leaves, on the other hand to look for aquatic Hyphomycetes living on terrestrial forest litter. Since in a previous paper (GÖNCZÖL & RÉVAY 1983) the rare appearance of aquatic (Ingoldian) Hyphomycetes on terrestrial forest litter has been pointed out, the main attention was turned to the terrestrial litter-leaf Hyphomycetes. The present observations again confirmed that, however, the presence of aquatic Hyphomycetes in terrestrial litter can be demonstrated but their activity and proportion to terrestrial Hyphomycetes is definitely insignificant. Therefore the present paper only deals with the terrestrial species and contains further data and observations to the knowledge of forest litter Hyphomycetes of Hungary.

## MATERIAL AND METHOD

Forest litter samples were collected from the Börzsöny Mts and the Bükk National Park. Samples were usually taken from the lower layer of the litter deposited on the soil where decaying leaves were almost always wet. Decaying leaves were stored in a refrigerator and incubated in petri dishes in moist condition. Leaves decayed and skeletonized to a great extent were kept and incubated in glass-boxes specially made for microscopic observations. This method has been detailed in a previous paper (GÖNCZÖL & RÉVAY 1983). In addition to the leaf material, smaller quantities of other litter debris were collected and observed. Slide preparations of the examined material are deposited in the slide collection of the Mycological Herbarium of the Hungarian Natural History Museum, Budapest.

## RESULTS AND DISCUSSION

During a further one-year period of study of forest litter Hyphomycetes, again a very scanty growing of Ingoldian Hyphomycetes was observed on terrestrial litter leaves. Altogether only Alatospora acuminata Ingold and Dactylella submersa (Ingold) Nilsson have on some occasions been observed sporulating on decaying incubated leaves.

The previous paper dealing with aquatic and terrestrial species of forest litter Hyphomycetes presented some species to which additional comments may here be of interest. Correspondingly with

the observations made in the previous years, this time Camposporium pellucidum Grove and Vargamycetes aquaticus (Dudka) Tóth were also the commonest species sporulating profusely in almost all litter samples. Camposporium japonicum Ichinoe was also found to be fairly frequent. Neta patuxentica Shearer et Crane and Mirandina corticola Arnaud were reported from litter leaves, these species have in the present observations been found on woody-litter (decaying twigs). A fungus mentioned as Tricladium sp. under No. 30 is undoubtedly identical with Tricladium castaneicola Sutton. During the further observations this fungus has once again been found in a litter sample. Under No. 32, an unidentified fungus having a rather interesting conidium, was reported and a new genus, Hydrometrospora Gönczöl et Révay was described for it (GÖNCZÖL & RÉVAY 1984). Further species of forest litter Hyphomycetes are present in Hungary as follows:

Chalara aurea (Cda.) Hughes (Pl.I, Fig. 2). T.G.NAG RAJ & B.KENDRICK: A monograph of Chalara and allied genera, p.87. 1975. On the veins of leaf skeleton of Carpinus betulus, collected on the bank of Morgó-stream, near Verőcsemaros in Börzsöny Mts, 10.10.1983. Conidiophores (phialophores) growing profusely on leaf-veins, simple, erect, straight or variously bent, cylindrical, one to five septate, without constrictions at the septa, pale brown to reddish brown, usually paler towards the apex, walls smooth, 65-80 µm long, 5-6 µm wide at the base. Venter cylindrical 27-35 µm long, 5-6 µm wide; collarette cylindrical, 30-40 µm long, 2.5-3.2 µm wide, transition from venter to collarette gradual. Phialoconidia cylindrical, truncated at the both ends, hyaline, smooth-walled, 10-14 x 2-2.5 µm, 1 obscurely septate, forming chains on the tip of the phialophores. This fungus is identified with Chalara aurea with certain reservations since only some phialophores arise from stromatal layer of cells. Another difference is that the venter is cylindrical, not ellipsoidal.

Chalara fusidioides (Cda.) Rabenh. (Pl.I, Fig. 1). T.G.NAG RAJ & B.KENDRICK: A monograph of Chalara and allied genera, p.119. 1975. Found on the same leaf-skeleton from which Chalara aurea was reported, Morgó-stream, Börzsöny Mts, 10.10.1983. Phialides in dense clusters on leaf-veins, bearing directly or on very short 1-septate phialophores, pale to mid-brown, smooth-walled, 15-25 µm long, venter ellipsoidal or subglobose-globose, 7-10 x 5-8 µm, collarette cylindrical, 10-15 µm long, 2-2.5 µm wide, transition from venter to collarette mostly abrupt. Phialoconidia singly or in chains, unicellular, hyaline, smooth-walled, with truncated ends, 6-8 x 2-2.5 µm.

Chaetopsis grisea (Ehrenb. ex Pers.) Sacc. (Pl.II, Figs 1-2). M.B.ELLIS: Dematiaceous Hyphomycetes, p.564. 1971. Found on debris of alder litter, on the bank of Morgó-stream, near Verőcsemaros in the Börzsöny Mts, 10.11.1983. Colonies on a small piece of Alnus twig greyish-green, punctiform. Conidiophores growing densely, brown or dark brown, setiform, straight or flexuous, rarely simple, usually branched, up to 1 mm long, 5-7 µm wide at the base. Lateral branches arising out from main axis at various height, up to 400 µm long, 3-4 µm wide at the base. Conidiogenous cells polyphialidic. Polyphialides growing on main axis and also on lateral branches, pale brown at its base, subhyaline towards the apex, 10-30 µm long and 3-4 µm wide at the base. Conidia 8-11 x 2 µm, cylindrical, hyaline, 1-septate. The present fungus differs from Chaetopsis grisea in having a highly branched structure of the conidiophores. Nevertheless the other characters of this fungus correspond to the description, therefore this difference is not considered as specific.

Gonytrichum macrocladum (Sacc.) Hughes. M.B.ELLIS: Dematiaceous Hyphomycetes, p.532. 1971. Found on several occasions during collections of autumn and winter litter samples from the Börzsöny Mts 1983., on strobile of Alnus glutinosa collected together with litter leaves of Alnus glutinosa. Profuse growths of the fungus on this substrate were often observed. Colonies on strobile greyish-green, hairy. Conidiophores 250-350 µm long, mid- or reddish brown, paler towards the apex, 4-6 µm wide at the base. Collar hyphae only poorly developed at the upper third of the conidiophores, 120-150 µm long, whip-like towards their apex. Both tips of conidiophores and tips of collar hyphae fertile. Phialides subulate, 15-20 x 3-3.5 µm, conidia unicellular, ellipsoidal, olive-green, 4-5 x 1.6-2 µm. The fungus was inoculated onto corn-meal agar and kept on 25 C°. One week old colonies 1-1.5 cm in diameter, velvety, fertile centre of the colonies arising conically, greyish-green and surrounded with a greyish-white sterile ring composed of immersed hyphae. Fascicles of hyphae 0.5-1.5 mm x 8-12 µm growing out from the fertile part of the colonies were observed. Fascicles brown and individual hyphae pale yellowish-brown, 2-3 µm wide, septated. Originating from the fascicles, very pale brown Chloridium-like conidiophores 30-120 µm long, 3-4 µm wide at their bases, gradually tapering to the apex, were observed. Both long and short conidiophores were fertile (Pl.I, Fig. 5).



*Idriella lunata* Nelson and Wilhelm (Pl.I, Fig. 4). G.L.BARRON: The genera of Hyphomycetes from soil, p.210. 1972. Found only in one litter sample, on decaying leaf of *Alnus glutinosa*, on the bank of Morgó-stream in Börzsöny Mts, 24.9.1983. Conidiophores solitary, simple, sparsely growing on leaf-veins, 8-12  $\mu\text{m}$  long, 2-2.5  $\mu\text{m}$  wide, somewhat swollen below and tapering towards denticulate apex. Conidia more or less aggregated on tip of conidiophores, hyaline, nonseptate, falcate, with acutely pointed ends, 14-16 x 1.6-1.8  $\mu\text{m}$ .

*Nematogonium highlei* (A.L.Smith) Matsushima (Pl.II, Figs 3-4). T.MATSUSHIMA: Icones microfungorum, p.101., Pl.6, 1-4., 1975. Collected on unidentified decaying leaf, on the bank of Morgó-stream in Börzsöny Mts, 9.2.1984. A few conidiophores were growing on the decaying leaf substrate which were simple, erect, 600-1000  $\mu\text{m}$  long, 9-14  $\mu\text{m}$  wide, thick-walled, very pale brown (almost hyaline), somewhat swollen at the base, 8-11 septate, straight, but may be geniculate when intercalary ampullae present. Number of ampullae were only two on the observed conidiophores. Ampullae (conidiogeneous cells) subspherical (16-20  $\mu\text{m}$  diam.), or elliptical (18-24 x 16-20  $\mu\text{m}$ ), polyblastic, denticulate. Conidia in acropetal chains, subhyaline or very pale yellowish-green. Primary blastoconidia ellipsoidal, obovoid or somewhat pear-shaped with truncated or pointed basal end, 20-26 x 9-13  $\mu\text{m}$ . Secondary and subsequent conidia are considerably smaller (14-15 x 9-11  $\mu\text{m}$ ), constructing straight or branched chains.

*Menispora caesia* Preuss. M.B.ELLIS: More Dematiaceous Hyphomycetes, p.461. 1976. On decaying fruit of *Fraxinus* sp. in Bükk Mts, Bányahegy, 10.8.1983. Colonies minute, greyish, irregular, velvety, composed of conidiophores and scattered sterile setae. Setae unbranched, straight, curved, undulate, septate, dark brown, paler near the apex, 200-400  $\mu\text{m}$  long, 3-4  $\mu\text{m}$  wide below, tapering gradually towards the apex. Conidiophores usually branched, brown but paler towards the phialides, 100-200 x 3-4  $\mu\text{m}$ . Conidiogenous cells monophialidic with a poorly developed collarette, hyaline or subhyaline, sometimes swollen at the apex, 20-45 x 3.5-8  $\mu\text{m}$ , developing at end of main axis of conidiophores as well as on its lateral branches. Some of the phialides developing on lateral branches, sometimes bearing another (secondary) phialide instead of a conidium. Conidia in slimy heads, cylindrical to fusiform, slightly curved, non-septate, hyaline, 14-20 x 2.5-3.5  $\mu\text{m}$ . Most of the matured conidia are highly vacuolised.

*Pseudospiropes rousselianus* (Mont.) M.B.Ellis (Pl.III, Figs 3-4). M.B.ELLIS: More Dematiaceous Hyphomycetes, p.221. 1976. On unidentified decaying leaf, collected on the bank of Morgó-stream in Börzsöny Mts, 25.11.1983. Colonies minute, dark brown, hairy. Conidiophores solitary, erect, straight or slightly bent, mid- or dark brown, paler and gradually tapering towards the apex, 200-250  $\mu\text{m}$  long, 7-8  $\mu\text{m}$  wide at the base, 8-10 septate. Apical (conidiogenous) cell very pale brown or subhyaline, with undulate side-wall. Conidia often remaining in aggregated head at the tip of conidiophore, variable in shape and size, cylindrical-fusiform with rounded or more or less pointed apical end, hyaline or subhyaline, 2-7 septate, with a distinct scar at the base. Two kinds of conidial size were seen: a thinner and longer one, 40-45 x 4-5  $\mu\text{m}$ , and a fatter and shorter one, 20-30 x 7-8  $\mu\text{m}$ .

*Spondylocodiopsis cupulicola* M.B.Ellis (Pl.III, Figs 1-2). M.B.ELLIS: Dematiaceous Hyphomycetes, p.295.1971. On skeletonized leaves of *Acer* sp., from the bank of Morgó-stream in the Börzsöny Mts, 24.9.1983. Conidiophores in small groups, simple or branched near the base, pale brown at the base and at the middle part, gradually paler towards the apex, 150-250  $\mu\text{m}$  long, 4.5-6  $\mu\text{m}$  wide at the base, tapering up to 1.5-2  $\mu\text{m}$  at the tip. Conidiogenous cells solitary or in pairs or verticils, subspherical or irregular in shape, 4-8  $\mu\text{m}$  in diameter, hyaline or very pale brown. Conidia fusiform, hyaline, 2-septate, 18-22 x 2.5-3.5  $\mu\text{m}$ . Found on very few occasions in litter samples.

*Tridentaria glossopaga* Drechsler (Pl.I, Fig. 3). CH.DRECHSLER: Sydowia, Ann.Mycologica 15, p.17.1962. Very decayed piece of wood from the litter of a beechwood, near Hollósető in Bükk Mts, 11.10.1984. Incubated for some days. A small group of freshly grown conidia was noticed on the surface of the wood-piece. Hyaline conidia developed in the air, consisting of a wedge-shaped basal trunk, uniseptate, 10-14  $\mu\text{m}$  long, rather pointed at basal end, widening gradually up to 3-3.5  $\mu\text{m}$  wide tip, from where three finger-like branches diverge. The three fusiform branches are attached to the tip of basal trunk with very narrow isthmuses as it is a well-known characteristic structure of the conidia of the species of *Isthmotricladia* and *Tridentaria*. Branches three or more often five septated, 30-40  $\mu\text{m}$  long, about 3  $\mu\text{m}$  wide at middle part and gradually tapering to the very pointed tips. Amongst the numerous free conidia observed in this sample there were some with two branches, but the majority of the conidia were three-branched. None of the conidia were four-branched. Unfortunately conidiophores of this fungus could not be observed. For the generic classification of this fungus *Isthmotricladia* Matsushima was also considered, but the definitely

wedge-shaped basal trunk (main body) of the conidia conspicuously differs from the slightly clavate main body of the conidia of the known species of *Isthmotricladia*.

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#### Plate I.

- Fig. 1. *Chalara fusidioides* (Cda.) Rabenh., a group of phialides on decaying leaf-vein, X 1000.  
Fig. 2. *Chalara aurea* (Cda.) Hughes, phialophores on decaying leaf-vein, X 700.  
Fig. 3. A conidium of *Tridentaria glossopaga* Drechsler, X 1000.  
Fig. 4. *Idriella lunata* Nelson et Wilhelm, a group of conidiophores with aggregated conidia at their tips, X 330.  
Fig. 5. *Gonytrichum macrocladum* (Sacc.) Hughes, fascicles of hyphae, with Chloridium-like conidiophores, X 250.

#### Plate II.

- Figs 1-2. *Chaetopsis grisea* (Ehrenb. ex Pers.) Sacc., branched conidiophores with long lateral branches, X 150, X 500.  
Figs 3-4. *Nematogonium highlei* (A.L.Smith) Matsushima, Fig. 3: terminal ampulla with conidia, X 700, Fig. 4: conidiophore with two ampullae and detached conidia. Conidiophore proliferating through the terminal ampulla X 200.

#### Plate III.

- Figs 1-2. *Spondylocyadiopsis cupulicola* M.B.Ellis, conidiophores on decaying leaf-vein, X 200, X 1000.  
Figs 3-4. *Pseudospiropes rousselianus* (Mont.) M.B.Ellis, Fig. 3: detached conidia X 840; Fig. 4: tip of the conidiophore with aggregated conidia, X 700.

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Plate I.

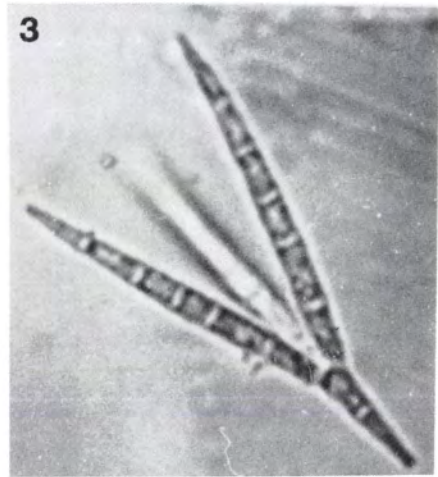
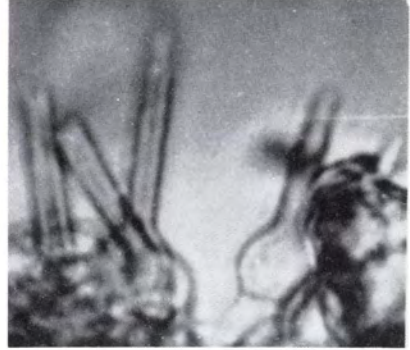


Plate II.

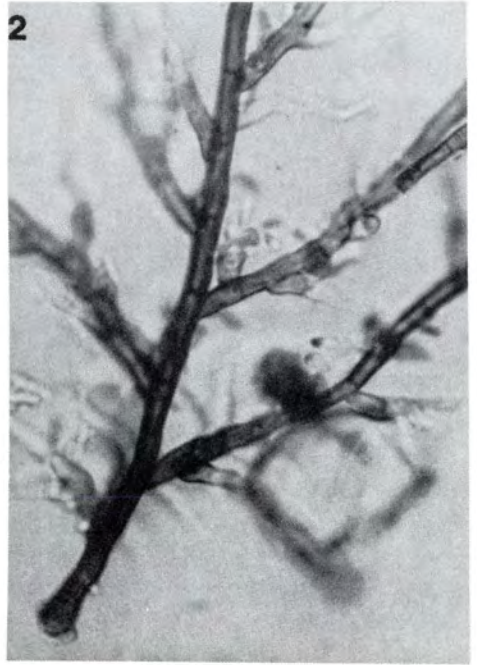
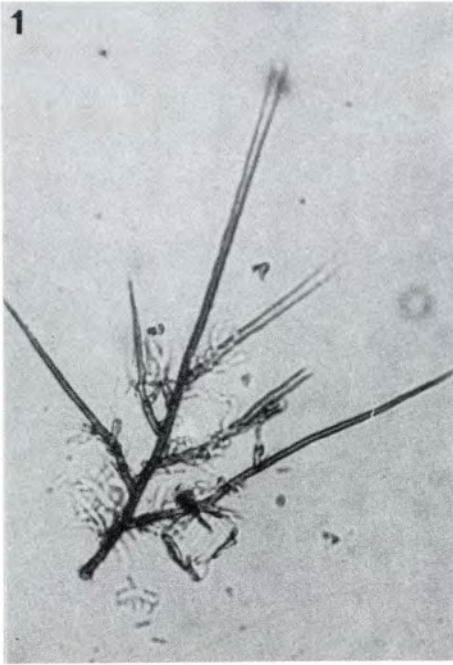




Plate III.

