

## ***Myxocephala*, a new genus of Hyphomycetes from roots and soil**

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*Myxocephala*, a new genus of phialidic Hyphomycetes, with the type species *Myxocephala albida* sp. nov., is characterized by highly evolved, stout, mid-brown, thick-walled, multiseptate conidiophore stipes, bearing a ter- to quaterverticillately branched sporogenous head with penicillate phialides, upon which the conidia become aggregated in a slime drop. Related phialidic genera of Hyphomycetes are compared and discussed.

When plating out washed soil particles from the rhizosphere, and washed and surface-sterilized root fragments of *Picea abies* (L.) KARST. from an experimental plot near Freudenstadt in the Black Forest, West Germany, a hyphomycete was repeatedly isolated with stout, brownish conidiophore stipes and apically polyverticillate, penicillate branches, producing numerous phialoconidia in slimy heads. Since the fungus does not conform to any other described species and genus, *Myxocephala albida* gen. nov., sp. nov. is proposed.

### **Taxonomy**

*Myxocephala* WEBER, SPAALJ & OBERWINKLER, gen. nov.

Genus hyphomycetum. Conidiophora erecta, solida, solitaria vel raro aggregata, deorsum brunnea, sursum pallescentia, plus minusve hyalina. Stipites mononematei, leves, multiseptati, crassitunicati; apparatus sporogenous apicalis complexus, obconicus, ex seriebus pluribus ramulorum et phialidibus constans. Phialides subcylindricae, hyalinae, longitudine diversae; conidia multa, unicellularia, ad basim inconspicue apiculata, in capitulum mucosum, album successive extrusa. Teleomorphosis ignota.

Habitat: in terra et ad radices *Piceae abietis*.

Species typica: *Myxocephala albida* WEBER, SPAALJ & OBERWINKLER sp. nov.

Conidiophores erect, stout, solitary or occasionally clustered, mid-brown near the base, gradually becoming lighter towards the subhyaline to hyaline apex; stipe mononematous, smooth, septate, thick-walled, bearing a complex sporogenous head at its apex,

which consists of several series of branches, each bearing a few metulae and several phialides. – Phialides subcylindrical, hyaline, variable in length, producing numerous hyaline, slightly apiculate ameroconidia, which become aggregated in a large slime drop. – Teleomorph unknown.

Habitat: Rhizosphere and rhizoplane of *Picea abies*.

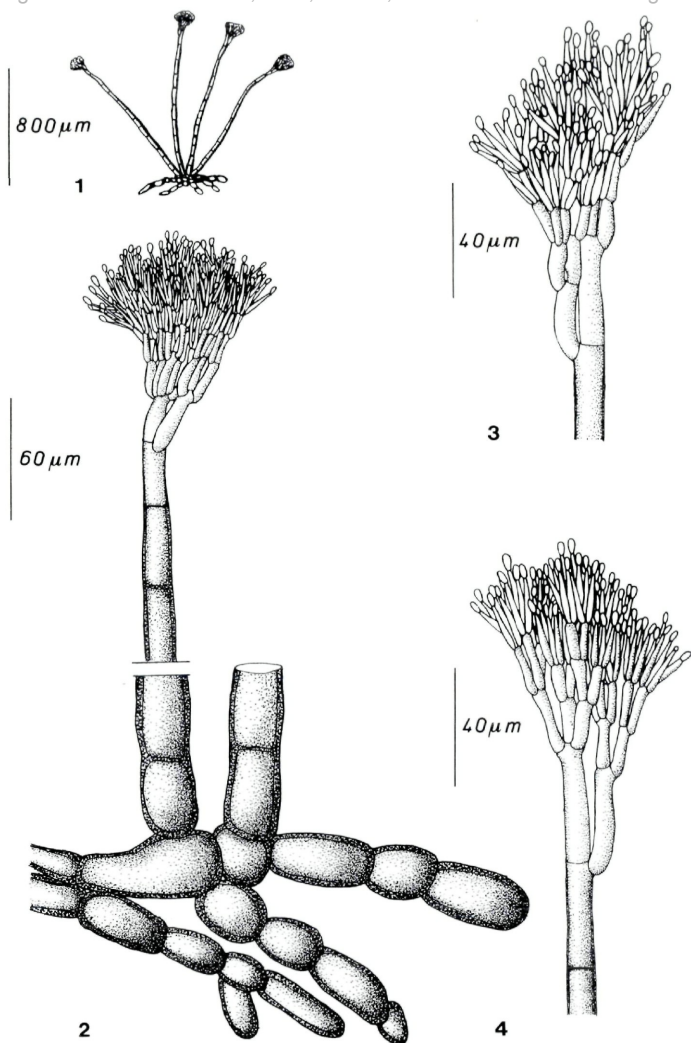
*Myxocephala albida* WEBER, SPAALJ & OBERWINKLER sp. nov. –

Figs. 1–11.

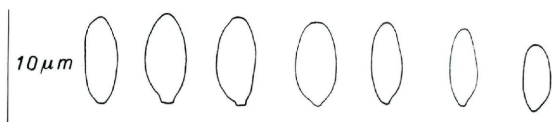
Coloniae post 14 dies ad 21 °C in agaro malti 45–50 mm diametro; velutinae, medio brunneae, marginem versus dilute brunneae, loci conidiorum albi, reverso in parte centrali hyphis crassitunicatis pigmentatis brunneo, marginem versus pallidore; odore indistincto. Conidiophora mononematea, erecta, solitaria vel raro aggregata (2–5); stipites 700–1200 µm longi; ad basim 20–35 µm, in summo 8–15 µm lati, multiseptati, crassitunicati (1.5–3 µm), deorsum brunnei, sursum pallescentes, subhyalini vel hyalini. Caput sporogenum complexum, hyalinum, 80–110 µm longum, ex 3–5 seriebus ramulorum, metularum, phialidum constans. Rami primarii vulgo singuli, 30–37 × 6.5–10 µm. Rami secundarii vulgo 2–4, 15–22 × 3.5–5 µm, metulae vulgo 2–5, 9–11(–18) × 2–3 µm. Phialides hyalinae, subcylindricae, e 2–2.5 µm sursum ad 0.5–1(–1.5) µm attenuatae, longitudine variabiles, 15–16,5(–20) µm. Conidia unicellularia, hyalina, apiculata, 4.5–5(–6.5) × (2–)2.5–3 µm. Hyphae submersae crassitunicatae (2–3.5 µm), brunneae, 20–35 × 15–18 µm.

Holotypus: GW72 in M; isotypus in TUB. Cultura viva, CBS 962.87, TUB GW72, isolata e radice Piceae abietis, Freudenstadt, in Germania, 7-III-1986.

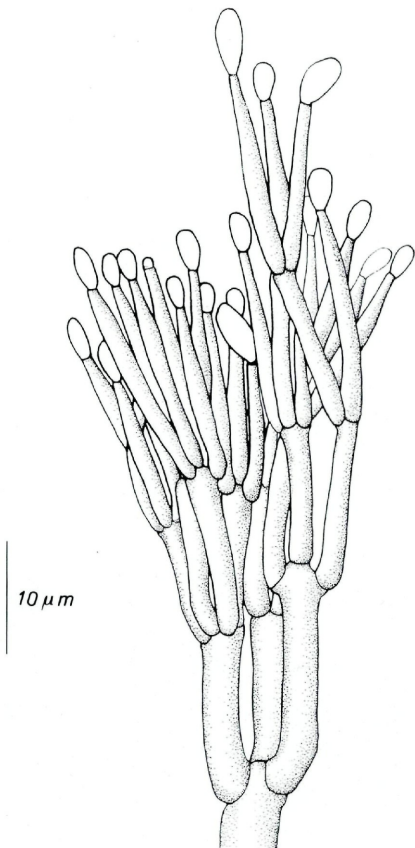
Colonies on 2% MEA (Difco) reaching 45–50 mm diam after 14 days at 21 °C, velvety, brown (6E8; KORNERUP & WANSCHER, 1983) in the center, lighter towards the margin, irregularly lobate; conidial area whitish; reverse brown in the central area due to abundant brownish, thick-walled submerged hyphae, paler towards the margin. – Conidiophores mononematous, erect, solitary or clustered (in groups of 2–5), stipes 500–1200 µm tall, near the base 20–35 µm, below the penicillus 8–15 µm wide, multiseptate, thick-walled (1.5–3 µm), mid-brown near the base, gradually paler towards the subhyaline to hyaline apices. – Sporogenous complex hyaline, 80–110 µm tall, consisting of 3–5 series of branches. A primary branch, usually single, narrower than the main stipe, 30–37 µm long and 6.5–10 µm wide, arises laterally. Secondary branches in groups of 2 to 4, measuring 15–22 × 3.5–5 µm. Tertiary and quaternary branches, 9–11(–18) × 2–3 µm, in groups of 2–5. – Phialides subcylindrical, length varying between 15–20 µm, width from 2–2.5 µm near the base tapering to 0.5–1(–1.5) µm at the apex. – Conidia produced successively, sometimes bulging out unilaterally near the base (Fig. 10, arrow) and appearing to be obliquely inserted into the phialide. Conidia one-celled, hyaline, smooth, slightly apiculate at the base, 4.5–5(–6.5) × (2–)2.5–3 µm, becoming aggregated in a large, whitish slime drop occasionally covering several stipes. – Substrate



Figs. 1-4. *Myxocephala albida*. - 1. Habit sketch. - 2. Sporogenous head and conidiophore stipe, showing the thick-walled stipe cells and basal cells. - 3-4. Branching pattern of the sporogenous head.

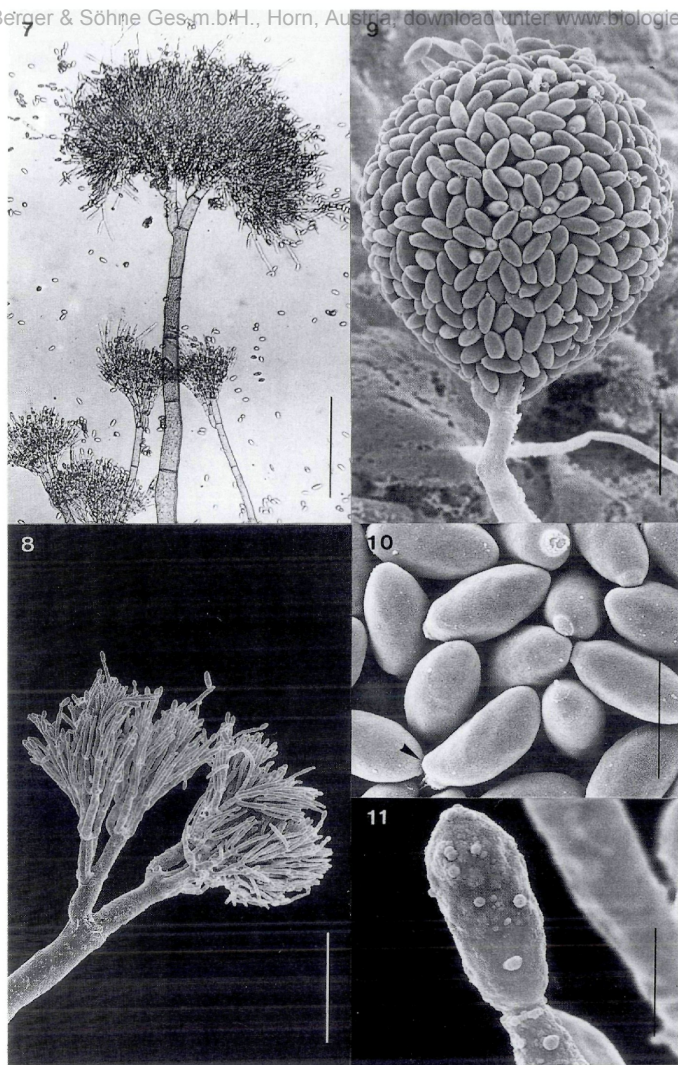


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Figs. 5-6. *Myxocephala albida*. - 5. Conidia. - 6. Secondary, tertiary and quaternary branches with phialides.



Figs. 7-11. *Myxocephala albida*. - 7. Light microscopic micrograph, showing the thick-walled, multiseptate conidiophore stipes (bar = 100  $\mu\text{m}$ ). - 8-11. Scanning electron microscopic micrographs. - 8. conidiophore stipe bearing primary, secondary, tertiary and quaternary branches with phialides (bar = 40  $\mu\text{m}$ ). - 9. Young sporogenous head with conidia aggregated in a slime drop (bar = 10  $\mu\text{m}$ ). - 10. Conidia, slightly apiculate and sometimes bulging out unilaterally near the base (arrow) (bar = 4  $\mu\text{m}$ ). - 11. Phialide tip, showing the phialidic conidiogenesis (bar = 2  $\mu\text{m}$ ).

hyphae locally enlarged and thick-walled (2–3.5  $\mu\text{m}$ ), near the conidiophores the cells measuring 20–35  $\times$  15–18  $\mu\text{m}$ .

Colonies on OA reaching 35–40 mm diam after 14 days at 25 °C, velvety, aerial mycelium restricted to the center or absent. – Colour greyish orange (6B5; KORNERUP & WANSCHER, 1983). – Conidial areas in concentric rings, whitish. Reverse greyish orange, margin pale. – Conidiophores 400–1200  $\mu\text{m}$  tall, other microscopic features as on 2% MEA.

On plated root fragments conidiophores conspicuous, erect and solitary, stipes 500–1000  $\mu\text{m}$  tall and 8–30  $\mu\text{m}$  wide.

### Discussion

*Myxocephala* superficially resembles *Gliocephalis* MATR. (MATRUCHOT, 1899, EMBREE, 1963) and *Goidanichiella* ARNAUD (ARNAUD, 1953, not validly published, compare BARRON, 1968), both of which have erect and stout conidiophores, but differ microscopically from *Myxocephala* in having conspicuous apical vesicles bearing a single series of metulae. In addition in *Gliocephalis* the conidiophores are non-septate and hyaline while in *Goidanichiella* dark pigmented, septate stipes occur.

Species of the genera *Phialocephala* KENDR. (1961) sensu stricto (WINGFIELD et al., 1987) and *Gliocladium* CORDA (1840) have complex penicillate conidiophores like *Myxocephala*.

The former was included in the *Leptographium*-complex, characterized by highly evolved, darkly pigmented, often massive conidiophores (KENDRICK, 1961, 1963). The mononematous stipe bears a sporogenous apparatus, consisting of several series of branches. However, the pronounced collarettes and the dark brown stipes typical for the dematiaceous genus *Phialocephala* are lacking in our isolates. A further distinguishing feature is the width of the stipe of *Phialocephala* which, unlike stipes in *Myxocephala*, seldom exceeds 10  $\mu\text{m}$ .

*Gliocladium* sensu stricto, as delimited by SEIFERT (1985), is characterized by densely penicillate conidiophores, which bear slimy conidia in heads. The conidiophores are hyaline in most cases. Yellow-ochraceous pigmentation of stipes occurs in only a few species. In the mononematous *Gliocladium penicilloides* CORDA, the stipes are normally bright yellow and roughened near the base and in some of the synnematosus species, *G. polyporicola* (HENN.) SEIFERT & W. GAMS, *G. aurifilum* (GERARD) SEIFERT, SAMUELS & W. GAMS and *G. thaxteri* SEIFERT & W. GAMS for example, the basal hyphae of the synnemata can be pigmented yellowish or brownish. Species of *Gliocladium*, however, have thinner-walled stipes than *Myxocephala* and in the mononematous species of *Gliocladium* co-

nidiophore width seldom exceeds 8–10  $\mu\text{m}$ , whereas in our isolates the stipes are much more massive. As the genus *Gliocladium* is already rather heterogeneous it seems most reasonable not to include our fungus in it.

Consideration of all common and differentiating features between our isolates and comparable species of *Gliocephalis*, *Goidanichiella*, *Phialocephala* and *Gliocladium* has led us to propose the new genus *Myxocephala*.

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