

A Polyphialidic Hyphomycete *Gonytrichum macrocladum* New to Korea from the Arable Soil in Jinju-shi

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During the study of soil mycoflora in Jinju-shi in 1997, a dematiaceous hyphomycete, *Gonytrichum macrocladum*, was isolated using the soil dilute plating method. The isolate was recovered with very low frequencies and recorded for the first time in Korea. Illustrated descriptions are presented for the isolate examined in the present study.

KEYWORDS: Fungi imperfecti, *Gonytrichum macrocladum*, Hyphomycetes, Soilborne

While studying fungi isolated from arable soils in Jinju-shi, Kyungsangnam-do, a dematiaceous hyphomycete producing polyphialidic spores was isolated with very low frequencies. Subsequent studies revealed that it was *Gonytrichum macrocladum* (Sacc.) S. Hughes.

The genus *Gonytrichum* Nees & T. Nees was first introduced by Nees, C. G. & F. in 1818 for the single species *G. caesium*. The generic citation was differently described by Hughes (1951) and Gams and Holubová-Jechová (1976) as *Gonytrichum* Nees ex Wallroth and *Gonytrichum* C. G. & F. Nees ex Leman, respectively. The first major generic concept, the presence of the collar-like fertile hyphae, was presented by Hughes (1951). Four years later the polyphialidic feature of sporulation was contributed to the major concept by Swart (1959).

Hughes (1951) examined most of the specimens assigned to *Gonytrichum* since its first description. Seven species were compiled and three of them were stated to resemble *G. caesium*. Thereafter, Gams and Holubová-Jechová (1976) reviewed the genus *Gonytrychum* and provided a key to 4 species, including 3 varieties. They also presented the teleomorphic state, *Chaetosphaeria* Tul. & C. Tul. which is a perithecial ascomycete producing part spores, associated with the *Gonytrichum* conidial state; *C. inaequalis* (Grove) W. Gams & Hol.-Jech. was connected with *G. caesium* and *C. chloroconia* W. Gams & Hol.-Jech. with *G. clamydosporium* G. L. Barron & G. C. Bhatt.

Gonytrichum species are commonly found on decaying wood and in the soils with worldwide distribution. Especially, *G. macrocladum* is the one most frequently isolated from soil (Domsch *et al.*, 1980).

The species *G. macrocladum* was first placed in *Chaetopsis* Grev. and moved to *Mesobotrys* Sacc. by Saccardo.

However, Hughes (1951) reduced the name *Mesobotrys* to a synonym of *Gonytrichum* and subsequently transferred *M. macroclada* (Sacc.) Sacc. to *G. macrocladum*.

The arable soil samples were collected from Jinju-shi, Kyungsangnam-do in May 1997 by the junior author. Soil dilutants were plated on Bacto[®] rose bengal agar with streptomycin. Individual colonies were transferred onto general media.

Three duplicates of the isolate were cultured on both corn meal and malt extract agar at 25°C and 70% RH. General observations and measurements of characteristic structures were made on fresh material mounted in water. Sizes represent 25 measurements. Photographs were taken with an Olympus PM-D35DX on an Olympus BX50 stereo microscope. Identification was determined by referring to Arx (1981), Barnett and Hunter (1987) for the genus and to Gams and Holubová-Jechová (1976) for the species.

Morphological and cultural characteristics were described and the isolate was deposited in the KACC (Korean Agricultural Culture Collection, NIAST, RDA, Republic of Korea).

Gonytrichum macrocladum (Sacc.) S. Hughes, 1951. *Transactions of British Mycological Society* 34: 565.

Figs. 1-11.

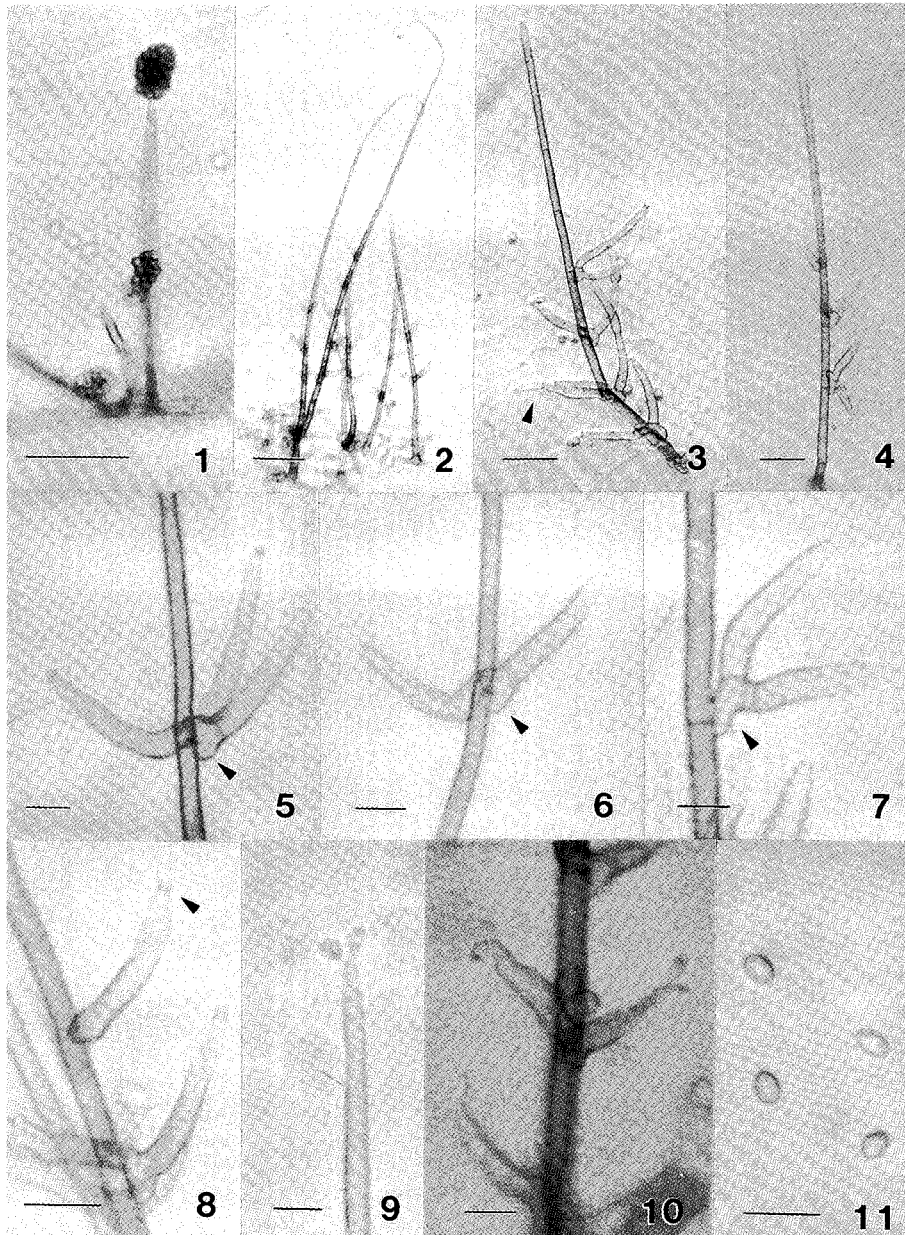
≡ *Chaetopsis macroclada* Sacc., 1877. *Michelia* 1: 79.
≡ *Mesobotrys macroclada* (Sacc.) Sacc., 1880. *Michelia* 2: 27.

Colonies reaching 45 mm diam in 14 days, velvety, light olivaceous at first but becoming dark olivaceous brown with a broad hyaline margin with age, with olivaceous black reverse, abundantly sporulating. Mycelium mostly immersed. Vegetative hyphae hyaline to light brown. Conidiophores subulate, crowded, arising singly, consisting of a straight

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erect stipe, brown, unbranched, some (97.5~)122.5~212.5 (~250) μm long with a terminal sporulating phialide, others 275.0~370.0 μm long with a sterile ending, 3.0~5.0 μm wide at the dark brown base, tapering to 2.5~3.0 μm wide at the paler setiform apex septate. Collar-like hyphae (or short basal cells) formed just underneath the septum, arising from the lower half of the conidiophore stipe, short, irregularly curved, slightly pigmented, giving rise to a succession of 2~4 phialides. Internodes (17.5~)20~30(32.5) μm long,

repeatedly septate. Phialides lightly pigmented, subulate, with a tapering tip, (15.0~)17.5~22.5 \times 2.5~3.8 μm , collarete conspicuous, occasionally proliferating percurrently. Conidia formed on a protruding meristematic tip from multiple conidiogenous loci, accumulating in slimy heads, 1-celled, ellipsoidal to oval, colorless or pale brown, smooth, usually 1-guttulate, slightly apiculate at the base, (4.0~)5.0(~6.0) \times 2.5~3.8 μm . Chlamydospores absent. Sterile lateral setae in the upperpart of the conidiophores absent. No teleomorph was



Figs. 1-11. Light micrographs of *Gonytrichum macrocladum* (KACC 40849). 1. Young conidiophore with conidia accumulating in slimy heads. 2. Overview of conidiophores with sterile ending. 3. Conidiophore with phialide-bearing ending and proliferation of phialide (arrowhead). 4. Young conidiophore stipe. 5-7. Collar-like basal hyphae (arrowheads) giving rise to a false whorl of 2-4 phialides. 8. Phialides with a distinct collarete (arrowhead). 9-10. Polyphialidic conidia from simultaneous succession. 11. Conidia with slightly apiculate base. Scale bars: 1, 2, 8, 11 = 10 μm ; 3, 4 = 20 μm ; 5-7, 9, 10 = 2 μm .

found.

The Korean isolate of *G. macrocladum* showed fewer phialide whorls but somewhat larger conidia than the ones described in Gams and Holubová-Jechová (1976) and Ellis (1971) but otherwise it is the same. Two diagnostic characteristics of *Gonytrichum*, the collar-like basal cells (Figs. 5-7) and polyphialidic spores (Figs. 8-10), were definitely observed in the isolate. The specific features of *G. macrocladum*, unbranched conidiophore stipes (Figs. 2-4) and olivaceous short-ellipsoidal conidia (Fig. 11), were detected except for sterile setae in upper conidiophores which also were observed by Hughes (1951).

Chloridium Link is the most similarly related genus to *Gonytrichum* besides its simple conidiophores. Swart (1959) mentioned that *Chloridium* does not show the branching pattern but a very similar sporogenesis of *Gonytrichum*. Barron & Bhatt (1967) reported the suppression of conidiophores and the production of the *Chloridium* state after several transfers of *G. chlamydosporium*. This phenomenon was also observed in the early and old stage of cultures studied in this study.

References

- Arx, J. A. von. 1981. Moniliales Key III (Genera with conidia borne in basipetal succession). Pp 185-211. *In*: The genera of fungi sporulating in pure culture. J. Cramer, Germany. 315 p.
- Barnett, H. L. and Hunter, B. B. 1987. Illustrated genera of imperfect fungi. 4th edn. MacMillan Publishing Company, New York, USA. 218 pp.
- Barron, G. L. and Bhatt, G. C. 1967. A new species of *Gonytrichum* from soil. *Mycopathologia et Mycologia Applicata* **32**: 126-128.
- Domsch, K. H., Gams, W. and Anderson, T.-H. 1980. Compendium of soil fungi. Academic Press, New York, USA. 859 pp.
- Ellis, M. B. 1971. Dematiaceous Hyphomycetes. Commonwealth Mycological Institute, Kew, England. 608 pp.
- Gams, W. and Holubová-Jechová, V. 1976. *Chloridium* and some other dematiaceous hyphomycetes growing on decaying wood. *Studies in Mycology* **13**: 1-99.
- Hawksworth, D. L., Kirk, P. M., Sutton, B. C. and Pegler, D. N. 1995. Ainsworth & Bisby's Dictionary of The Fungi. 8th edn. International Mycological Institute. CABI. Kew. England. 888 pp.
- Hughes, S. J. 1951. *Stachylidium*, *Gonytrichum*, *Mesobotrys*, *Chaetopsis* and *Chaetopsella*. *Transactions of British Mycological Society* **34**: 551-576.
- Swart, H. J. 1959. A comparative study of the genera *Gonytrichum* and *Bisporomyces*. *Antonie van Leeuwenhoek* **25**: 439-444.