NOTES ON BEAUVERIA

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Relationship between Beauveria and some other genera is discussed. SEM-micrographs of the conidiophores of B. nivea are given. Synonymy of Tolypocladium with Beauveria is emphasized. The orthographic error B. arenarium (Petch) v. Arx (1986) is corrected and should be read B. aranearum.

The hyphomycetous genus Beauveria Vuill. includes fungi occurring either on living or dead insects, or isolated from litter, soil, or from soil-inhabiting animals. In culture all species form expanding or restricted colonies which are white, lanose, floccose or powdery. The hyphae are delicate and hyaline. The conidiogenous cells develop either directly on the hyphae, or on large, swollen cells and are then clustered. Typical conidiogenous cells are swollen, ampulliform or nearly spherical, and form a narrow conidiogenous rhachis which usually elongates percurrently or sympodially. The conidia are small, obovate and hyaline, with a small but distinct scar at the base.

In 1986 a fungus was encountered on living larvae of an unknown insect found on litter collected in a ‘snow valley’ at the Gemmi-Pass (2300 m) in Switzerland. The fungus was identified as Beauveria nivea (Rostr.) v. Arx. Its clustered conidiogenous cells are ovate. In young states the rhachis is short; at first it elongates percurrently, but later it becomes cicatrizated by sympodial elongation. The rhachis is not geniculate, but slightly protuberant scars were visible. SEM micrographs from a similar fungus were received from Dr. M. M. Dreyfuss (Basle) as Tolypocladium inflatum W. Gams. These micrographs are made from the cyclosporin-producing strain S 79391F, referred to by Dreyfuss (1987). This strain has conidiogenous cells with a very distinct, long, often geniculate rhachis with sessile or slightly protuberant scars (Fig. 1).

Beauveria (including Tolypocladium) is closely related to other entomogenous fungi (von Arx, 1986) and also to Nomuraea Maubl. sensu Samson (1974). Only two species, N. rileyii (Farlow) Samson and N. atypica (Yasuda) Samson, were treated, but several further species now classified in the closely related genus Isaria Fr. or in the unrelated genus Paecilomyces Bainier, have to be added. In Nomuraea species conidiogenesis is considered to be 'phialidic', but it should be studied more carefully by SEM and TEM.

The related genus Culicinaomyces Couch should be restricted to water-inhabiting species, parasitizing mosquito larvae. Morphological characters are not available for an adequate distinction from Beauveria, Isaria, Diheterospora Kamyschko and other relatives. Some Hyphomycete specialists do not accept the synonymy of Tolypocladium with Beauveria. This synonymy, however, was required, because B. nivea (= T. inflatum

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W. Gams) and B. bassiana, the type species of the two genera, are more closely related to each other than to other species classified in Beauveria and Tolypocladium. Young cultures of the two species cannot be distinguished by morphological characters; the small differences in old cultures may be a consequence of temperature requirements.

Teleomorphs are unknown in Beauveria species. Only the Clavicipitales, however, include fungi with such particular anamorphs and cultural characters.


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REFERENCES


Fig. 1. Beauveria nivea, conidiogenous cells and conidia. Note the long rhachis with annellations and/or lateral scars (from S 79391F) (c. 9000 ×).