

ADDITIONAL NOTES ON TRITIRACHIUM

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(With two Text-figures)

Sporotrichum isariae Petch is redescribed and placed in *Tritirachium*; it is compared with *T. cinnamomeum*. A new species is described in *Nodulisporium*. Its relationship with *Tritirachium* is discussed.

The genus *Tritirachium* Limber (1940) was redefined by de Hoog (1972) as having conidia which are formed on a regularly flexuose conidiiferous rachis; the point of attachment is inconspicuous when a conidium is liberated. In both accepted species, viz. *Tritirachium dependens* Limber (type species) and *T. oryzae* (Vincens) de Hoog, the conidiogenous cells are distinctly tapered towards the tip, and the conidiophores are very long, ascendent, basally slowly merging into the vegetative mycelium, in the apical region with strictly verticillate branching. *Tritirachium cinnamomeum* van Beyma (1942) resembled *T. dependens*, but differed by the long, strictly cylindrical conidiogenous cells, not tapered towards the tip, and the more irregular branching pattern. It was preliminarily assigned to *Nodulisporium*.

During the study of the type material of some *Sporotrichum* species in the herbarium of T. Petch (K), *S. isariae* was encountered. This species appeared to be intermediate in all characters mentioned above between *Tritirachium dependens* and *T. cinnamomeum*.

***Tritirachium isariae* (Petch) de Hoog, comb. nov.**—Fig. 1a-c

Sporotrichum isariae Petch in Naturalist, Hull 1931: 102 (basionym).

Mycelium on natural substrate forming loose, pale pinkish ochraceous tufts, up to 2 mm high. Aerial hyphae pale ochraceous, smooth- and rather thin-walled, ascendent, very regular, width uniform throughout 1.6–2.8 μm , without main stalk, branched throughout verticillately. Conidiogenous cells subhyaline to pale brown, consisting of a linear basal part, mostly 30–55 μm long, somewhat swollen near the base, about 1.5–2.3 μm wide, tapering very slightly towards the tip (especially when young), and a regularly flexuose (intervals about 2 μm) conidiiferous rachis, up to 70 μm long and 1–1.5 μm wide, on which the conidial points of attachment are inconspicuous. Conidia hyaline, smooth- and thin-walled, globose to ellipsoidal, rounded at the base, about 1.8–2.6 \times 1.6–2.3 μm . No chlamydo-spores were observed. Perfect state unknown.

MATERIAL EXAMINED.—*Sporotrichum isariae*, type collection in herb. T. Petch (K), R-636 and R-743, both growing on or in association with *Paecilomyces farinosus* (Dicks. per Fr.) Brown & G. Smith on plant debris in England, collected in Black Hills, North Wootton, Norfolk, March 1930, and Mulgrove Woods, Yorkshire, September 1930, respectively.

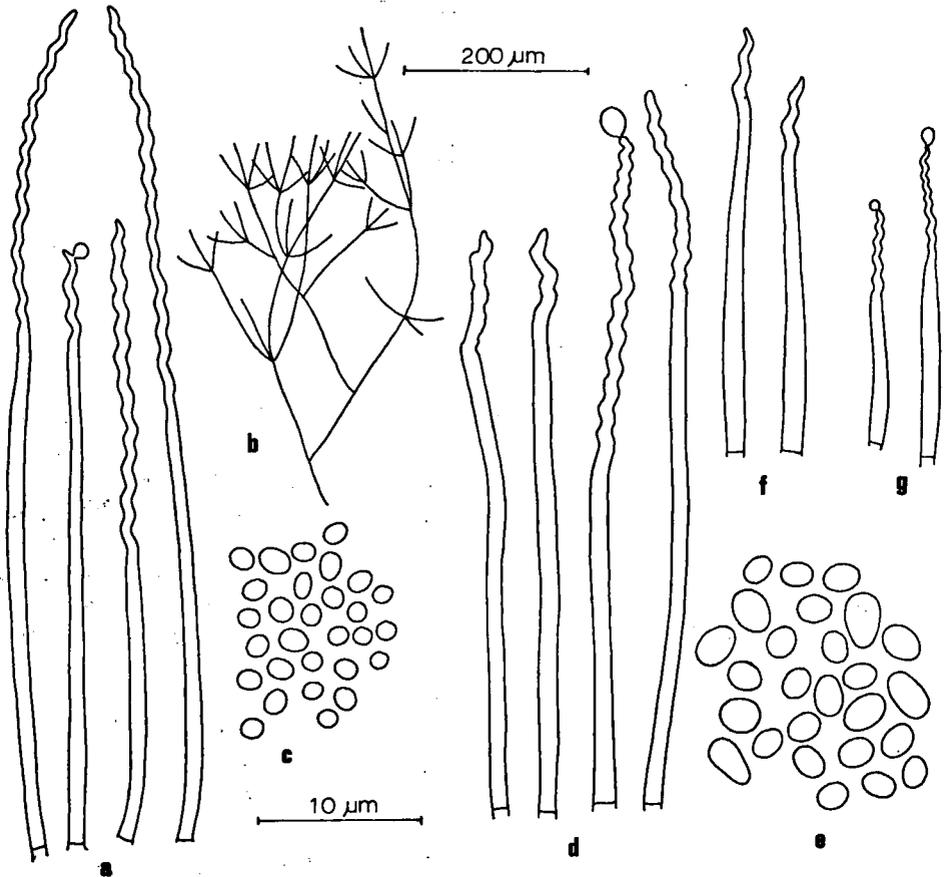


Fig. 1. Species of *Tritirachium*. — a-c. *T. isariae*: a. conidiogenous cells. — b. branching pattern. — c. conidia. — d, e. *T. cinnamomeum*: d. conidiogenous cells. — e. conidia. — f. *T. dependens*: conidiogenous cells. — g. *T. oryzae*: conidiogenous cells.

DISCUSSION.—*Tritirachium isariae* mostly grew intermixed with abundantly sporulating *Paecilomyces farinosus* and it was difficult to determine which conidia belonged to which species. Mostly the smaller conidia, which definitely did not belong to *P. farinosus*, were measured and figured. Trotter & Cash (1972: 1293) described the conidia as ovoidal, $3\text{--}5 \times 2\text{--}2.5 \mu\text{m}$, or globose, $2\text{--}2.5 \mu\text{m}$ in diameter.

Tritirachium isariae is reminiscent of *T. dependens* (Fig. 1f); it can easily be distinguished, however, by the linear conidiogenous cells. Moreover no main stalk of the conidiophore is recognizable: there is no differentiation between branches of lower and higher order. It differs from *T. cinnamomeum* mainly by the smaller conidia; furthermore the conidiogenous cells mostly are not uniform throughout but slightly swollen near the base and tapering towards the tip.

The linear, only slightly tapering conidiogenous cells of both *Tritirachium isariae* and *T. cinnamomeum* remind *Geniculosporium* Chesters & Greenhalgh (1964) and some conidial states of *Hypoxylon* species, e.g. *H. multifforme* Fr., as described by Greenhalgh & Chesters (1968). Main criterium for separation is the truncate base of the conidia, which leave blunt denticles at liberation, in the latter group of fungi.

TRITIRACHIUM CINNAMOMEUM Beyma—Fig. 1d-e

Tritirachium cinnamomeum Beyma in Antonie van Leeuwenhoek 8: 116. 1942. — *Nodulisporium cinnamomeum* (Beyma) de Hoog in Stud. Mycol. 1: 37. 1972.

Colonies on 2% malt agar at 20°C growing slowly, attaining a diameter of 2–4 mm in 10 days, appearing powdery to velvety, pale pinkish buff to pinkish cinnamon. Reverse yellowish to argus brown, sometimes with a brown pigment diffusing into the agar. Exudate and odour absent. Submerged hyphae hyaline, smooth- and thin-walled, 1–1.5 μm wide, usually forming a rather compact, slightly elevated mycelial cushion. Aerial hyphae hyaline to light brown, smooth-walled or finely warty, walls slightly thicker than in the submerged mycelium, ascendent, about 90–700 × 1.5–2.5(–3) μm, without a main stalk, usually bearing 1–3 whorls of 1–4(–5) conidiogenous cells or lateral branches at distances of 60 μm, branches bearing conidiogenous cells in 1(–2) whorls of 1–4; sometimes the conidiogenous cells occur scattered along ascendent hyphae. Conidiogenous cells subhyaline to pale brown, consisting of a linear basal part, mostly 35–75 μm long, width uniform throughout 1.5–2.5 μm, and a regularly flexuose (intervals 2–3 μm) conidiiferous rachis, up to 210 μm long and 1.5 μm wide, on which the conidial points of attachment are inconspicuous. Conidia hyaline, smooth- and thin-walled, subglobose to ellipsoidal, sometimes pyriform, rounded at the base, (2.5–)3–5(–8) × 2.5–3(–4) μm. Rarely intercalary, hyaline, ellipsoidal chlamydospore-like hyphal swellings occur. Perfect state unknown.

MATERIAL EXAMINED.—CBS 182.42, type culture of *Tritirachium cinnamomeum*, isolated by P. Bels from a fly in a cave near Maastricht.

CBS 377.49 (=IMI 45,558) sent by W. L. White as *Tritirachium dependens*, isolated from shoeleather, Solomon Islands, 1944.

CBS 369.53 sent by Fa. Kievit, Rotterdam, isolated from sapele three-ply wood, Nigeria.

CBS 129.71 isolated by W. Gams and R. A. Samson from decayed *Quercus* wood, Vogelenzang near Haarlem, October 1970.

DISCUSSION.—The shape of the conidia in this species sometimes is variable: usually the conidia are subglobose to ellipsoidal, but in some subcultures the conidia are often ovoidal, obovoidal, oblong or pyriform, and rather large, up to about 8 μm long.

The present species fits *Tritirachium* because of the regularly flexuose conidiiferous rachids, and of the conidia, which are sessile, attached to the conidiogenous cell with a narrow connection, leaving no distinct scars at liberation, whereas in *Nodulisporium* Preuss (1851) the rachids are straight and show blunt denticles. These details in the structure of the conidiiferous rachids are regarded here as the most valuable diagnostic criteria for the distinction of *Tritirachium* and *Nodulisporium*.

In the submerged mycelium of a subculture of CBS 129.71, spirally curled hyphal parts occurred, reminding initials of ascogonia. Some of them grew into tight coils of hyaline hyphae, but no further development was observed.

Nodulisporium cylindroconium de Hoog, *sp. nov.*—Fig. 2

Tritirachium sp. A, Evans in Trans. Br. mycol. Soc. 57: 253. 1971.

Coloniae in agaro maltoso 2% post 10 dies 40°C 35 mm diametro, velutinae pallide roseo-cinnamomeae. Reversum ochraceum ad brunneum. Exudatum abest. Odor suaveolens. Hyphae hyalinae ad pallide brunneae, erectae, fragiles. Cellulae conidiiferae sparsim in hyphis non-evolutis distributae, parte infera cylindracea, 45–135 μm longa et stipite recto, conidia in denticulis obtusis circa 1 μm intervallo gerente, consistentes. Cellula conidiogena saepe in vel sub apice incrementum persistens, eo modo novum seriem denticulorum formans. Conidia hyalina, oblonga, interdum subpiriformia vel uno latere applanata, basi rotundata, interdum cicatrice prominente praedita, (3.5–)4–6(–7) × 2–2.5(–3) μm. Chlamydosporae non observatae. Status perfectus ignotus. Typus: CBS 838.71 a H. C. Evans ex rejectamentis carbonis in Staffordshire, Anglia, isolatus.

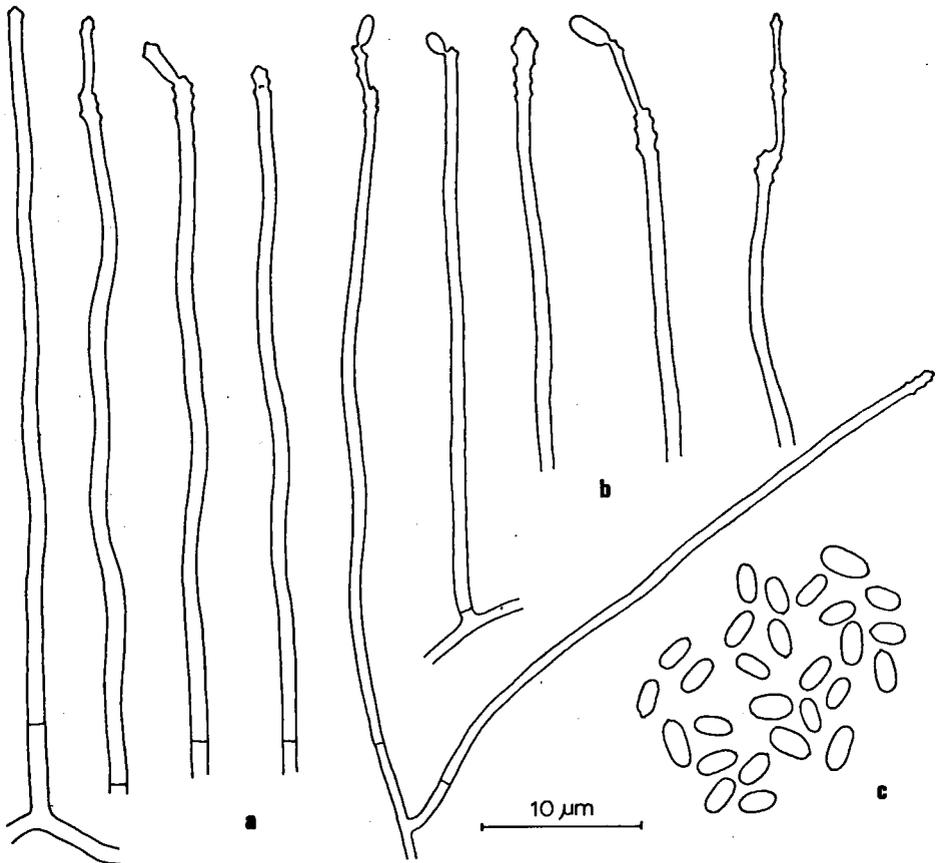


Fig. 2. *Nodulisporium cylindroconium*. — a. conidiogenous cells. — b. apical parts of conidiogenous cells in different stages of development. — c. conidia.

Colonies on 2% malt agar at 40°C attaining a diameter of 35 mm in 10 days, appearing velvety, pale pinkish cinnamon. Reverse yellowish to brownish. Exudate absent; odour slightly sweetish. Submerged hyphae hyaline, smooth-walled, 1.5–3 μm wide. Aerial hyphae hyaline to pale brown, usually smooth- and thin-walled, ascendent to suberect, fragile, up to 380 μm high, 1.5–3 μm wide, mostly unbranched. Conidiogenous cells scattered on undifferentiated hyphae, pale brown, smooth-walled or finely warted, consisting of a cylindrical basal part, mostly 45–135 μm long, width uniform throughout 1.5–2.5 μm , and a straight rachis, up to 45 μm long and 2–2.5 μm wide, bearing conidia on blunt denticles at intervals of about 1 μm . The conidiogenous cell often proliferates at or somewhat below the apex and gives rise to another series of denticles; consequently a nodose conidiiferous rachis may be formed. Conidia hyaline, smooth- and thin-walled, oblong, occasionally slightly pyriform or flattened at one side, rounded at the base, sometimes with a prominent scar, (3.5–)4–6(–7) \times 2–2.5(–3) μm . No chlamydo-spores were observed. Perfect state unknown.

MATERIAL EXAMINED.—CBS 838.71, type culture, isolated by H. C. Evans from coal spoil tip.

DISCUSSION.—*Nodulisporium cylindroconium* is recognizable by the shape and size of the conidia. In most of the other species described in *Nodulisporium* the conidia are shorter, usually obovoidal to ellipsoidal. The shape and pigmentation of the conidiogenous cells of *N. cylindroconium* are also diagnostic.

The above species is intermediate between the conidial states of some *Hypoxylon* species, e.g. *H. multiforme*, and *Tritirachium cinnamomeum*, but fits *Nodulisporium* because of the straight rachids with conspicuous blunt denticles.

ACKNOWLEDGEMENT.—The author is indebted to Dr. H. C. Evans for the permission to describe his *Tritirachium* strain as a new species.

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