

THE LEPTOGRAPHIUM COMPLEX

PENICILLIUM REPENS C. & E.¹

W. BRYCE KENDRICK

Plant Research Institute, Research Branch, Canada Department of Agriculture, Ottawa, Canada

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Abstract

Penicillium repens C. & E. is transferred to the genus *Phialocephala* Kendrick, and is redescribed and illustrated from the type, another authenticated collection, and a recent collection and isolation.

The genus *Phialocephala* Kendrick was erected for two new species of Hyphomycete (Kendrick 1961). These species resemble *Leptographium* Lagerb. & Mel. in the construction of the complex sporogenous apparatus, which develops at the apex of a dark mononematous stipe, and in their preference for wood as a substrate, but differ basically from *Leptographium* in the method by which their slimy amerospores are produced. The sporogenous cells of *Leptographium* are annellophores (Hughes 1953), whereas those of *Phialocephala* are phialides.

This paper is concerned with the fungus described as *Penicillium repens* Cooke and Ellis. Cooke and Ellis published this species in September 1878 as No. 2900 of their 'New Jersey Fungi,' with the diagnosis:

'Argillaceum, effusum. Hyphis repentibus, intricatis; ramis adscendentibus; ramulis patentibus, brevibus, quandoque furcatis; capitulis bifurcatis, hyalinis; sporis globosis. On rotten Magnolia'.

Although they did not designate a type, this description was evidently derived from a specimen collected by Ellis in January 1878 at Newfield, New Jersey. Parts of this collection preserved in Herb. M. C. Cooke in Herb. K² and in Herb. FH have been examined, and it was found that the fungus is dematiaceous and produces slimy spores. It must therefore be excluded from *Penicillium* on both of these counts, and may be accommodated very satisfactorily in *Phialocephala*. The description which follows is based on the collection cited above, a further authenticated collection made on the same host at the type locality by Ellis and Harkness in November 1880, and a recent collection on wood of *Populus* near Ottawa.

¹Contribution No. 263.

²Reference to particular Herbaria is made by use of abbreviations found in Index Herbariorum (Regnum Vegetabile, Vol. 15. 1959.).

Phialocephala repens (COOKE AND ELLIS) KENDRICK COMB. NOV.

≡ *Penicillium repens* Cooke & Ellis, Grevillea 7:6. 1878.

Colonies on the host are irregularly spreading and 'grayish-olive'.³

The aerial **mycelium** is composed of smooth-walled lustrous brown hyphae 2.6–5.4 μ wide and regularly septate at intervals of 40–50 μ . The hyphae produce frequent side branches which grow out at right angles to the parent hyphae. The side branches themselves sometimes form side branches in the same way, and a loosely floccose web of hyphae up to 600 μ high is produced.

The **conidiophores** are scattered throughout the aerial mycelium, developing as rather short, fertile, side branches on aerial hyphae.

The mononematous brown **stipe**, though not usually more than 40 μ in length, may occasionally attain 70 μ . The stipe wall is smooth and relatively thin, not usually exceeding 0.2–0.3 μ in thickness. In shorter conidiophores there is a single septum near the base of the stipe; longer conidiophores may develop an extra median septum. The stipe is 2.0–4.0 μ wide just below the sporogenous apparatus, and 2.2–4.4 μ wide at the basal septum, below which it frequently broadens to become smoothly confluent with the wall of the parent hypha. No rhizoidal hyphae are present.

The **sporogenous apparatus** is 20–36 μ long and consists of two or three multiplicative series of metulae, the ultimate series of which bear clusters of phialides. The general appearance of the sporogenous apparatus is rather fan-shaped, although it is, of course, actually more or less obconical.

The rather divergent primary metulae number two or three, and are 5.4–14 μ long and 2.4–4.6 μ wide. Often, as in *Verticicladiella serpens* (Kendrick 1962), the main stipe axis can be recognized through successive series of metulae. This is particularly noticeable where there are only two primary metulae. One often continues the direction of growth of the stipe, while the other diverges from it at an angle, giving the whole sporogenous apparatus a rather lop-sided appearance. The secondary and tertiary metulae are usually shorter than the primary metulae and are more lightly pigmented.

The **phialides** are typically flask-shaped, being usually broader in the middle than at the base, narrowing sharply toward the apex, then producing a short, flaring collarette around the open end. The phialides, including collarette, are 5.4–10.8 μ long and up to 3.6 μ wide at their widest point. The collarettes are up to 2 μ wide and from 0.6–1.2 μ deep. The mid-brown pigmentation found in the stipe diminishes considerably in the metulae, but even the phialides are pale brown to their apices.

By definition (Hughes 1953), the **phialoconidia** are produced in a basipetal series from the open end of each phialide without any concomitant increase in the length of the sporogenous cell. They are hyaline, smooth-walled, and more or less spherical, frequently showing a small apiculus. They measure 1.6–2.8 μ in diameter, and accumulate in a small, more or less spherical head of slime around the sporogenous apparatus.

³Colors are cited from Ridgway, R. Color standards and color nomenclature. Washington 1912. Copy in the Library of the Research Branch, Canada Department of Agriculture, Ottawa.

Substrate: this species has so far been collected on *Magnolia* and *Populus* in eastern North America.

Following a recent collection on wood of *Populus*, *P. repens* has been successfully obtained in pure culture, and details are given below.

On potato dextrose agar and malt extract agar, *P. repens* forms a dark, spreading colony, with a slightly diffuse and fibrillose margin, and covers the entire plate in about a month. All but the margin of the colony is covered with a thick floccose turf of 'chaetura drab' aerial mycelium, and few conidiophores are produced. The immersed mycelium appears 'chaetura black'. When the fungus is grown in sloped tubes of malt extract agar at about 10° C the profuse aerial mycelium appears 'dark olive gray' owing to the presence of innumerable scattered conidiophores bearing small spherical translucent droplets of phialoconidia. Microscopic characters in culture are very similar to those described from the natural substrate, with the exceptions that in culture the primary metulae are sometimes less divergent, and the collarettes of the phialides sometimes less conspicuous, than those on the host.

Collections Examined

(1) The type collection of *Penicillium repens* C. & E. (Figs. 1, A-C; 2, A, B) preserved in Herb. M. C. Cooke in Herb. K with the following label:

'Fungi—New Jersey. U.S.A.
Penicillium repens C. & E.
On rotten *Magnolia*
No. 2900 Newfield; J. B. Ellis.'

(2) What is presumably part of the same collection preserved in Herb. FH:

'Penicillium repens C. & E.
Grev. 7-6
on rotten *Magnolia*
Newfield, N.J.,
January 1878.
No. 2900.'

(3) An authenticated collection preserved in Herb. NY and labelled:

'Ellis. North American Fungi
553 *Penicillium repens*, C. & E.
Grev. 7, p. 6.
On rotten *Magnolia*
Newfield, N.J.
Ellis & Harkness November 1880'.

(4) Part of the same collection preserved in Herb. B.P.I. (Fig. 2, E-G):

In Herb. DAOM
On POPULUS: (5) Bell's Corners, Carleton County, Ontario, 23.X.1960, G.L.H.,
DAOM 74357. (Figs. 1, D-I; 2 C, D).

Although in some features *Phialocephala repens* resembles *P. dimorphospora*, the type species of the genus *Phialocephala*, it is easily differentiated by the fact that it does not produce an elongated primary conidium like that found in *P. dimorphospora*, and accordingly lacks the long collarette needed to accommodate that atypical spore. In addition, *P. dimorphospora* on the

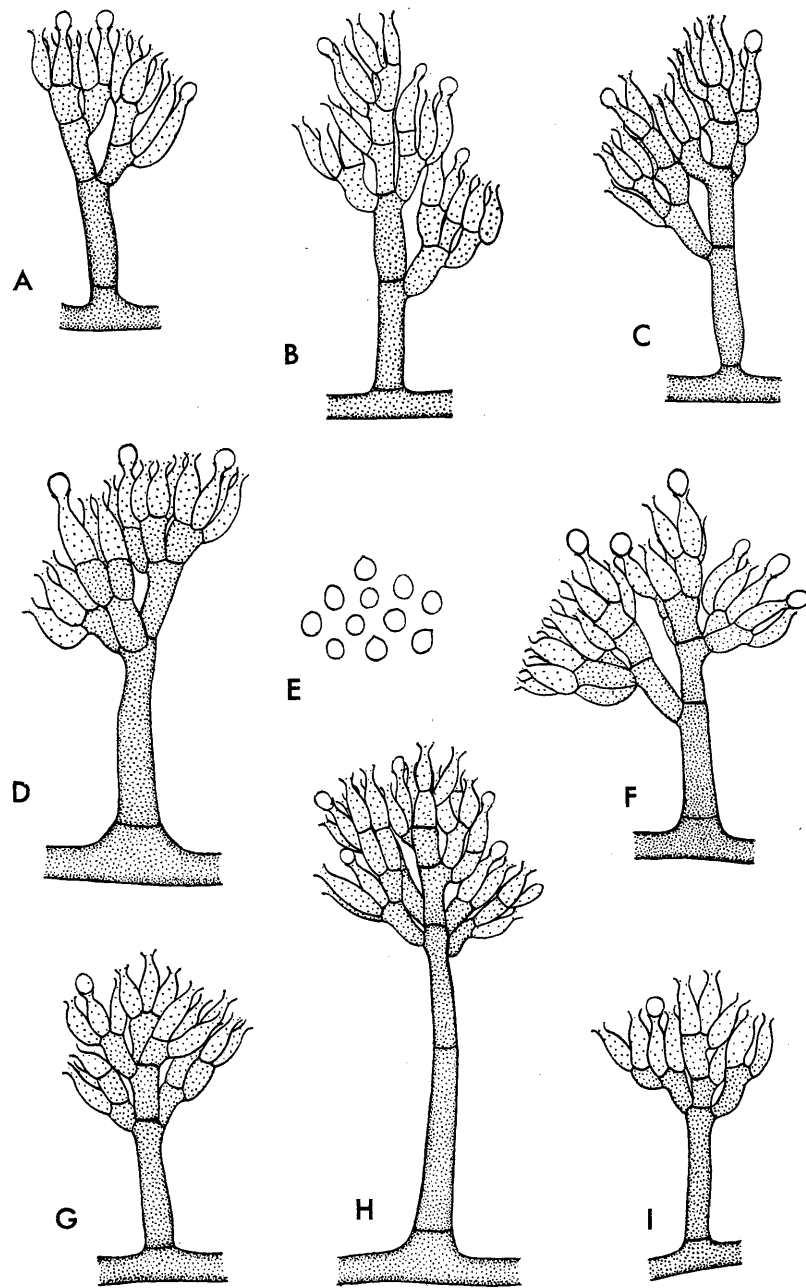


FIG. 1. A-C, conidiophores from the type collection of *Penicillium repens* in Herb. M. C. Cooke in Herb. K. D-I, conidiophores and conidia of *Phialocephala repens* (DAOM 74357). All $\times 1000$.

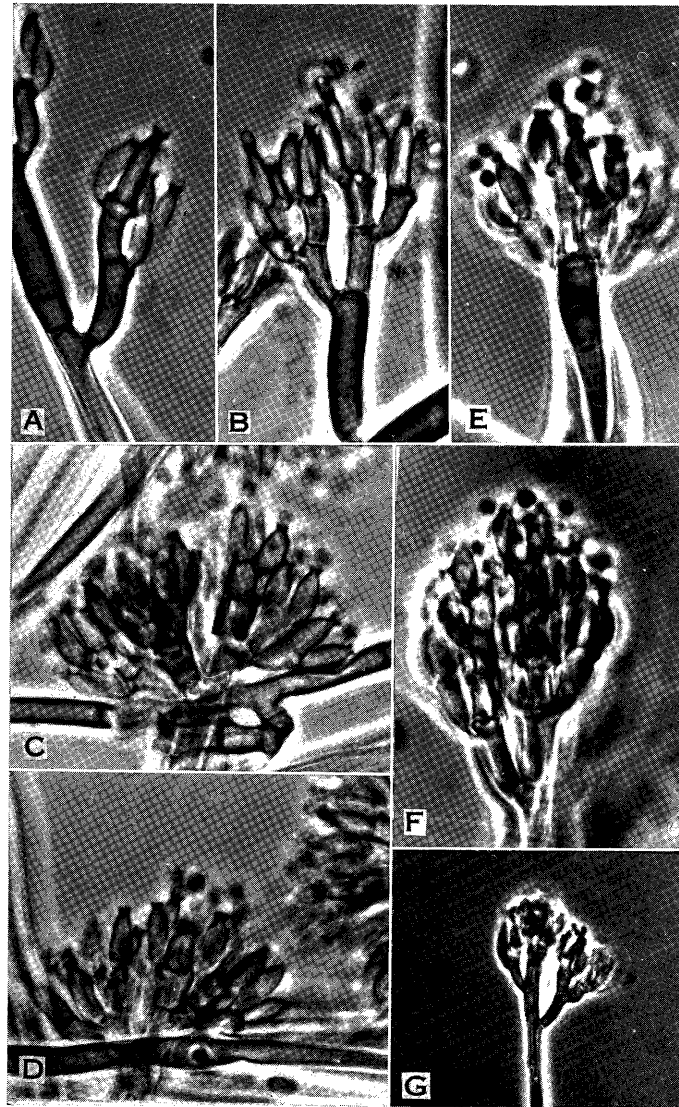


FIG. 2. A, B, conidiophores from the type collection of *Penicillium repens* in Herb. K. Note the short, flaring collarette and spherical conidia. C, D, conidiophores from the recent collection of *Phialocephala repens* (DAOM 74357). E-G, conidiophores from Ellis, North American Fungi No. 553. *Penicillium repens*, in Herb. BPI. Note the divergent metulae in G.
All phase contrast. A-F, $\times 1000$, G, $\times 450$.

host produces solitary conidiophores arising directly from the surface of the wood, and apparently lacks the web of aerial mycelium seen in all specimens of *P. repens* examined.

Acknowledgments

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References

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