

Capnophialophora pinophila (Nees) comb. nov.

ALICJA BOROWSKA

During investigations on fungi growing on fir honey-dew in the Świętokrzyskie Mountains, performed together with professor Demianowicz, it was observed that the most frequent fungus growing longest on this substrate was closely related to *Hormiscium pinophilum* (Nees) Lindau [= *Torula pinophila* Chevall.]. This fungus has some common traits with other species such as *Ophiocapnocomma batistae* Hughes and *Limacinia moniliforma* Barr as well *Hormisciomyces prepusum* Batista et Nascimento which develop on honey-dew in the tropical zone. Lindau (1907) when establishing the new combination *H. pinophilum* says that the mycelium of this fungus consists of closely interconnected conidia, barrel-shaped or spherical-barrel-shaped 18–20 μm in diameter. He claims that this fungus grows in central Europe on the branches of *Abies*, *Pinus* and *Taxus*. Beside the description he placed a part of a drawing representing *Torula pinophila*, taken from the work of Corda (1842). In the original work of the latter author, beside fragments of the branched mycelium, one conidium is shown, tapering distinctly at both ends. The author describes it as "spora septata" Lindau does not mention whether the fungus described by him forms such conidia.

Höhnelt (acc. to Woronichin, 1926) reports that *H. pinophilum* forms 7–16-cell conidia with dimensions 107–181, $5 \times 13,9$ –18,5 μm . Woronichin (1926) observed in this fungus conidia of the *Helminthosporium* type 46 – 123×10 –5 μm in size. He also describes the occurrence of *H. pinophilum* on the honey-dew of *Corylus avellana*, *Ilex aquifolium*, *Picea orientalis* and *Ulmus elliptica* in the Caucasus.

Very accurate experimental investigations of Neger (1918) did not confirm the observations of the above named mycologists. Neger studied fungal associations developing on fir honey-dew in various localities in Germany. He found that *H. pinophilum* does not form phragmospores, and he mentions that the separate fragments of the mycelium may form elongated cell groupings resembling conidia. According to this author, the two-cellular spores 18×12 μm in size with a smaller apical cell, which form on the side chains of the mycelium, consisting of several cells, are actually conidia. The cells of the mycelium reach 20 μm in dia-

meter. The same author described *Hormiscium* II which differs from *H. pinophilum* by smaller cells in the mycelium reaching 10 μm in diameter and by smaller conidia measuring $10 \times 8 \mu\text{m}$ and formed directly on the mycelial cells. It would seem that both fungi belong to the same species.

The fungus which grows on fir honey-dew in the Świętokrzyskie (Holy Cross) Mountains has all the features of *Hormiscium pinophilum* (Nees) Lindau whose diagnosis was supplemented by Neger. "Sporae septate" and the ascus stage could not be detected. It was, however observed that the fungus forms phialides and phialospores. Therefore, the author considers that this fungus should be transferred from the genus *Hormiscium* to *Capnophialophora* Hughes (1966). Hughes established that the stage described by him occurs in the development of certain species of the genera *Limacium* and *Ophiocapnocomma* growing on honey-dew of various trees and shrubs in Australia and New Zealand.

Capnophialophora pinophila (Nees) comb. nov. (Fig. 1)

(Basionym: *Torula pinophila* Chevall. 1826)

The mycelium on honey-dew of *Abies alba* forms black patches on the surface, cushion-like or semispherical with a spongy structure generally about 6 mm² in size or larger. They may be irregular owing to the merging of neighbouring patches. On fir branches it develops most frequently close to the needles, but only exceptionally on them.

Hyphae branched, several times, straight, growing close to one another, olive-brown up to very dark brown, tapering towards the apex with numerous anastomoses. Numerous side branchings consisting of several or some dozen cells grow from the parent hyphae at right angles. They are formed like the main hyphae of a chain of flattened spherical cells with thick walls irregularly roughened. The basal cells of the mycelium are darkest, $22.5-25 \times 18-20 \mu\text{m}$ in size coarsely roughened. The outer layer of their cell wall easily bursts. The cells of the central mycelium generally are $15-17.5 \times 12-12.5 \mu\text{m}$ in size. The apical cells are light-brown with an olive hue, slightly roughened, $5-7.5 \times 5-7 \mu\text{m}$ in size. The mycelium easily breaks into smaller fragments (like *Ophiocapnocomma* Hughes). These propagules are either straight side branches, a branched piece or a two- or several-cell segment or else — less frequently — single cells. Fragmentation of the mycelium occurs accidentally along the septa. After separation of the cells, their smooth contact membrane bulges and shows a characteristic lighter surface.

On the apical cells of the mycelium frequently small spherical cells in clusters (like in *Hormisciomyces prepusum* Batista et Nascimento)

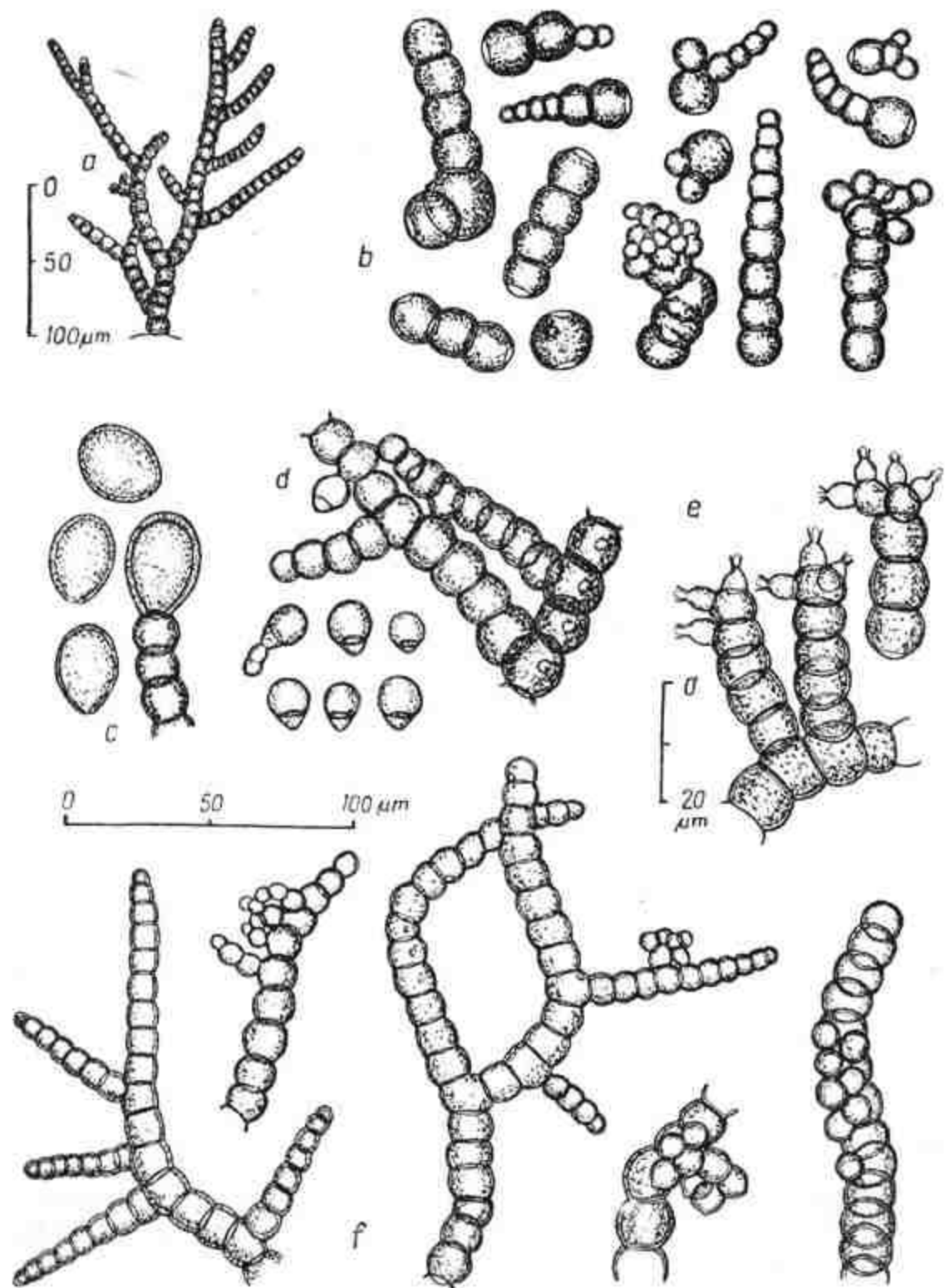


Fig. 1. *Cepnophialophora pinophila* comb. nov.

a — moniliform hyphae of mycelium; b — separated portions of hyphae; c — amerospores; d — didymospores, one on anastomosing hyphae; e — phialides on hyphae; f — fragments of mycelium

appear, at first almost hyaline, later brown, delicately roughened, with rather thick walls 5—10 μm in diameter. Cells similarly arranged may form on older parts of the mycelium (as in *Capnodium moniliforme* Fraser 1935).

The conidia are uni- or bicellular. Amerospores on the tips of hyphae are very large 25—32,5 \times 10—25 μm , ovate, somewhat truncated at the narrower end, thick-walled, smooth or delicately roughened, red-brown. Didymospores grow directly on the mycelial cells. They are smooth, dark-brown, 17,5 \times 12,5 μm in size generally. One of the cells is distinctly larger, almost spherical, up to 12,5 μm in diameter, slightly truncated on the side facing the septum. The second cell reaches a length of 5 μm and width of 10 μm , tapering towards the apex on which during germination axial or lateral mycelial chains.

Phialides, frequently paired, grow from the apical cells of the mycelium. They are brownish, with thick walls, barrel-like, wider at the base, 5 \times 5 μm in size with a collar 2,5—3 μm high expanding at the top. Phialospores very scarce, only single forming ones 1,5 μm long and ovate are visible.

The growth of the fungus on media is limited (colonies up to 3 mm in diameter). On the average on one hypha two new cells form during 24 h.

Observation of the fungi for a year and a half in various natural conditions in several localities and in culture in a moist chamber on various media did not reveal the occurrence of the ascus stage in *Capnophialophora pinophila*. It is possible that it develops but rarely and only under specific conditions.

C. pinophila was found in Poland in the following localities: Bartoszewiny, Pisarska Góra, Podgórze and Święta Katarzyna (all within the range of the Świętokrzyskie Mountains).

The specimens collected in Podgórze on Feb. 22, 1969, July 12 1969 and Oct. 28, 1969 have been deposited in the Herbarium of the Department of Plant Systematics and Geography of the Institute of Botany, Warsaw University.

The author wishes to thank professor Z. Demianowicz for the material transmitted for elaboration. She is also grateful to professor A. Skirgiełło for valuable consultations and for making available her private library.

*Institute of Botany,
Warsaw University
Warszawa, Al. Ujazdowskie 4*

REFERENCES

- Barnett H. L., 1957, Illustrated genera of Imperfect Fungi, Minneapolis.
- Barr M. E., 1955, Species of sooty molds from Western North America, Can. J. Botany 33: 505—507.
- Corda A. J. C., 1842, Icones fungorum hucusque cognitorum, Pragae.
- Fraser L., 1935, An investigation of the sooty moulds of New South Wales. IV., Proc. Linn. Soc. N.S.W., 60: 168—169.
- Hughes S. J., 1966, New Zealand Fungi 7. *Capnocybe* and *Capnophialophora*, new from genera of sooty moulds, N.Z. J. Bot., 4: 333—353.
- Hughes S. J., 1967, New Zealand Fungi 9. *Ophiocapnocomma* with *Hormiokrypsis* and *Capnophialophora* states, N.Z. J. Bot. 5: 117—133.
- Lindau G., 1907, Fungi imperfecti in Rabenhorst's Kryptogamen-Flora, Die Pilze 8: 597—599.
- Neger F. W., 1918, Experimentelle Untersuchungen über Russtaupilze, Flora N. F., 10: 103—110.
- Woronichin N. N., 1926, Zur Kenntnis der Morphologie und Systematik der Russtaupilze Transkaukasiens, Ann. Myc. 24: 251—254.

STRESZCZENIE

W pracy zaproponowano nową kombinację nomenklatoryczną grzyba z rzędu *Moniliales* (rodz. *Dematiaceae*) — *Capnophialophora pinophila* (Nees), często wystającego na spadzi na jodle w Górach Świętokrzyskich.

ADDENDUM

After this article had been sent to the publishers appeared the publication of Hughes (1970, New Zealand Fungi 14., Z. J. Bot. 8: 153—209) in which the author entered a short description and the photograph (fig. 19 B-D) *Capnophialophora* sp. It is probable that this is the same species which I have described above from Poland. It will be possible to express an opinion as to the validity of this view after analysing comparative material.