

A NEW SPECIES OF CHONDROPODIUM ON PSEUDOTSUGA TAXIFOLIA

W. LAWRENCE WHITE¹

(WITH 7 FIGURES)

The sphaeropsidaceous fungus, here discussed, was first encountered by Doctor J. S. Boyce of Yale University near Bear Springs, Clackamas County, Oregon, August 23, 1930. Two additional collections were made by J. R. Hansbrough near Revelstoke, British Columbia and Madras, Oregon in August of 1930 and 1931 respectively. The organism was found in small sunken lesions in the outer cortex of smooth-barked trees of *Pseudotsuga taxifolia*. It is stated by the collectors to be common but not serious from the disease standpoint.

Impressed by the superficial resemblance of the fruit-bodies of the fungus to those of *Caliciopsis*, Doctor Boyce sent material of the three collections to Professor Fitzpatrick. Careful search of the literature having failed to reveal any record of the occurrence of such a form on *Pseudotsuga* or any closely related host, the writer, at Professor Fitzpatrick's suggestion, undertook the study which has resulted in the preparation of this paper.

The lesions occupied by the fungus are small, superficial, slightly sunken, and often somewhat orbicular in shape, being then slightly greater in lateral than in vertical diameter (FIG. 3). They measure 1-2 × 1-1.5 cm. The outer cortex has a tendency to crack along the margin of the cankered area and to pull away from the adjacent healthy tissue, leaving the canker sharply defined. From two to a dozen erumpent (FIG. 3) pycnidia occur, scattered over the central area of each canker. The pycnidium is an erect columnar body, chiefly cylindrical, but sometimes spreading at the base, and typically compressed apically when dry (FIG. 2). It measures 1-1.5 mm. in height and 125-200 μ in thickness. The spreading base, more or less covered by the

¹The writer wishes to acknowledge his indebtedness to Doctor H. M. Fitzpatrick for valuable suggestions and for a critical reading of this paper.

thin outer cortical layer of the host, may attain a diameter of 500 μ . Though the pycnidia usually stand singly, two or three may be found clustered together, their bases sometimes united in a common basal stroma. Externally the pycnidium is black

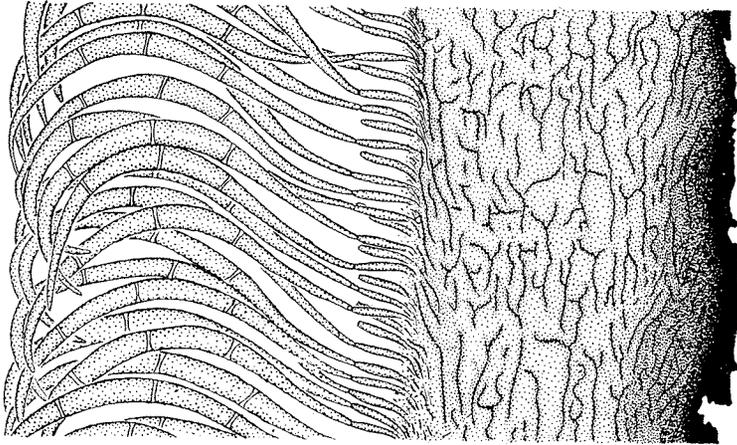


FIG. 1. Lateral wall of pycnidial cavity of *Chondropodium Pseudotsugae* bearing conidiophores and conidia. (Drawn to a magnification of 720 with aid of camera lucida and not reduced in reproduction.)

and minutely scabrous. The pycnidial cavity occupies the apical region of the column (FIG. 5, 6, 7). In wet weather it opens by a broad circular ostiolum freeing its crescent-shaped, 4-celled conidia. When dry it collapses completely, the compressed apex of the column then having the aspect of a coarsely toothed wedge (FIG. 2). The column beneath the locule is composed of a compact, subgelatinous to cartilaginous tissue, formed of closely interwoven hyphae which are chiefly subhyaline but at the periphery are darkened to provide a thin black rind (FIG. 6).

Since the genus *Chondropodium* is not well known, and because of the confused ideas of the limits of related genera, a brief discussion of our reasons for placing the species in this genus will be given.

The organism is excluded from *Sphaerographium* Saccardo because of its septate spores. It is excluded from *Pseudographium* Jaczewski because the description of the latter genus as amended by von Höhnelt (1, no. 921, pp. 67-69) with *P. Persicae* as the type, calls for pycnidia composed of brown

parallel hyphae, and a columnar stalk arising from hyphae superficial on the substratum. Examination of *P. Persicae* shows it to be strikingly different in gross aspect from the fungus with which we are dealing here.

The genus *Corniculariella* Karsten (3: 57), based on *C. Abietis* Karst., was characterized by him as having erect, superficial, caespitose, or rarely single pycnidia, and septate, hyaline or yellowish pycnospores. In 1890, apparently without reason and without giving any explanation he (4: 19) changed the name of the genus to *Cornularia*. By 1916 eleven additional species had been placed in the genus. At that time von Höhnelt (2, no. 958, 19-21) showed that all except three of these belong to other genera, these three—*C. spina* (Berk. & Rav.) Sacc. & Sydow, *C. Viburni* Sacc. and *C. Urceolus* v. Höhn.—being regarded by him as closely related species which might well be retained and treated as a genus. Meanwhile, *C. Abietis*, on which the genus *Corniculariella* had been based, apparently had not been collected again and was known only from the inadequate original description. This led von Höhnelt (2, no. 956, p. 42, no. 958, p. 45) to suggest that Karsten's description might have been based on a specimen of *Gelatinosporium Pinastri* (Moug.) v. Höhn. Knowing *C. Abietis* only from Karsten's description he made it synonymous with *Gelatinosporium Pinastri*, thus making *Cornularia* a synonym of *Gelatinosporium* Peck, and erected, for the three species named above, a new genus, which he named *Chondropodium*, it being his opinion that *Cornularia* should remain monotypic at least until the type species should become better known. Finally he placed in *Chondropodium* the species *Sphaerographium hystricinum* (Ellis) Sacc., stating on meagre evidence that in its perfect stage it also belongs to the genus *Godronia*.

A close relationship of *Chondropodium* to *Gelatinosporium* is indicated by von Höhnelt, and perhaps not essentially different is the genus *Micropera*.

Though the original description of *Cornularia* states that the pycnidia are superficial, the species placed in *Chondropodium* as well as *Gelatinosporium Pinastri* have actually erumpent pycnidia. It seems likely, therefore, that the terms "erumpent" and "superficial" were used somewhat vaguely by these authors.

Von Höhnel did not present a formal diagnosis of his new genus, *Chondropodium*. He wrote as follows concerning the species on which it was established:

"Diese Pilze haben ein eingewachsenes schwarzes Hypostroma, auf dem, meist büschelig verwachsen, mehrere aufrechte, meist sehr unregelmässig gestaltete, aussen schwarze, innen blasse, gelatinös-knorpelige Stromata sich erheben, die aus plectenchmatisch verflochtenen, knorpelig-dickwandigen Hyphen bestehen, oben meist konisch verschmälert sind und daselbst einen aufrecht-elliptischen oder zylindrischen Lokulus zeigen, in dem sich auf einfachen Trägern spindelig-zylindrische, lange, hyaline, einzellige oder undeutlich zweibis mehr-zellige Conidien finden. Lokulus schliesslich sich oben klein, rundlich öffnend."

This description applies extremely well to our fungus on *Pseudotsuga taxifolia*. In the erumpent character of the pycnidium, the gelatinous-cartilaginous nature of its tissue, the form and method of dehiscence of its locule, and in the shape and septation of its conidia there is complete agreement. Whether in its perfect stage it is a *Godronia* is not known.

In erecting the genus *Chondropodium* it is clear that von Höhnel has attempted to bring together related species. Students who regard the classification of the Fungi Imperfecti as merely a cataloging system based on artificial characters may raise objection to the recognition of this genus on the ground that it represents unnecessary splitting of the older more inclusive genus *Cornularia*. While it will be admitted that classification in the group as a whole must of necessity rest on artificial bases, there seems to be no sound objection to placing subdivisions of the group on a natural phylogenetic basis where possible. For this reason we prefer to place the organism under discussion in *Chondropodium* rather than in the larger and admittedly artificial genus *Cornularia*.

Chondropodium Pseudotsugae sp. nov.

Pycnidii plerumque singulis, rarius vel binis vel quaternis, erumpentibus, stipatis, columnaribus, erectis, 1-1.5 mm. altis, in superiori parte cylindraccis 125-200 μ diam.; basi interdum ad 300-500 μ incrassante partimque summo immersa; extrinsecus atris, minuteque scabris, duris ac fragilibus si sicca; ostiolo largo, circulari, compresso et ocluso si siccum; loculis sporiferis, per totam interiorem faciem conidiophoris vestitis, elongatis, 1/4-1/3 superioris

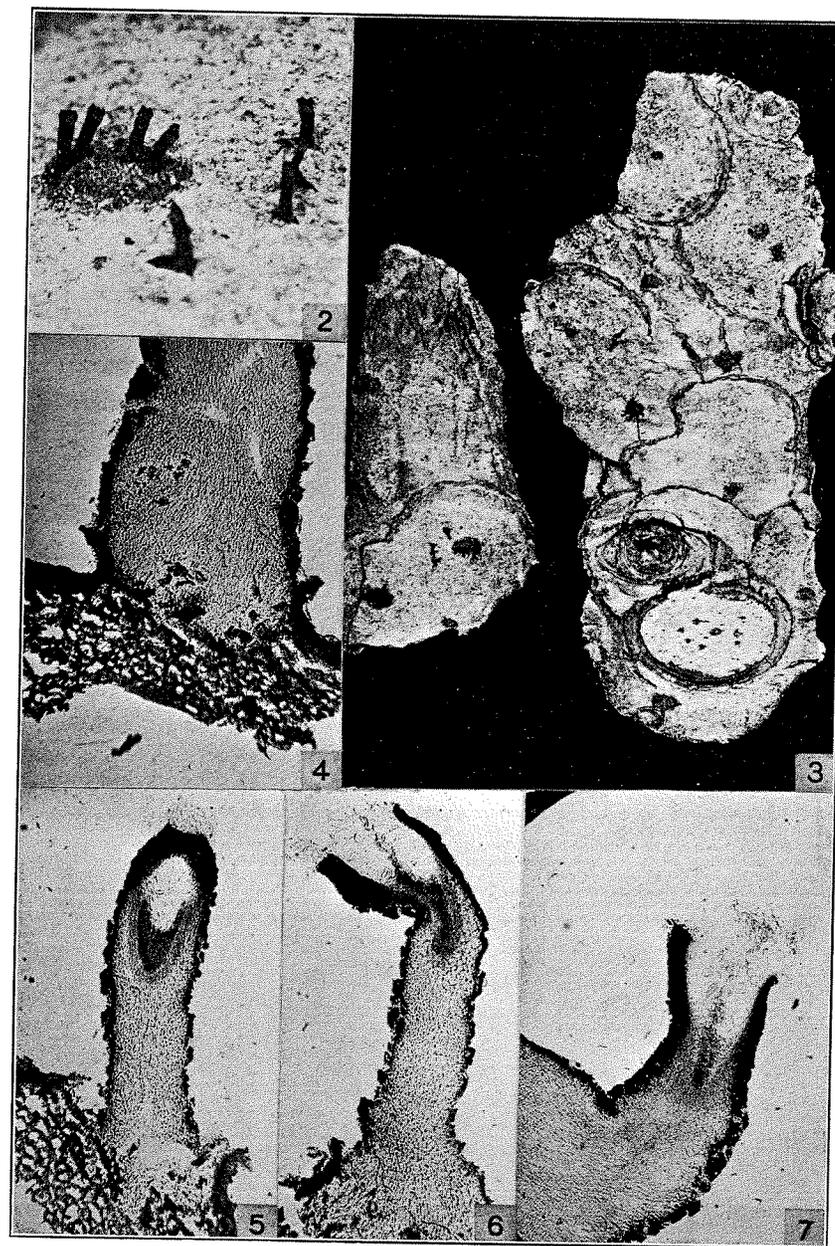


FIG. 2-7. Photographs of *Chondropodium Pseudotsugae*: 2, erumpent pycnidia in canker, $\times 3.8$; 3, characteristically sharply delimited cankers on *Pseudotsuga taxifolia*, $\times 1.4$; 4, longitudinal section through erumpent basal portion of pycnidium, $\times 28$; 5, longitudinal section through pycnidium, not median at apex but indicating position and width of ostiolum through which extruding spores are shown, $\times 28$; 6, 7, pycnidium in longitudinal section, the locule apparently widely dehiscent due to spreading of walls following sectioning, $\times 28$.

columnae partem obtinentibus; basi sterili, ex hyphis facta septatis, dense intectis, ramosis, quae agglutinatae texturam reddunt subgelatinosam oel etiam cartilagosam, fuscis circum fructus superficiem, tenuem et atram crustulam efficientibus; conidiophoris simplicibus, aseptatis, $12-16 \times 2-2.5 \mu$; conidiis hyalinis, $35-60 \times 3.5-4.5 \mu$, si libera, lunatis vel falcatis si conidiophoris adhaerentia, a basi plus minus rectis, 4-septatis, cellulis plures olei guttas continentibus.

Hab. in fossulis ($1-2 \times 1-1.5$ cm. diam.) leviter depressis in viridi cortice *Pseudotsugae taxifoliae* (Lam.) Br., British Columbia et Oregon in America boreali.

Pycnidia occurring singly or more rarely in groups of two to four, erumpent, stalked, columnar, erect, 1-1.5 mm. high, cylindric above, $125-200 \mu$ diam., sometimes more or less spreading at the base to $300-500 \mu$, the enlarged portion partly buried in the outer layer of the cortex, externally black, minutely scabrous, drying hard and brittle; ostiolum broadly circular, compressed and closed when dried; sporiferous locule lined with conidiophores, elongate, occupying the upper one-fourth to one-third of the column; the sterile basal portion composed of densely interwoven, branched, septate hyphae which have a tendency to become agglutinated and give the tissue a subgelatinous to cartilaginous character, darkened around the outer surface of the fruit body to form a thin black layer; conidiophores simple, one-celled, $12-16 \times 2-2.5 \mu$; conidia hyaline $35-60 \times 3.5-4.5 \mu$, when lying free crescent-shaped or sickle-shaped, when attached to the conidiophores more or less straight at the basal end, 4-celled, each cell containing several oil drops.

Occupying small superficial sunken lesions, $1-2 \times 1-1.5$ cm. diam. in the cortex of young, living, smooth-barked trees of *Pseudotsuga taxifolia* (Lam.) Br. British Columbia and Oregon.

Type collected near Bear Springs, Clackamas County, Oregon, Aug. 23, 1930, by J. S. Boyce (Cornell University, Department of Plant Pathology Herbarium No. 24008).

DEPARTMENT OF PLANT PATHOLOGY,
CORNELL UNIVERSITY,
ITHACA, NEW YORK

LITERATURE CITED

1. Höhnelt, F. von. Fragmente zur Mykologie, Mitt. XVII. Sitz.-ber. Akad. Wien 124: 50-159. 1915.
2. ——. Fragmente zur Mykologie, Mitt. XVIII. Sitz.-ber. Akad. Wien 125: 27-138. 1916.
3. Karsten, P. A. Fragmente mycologica, XIV. Hedwigia 23: 57-59. 1884.
4. ——. Sphaeropsidaeae hucusque in Fennia observatae. Acta Soc. Fauna Fl. Fenn. 6²: 1-86. 1890.