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THE PSILOPEZIOID FUNGI. I. HISTORY, NOMENCLATURE, AND DELIMITATION OF THE PSILOPEZIOID GENERA

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SUMMARY

A list of the psilopezioid genera is given with nomenclatural and taxonomic comments. The genera *Pachyella* and *Psilopezia* are accepted and an emended circumscription is provided. *Psilopezia* is treated as a member of the tribe Otideae in the Pyronemataceae and *Pachyella* as a member of the Pezizaceae. A key to the genera of psilopezioid fungi, *Psilopezia*, *Pachyella*, *Iodophanus*, *Thecotheus*, *Peiziza*, and "*Peziza*" *lechithina*, is included.

Several species of Discomycetes commonly collected on wet or submerged wood and plant debris are sessile, generally pulvinate to shallow cupulate, and broadly attached to the substrate. Fungi with these general characteristics are here referred to as "psilopezioid." Although six generic names have been proposed for these fungi, only the names *Psilopezia* Berk. and *Pachyella* Boud. are in common usage. There is no complete monographic study of either genus, though *Psilopezia* has been treated by Seaver (1928) and by Le Gal (1953), who also emended the circumscription of *Pachyella*. This study is based on reinvestigations of type and authentic material of all the described species in the genera *Psilopezia* and *Pachyella*, as well as studies of living material from North America and the Caribbean. This paper, the first of a series, is designed as an introduction to monographs and notes on psilopezioid fungi.

HISTORY AND NOMENCLATURE

1. PSILOPEZIA Berk., London J. Bot. 6: 325. 1847.

HOLOTYPE: *P. nummularia* Berk. (only original species).

Berkeley (1847) described *P. nummularia* as purple to brown and as "growing on a white tomentose substratum." Because of this "subicu-

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lum" he suggested that the genus was close to *Pyronema*, in which the apothecia are also situated on mycelium. He described it as having "the habit of a *Corticium*, with the hymenium of a *Peziza*."

In the following years several species were added to *Psilopezia* by Berkeley, or Berkeley and coauthors. These species were all characterized by the close adherence of the apothecium to the substrate. Specific differentiations were based on apothecial size and color, and on ascospore size. Among these later species was *P. flavida* Berk. & Curt., which is bright yellow.

2. *PELTIDIUM* Kalchb., *Hedwigia* 2: 58. 1862; (non *Peltidium* Zoll. 1820 [Compositae]).

HOLOTYPE: *P. oocardii* Kalchb. (only original species).

This name is a later homonym and thus is illegitimate. *Peltidium oocardii* was synonymized with *Psilopezia babingtonii* (Berk. & Br.) Berk. by Le Gal (1953) and was discussed at length by Lindau (1904). *Peltidium* also was discussed by Hazslinszky (1882) and has been synonymized with *Psilopezia* by Hennings (1900, 1902, 1903), Rehm (1904), Seaver (1928), and Clements and Shear (1931).

3. *FLEISCHHAKIA* Rabenh., *Hedwigia* 17: 114. 1878; (non *Fleischhakeia* Auersw. 1869 [Perisporiaceae]).

HOLOTYPE: *F. rhizinoides* Rabenh. (only original species).

This name is a later homonym and thus also is illegitimate. No type specimens have been located. It has been synonymized with *Psilopezia* by Hennings (1900, 1902, 1903), Rehm (1904), Seaver (1928), and Clements and Shear (1931).

4. *PACHYELLA* Boud., *Hist. Class. Discom. d'Eur.*, 50. 1907.

LECTOTYPE: *Peziza barlaeana* Bres. (selected by Le Gal, 1953).

Boudier (1907), when he erected the genus *Pachyella*, treated ten species from Europe, including most of the previously described species of *Psilopezia*. He accepted *Psilopeziza* [sic] and *Peltidium* but only as doubtful genera. The species of *Pachyella* were grouped together on the basis of the pulvinate to convex form of the apothecia and the positive iodine reaction of the asci. The genus was considered a member of the tribe Aleuriées of the family Pezizacées.

5. *PULVINARIA* Velen., Mon. Discom. Boh. 1: 332. 1934; (non *Pulvinaria* Bonorden, 1851 [Sphaeriales], nec *Pulvinaria* Rodway, 1918 [Sphaeropsidales]).

LECTOTYPE: *Peltidium oocardii* Kalchb. (selected by Eckblad, 1968).

The genus *Pulvinaria* as erected by Velenovský included two species, *P. oocardii* (Kalchb.) Velen. and *P. bohémica* (Velen.) Velen. This generic name is illegitimate since it is a later homonym, and it has been synonymized with *Psilopezia* by Svrček and Kubička (1961) and by Eckblad (1968), who designated *Peltidium oocardii* lectotype.

6. *DISCOMYCETELLA* Sanwal, Sydowia 7: 200. 1953.

HOLOTYPE: *D. aquatica* Sanwal (only original species).

The genus is considered by Eckblad (1968) to be close to *Psilopezia*. Kimbrough (1970) suggests it may be close to *Inermisia* Rifai. No specimens have been available for study.

OTHER TAXONOMIC TREATMENTS

Rehm (1887–1896) treated the described European species of psilopezioid fungi in three genera: *Psilopezia*, *Plicaria* Fckl., and *Humaria* (Fr.) Boud. *Psilopezia* was considered a member of the Helvellaceae because of its macroscopic similarity to *Rhizina* Fr. ex Fr. and *Discina* (Fr.) Fr. Rehm's treatment added valuable information about the ascus reaction in iodine and also provided some anatomical features. Species distinctions were primarily based on gross apothecial features and ascospore characters.

Seaver's (1928) treatment of the North American species of *Psilopezia* included six species, two of which, *P. flavida* and *P. aquatica* sensu Seaver are bright yellow. The genus was characterized chiefly by its medium-sized apothecium which adheres closely to the substrate. Apothecial color, size of the ascospores, and presence of spore markings in one species were characteristics used to separate taxa. *Psilopezia* was treated in the tribe Humarieae of the family Pezizaceae. Seaver (1928) synonymized *Pachyella* with *Peziza* L. ex St.-Amans, but the only combination he listed was *Pachyella barlaeana* (Bres.) Boud. This species he questionably synonymized with *Peziza clypeata* Schw.

Le Gal's (1953) critical study of *Psilopezia* and *Pachyella* provided anatomical features of *Psilopezia babingtonii* (Berk. & Br.) Berk., around which she built her concept of the genus *Psilopezia*. She de-

scribed the asci as suboperculate, though the genus was placed in the Humariaceae. Both yellow species, *P. flavida* and *P. aquatica* sensu Seaver, were excluded from the genus. *Psilopeziza flavida* was placed in the genus *Phaedropeziza* Le Gal, which is characterized by its small ascospores. *Psilopeziza aquatica*, in Seaver's sense, she correctly identified as *Peziza lechithina* Cke., though it is not a *Peziza* in the restricted sense. This species was distinguished by Le Gal from *Psilopeziza* by its yellow pigments and lack of large cells in the ectal excipulum, but was not treated further by her. In the same treatment, she proposed an emended concept of *Pachyella*, limiting the genus to two species, *P. clypeata* (Schw.) Le Gal and *P. barlaeana*, of which she chose the latter as lectotype of the genus. The genera were differentiated almost solely on the basis of the ascus reaction in Melzer's reagent: the asci of *Psilopeziza* give a negative reaction and those of *Pachyella* give a positive reaction. Because of this positive reaction, *Pachyella* was placed in the Aleuriaceae. Le Gal's delimitation of these two genera was followed by Gamundi (1964) and in part by Eckblad (1968).

Eckblad (1968), following Le Gal's treatment of *Psilopeziza*, included *P. babingtonii*. He studied the holotype of *P. nummularia*, but was unable to provide detailed anatomical information. He considered *Psilopeziza* to be a member of the Pezizaceae and he synonymized *Pachyella* with *Peziza*.

GENERIC LIMITS OF PSILOPEZIA AND PACHYELLA

The present studies have shown that, with Le Gal's (1953) exclusion of the carotinoid-containing species, *Psilopeziza flavida* and *P. aquatica* sensu Seaver, there are two major distinct groups of psilopezoid species. One group agrees with the holotype of the genus *Psilopeziza*, and the other group agrees with the lectotype of the genus *Pachyella*.

Psilopeziza may be characterized as follows: asci J — with prominent repeating croziers; ascospores exceeding 25 μm in length with an outer spore wall which loosens in lactic acid-cotton blue and/or Melzer's reagent; gel tissue, when present, located in the inner layer of the ectal excipulum; hyphoid hairs not embedded in gel; medullary and ectal excipular zones poorly differentiated; paraphyses usually bent or deformed at the apex and anastomosing at the base.

Pachyella is characterized as follows: asci diffusely J + without prominent croziers; ascospores usually less than 25 μm long and lacking a loosening outer spore wall; gel present in the medullary excipulum as well as surrounding the external, hyphoid hairs; medullary and ectal

excipular zones well defined; paraphyses neither branching nor anastomosing.

With these emended circumscriptions *Psilopezia babingtonii*, treated as a *Psilopezia* by Le Gal, is included in *Pachyella* as it was by Boudier. In the key which follows the names *Psilopezia* and *Pachyella* are used as delimited above.

TAXONOMIC POSITION OF THE GENERA PSILOPEZIA AND PACHYELLA

Psilopezia is treated in the tribe Otideae of the family Pyronemataceae (Korf, 1972). This is based on its lack of carotinoids, the negative reaction of the ascus in Melzer's reagent, its uninucleate ascospores, and its anatomical similarity to *Otidea* (Pers.) Bon. This placement is in agreement with Le Gal's (1953) deposition of the genus in the Humariaceae.

Pachyella is considered to be a member of the Pezizaceae as restricted by Rifai (1968), Kimbrough (1970), and Korf (1972). The structure of the apothecium and the amyloid asci suggest that its affinities are with *Peziza*. This also agrees with Le Gal's deposition of the genus in the Aleuriaceae (Galactiniaceae) (Le Gal, 1953, 1963, 1969).

Though a *nomen nudum*, lacking a Latin diagnosis, the tribe name Psilopezae in the family Pezizaceae has been used in the literature. It was first used by Korf (1954), and was later used by Korf (1958) and Raitviir (1963) as a phylogenetic starting point for deriving the majority of the Pezizales. In this work the tribe is not accepted.

OTHER PSILOPEZIOID FUNGI

As circumscribed here, the genera *Psilopezia* and *Pachyella* exclude some species which are psilopezioid in form and habitat. As mentioned above, both species possessing carotinoids, previously described in *Psilopezia*, are excluded.

Species are also excluded which have broad, iodine positive asci and eguttulate, thick-walled ascospores. These species are members of the tribe Iodophaneae of the family Ascobolaceae. Species of both *Iodophanus* Korf in Kimb. & Korf and *Thecotheus* Boud., though occurring primarily on dung, may occur on wet wood. The reaction of the asci of the Ascobolaceae in iodine is similar to that in *Pachyella*. In both cases the ascus is amyloid for most of its length.

Though a member of the Helotiales, at least one undescribed species of the genus *Pezicula* Tul. is occasionally collected and mistaken for a *Psilopezia* or *Pachyella* species when collected on wet or submerged

wood. The asci are not always easily recognized as inoperculate, but the spores become septate at maturity, thus differentiating it from an operculate discomycete.

Some species of *Peziza* are psilopezoid in habit and may be confused with *Pachyella* species. Both genera have amyloid asci, but the asci of *Peziza* have an apical amyloid ring or the amyloid reaction is limited to the upper half of the ascus. Asci of *Pachyella* become diffusely amyloid for almost their entire length and lack an apical amyloid ring. The presence of gel tissue in the apothecium and of hyphoid hairs are also distinctive of *Pachyella*, since so far as it is known they are lacking in *Peziza*.

KEY TO THE GENERA OF PSILOPEZIOID FUNGI

1. Ascospores septate at maturity, asci inoperculate.....*Pezicula* Tul.
- 1'. Ascospores nonseptate at maturity, asci operculate..... 2
 - 2(1). Spores guttulate..... 3
 - 2'. Spores eguttulate..... 6
- 3(2). Hymenium orange, paraphyses turning green in iodine (when fresh). Apothecium with a definite margin. Spores multiguttulate to spumose, delicately ornamented. Asci J —..... "*Peziza*" *lechithina* Cke.
- 3'. Hymenium dark or pallid, paraphyses not reacting in iodine. Apothecium generally emarginate. Spores 2-guttulate, more rarely 1-guttulate. Asci J + or J —..... 4
 - 4(3'). Asci J + in the form of an apical ring, gelatinous tissue not present in the apothecium, ascospores smooth or ornamented..... *Peziza* [Dill.] L. ex St.-Amans
 - 4'. Asci J + or J —, when J + never in the form of an apical ring, gelatinous tissue present or absent..... 5
- 5(4'). Asci J —, arising from prominent croziers. Ectal excipulum of long-celled hyphae not forming a discrete cortical layer of *textura globulosa* or *angularis*, gelatinous tissue present or absent. Spores mostly over 25 μ m, smooth, though sometimes with a wrinkled perispore. Paraphyses anastomosing, apically swollen, bent or deformed and with highly cyanophilic contents. Ascocarp not drying to a thin film, usually surrounded by a white "subiculum" when dried..... *Psilopezia* Berk
- 5'. Asci diffusely J + (in dried material sometimes J —). Without prominent croziers. Ectal excipulum forming a discrete cortical layer of *textura globulosa* to *angularis*, gelatinous tissue present. Spores smooth or ornamented, mostly under 25 μ m long. Paraphyses swollen, not bent or deformed. Ascocarp mostly drying to a thin film; without a "subiculum" when dried..... *Pachyella* Boud.
 - 6(2'). Ascospores thin-walled in youth; asci with an amyloid ring at the tip. Ascocarps often large, usually over 5 mm in diam..... *Peziza* [Dill.] L. ex St.-Amans
 - 6'. Ascospores thick-walled in youth; asci diffusely J + for the entire length, ascocarps small to minute. (Iodophaneae).... 7

- 7(6'). Apothecia dirty white, becoming vinaceous to dark brown or black, turbinate, excipulum with purple to brown pigments, paraphyses encrusted on the outside.....*Thecotheus* Boud.
- 7'. Apothecia yellow to red, lenticular to convex. Carotenoid pigments present. Paraphyses with lipids which contain carotene.....
.....*Iodophanus* Korf in Kimbr. & Korf

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LITERATURE CITED

- Berkeley, M. J.** 1847. Decades of fungi. London J. Bot. **6**: 325-326.
- Boudier, E.** 1907. Histoire et classification des Discomycètes d'Europe. Klincksieck, Paris. 221 p.
- Clements, F. E., and C. L. Shear.** 1931. The genera of fungi. H. W. Wilson Co., New York. 496 p.
- Eckblad, F.-E.** 1968. The genera of the operculate Discomycetes. A re-evaluation of their taxonomy, phylogeny, and nomenclature. Nytt Mag. Bot. **15**: 1-191.
- Gamundi, I. J.** 1964. "Discomycetes" operculados del Nahuel Huapi. Darwiniana **13**: 580-591.
- Hazslinszky, F. A.** 1882. *Peltidium* und *Geoglossum*. Oesterr. Bot. Z. **32**: 7-8.
- Hennings, P.** 1900. Fungi monsunenses, p. 137-174. In O. Warburg, Monsumia I. Leipzig.
- . 1902. Fungi Blumenavienses II. A cl. Alfr. Moeller lecti. Hedwigia **41**: 1-33.
- . 1903. Einige neue und interessante deutsche Pezizeen II. Hedwigia **42**: 17-20.
- Kimbrough, J. W.** 1970. Current trends in the classification of Discomycetes. Bot. Rev. (Lancaster) **36**: 91-161.
- Korf, R. P.** 1954. A revision of the classification of operculate Discomycetes (Pezizales). In VIII Congr. Int. Bot., Rapp. & Comm. I. **18-20**: 80.
- . 1958. Japanese Discomycetes notes I-VIII. Sci. Rep. Yokohama Natl. Univ., Sect. 2, Biol. Sci. **7**: 7-35.
- . 1972. Synoptic key to the genera of the Pezizales. Mycologia **64**: 937-994.
- Le Gal, M.** 1953. Les Discomycètes de Madagascar. Prodr. Flore Mycol. Madagascar **4**: 1-465.

- . 1963. Valeur taxinomique particulière de certains caractères chez les Discomycètes supérieurs. *Bull. Soc. Mycol. France* **79**: 456–470.
- . 1969. Position taxinomique du genre *Phaedropezia* Le Gal et révision de la famille des Humariaceae. *Bull. Soc. Mycol. France* **85**: 5–19.
- Lindau, G.** 1904. Betrag zur Kenntniss eines im Wasser lebenden Discomyceten, p. 482–486. *In* Fest. zu P. Ascherson's siebzigstem Geburtstage. Berlin.
- Raitviir, A.** 1963. Notes on the taxonomy of Pezizales. *Izv. Akad. Nauk Ėstonsk. SSR, Ser. Biol.* **12**: 325–331.
- Rehm, H.** 1887–1896. Die Pilze Deutschlands, Oesterreichs, und der Schweiz. Ascomyceten: Hysteriaceen und Discomyceten. Rabenhorst's Kryptogamen-Fl. Deutschl., Oesterr. Schweiz, Zweite Aufl. **1**(3): 1–1275.
- . 1904. *Psilopezia* Berk., Syn. *Peltidium* Kalchbr., eine im Wasser lebende Discomyceten-Gattung. *Mitt. Bayer. Bot. Ges.* **1**: 423–425.
- Rifai, M. A.** 1968. The Australasian Pezizales in the Herbarium of the Royal Botanic Gardens Kew. *Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Tweede Sect.*, **57**(3): 1–295.
- Seaver, F. J.** 1928. The North American Cup-Fungi (Operculates). Published by the author. New York, New York. 284 p.
- Svrček, M., and J. Kubička.** 1961. Some operculate Discomycetes from the vicinity of the pond "Dvoriste" in southern Bohemia. *Česká Mykol.* **15**: 61–77.

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