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THE PSILOPEZIOID FUNGI. III. THE GENUS PSILOPEZIA (PEZIZALES)[1, 2]

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ABSTRACT

The genus *Psilopezia* is treated in a restricted sense, limited to three species. *Psilopezia* is characterized by its flat, appressed apothecia, large ascospores, non-amyloid asci, and bent or deformed paraphyses. The relationship between *Psilopezia* and *Pachyella* is discussed. Species are distinguished by the presence or absence of gel in the apothecium, anatomy of the apothecium, size of the apothecium, and by ascospore size. Descriptions, illustrations, and a key are provided for the included species.

SINCE ITS ERECTION by Berkeley in 1847, *Psilopezia* has been an enigma. The sole species then placed in *Psilopezia* by Berkeley was *P. nummularia* Berk. This he compared to *Pyronema* Carus because of the mycelial mat at the base of the dried apothecium of *Psilopezia nummularia.* This mycelial mat, Berkeley believed, was analogous to the subiculum characteristic of *Pyronema.* Berkeley and co-authors added four species to *Psilopezia*: *P. babingtonii* (Berk. & Br.) Berk., *P. flavida* Berk. & Curt., *P. myrothecioides* Berk. & Br., and *P. mirabilis* Berk. & Curt. None of these species are psilopezias in the restricted sense proposed here.

In 1862 the genus *Peltidium* Kalch., sharing many of the superficial characteristics of *Psilopezia*, was erected. The nomenclature of *Peltidium* is discussed elsewhere (Pfister, in press a). Rehm (1904) synonymized *Peltidium* with *Psilopezia.* This synonymy has been followed by other authors.

The identity of *Psilopezia nummularia* itself was obscured by the misidentification of the North American species, *Peziza clypeata* Schw., by Ellis and Everhart. In the North American Fungi Exsiccati *P. clypeata* was issued under the name *Psilopezia nummularia.*

In Boudier's (1907) reorganization of the European Discomycetes the European species of *Psilopezia* were included in the newly erected genus *Pachyella* Boud. He treated both *Psilopeziza* [sic] and *Peltidium* as doubtful genera. *Pachyella* was characterized by amyloid asci and pulvinate apothecia.

Seaver (1928) treated the North American species of *Psilopezia* and proposed two new combinations, *P. deligata* (Peck) Seaver and *P. hydrophila* (Peck) Seaver. His concepts of both *P. nummularia* and *P. aquatica* were nebulous.

Le Gal (1953) clarified some of the confusion surrounding *Psilopezia* and *Pachyella.* The circumscription of *Pachyella* was emended: *Peziza barlaeana* Bres. was designated lectotype. The only other species retained in the genus was the North American species, *P. clypeata.* Though *Psilopezia nummularia* was discussed, Le Gal's concept of *Psilopezia* was based primarily on studies of *Pachyella babingtonii*, which she considered to be a typical *Psilopezia.* Her description of *Psilopezia* therefore was based on elements from both *Psilopezia* and *Pachyella.* Le Gal's delimitations were followed, however, by both Gamundi (1964) and Eckblad (1968).

The present study is based on a reinvestigation of the species of *Psilopezia* and *Pachyella.* Whenever possible, fresh material was used to augment preserved specimens. The generic limits of *Psilopezia* and *Pachyella* have been discussed previously (Pfister, in press a). The genus *Psilopezia* as presented here is restricted to three species. *Pachyella babingtonii* is not treated as a *Psilopezia.*

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MATERIALS AND METHODS—*Living material*—Portions of fresh apothecia were killed and fixed in FAA (Sass, 1958), embedded in paraffin following a tertiary butyl alcohol series (Jensen, 1962), and sectioned at 10 μm on a rotary microtome. Fungal gel was stained according to the schedule outlined by Moore (1965a), using Alcian blue-orange G. Nuclei were stained with Heidenhain's hematoxylin-orange G according to Jensen (1962) or with Fleming's triple stain (Johansen, 1940).

Dried material—A portion of an apothecium was wetted in an approximately 1% aqueous solution of Aerosol OT Solution (Fischer Scientific Co. #S-A-292), soaked in water for 1 hr, placed on the stage of a freezing microtome, and oriented in a drop of 50% aqueous solution v/v of commercial mucilage (Le Page's), frozen, and sectioned at 30–35 μm. Sections were mounted in Melzer's reagent (Ainsworth, 1963) and in cotton-blue (Le Gal, 1947).

Terminology—The terminology used in the descriptions of the zones of the apothecium and the apothecial tissue types is that outlined by Korf (1958). The term gel or gel tissue is used here to describe zones of the excipulum where hyphae are embedded in mucilaginous material. Fungal gels have been discussed by Moore (1965a, b, c).

Wall ornamentations which stain in cotton-blue have been referred to as "calloso-pectiques" (Le Gal, 1947). Histochemical studies of the composition of these markings indicate that they are neither callose nor pectin (Pfister, 1970). In this paper the term "cyanophilic" is used to describe markings which become blue in cotton-blue. This terminology follows that of Kotlaba and Pouzar (1964) and Kimbrough (1970a).

When asci become blue in Melzer's reagent the standard Discomycetes convention J + is used. When such a blue reaction is absent J – is used. The J + reaction is sometimes referred to as the "amyloid" reaction.

Herbarium abbreviations are those of Lanjouw and Stafleu (1964). The personal herbarium of Richard P. Korf is abbreviated "R.P.K." Hymenium colors cited in descriptions refer to those listed by Rayner (1970).

PSILOPEZIA Berk. emend. Pfister

≡ *Psilopezia* Berk., London J. Bot. 6: 325. 1847. (*Holotype*: *Psilopezia nummularia* Berk.)

Apothecia: flat, broadly attached to the substrate, 3 mm to 3 cm in diam, in some cases becoming convoluted, never drying to a thin film. *Hymenium*: dark to pallid, never brightly colored. *Ascus*: operculate, with prominent croziers, J –, 8-spored, long cylindrical, 275–375 × 14–27 μm. *Ascospores*: two-guttulate at maturity, hyaline, thick-walled (up to 1 μm), mostly more than 25 μm long, smooth, with a perispore which loosens in cotton-blue lactic acid and/or in Melzer's reagent, ellipsoidal, with or without deBary bubbles, uninucleate. *Paraphyses*: clavate, in age usually becoming bent or deformed, usually with external, dark encrusted pigments at the apex, anastomosing freely toward the base, sometimes branching. *Medullary excipulum*: dense or loose textura intricata, gel absent. *Ectal excipulum*: sometimes lacking as a well-defined zone, gel present or absent; sometimes two-layered: an inner layer of hyphae oriented parallel to one another and perpendicular to the outside of the apothecium, usually gelatinous; an outer layer of textura intricata, never gelatinous. *Subhymenium*: not differentiated from the medullary excipulum. *Margin*: not present as a distinct zone, the parallel cells of the ectal excipulum merging with the hymenium.

Substrate and habitat: usually on water-soaked, well-rotted wood, though occasionally on other decaying plant parts.

Name: from Greek "psilo," "naked" and "pezia," "sessile fungus."

Variant spellings: "*Psilopeza*" by Fries (1849); "*Psilopeziza*" by Boudier (1907) and by Dodge (1914).

Notes: The loosening outer spore wall of species of *Psilopezia* is one of the most distinctive characteristics of the genus. The phenomenon also occurs in *Cheilymenia* Boud. and *Thecotheus* Boud. These genera differ from *Psilopezia* in that *Cheilymenia* has carotenoids, eguttulate spores and J – asci. The large smooth ascospores of *Psilopezia* are readily distinguished from the smaller, smooth or ornamented spores of *Pachyella*. When the outer spore wall loosens, *Psilopezia* ascospores may have a rough appearance. The large spores are somewhat reminiscent of those of the Sarcoscyphaceae. They are, however, uninucleate as opposed to plurinucleate as in the Sarcoscyphineae (Berthet, 1964).

The asci of *Psilopezia* have a terminal operculum and are J –. *Pachyella* has J + asci; thus the two genera may be distinguished. The asci of *Psilopezia* generally have prominent, sometimes repeating croziers.

Paraphyses which are bent or deformed apically are characteristic of *Psilopezia*. They usually have dark, external pigment granules, and anastomose at their bases. In *Otidea* (Pers.) Bonorden the paraphyses are also bent and apically deformed and anastomose in some species. Anastomosis of

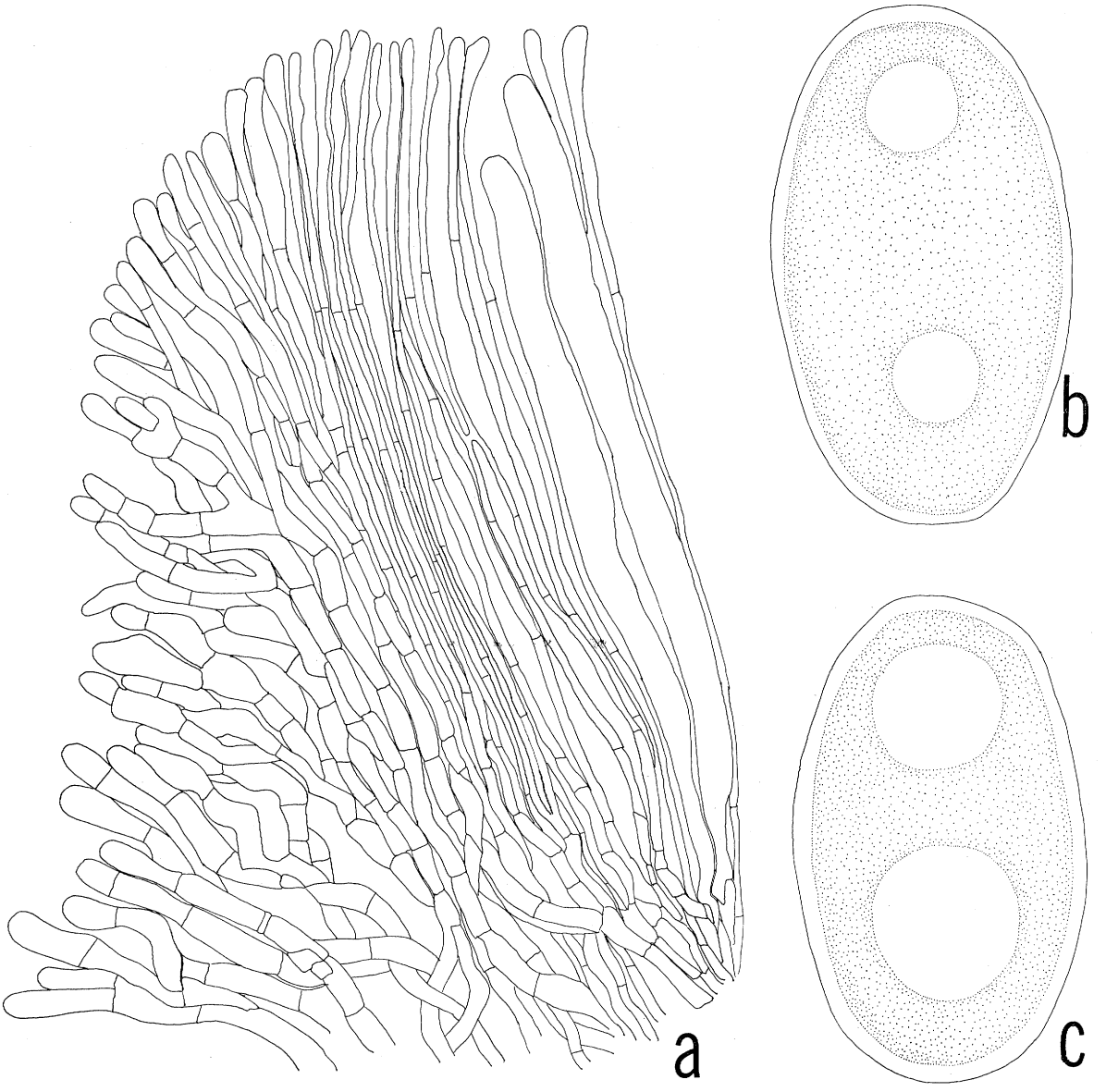

Fig. 1 (a–c). *Psilopezia deligata*: (a) cross section of the margin of an apothecium (CUP 52262 × 250). (b–c) Ascospores in optical section (CUP 50919 × 2000). Drawn with the aid of a camera lucida.

paraphyses is not a common phenomenon in the Pezizineae, though it is quite common in the Sarcoscyphineae.

A major difference between the genera *Psilopezia* and *Pachyella* occurs in the anatomy of their apothecia and the distribution of gel tissue. In *Psilopezia* there is no well-defined cortical layer of cells; the ectal excipulum is hyphoid and undifferentiated from the medullary excipulum. Hyphoid hairs are absent. Gel, when present, is found only in the inner zone of the ectal excipulum. Because the excipular cells of *Psilopezia* species are hyphoid and relatively small in diameter, and since gel is not present in the medullary excipulum, the apothecia preserve by drying much better than do those of *Pachyella*. As the apothecia of some species of *Psilopezia* shrink in drying, the hyphae of the ectal excipulum become exposed. This exposed tissue has been described as a subiculum in some species. There is no such "subiculum" in *Pachyella*.

The undifferentiated ectal excipulum in *Psilopezia* is very similar to the ectal excipulum of some species of *Otidea*, though the excipulum in *Otidea* is ungelatinized. The ectal excipulum of *P. deligata* is ungelatinized and thus more closely resembles *Otidea*. If the genera *Otidea* and *Psilopezia* are related it is probably through *P. deligata*.

KEY TO THE SPECIES OF PSILOPEZIA

1. Apothecium less than 1 cm broad; temperate; gel lacking ..... *P. deligata*
1. Apothecium more than 1 cm broad; temperate or tropical; gel tissue present in the excipulum 2
   2. Ascospores smaller than 30 × 14 μm; apothecium flat, remaining so; tropical ..... *P. juruensis*
   2. Ascospores larger than 30 × 14 μm; apothecium broad-pulvinate, becoming undulate to convolute; temperate or tropical ..... *P. nummularia*

1. PSILOPEZIA DELIGATA (Peck) Seaver, The North America Cup-Fungi (Operculates) p. 107. 1928.—Fig. 1 (a–c).
   ≡ *Bulgaria deligata* Peck, Ann. Rep. New York State Mus. 32: 49. 1879.
      ≡ *Peziza leucobasis* Peck, Bull. New York State Mus. 1: 20. 1887. (a name change, non *Peziza deligata* Peck, 1878).
      ≡ *Pyronema leucobasis* (Peck) Sacc., Syll. Fung. 8: 110. 1889.

Apothecium: convex-pulvinate, becoming somewhat convoluted, 3–7 mm in diam, with a white "subiculum," especially when dried. *Hymenium*: fawn to hazel, drying darker. *Asci*: 325–375 × 22–27 μm. *Ascospores*: thick-walled, ellipsoid, 28–35 (–37) × 15–20 (–21) μm, smooth, 2-guttulate (sometimes indistinct), deBary bubbles sometimes present. *Paraphyses*: expanded at the tip to 12 μm, slightly bent or deformed at the tip, anastomosing at the base; paraphyses extending beyond the asci, pigmented at the apex with small external granules. *Medullary excipulum*: loose textura intricata, hyphae 13 μm in diam; the loose construction of this tissue sometimes causing the apothecium to appear hollow in section. *Ectal excipulum*: hyphae oriented parallel to one another and perpendicular to the outside of the apothecium, shorter toward the margin than at the base of the apothecium, 15–23 μm broad.

Substrate and range: on rotten, usually wet wood; North America and Argentina.

Name: from Latin, "deligatus," "bound together"; referring to the mycelial "subiculum" binding the apothecium to the substrate.

Illustrations: Peck, Ann. Rep. N.Y. State Mus. 32: pl. 2, figs. 1–3. 1879. (as *Bulgaria deligata*); Peck, Bull. N.Y. State Mus. 1: pl. 2 figs. 1–3. 1887. (as *Peziza leucobasis*).

Exsiccati: none.

Isotype: on wet hemlock wood. Catskill Mts., July (NY).

Specimens examined: USA—Maine: on water-soaked poplar log in swamp, Norcross, 20. VIII. 1940, D. H. Linder (UPS = CUP 50919); Mass.: on decorticated wood, Mt. Toby State Forest, 25. VIII. 1963. R. P. Korf (CUP 51654); Michigan: on wet wood, Stutsmanville, Emmet Co., 7. IX. 1969, A. H. Smith (CUP 51652); on rotten wood, Reese's Bog near UMBS, Cheboygan Co., 30. VII. 1969, N. J. Smith (CUP 51655); on wood, Luce Co., 12. IX. 1969, R. P. Korf, J. R. Dixon, A. Sánchez (CUP 52306); on wood, Reese's Bog near UMBS, Cheboygan Co., 10. IX. 1969, N. J. Smith (CUP 52310); New Hampshire: (no substrate), Hanover, 27. VIII. 1937, C. L. Shear (BPI = CUP 50969); New York: on unidentified submerged wood, Hendershot Gulf, Lost Gorge, Schuyler Co., 28. X. 1970, D. H. Pfister and P. E. Powell (CUP 51651); on yellow birch, neither in nor near water, (as above) (CUP 51653); on rotten wood, (as above), 7. X. 1968, D. H. Pfister, R. P. Korf, and K. P. Dumont (CUP 52262); on moist wood in bed of stream, 7th Lake and vicinity, 21–24. III. 1934, H. S. Jackson, (BPI = CUP 50968). ARGENTINA: on dead log submerged in a creek, P. N. Nahuel Huapí: Lago Mascardii, 28. IV. 1958, Carmen Pujals and I. Gamundi (BAFC 20351 = R.P.K. 2960). CANADA: on rotting log of *Fraxinus nigra*, Gull Lake Portage, Lake Temagami, T. F. R., Ont., 6. VI. 1931, H. S. Jackson, R. F. Cain, S. M. Pady (BPI = CUP 50967).

Notes: This species is noteworthy in that it occurs at approximately the same latitude in both the northern and southern Western Hemisphere. The Argentine specimen, identified by Gamundi (1964), is essentially identical to the New York specimen. It is apparently a fairly common north temperate species, though it is rarely collected.

This species differs from the others in the genus in its lack of gel tissue. It is, however, consistent in other anatomical features and has the characteristic loosening spore wall.

2. PSILOPEZIA JURUENSIS P. Henn., Hedwigia 43: 273. 1904.—Fig. 2, 4 (a–c).

Apothecium: flat, appressed, margin sometimes free, sometimes a mycelial mat present, up to 3 cm in diam. *Hymenium*: at first pallid brown, then castaneous (fide Hennings), drying dull brown.

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Fig. 2. *Psilopezia juruensis*: cross section of the margin of an apothecium (CUP 51607 × 250). Stippling indicates gelatinous zones. Drawn with the aid of a camera lucida.

Fig. 3. *Psilopezia nummularia*: cross section of the margin of an apothecium (CUP 51652 × 250). Stippling indicates gelatinous zones. Drawn with the aid of a camera lucida.

Asci: croziers indistinct, 275 × 20 μm. *Ascospores*: thick-walled, ellipsoid, 22–26 × 10–14 μm, smooth or with cyanophilic deposits on the surface, perispore highly cyanophilic, especially at the poles of the spore, 2-guttulate (in some specimens mature spores appearing to be eguttulate). *Paraphyses*: expanded at the tip to 7 μm, paraphyses extending slightly beyond the asci, thick-walled or highly gelatinous, with dark, external granular pigments present at the apex. *Medullary excipulum*: textura intricata, hyphae up to 5 μm in diam. *Ectal excipulum*: inner layer of hyphae parallel to one another and perpendicular to the outside of the apothecium, gel present, hyphae 5 μm in diam, anastomosis occurring; outer layer: thin-walled textura intricata, gel absent, hyphae to 8 μm in diam, swollen at the tip to 15 μm, in some collections this layer forms a dense mat at the base of the apothecium.

Substrate and range: on wood; Brazil, Costa Rica, and Florida.

Name: from the Jurúa River in Brazil; referring to the type locality.

Illustrations: Hennings, Hedwigia 43: 273. 1904.

Exsiccati: Ule, E., Appendix Mycothecae Brasiliensis #34.

Probable holotype: Schleimbecker auf vermodertem Holz, Bom Fim, Amasonas, Brazil, Nov., 1900, E. Ule (3097), (FH = CUP 51607).

Specimens examined: USA—Florida: growing flat on a wet stick, Florida, IX. 1913, C. Bayard (NY = CUP 49545). BRAZIL: probably isotypes of *P. juruensis*: ad lign. putrid; Río Jurúa, Bom Fim, Amasonas XI. 1900, E. Ule Appendix Mycothecae Brasiliensis #34 FH (= CUP 51608), HBG (= CUP 50910), S (= CUP 51617), W (= CUP 50926). COSTA RICA: on rotten log along trail near stream in wet forest, altitude ca. 500′, Finca la Selva, Puerto Viejo, 11. VI. 1962, W. C. Denison and Mary Alt (CUP-CA-7); Flood plain of Río Sándalo, Península de Osa, 22. VIII. 1936, C. W. Dodge and V. F. Goerger (NY); Limón Prov., Río Siquirres, 4. XII. 1929, C. W. Dodge, et al. (NY).

Notes: *P. juruensis* is poorly known. I have only been able to examine a few dried specimens. It is distinguished from other psilopezias by its smaller ascospores and copious gel.

3. PSILOPEZIA NUMMULARIA Berk., London J. Bot. 6: 325. 1847.—Fig. 3, 4 (d–f).

   ≡ *Peziza nummularia* (Berk.) Morgan, J. Mycol. 8: 190. 1902.

   = *Peziza atroviolacea* Bres., Fungi Trid. 1: 24. 1882. (ut "*atro-violacea*") (non *P. atroviolacea* Delile ex de Seynes, 1886).

      ≡ *Humaria atroviolacea* (Bres.) Sacc., Syll. Fung. 8: 150. 1889.
      ≡ *Pachyella atroviolacea* (Bres.) Boud., Hist. Class. Discom. d'Eur. p. 51. 1907.
      ≡ *Pezicula atroviolacea* (Bres.) Bres., Icon. Mycol. 25: pl. 1237 (2). 1933.

   = *Peziza rivularis* Clem., Bot. Surv. Nebraska 3: 8. 1894. (non *Peziza rivularis* Cr., 1867).
   = *Peziza paraphysata* Clem., Bot. Surv. Nebraska 4: 9. 1896.
   = *Psilopezia fleischeriana* P. Henn. & E. Nym. *In* O. Warburg, Monsunia I. p. 35. 1900. (ut "*Fleischeriana*")
   = *Psilopezia paulii* P. Henn., Hedwigia 42: (18). 1903. (ut "*Pauli*")

      ≡ *Pachyella paulii* (P. Henn.) Boud., Hist. Class. Discom. d'Eur. p. 51. 1907. (ut "*Pauli*")

   Apothecium: broad-pulvinate, becoming undulate or somewhat convoluted, up to 3 cm in diam, surrounded by a white mycelial mat especially when dried. *Hymenium*: olivaceous, drying almost black. *Asci*: 275–300 × 20–27 μm. *Ascospores*: thick-walled, ellipsoid, smooth, (25–) 29–40 × 14–20 μm, 2-guttulate, deBary bubbles sometimes present. *Paraphyses*: expanded at the tip to 12 μm, extending slightly beyond asci, encrusted externally with brown pigments. *Medullary excipulum*: dense textura intricata, cells 12–15 μm in diam. *Ectal excipulum*: of two layers; inner layer: of anastomosing hyphae parallel to one another, 2–7 μm in diam, gel present; outer layer: of thin-walled textura intricata 10–17 μm in diam, forming a mycelial mat at the base of the apothecium.

   Substrate and range: on rotten, usually very wet wood; North America, the Caribbean, Europe and Asia.

   Name: from Latin, "nummularius," "pertaining to money, coin-shaped"; referring to the form of the apothecium.

   Illustrations: Boudier, Icones Mycol. 2: pl. 311. 1907. (as *Pachyella atroviolacea*); Bresadola, Fungi Trid. 1: pl. 29, fig. 2. 1882. (as *Peziza atroviolacea*); Bresadola, Iconogr. Mycol. 25: pl. 1237. 1933 (as *Pezicula atroviolacea*).

   Exsiccati: none. [Ellis and Everhart. North America Fungi # 568 issued as *Psilopezia nummularia* is *Pachyella clypeata* and Torrend, Fung.

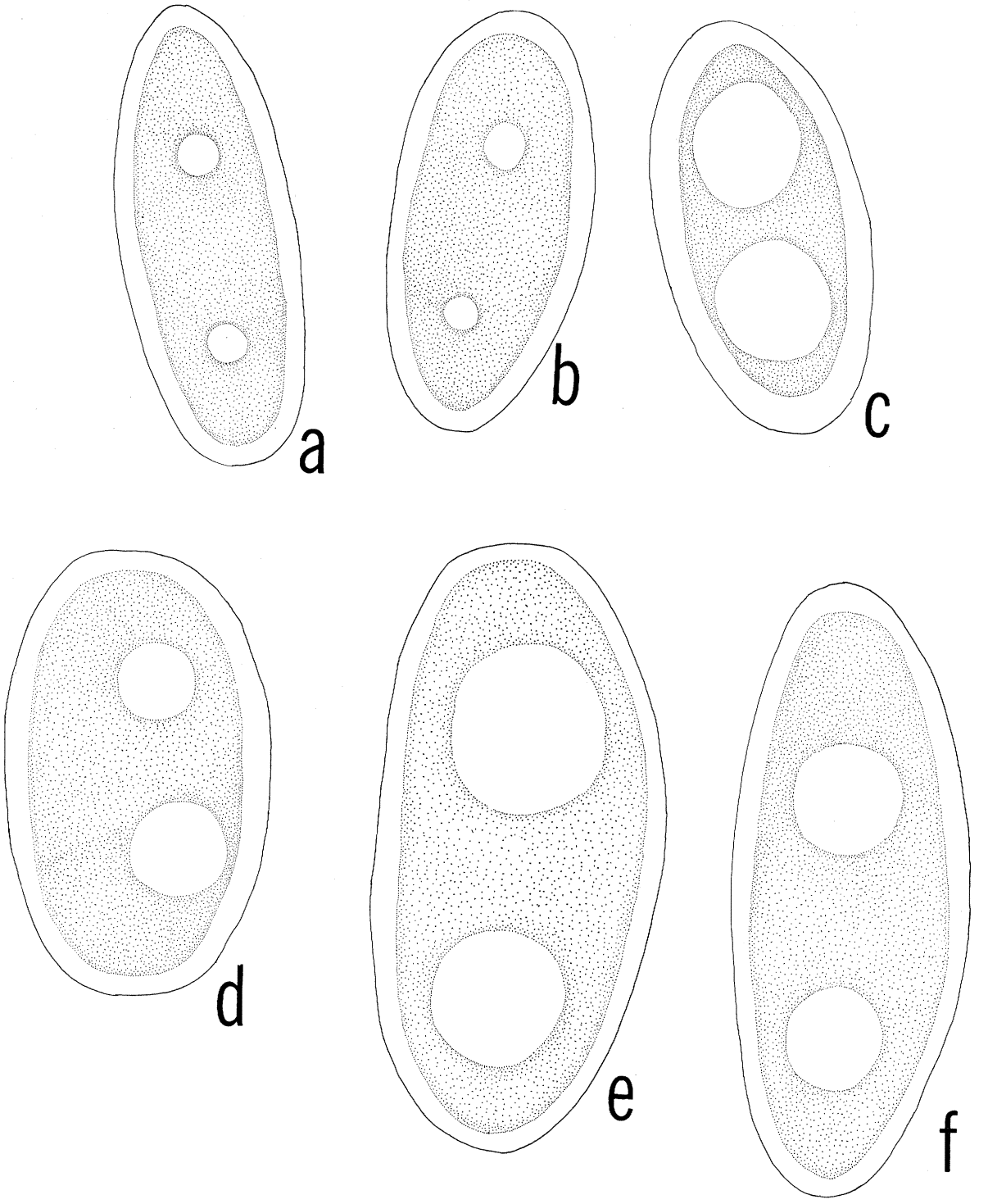

Fig. 4 (a–f). *Psilopezia juruensis* and *Psilopezia nummularia*: (a–c) ascospores of *P. juruensis* (CUP 51617 × 2000). (d–f) ascospores of *P. nummularia* (CUP-D-9950 × 2000). Drawn with the aid of a camera lucida.

Sel. Exs. #273 issued as *Pachyella paulii* is a spherical-spored fungus, possibly *Pulparia*]

Holotype: on rotten log in wet place, upper end of Estes Prairie, Ohio, 16. VII. 1842, Lea. (K).

Specimens examined: USA—Indiana: on wood in stream, Shades State Park, Montgomery Co., 25. VIII. 1961, C. Berg (CUP 52302); Iowa: on the ground, Decorah, 18. IX. 1884, E. W. D. Holway (BPI = CUP 50972); Michigan: on old log and the base of a tree, Reese's bog near the Old Saw Mill, Cheboygan Co., 7. IX. 1969, N. J. Smith (2325) (CUP 50953, MICH); on wet logs in a creek, Frankfort, IX. 1908, E. T. and S. A. Harper (2307) (S, Herb. Rehm = CUP 50931); on wet wood in stream, Harbor Springs, 2. VII. 1949, A. H. Smith (32636) (MICH = CUP 50898); on wet wood, Reese's Bog near UMBS, Cheboygan Co., 30. VII. 1969, N. J. Smith (CUP 52311); on rotten wood, (as above), N. J. Smith (CUP 52337); on wet wood, Gorge of Carp Creek, Cheboygan Co., 7. IX. 1969, N. J. Smith (2329) (CUP 52338); (as above) 16. VIII. 1969, N. J. Smith (2270) (CUP 52339); Missouri: on very rotten log, McBaine, 12. X. 1912, E. J. Durand (CUP-D-9950); Nebraska: ISOTYPE of *Peziza rivularis*, on semi-immersed branches, Meadville, 25. VIII. 1893, Clements (CUP-D-10917); ISOTYPE of *Peziza paraphysata*, (no substrate data), Meadville, 27. VIII. 1895, M. E. Moore (CUP-D-10913); New York: Alleghany Co., 23. VIII. 1906, D. R. Sumstine?, (CUP-D-9027); on wet mossy piece of wood, Lloyd Preserve, McLean, (no date), H. H. Whetzel, W. L. White (CUP 25484); on mossy log in swampland, ½ mile south of south end of Canandaigua Lake, Yates Co., 22. VIII. 1950, R. E. Perkins and R. P. Korf (R.P.K. 2205); the "600" Lloyd-Cornell Preserve, Slaterville Springs, 17. X. 1967, R. P. Korf (CUP 52340); Verna, VIII, Dr. Peck (CUP-D-5777). AUSTRIA: Wiener Wald, 20. VIII. 1912, von Höhnel (FH = CUP 51612), auf Erde (an Holz) in Wasser, Wiener Wald, 1907, Paula Demelius (FH = CUP 51613). FRANCE: on rotten log in woods, Coye-la-Forêt (Oise), 27. VII. 1949, Le Gal, M. & Mme. Romagnesi, and R. P. Korf (R.P.K. 1780). GERMANY: ISOTYPE of *Psilopezia paulii*, Bernau, Chiemsee, X. 1902, Dr. Paul (S, Herb. Sydow = CUP 51618). ITALY: Authentic material of *Peziza atroviolacea*, ex ipso, Trente, (Herb. Boudier, PC = R.P.K. 1781). JAVA: HOLOTYPE of *Psilopezia fleischeriana*, (no data), Java, M. Fleischer, (B = CUP 52286); Authentic material of *P. fleischeriana*, auf Baumrinden, Tjibodas, Java, 24. VI. 1890, E. Nyman (Sydow Herb., S = CUP 51616); Tjibodas, Java, 1907–8, v. Höhnel, (v. Höhnel Herb., FH = CUP 51614). TRINIDAD: L'Grange, Aripo Valley, Trinidad (B.W.I.), 13. X. 1949, R. W. G. Dennis (K,R.P.K. 2034).

Notes: This species is characterized by its gelatinous inner ectal excipulum and large spores, which may reach a length of 40 μm. This species is quite variable, which probably explains the large synonymy. Further study of fresh material should better define the species. It has seldom been properly identified, judging by the specimens I have studied.

Seaver's (1928) concept of *P. nummularia* was based primarily on *Pachyella babingtonii*. He did point out, however, that *Psilopezia nummularia* as issued by Ellis and Everhart in the North American Fungi was actually *Peziza clypeata*. Von Höhnel used the name *Peltidium tremellosum* Hazsl. for this species. There has been no type specimen of *P. tremellosum* located. If von Höhnel was correct in his identification, *P. tremellosum* should be added to the above synonymy.

INSUFFICIENTLY KNOWN AND DOUBTFUL SPECIES—The following list includes species for which neither type nor authentic material has been available for study and for which descriptions in the literature are inadequate:

1. DISCOMYCETELLA AQUATICA Sanwal, Sydowia 7: 200. 1953.—This is the type species of *Discomycetella* Sanwal. No specimens are available and the illustration accompanying the original description is not significantly distinctive to allow the disposal of the genus. Eckblad (1968) says "very close to if not identical with *Psilopezia*." Kimbrough (1970b) says that the species may be near *Inermisia* Rifai. With no specimens available the question remains unresolved.

2. PSILOPEZIA MOELLERIANA P. Henn., Hedwigia 41: 32. 1902.—Neither type nor authentic material of this species was located. Probably all were destroyed during World War II, in Berlin.

3. PSILOPEZIA HYDROPHILA (Peck) Seaver, North American Cup-Fungi (Operculates), p. 106. 1928.
   ≡ *Peziza hydrophila* Peck, Ann. Rep. New York State Mus. 34: 51. 1881.
   ≡ *Humaria hydrophila* (Peck) Sacc., Syll. Fung. 8: 140. 1889.
   Study of the holotype (Adirondack Mountains, July, Peck, NYS) and isotype (CUP-D-3035) indicates that this species is a *Peziza* in the restricted sense.

4. FLEISCHHAKIA RHIZINOIDES Rabenh., Hedwigia 17: 114. 1878.
   ≡ *Psilopezia rhizinoides* (Rabenh.) Rehm *in* Rabenhorst Kryptog. -Fl. 1 (3): 1137. 1895.

≡ *Pachyella rhizinoides* (Rabenh.) Boud., Hist. Class. Discom. d'Eur. p. 51. 1907.

This is the type species of *Fleischhakia* Rabenh. 1878 (non *Fleischhakia* Auersw., 1869, Perisporiaceae). Neither type material nor authentic material has been located. It has been synonymized with *Psilopezia* by Hennings (1903) and Seaver (1928).

5. PELTIDIUM TREMELLOSUM Hazsl., Oesterr. Bot. Z. 32: 7. 1882.
   ≡ *Humaria tremellosa* (Hazsl.) Sacc. Syll. Fung. 8. 144. 1889.

Apparently there are neither type nor authentic specimens extant. Communication with the Museum of Natural History in Budapest indicates that the specimens were probably destroyed during World War II. Von Höhnel (1909b) used this name for specimens I have referred to *Psilopezia nummularia*. If he is correct, the two additional names above should be added to the synonymy of that species.

EXCLUDED SPECIES AND SYNONYMS—In preparing this monograph, I also examined the species of *Pachyella*. A monograph of *Pachyella* is in preparation, in which species described as *Psilopezia* are referred to *Pachyella*. Some *Psilopezia* species belong to the genera *Thecotheus* Boud. and *Iodophanus* Korf (Pfister, in press b). All these synonymies are listed below.

1. PSILOPEZIA ALBIDA Kanouse, Pap. Michigan Acad. Sci. 19: 99. 1934. = *Pachyella babingtonii*
2. PSILOPEZIA AQUATICA (Lam. ex Fr.) Rehm in Sacc. & D. Sacc., Syll. Fung. 18: 12. 1906. This is a *nomen ambiguum* (Pfister, 1972b).
3. PSILOPEZIA AURANTIACA Gill., Champignons de France. Les Discomycètes. p. 28. 1879. pl. 30. no. 2. = *Iodophanus* sp. (Pfister, in press b)
4. PSILOPEZIA AURANTIACA Gill. subsp. XYLOGENA Sacc., Malpighia 10: 271. 1896. = *Iodophanus testaceus* (Moug. in Fr.) Korf in Kimb. & Korf. (Pfister, in press b)
5. PSILOPEZIA BABINGTONII (Berk. & Br.) Berk., Outlines of Fungology. p. 373. 1860. = *Pachyella babingtonii*
6. PSILOPEZIA BOHEMICA Velen., Česka Houby. p. 879. 1922. = *Pachyella babingtonii*
7. PSILOPEZIA FLAVIDA Berk. & Curt., Grevillea 4: 1. 1875. ≡ *Phaedropezia flavida* (Berk. & Curt.) Le Gal
8. PSILOPEZIA MIRABILIS Berk. & Curt., J. Linn. Soc., Bot. 10: 364. 1869. ≡ *Aleurodiscus mirabilis* (Berk. & Curt.) v. Höh., Fragmente 292. 1909. No specimens have been examined; von Höhnel's (1909a) synonym has been followed.
9. PSILOPEZIA MYROTHECIOIDES Berk. & Br., Ann. Mag. Nat. Hist. IV, 15: 39. 1875. = *Pachyella babingtonii*
10. PSILOPEZIA OOCARDII (Kalchb.) Sacc. & D. Sacc., Syll. Fung. 18: 11. 1906. = *Pachyella babingtonii*
11. PSILOPEZIA ORBICULARIS (Peck) Dodge, Trans. Wisconsin Acad. Sci. 17: 1052. 1914. = *Pachyella clypeata*
12. PSILOPEZIA RIVICOLA Vaček, Studia Bot. Čechoslovaca 10: 129. 1947. ≡ *Thecotheus rivicola* (Vaček) Kimb. & Pfister
13. PSILOPEZIA TRACHYSPORA Ell. & Ever., Erythea 1: 200. 1893. = *Pachyella* sp.

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