AN ABSTRACT OF THE THESIS OF

JOHN HALDOR HAINES (Name) for the DOCTOR OF PHILOSOPHY (Degree)

in BOTANY (MYCOLOGY) (Major) presented on February 9, 1972 (Date)

Title: THE GENUS TRICHOPEZIZELLA

Abstract approved: Redacted for privacy

A taxonomic study of the genus Trichopezizella Raitviir is presented. T. nidulus var. nidulus, T. horridula, T. barbata, and T. relicina var. relicina are fully described and figured. Three provisional combinations are made: T. nidulus var. hystriculus, T. nidulus var. setigera, and T. relicina var. macrospora. T. onocleae and T. otanii are described as sp. prov. An attempt has been made to include a complete list of synonomy and to examine types for all taxa included. Keys to the subfamilies and tribes of the Hyaloscyphaceae, the genera of tribe Lachneae, and the species and varieties of Trichopezizella are included.

The Genus *Trichopezizella*

by

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A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Doctor of Philosophy

June 1972

APPROVED:

Redacted for privacy

Professor of Botany and Plant Pathology
in charge of major

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Dean of Graduate School

Date thesis is presented February 9, 1972

Typed by Mary Jo Stratton for John Haldor Haines

ACKNOWLEDGMENTS

The author wishes to thank those who so generously made material available from the following herbaria: (H), (BPI), (S), (PC), (CUP), (FH), (LPS), (PAD), (NY), (MICH), (TU), (SAP), (UPS), (K), and (NYS) (Lanjouw and Stafleu, 1964).

Special thanks are extended to the New York State Museum and Science Service for making this study possible, to Dr. William C. Denison, Dr. Richard P. Korf, and Mr. Stanley Jay Smith, upon whose knowledge and experience I have frequently drawn, to Mr. Richard Snook, who has applied his talent to the line drawings, and to Dr. Edith Cash for the Latin diagnoses.

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THE GENUS TRICHOPEZIZELLA

INTRODUCTION

The genus Trichopezizella Raitviir (1969) was proposed for a small group of hyaloscyphaceous discomycetes with glabrous, colored, thick-walled hairs and lanceolate or pointed paraphyses. This thesis is a study of the species previously placed in this group, plus a number of taxa uncovered in a review of nearly 1,000 names of larger Hyaloscyphaceae, in addition to numerous herbaria and personal collections. Six species, two of which are described as new, and three varieties are included. Three new combinations are made. A key to the genera of Hyaloscyphaceae tribe Lachneae, to which Trichopezizella belongs, is included.

Trichopezizella is found throughout most temperate regions, but it is seldom reported from the tropics. It appears to be host specific, a factor which must influence its distribution.

The affinities of the genus appear to be with Belonidium Mont. et Dur., from which it is distinguished by glabrous instead of granularly roughened hairs.

MATERIALS AND METHODS

Both fresh collections and dried herbarium specimens were examined in this study. Descriptions and illustrations were made from type specimens wherever possible and many of the other specimens mentioned are from exsiccati sets.

The specimens were examined on their natural substrate with a stereodissecting scope or the compound microscope with the lower power objective and incident light. Unstained squash mounts of whole or partial apothecia were examined with both standard brightfield and Zernike phase contrast microscopy. Water mounts were satisfactory for fresh specimens but lactophenol solution was found necessary to reinflate the cells of dried material. Lactophenol was made up of 10 g phenol, 20 ml lactic acid, 20 ml glycerin, and 10 ml water (Von Arx, 1967). Semipermanent mounts were made with lactophenol by sealing the cover slip with Adams Histoclad or Cutex fingernail polish.

Poorly dried or very old specimens did not reinflate with lactophenol and a 2% solution of KOH was used. KOH has the disadvantage of swelling cell walls and distorting cell shapes if the mount is left too long. This property may sometimes be used to advantage to accentuate very thin septa which are normally difficult to see.

Line drawings were made from projected negatives.

Photomicrographs were made on 35 mm Kodak high-contrast copy film and developed 5 min at 70°F in D-76 developer.

The color nomenclature used is from R. W. Rayner (1970) and the colors are cited by their Ridgeway names. Munsell equivalents may be determined by referring to Rayner's Table 3. Color matching of macroscopic features was made in sunlight whenever possible, and colors of microscopic features were determined with a standard brightfield microscope illuminated by unfiltered light from an incandescent source.

Measurements were made with an ocular micrometer except those of spores which were made with a filar micrometer eyepiece.

For the iodine reaction of the pore plug, a separate mount was made in Melzer's reagent made up of 1.5 g potassium iodide, 0.5 g iodine, 20.0 ml chloral hydrate and 20.0 ml distilled water (Dennis, 1968).

The term "refractive" is used throughout the descriptions to denote the bright appearance of an object under bright or dark field phase microscopy due to its having a higher index of refraction than its mounting medium. Water or 2% aqueous KOH was used as a mountant to determine this property in this study.

MORPHOLOGY AND EVALUATION OF TAXONOMIC CHARACTERS

Apothecia

The apothecia of Trichopezizella range from sessile in T. nidulus to stipitate in T. relicina, and from 0.2 mm diam in T. onocleae to 2.0 mm diam in T. otanii, but size range is quite constant for a given species. The pigmentation becomes slightly darker during maturation and then appears to get lighter as the colored hairs are lost due to abrasion. In nature, the tough exciple and hairs may remain into the next growing season, long after the hymenium and softer medullary tissues have decayed. It is not uncommon to find a new fruiting body inside the old shell, giving it the appearance of an involucre. This phenomenon is especially prevalent in T. barbata.

Hairs

The characteristics of the hairs are most important in delimiting the genus, and are also helpful for distinguishing species. Two types of hairs are generally present on a fruiting body. The most common (and the only kind given taxonomic importance) arise perpendicularly from the ectal exciple. They are always thick-walled, septate, colored, smooth and rigid--except in T. barbata, where they are flexuous. The longer hairs of this type usually have pointed tips

while shorter ones usually have bulbous tips. Both types of tips may be found on the same individual in some cases. The second and less prevalent type of hair arises as a continuation of the excipular margin. They tend to be short, thin-walled, granularly encrusted and hyaline, and they are most well-developed in old apothecia. Granular encrustations are found only on thin cell walls as found on marginal hairs and on the thin-walled tips of excipular hairs. The encrustations are coarser than those found in Dasyscyphus "section typicae" and are more like those of Belonidium corticalis.

Ectal Exciple

The ectal exciple is a thin, homogeneous layer surrounding the medullary or ental exciple. It is composed of short, thick-walled cells, characteristics to which fundamental importance has been given in delimiting the genus and the subgenera. Trichopezizella subgenus Trichopezizella sensu Raitv. is characterized by exciples of "textura angularis" to "textura globulosa," whereas Trichopezizella subgenus Relitricha Raitv. has exciples of "textura prismatica." The terminology to describe exciple types is taken from Korf (1958).

Squash mounts are helpful for separating the ectal exciple from the other tissues and for orienting it for a surface view.

Spores

Spore size and shape help to distinguish species, but large variations in spore length occur in some species. T. nidulus and T. relicina both have large-spored variants which occur in alpine habitats. These large spores become thick-walled and filled with refractive material which makes them quite different from the normal spores of the species.

No conspicuous surface features or appendages are known on the spores of this group, but septa are common in T. horridula, T. relicina var. macrospora and T. barbata. Septa may be difficult to see in unstained material, but keeping them overnight in 2% KOH will usually swell the walls and make the septa visible.

Asci

The asci of Trichopezizella are not strongly differentiated from other species of Hyaloscyphaceae tribe Lachneae. They are cylindrical with a slightly-thickened, hemispherical apex, a short stalk, and they exhibit a blue reaction around the pore plug when treated with Melzer's solution. The species with small asci (T. nidulus, T. onocleae, and T. otanii) seldom exhibit a crozier at the basal septum of the ascus, whereas species with larger asci very often have a conspicuous crozier, which is readily observed in immature specimens.

Measurements of the asci are correlated with, but more variable, than those of the spores, so comparatively fewer measurements were taken of the asci.

Paraphyses

The paraphyses are variable within the genus but all have the acute apex characteristics of tribe Lachneae. In the early stages of development they are filiform and become lanceolate as they develop. The width of the fully developed paraphyses is constant for a species, but it is often difficult to tell if full development has been reached, as the asci and paraphyses develop on separate hyphal systems which may be in different stages of development in the same apothecium.

Cultural Characters

Cultural characters are unknown for this genus due to the difficulty of obtaining growth in culture. Several specimens have shown what appears to be an imperfect stage or spermatia in place of the hymenium, but it has not been placed in a form genus.

KEY TO THE SUBFAMILIES AND TRIBES OF HYALOSCYPHACEAE

1. Apothecia tough and persistent, on sound coniferous twigs, usually more than 1.5 mm in diam when mature; spores ellipsoidal or spherical, never fusiform; paraphyses filiform or clavate, never lanceolate. Subfamily Trichoscyphelloideae.

1'. Apothecia soft and ephemeral, on various substrates, but not on sound coniferous twigs, usually less than 1.0 mm in diam; spores ellipsoidal or, more often, fusiform; paraphyses lanceolate, filiform or clavate. Subfamily Hyaloscyphoideae. (2)

2. Subiculum present; paraphyses never lanceolate. Tribe Arachnopezizeae (excluded from Hyaloscyphaceae by Raitviir, 1970).

2'. Subiculum absent; paraphyses lanceolate, filiform or clavate. (3)

3. Paraphyses filiform or clavate, never lanceolate nor with acute apices; hairs usually nonseptate, never rough; apothecia less than 0.5 mm in diam when mature and moist. Tribe Hyaloscypheae.

3'. Paraphyses lancolate or with acute apices; hairs septate, often rough; apothecia usually more than 0.5 mm in diam when mature and moist.

Tribe Lachneae.

KEY TO THE GENERA OF HYALOSCYPHACEAE TRIBE LACHNEAE

1. Hairs externally rough 2

1'. Hairs externally smooth 4

2. Apothecia immersed in leaf tissue . . . . . Stegopeziza Höhn.

2'. Apothecia superficial 3

3. Hairs finely granulate, hyaline in most species . . . . . Dasyscyphus S. F. Gray[1]

3'. Hairs covered with coarse granules, with colored walls or hyaline walls enclosing colored contents . . . . . Belonidium Mont. and Dur.[2]

4. Hairs tapered to an acute apex, hyaline . . . . . Albotricha Raitviir

4'. Hairs cylindrical, or if tapered, strongly pigmented 5

5. Hairs hyaline, thin-walled (less than 0.5 μ), 0-2 septate; ectal exciple thin-walled . . . . . Psilachnum Höhn.

5'. Hairs orange to brown, thick-walled (more than 1.0 μ), Multiseptate; ectal exciple thick-walled. . . . . Trichopezizella Raitviir

[1] Dasyscyphus as used here includes Atractobolus (Tode) Kuntze, Dasyscyphella Tranz. emend Raitv., Erinella Quelet, Erinellina Seaver, Helolachnum Torrend, Lachnaster Hohn, Lachnum [Retzius] Fries.

[2] Belonidium as used here includes Dyslachnum Clem., Trichopeziza Fuckel.

TRIBE LACHNEAE: DOUBTFUL OR EXCLUDED GENERA

Arenaea Penz. et Sacc. This genus has often been placed in synonomy with Dasyscyphus S. F. Gray (Nannfeldt, 1932). If Dasyscyphus is taken in the restricted sense of containing only species with lancolate paraphyses this is an error. The species in Arenaea have pointed spores and filiform-clavate paraphyses, and appear to warrant a separate genus, but the only collection of the type species known to me no longer bears apothecia.

Diplocarpa Massee has been placed in tribe Lachneae because of its paraphyses with lancolate tips. These paraphyses differ from those of the rest of tribe Lachneae, however, in being filiform with deciduous, conidia-like tips. Other features of this fungus are unlike those of tribe Lachneae and it must be included elsewhere.

Solenopezia Sacc. This genus shows some affinities with Belonidium Mont. et Dur., in which it has been included, but it does not have lanceolate paraphyses. It is sufficiently distinct to be maintained as a genus, but its inclusion in tribe Lachneae is not certain.

Trichodiscus Kirschstein. This genus has been exluded from the tribe Lachneae by some recent authors (Dennis, 1962; Raitviir, 1970) and it has been suggested that it belongs to the Dermateaceae because of its dark, "textura globulosa" exciple.

Zoellneria Vel. This genus has some superficial characters in

common with Trichopezizella; e.g., its long, smooth, colored hairs with lighter-colored tips, but it has filiform-clavate paraphyses, and nearly opaque, "olive-black" pigments and relatively thin-walled hairs. Its affinities may be with Pirottaea Sacc.

TRICHOPEZIZELLA Raitv. Eesti NSV Tead. Akad. Toim., Biol. Ser. 18:68. 1969.

= Dasyscyphus subgenus Trichopezizella Dennis, Persoonia 2:182, 1962. (nomen nudum)

Apothecia solitary to gregarious, discoid, cupulate or cyathiform, sessile or stipitate, superficial 0.2-2.0 mm in diam, externally covered with orange to brown hairs; hairs smooth, rigid or flexuous, with thick walls 1.0-2.5 μ thick, septate, up to 500 μ long with pointed, hemispheric, or glandular apices; asci cylindrical, 8-spored, crozier present or absent at basal septum, pore plug visible at thickened apex, exterior or plug usually stains blue with Melzer's solution; ascospores more than 4 but less than 10 times as long as wide, fusiform, bacilliform or elongate-ellipsoid, symmetrical or very slightly asymmetrical about the transverse axis, straight or very slightly curved along the longitudinal axis, continuous or more rarely septate; paraphyses longer than the asci in the hymenium, lanceolate to nearly filiform never with enlarged, acute apices; ental exciple of hyaline, thin-walled, elongate cells forming "textura intricata" to "textura

prismatica"; ectal exciple of slightly thick to thick-walled, short, hyaline to brown cells forming "textura prismatica," "textura angularis," or "textura globulosa."

Habitat:

Saprophytic on ferns, monocots, herbaceous dicots or more rarely woody dicots.

Etymology:

Tricho from Greek trichos or hair, and Pezizella diminutive form of Latin Pezicae, or unstalked mushrooms.

Type:

Peziza nidulus Schmidt et Kunze

Discussion:

Within the Hyaloscyphaceae, Trichopezizella is distinguished by its smooth, brown, thick-walled hairs and its short-celled ectal exciple. Placement in the tribe Lachneae of the subfamily Hyaloscyphoideae is based on its lanceolate paraphyses and similarity to Belonidium lonicerae (Fries) Raitviir.

The publication of Trichopezizella (Raitviir, 1969) consisted of a brief but adequate Latin diagnosis, a reference to subgenus Trichopezizella Dennis (1962) of Dasyscyphus S. F. Gray, and a reference to Dasyscyphus nidulus (Fr.) Massee as the type. Only one

combination was made in the new genus at that time; Trichopezizella macrospora Raitv. Further combinations were made by Raitviir (1970).

Unfortunately subgenus Trichopezizella Dennis is a nomen nudum. Earlier, Dennis (1949) published Dasyscypha section Glandulosae containing most of the same species as Trichopezizella Dennis, but it is also a nomen nudum.

Thus the proper citation of the genus is Trichopezizella Raitviir, not Trichopezizella (Dennis) Raitviir.

KEY TO THE SUBGENERA, SPECIES AND VARIETIES OF TRICHOPEZIZELLA RAITV.

1. Ectal exciple of cuboid-celled "textura prismatica"; paraphyses encrusted with amorphous matter . . . . . subgenus Relitricha Raitv. 2

1'. Ectal exciple of "textura angularis" to "textura globulosa"; paraphyses not encrusted . . . . . subgenus Trichopezizella 3

2. Spores avg. 12 μ long . . . . . T. relicina var. relicina

2'. Spores avg. 20 μ long . . . . . T. relicina var. macrospora

3. Hairs flexuous; apothecia on small woody twigs; spores 8-15 μ long . . . . . T. barbata

3'. Hairs rigid and straight or evenly curved; apothecia on non-woody stems 4

4. Apothecia on Gramineae; spores often septate, 10-15 μ long . . . . . T. horridula Raitv.

4'. Apothecia on other substrates; spores rarely septate 5

5. Paraphyses filiform with acute apices; apothecia on Onoclea 5

5'. Paraphyses lanceolate; apothecia not on Onoclea 6

6. Apothecia distinctly stipitate, on Polygonum: spores 6-9 μ long . . . . . T. otanii

6'. Apothecia sessile on various substrates T. nidulus 7

7. Paraphyses cylindric to very narrowly lanceolate, less than 2.5 μ wide, exceeding the asci by less than 10 μ; apothecia on Cyperaceae . . . . . T. nidulus var. hystricula

7'. Paraphyses lanceolate, more than 3.0 μ wide, usually exceeding the asci by more than 20 μ; apothecia not on Cyperaceae 8

8. Spores 6-10 μ; hairs not more than 150 μ; apothecia usually on Polygonatum . . . . . T. nidulus var. nidulus

8'. Spores 9-21 μ; hairs up to 350 μ; apothecia on Polygonum and unspecified herbaceous stems . . . . . T. nidulus var. setigera

Subgenus Trichopezizella

This subgenus is characterized by ectal exciple of angular to globose cells which are not arranged in chins or rows, and by paraphyses which are free from encrusting matter.

The species included herein form a closely related group except for Trichopezizella barbata which occurs on hardwood twigs instead of herbaceous stems. Until clear-cut characters are found which can set it apart from the other species it is best placed in this subgenus.

TRICHOPEZIZELLA NIDULUS (Schmidt et Kunze per Pers.) Raitv. Scripta Mycol. 1:59. 1970. var. NIDULUS. [Fig. 1]

Basionym: Peziza nidulus Schmidt et Kunze, Deutschl. Schwm. in Getr. Exemp. #72. C. F. Hall, I. C. Schmidt and G. Kunze. 1816.

≡ Peziza nidulus Schmidt et Kunze per Pers. Mycol. Europ. 1:250. 1822.

≡ Trichopeziza nidulus (Schmidt et Kunze per Pers.) Fuckel, Symb. Mycol. p. 296. 1869.

≡ Lachnea nidulus (Schmidt et Kunze per Pers.) Gillet, Champ de France. p. 87. 1879-1883.

≡ Dasyscypha nidulus (Schmidt et Kunze per Pers.) Massee, Brit. Fung. Fl. 4:104. 1895.

Lectotype: Peziza nidulus Schmidt et Kunze: Deutschlands Schwämme in Getrockneten Exemplaren #72. C. F. Hall, I. C. Schmidt and G. Kunze. Leipzig. 1816. I chose the specimen in the Fries Herbarium (UPS) as lectotype.

Apothecia solitary or scattered, sessile, 0.2-0.5 mm in diam, covered with stiff, "chestnut" to "umber" hairs which become lighter-colored toward the margin of the cup; hymenium "cream"; hairs radiating outward, up to 150 μ (avg. of 52 = 104.7 μ) X 5-8 μ, smooth, septate, cells (8) 10-15 (25 μ) long, thick-walled; walls up to 2.5 μ thick, appearing "luteous-orange"; apices and bases lighter colored or hyaline; tips of shorter hairs generally bulbous, inflated to several micra broader than hyphae; longer hairs generally with hemispheric or slightly tapered tips; tips sometimes capped with water soluble, red, amorphous matter; marginal hairs much

thinner-walled, hyaline, often with a few non-refractive adhering granules *circa* 1 μ diam. Ectal exciple "buff" to subhyaline, thick-walled, refractive "*textura angularis*" to "*textura globosa*."

Asci (32 μ) 35-47 μ (49 μ) X (4 μ) 4.5-5.5 μ, cylindric with hemispheric or slightly conical apices; pore plug small but easily observed, blue with Melzer's solution; croziers not observed at base, often branched below basal septum.

Spores (5.5) 6.5-8.5 (10.5) X (1.2) 1.5-2.0 μ (avg. of 100 = 7.4 X 1.6 μ), straight, bacilliform.

Paraphyses (3.0) 3.5-5.0 (5.5 μ) wide, distinctly lanceolate when fully developed, sharp-pointed, tapered to 1.5-2.0 μ below, exceeding the asci by as much as 30 μ, several septate in lower portion, thin-walled, without conspicuous inclusions or adhering matter.

Hosts:

Usually confined to *Polygonatum multiflorum* (L.) All. (*Convallaria multiflora*) and *P. verticillatum* (L.) All. (*Convallaria verticillata*), but also confirmed to be on *P. officinale* All., *Aconitum napellus* L., *Aconitum septentionale* Koelle, *Filipendula denudata* (Presl.) Rydb., *Epilobium hirsutum* L., and *Aster salicirolius* Scholler.

Range:

Common throughout Europe but rare in North America. Not reported from tropical areas or the Southern Hemisphere.

Etymology:

From Latin Nidus, a nest; Nidulus, a little nest.

Illustrations:

Dennis, Brit. Ascom. Pl. XIX, F. J. 1968; Dennis, Commonw. Mycol. Inst., Mycol. Pap. 32:55 F. 54. 1949; Boudier, Icones Mycol. 3:516, 1911; Naumov, Fung. Fl. Leningr. II Discom. p. 164, fig. 78, 1954; Velenovsky, Monogr. Disc. Bohem. 2:Pl. 9, fig. 24, 1934.

Specimens examined:

Sweden

Eliasson, A. G., 30. VI. 1924 on Aconitum septentionale (S).

Eliasson, A. G., 15. VIII. 1933 on Convallaria verticillata (S).

Eliasson, A. G., 31. VII. 1923 on Aconitum septentionale (S).

Kretschmar, C. T., XI, 1850 ex herb. M. A. Lindblad. (S).

Nannfeldt, J. A., 17. VII. 1927 on Polygonatum verticillatum Torne Lappmark (S).

Fries, E. M., on Polygonatum multiflorum (UPS) Herb. Fries.

Starback, K., 22. VI. 1888 Spiraea (S).

Finland

Starbäck, K., VIII. 1893. (S).

Denmark

Lind, J., 21. V. 1903 on Polygonatum multiflorum (S).

Belgium

Bellynck, on Convallaria multiflora in Herb. Crypt. G. D. Westendorp & A. C. F. Wallays #691 (NY).

Libert, M. A., on Convallaria multiflora in Libert, Pl. Crypt. Arduennae #25 (S).

France

Mougeot, J. B. & C. Nestler, Stirpes Crypt. Vogeso-Rhenanae #588 (NY), (FH) Herb. Patouillard, (S) Herb. Rehm, (UPS) Herb. Fries.

Roberge, on "Sceaux de Salomon" in Herb. Barbey-Boissier #1386 (CUP) (FH) (S).

Mougeot, J. B., 1851 (PC).

Richon, C., on Convallaria multiflora (FH) Herb. Patouillard.

Camelle, 19. V. 1902 on Polygonatum (FH) Herb. Patouillard.

Bellk, V., 1851 on Polygonatum multiflorum (FH) Herb. Patouillard.

Lenormand, on Polygonatum multiflorum (UPS) Herb. Fries.

Germany

Schmidt, I. C., G. Kunze & C. F. Hall, on Convallaria multiflora in Deutschlands Schwämme #72 (UPS) Herb. Fries (Lectotype) (MICH) (FH).

Sydow, H., 31. VII. 1922 on Polygonatum multiflorum in Sydow: Mycotheca Germanica #1947 (MICH) (S).

Ludwig, A., 25. IV. 1929 on Polygonatum verticillatum in Sydow: Mycotheca Germanica #2357 (MICH) (S).

Krieger, W., V. 1912, 1913 on Polygonatum multiflorum in Fungi Saxonici #2280 (MICH) (S) Herb. Rehm.

Rabenhorst, L. Rehm: Ascomyceten #319 (FH).

Fuckel, L. on Convallaria multiflora in Herb. Barbey-Boissier #1236 (CUP) (NY) (S) (FH).

Jaap, O #310, 10. VIII. 1905 on Polygonatum verticillatum (S).

Sydow, P., VI. 1888 on Polygonatum multiflorum in Rehm: Ascomyceten 756^{b} (S), (S) Herb. Rehm, (S) Herb. Sydow.

Leiner, IV. 1862 Convallaria multiflora in Kryptogamen Badens #646 (S) Herb. Rehm (S), (S) Herb. Sydow.

Piskorz, J., VIII. 1925 on Polygonatum verticillatum in Petrak: Flora Bohemiae et Moraviae exsiccata 44:2170 (S).

Ludwig, A., 15. V. 1937 on Polygonatum multiflorum (S).

Germany (cont.)

Rabenhorst, L. in Rabenhorst. Herb. Myc. #19 (S) Herb. Sydow (S) Herb. Rehm.

Tavel, F. #132, 16. V. 1888 on Polygonatum vulgare (S) Herb. Rehm.

Sydow, H. #15, VI. 1887 on Polygonatum multiflorum (S) Herb. Rehm.

Sydow, P., VII. 1906 on Polygonatum verticillatum (S) Herb. Sydow.

Jaap, O., 4. VII. 1909 on Aster salicifolius Scholler as Lachnum nidulus var. subnidulans Rehm. Otto Jaap, Fungi Selecti Exsiccati #409 (S) (PC).

Schroeter, J., 1876 on Polygonatum multiflorum in de Thümen: Mycotheca Universalis #517 (S) (NYS).

Sydow, H., 8. VII. 1909 on Polygonatum verticillatum in Sydow: Mycotheca Germanica #612 (CUP) (MICH) (S).

Kirschstein, W., 18. VI. 1939 on Polygonatum verticillatum (FH).

Krieger, W., VI. 1884 on Polygonatum verticillatum in (S) in Herb. Rehm.

Sydow, P., VI. 1887 on Polygonatum multiflorum in Sydow: Mycotheca Marchica #1481 (S) Herb. Rehm. (S) Herb. Sydow.

Ludwig, A., 22. IV. 1934 Polygonatum multiflorum (S).

Germany (cont.)

Rehm, H., VII. 1887 Epilobium hirsutum in Rehm: Ascomyceten #906 (S) Herb. Sydow, (S).

Krieger, #321, 10. VI. 1884 on Polygonatum verticillatum (S) Herb. Rehm.

Switzerland

Krieger, W., V. 1890, VI. 1892 in Polygonatum verticillatum in Fungi Saxonici (MICH) (CUP) (S) two collections.

Winter, G., V. 1876 on Polygonatum multiflorum ex herb. de Thumen (NYS).

Winter, G., V. 1876 on Convallaris multiflora Winter: Fungi Helvetici (FH).

Kirsner, J., IV. 1862 on Convallaria multiflora in Wartmann et Schenk: Schweizerische Kryptogamen #119 (S) Herb. Rehm.

Winter, G., 1. VI. 1882 on Aconitum napellus in Rabenhorst. Winter: Fungi Europaei #2741 as Trichopeziza subnidulans Rehm (NY) Ellis Collection, (S) Herb. Sydow, also as Rehm: Ascomyceten #709 (MICH), (NY), also Herb. Patouillard (FH) sheet #5161.

Hungary

Kmet, A., 23. IV. 1889 on Polygonatum vulgare, Fungi Schemnitziens (S).

Hungary (cont.)

Moesz, G. and B. Husz, 15. III. 1913 on Polygonatum multiflorum in Flora Hungarica exsiccata, cent. IX #810 (MICH) (CUP) (S) (FH).

Kalchbrenner, #262, on Polygonatum vulgare (UPS) Herb. Fries.

Italy

Carestia, A., IV. 1890 on Convallaria multiflora in Saccardo: Mycotheca Italica #671 (S) Herb. Sydow.

Kirchizia

Raitviir, A., 3. VI. 1968 Aconitum #60239 (TU).

U.S.S.R.

Elango, A. #712, 4. VI. 1961 on Filipendula denudata (TU).

Latvia

Ex herb. Kirulis #393, 8. VI. 1932 on Polygonum multiflorum (FH) (S).

Smarods, J., V. 1940 on Polygonatum officinale.

Austria

Strasser, P. O., Polygonatum multiflorum (S).

Tunisia

Bresadola, G., 1883 on Convallaria polygonatum (S) Herb. Bresadola.

U.S.A.

Peck, C. H., V. 1885 (NYS) Host unrecorded.

Peck, C. H., VI. 1885 (NYS) Host unrecorded.

Discussion:

Judging from the number of specimens deposited in herbaria, this is the most common species of Trichopezizella.

It is recognized in the field by its host, its sessile habit, and the manner in which the short hairs radiate out in all directions, instead of being directed upward as in T. relicinus. T. nidulus var. nidulus occupies a central position in a complex of host specific taxa which includes T. nidulus var. hystriculus on sedges, T. onocleae on the fern Onoclea, T. otanii on Polygonum and T. horridula on Gramineae. This complex also includes the following atypical specimens:

Kugelberg, H., V. 1891, Uppland: Vǎrmdő, Aspvik, Sweden, on Spiraea ulmarea L. (S). This specimen has larger than normal spores, 9-13 X 1.5-2.5 μ.

Dennis, R. W. G., V. 1952, Cornwall, England on Oenanthe crocata (FH) ex Herb. Kew. This collection has hairs as long as 200 μ.

Sydow, P., 1885-1886 on Lilium as Mycoth. March. #1265. (S). The hairs of this specimen measure as long as 325 μ.

It is possible that Dasyscyphus rubro-guttatus Svrvek is a synonym, but the type was not examined. The protologue of D. rubro-guttatus states "Species ex affinitate Dasyscyphus niduli (Schmidt et Kunze) Massee, sed pilis apice rubro-guttulatis discrepans." It was found in the present study that most specimens have traces of red matter on the hair tips.

The lectotype was chosen from the exsiccati of Schmidt, Kunze and Hall, who were the originators of the name Peziza nidulus. The specimen from the Fries herbarium and presumably a specimen that Fries had in mind when writing his description was chosen. The other examples of Schmidt and Kunze #72 are to be considered isotypes unless it can be proved that they were not part of the same collection.

TRICHOPEZIZELLA NIDULUS var. SETIGERA (Phill.) comb. prov.

Basionym: Peziza (Dasyscypha) setigera Phillips, Grevillea 7:22. 1878. [Fig. 3]

≡ Trichopeziza setigera (Phill.) Sacc. Syll. Fung. 8:407. 1889.

≡ Lachnum setigerum (Phill.) Rehm, Ann. Mycol. 3:518. 1905.

≡ Dasyscyphus setigerus (Phill.) Dennis, Kew Bull. 17(2):364. 1963.

≡ Trichopezizella setigera (Phill.) Raitv. Scripta Mycol. 1:60. 1970.

= Trichopezizella brunnea Raitv. Scripta Mycol. 1:59. 1970.

Holotype:

Harkness, H. W. & J. P. Moor, #981, U.S.A., California, location unspecified. (K) ex herb. Phillips.

Apothecia 0.3-1.1 mm diam. sessile, light "buff" externally, covered with dark brown hairs; disc covered by margin of cup when dry; hairs 150-350 X 6-10 μ, cylindrical, straight, thick-walled, rigid, septate, externally smooth and without pits, dark brown except at the apex which is lighter and often bulbous.

Asci 62-76 X 4.5-5.5 μ, cylindrical with a conical to hemispherical apex and slightly tapered base 8-spored, pore evident and blue with Melzer's solution. No crozier observed at basal septum.

Ascospores (9) 12-18 (21) μ (avg. of 65 spores = 14.8 μ), non septate, small inclusions at tips, cylindric-fusiform, straight, often slightly thick-walled and refractive.

Paraphyses lanceolate, sharp-pointed, 4.5-6.0 μ wide and exceeding the asci by as much as 35 μ, smooth externally, hyaline, without conspicuous inclusions, septa in basal portion only.

Ectal exciple "textura angularis" to "textura globulosa," "straw" to "pale luteous."

Illustrations:

Dennis, R. W. G. Kew Bull. 17:362, fig. 61. 1963.

Specimens examined:

U. S. A.

Harkness, H. W. & J. P. Moor, #981, California. Holotype of Peziza setigera Phill. (K).

Harkness, H. W. on Polygonum polymorphum California. As Rabenh. -Pazschke, Fungi Europaei et extra Europae #4475 as Trichopezizella setigera (Phill.) Sacc. (S) (BPI) (K).

Parks, H. E. #5631, 10. VI. 1937. Oregon, on Polygonum alpinum as Lachnum setigerum (Phill.) Rehm. (FH) (MICH) (BPI).

Parks, H. E. #5138, 24. VI. 1934. Oregon, on Polygonum alpinum as Lachnum setigerum (FH).

Kirghizia

Raitviir, A. TAA-44681, 11. VIII. 1967. U. R. P. S. S. Kirghizia, Tianschan Occidentalis, Montes Tschatkal, Sary-Tschelek Reserve, on dead herbaceous stems in sub-alpine meadows. Holotype of Trichopezizella brunnea Raitv. (TU).

Discussion:

This variety is larger in all features than the type of Trichopezizella nidulus, and is found on a different substrate. It perhaps

bears the same relationship to T. nidulus var. nidulus as T. relicina var. macrospora does to T. relicina var. relicina.

The host of the type specimen has often been cited as Aralia (Saccardo, 1889; Kanouse, 1947; Dennis, 1963; Raitviir, 1970), but the stem fragment which bears the type appears to be from a monocot.

Although the west coast of the United States and Kirghizia are widely separated geographically, the specimens from the two areas are identical.

TRICHOPEZIZELLA NIDULUS var. HYSTRICULA (Karst.) comb. prov. [Fig. 2]

Basionym: Lachnum hystriculum Karst. Mycol. Fenn. T. Discom. In Bidr. Känn. Finl. Nat. Folk 19:182. 1871. Non Peziza (Dasyscypha) hystricula Ell. & Everh. J. Mycol. 4:99. 1888.

≡ Trichopeziza hystricula (Karst.) Sacc. Syll. Fung. 8:422. 1889.

≡ Dasyscyphus hystriculus (Karst.) Dennis, Persoonia 2(2): 182. 1962. (Devalidated name) non Dasyscyphus hystriculus (Ell. & Everh.) Sacc. Syll. Fung. 8:445. 1889.

Lectotype:

Karsten, P. A. #3125 (hereby selected as lectotype). Fennia

Tavastia Australis. Tammela: Mustiala, Särkjärvi as Peziza (Lachnum) hystriculum ad Caricem acutam, 5. IX. 1870 (H).

Description:

Apothecia up to 0.4 mm diam, solitary or scattered, sessile, cyathiform, "buff," covered with dark brown hairs. Hairs radiating out and curved upward, covering the hymenium when dry, as long as 150 μ (avg. of 30 hairs = 98.6 μ) X 7-10 μ at the base, tapered to 3-6 μ toward the apex, brown, smooth, thick-walled, straight or slightly curved near the base, septate with hyaline, thinner-walled, hemispheric tips. Marginal hairs shorter, thin-walled, hyaline, septate, often curved with a granular exudate. Ectal exciple "straw," slightly thick-walled "textura globulosa" to "textura angularis," 2-4 cell layers thick.

Asci cylindrical or slightly enlarged in the middle, 49-63 X 5-8 μ, pore plug observed, blued with Melzer's solution, often subtended by a conspicuous crozier, apex hemispherical.

Spores (9) 10-14 (15) X 2-3 μ (avg. length of 20 spores = 11.7 μ), cylindric-ellipsoid, non-septate, slightly refractive, thick-walled, hyaline; contents irregular, refractive.

Paraphyses very narrowly lanceolate or cylindric with a slightly tapered apex, 2.0-2.5 μ wide, blunt but never inflated apices, devoid

of conspicuous inclusions, septate at the base only, exceeding the asci only slightly.

Host:

All three authentic collections made by Karsten are on Carex acuta.

Range:

Known only from the type locality, Mustiala, Finland.

Etymology:

Hystricula Latin for prickly, hairy or bearded.

Illustrations:

Dennis, Kew Bull. 17:349, fig. 41. 1963.

Specimens examined:

Karsten, P. A. #3125 (Lectotype) (H).

Karsten, P.A. #3126, Fennia, Tavastia Australis. Tammela: Mustiala, Särkjärvi on Carex acuta, 5. IX. 1870. (H).

Discussion:

Although this variety is known only through the collections of Karsten, it seems sufficiently distinct to be retained as a separate taxon. The larger spores, narrow paraphyses and different substrate differentiate it from var. nidulus.

Karsten's #3125 was chosen as lectotype because it bears the lower number and was presumably examined first, and it is more mature than the other collection.

Peziza badiella Karst. (=Trichopezizella badiella (Karst.) Raitv.) on Scirpus maritimus is doubtfully distinct, but when the type was examined it was found to be immature so that spore size comparisons could not be made.

TRICHOPEZIZELLA ONOCLEAE Haines, spec. prov. [Fig. 4]

Apothecia dispersa, sessilia, profunde cupulata, 0.10-1.15 mm diam, 100-200 μ alta; excipulum stramineum vel subhyalinum, e textura angulari vel marginem versus prismatica constitutum, sparse pilosum; pili cylindracei, glabri, muro crasso castaneo vel umbrino praediti, 2.5-5.0 μ diam, usque ad 110 μ longi, spetati, ad apices inflatuli; asci cylindracei, ad apices conici, 37-53 X 5.0-6.5 μ, saepe basim versus acute constricti et 2-3 μ lati, obturamento pori ope liquoris Melzeri caerulescente donati; ascosporae hyalinae, ellipticae, irregulariter biseriatae, continuae vel rare uniseptatae, (8) 9-11 (13) X 2.0-2.5 μ; paraphyses filiformes, hyalinae, glabrae, ad apices obtusos subattenuatae, interdum prope basim ramosae, 1.5-2.5 μ diam, ascos 5-10 μ superantes.

In rhachibus Onocleae sensibilis L., typus J. H. Haines et al.,

non-septate or rarely one-septate, hyaline, irregularly biseriate in the ascus, thin-walled and non-refractive or sometimes with refractive contents.

Paraphyses slightly tapered toward on an obtuse apex, nearly filiform, often with one or 2 septa, smooth, hyaline, sometimes branched.

Host:

Known only from Onoclea sensibilis L., "sensitive fern," in New York.

Etymology:

onocleae from Onoclea, a genus of Polypodiaceae.

Specimens examined:

U.S.A.

J. H. Haines & C. D. Marr, near Cooperstown, Otsego Co., 28. IX. 1970. JHH #1599 (NYS).

J. H. Haines, C. T. Rogerson, K. P. Dumont & G. Samuels, near Cranberry Cr., Sacandago Res., Fulton Co., 1. X. 1970. JHH #1622 (NYS).

Discussion:

This tiny Trichopezizella may be common throughout the range

of its host, but it is easily overlooked because of its very small size and non-distinctive coloration. It has been found growing with Pezizella chrysostigma on the same host.

It is similar to Trichopezizella nidulus var. nidulus in excipular and hair characteris, but may be distinguished by its substrate, small size, larger spores, and narrower paraphyses.

TRICHOPEZIZELLA OTANII Haines, spec. prov. [Fig. 5]

Apothecia solitaria vel dispersa, brevi-stipitata, infundibuliformia, usque ad 1.5 mm lata; stipes 0.2-0.3 mm longus; discus planus, albus, expositus; excipulum stramineum, e textura globulosa vel angulari constitutum, pilosum; pili recti, fusco-atri, glabri, crassitunicati, ad apices subattenuati, 8.0-10.5 μ diam, usque ad 400 μ longi; ascosporae bacilliformi-fusoideae, rectae, eseptatae, ad extremum unum saepe leniter amplificatae, 1.5-2.0 X 6-9 μ; paraphyses lanceolatae, ascos 50 μ superantes, vacuolatae, tenuitunicatae, 4.5-6.0 μ diam.

Ad stipites Polygoni sachalinensis, typus Y. Otani, Katsuraoka Zenibako, Ishikari Hokkaido, Japan, 1. VI. 1967 (Y). ut Dasyscyphus nidulus (SAP).

Apothecia solitary or scattered, substiptate, infundibuliform, up to 1.5 mm across; disc white, flat, exposed even in dried specimens. Stipe 0.2-0.3 mm long. Exterior of cup "buff" with reflected light, covered with "fuscous-black" hairs which radiate outward. Hairs 8-10.5 μ by up to 400 μ, slightly tapered toward the tips, straight, thick-walled, septate, smooth. Tips hyaline and bulbous or hemispheric, sometimes with several lumps of refractive material. Hairs at the margin of the cup thinner-walled, shorter, and light-colored or hyaline, often sparsely covered with refractive, water-insoluble lumps. Ectal exciple "straw," "textura globulosa" to "textura angularis," composed of thin-walled, slightly refractive cells 7-10 μ diam.

Asci cylindrical, 8-spored, 48-53 X 3.5-5.0 μ, apex hemispheric pore-plug evident, without crozier at basal septum, tapered at base. Paraphyses definitely lanceolate, sharp-pointed, exceeding asci by 25-50 μ in the hymenium, containing non-refractive vacuoles, septate in the lower portion only 4.5-6.0 μ wide, thin-walled, non-refractive.

Ascospores 1.5-2.0 X 6-9 μ (avg. of 22 spores 7.93 μ), bacilliform-fusoid, one end often slightly enlarged, non-refractive, non-septate, straight, without conspicuous contents.

Host:

Known only from Polygonum sachalinense in Japan.

Illustrations:

Otani, Trans. Mycol. Soc. Japan 8(2):44, fig. 12, Sept. 1967.

Etymology:

Named for the collector of the type; the Japanese mycologist Yoshio Otani.

Specimens examined:

Japan

Otani, Y., Moiwa Sapporo, 18. V. 1967. Y. O. #251 (SAP) as Dasyscyphus nidulus.

Otani, Y., Katsuraoka Zenibako, Ishikari Hokkaido, Japan, 1. VI. 1967. Y. O. #250 as Dasyscyphus nidulus (SAP) (Holotype).

Discussion:

T. otanii is a very robust species related to T. nidulus var. nidulus. It differs from the latter in its host, size and shape of its apothecium, and length of hairs and paraphyses. It differs from T. relicina in its excipular characteristics.

TRICHOPEZIZELLA HORRIDULA (Desm.) Raitviir. Scripta Mycologica 1:60. 1970. [Fig. 6]

Basionym: Peziza horridula Desmazieres. Ann. Sci. Nat. Bot. Ser. 3, 8:185. 1847.

≡ Trichopeziza horridula (Desm.) Sacc. Michelia 2:80. 1880.

≡ Lachnella horridula (Desm.) Quel. Enchirid. Fung. p. 315. 1885.

= Peziza secalis Libert apud Cooke, Grevillea 8:84. 1879.

≡ Trichopeziza secalis (Lib. apud Cooke) Sacc. Michelia 2:330. 1880.

≡ Lachnum secalis (Lib. apud Cooke) Rehm. Rabenh. Krypt. Fl. (Pilze) 1(3):897. 1896.

= Lachnella insularis Speg. Bol. Acad. Nac. Cienc. Cordoba II. p. 321. 1883.

Type:

Hereby chosen as Bouteille, M. Magny-en-Vexin (France) April 1847, "Sur le chaume sec des chaumieres exposees au nord." Lectotype in (PC) ex herb. Desmaziers. Portions of this collection were distributed as J. B. H. J. Desmazieres, Plantes Cryptogames de France #1740, and are isotypes.

Description:

Apothecia sessile, solitary to crowded on substrate up to 0.5 mm diam (over 1.0 mm including hairs), exciple "buff" to "pinkish-buff" covered with long "clay" to "raw sienna" hairs; hymenium concealed by hairs when dry. The hairs often adhere to the substrate in older specimens. Margin covered with short, white hairs.

Hairs up to 500 μ long by 4.5-9.0 μ wide, cylindrical, curved, slightly tapered at base; tapered, rounded or bulbous at the tip, smooth thick-walled, with thick septa which form cells up to 25 μ long, sometimes branched. Tips usually hyaline and thin-walled. Sometimes with small non-refractive gum-like particles. Marginal hairs light-colored or hyaline, thin-walled, septate much shorter than excipular hairs. Ectal exciple of thin to slightly thick-walled, hyaline cells, non-refractive "textura angularis" approaching "textura prismatica." Hairs arise from outermost cell layer by proliferation from single cells.

Asci 45-60 X 4.5-6 μ cylindrical with tapered base and hemispheric apex, evident pore plug blue in Melzer's solution, basal septum often subtended by a crozier. Paraphyses narrowly lanceolate with a blunt apex, hyaline, without distinctive inclusions, up to 10 μ longer than the asci in the hymenium, 2.5-3.0 μ wide, septate, without adhering matter.

Ascospores (7) 10-15 X 1.2-2.0 μ (avg. of 21 = 12.4 μ),

narrowly fusiform, slightly curved when mature, sometimes one-septate, symmetrical about the transverse axis. Non-refractive except for minute refractive bodies toward the ends of some spores, biseriate in the ascus.

Hosts:

This fungus is known primarily from Triticum vulgare Vill. (=T. aestivum L.) in France, but it is also known from Hierochloe antarctica from Tierra del Fuego.

Etymology:

Horridulus, a little bristling, shaggy or rough.

Illustrations:

Dennis, R. W. G., A Revision of the British Hyaloscyphaceae, p. 54, fig. 53. 1949.

Massee, G. Unpublished illustrations of type in (NY).

Dennis, R. W. G., Kew Bull. 17(2):363. 1963 as Trichopeziza secalis.

Specimens examined:

France

Bouteille, M. Magny-en-Vexin, IV. 1847. Det: Desmazieres (PC), Lectotype, (NY) as Desmazieres, Plantes Cryptogames de France #1740. Isotype.

France (cont.)

Bouteille, M. in Roumeguere. Fungi Selecti Galliae Exsiccati #329 (S), (NY), (CUP).

Montagne 724 bis, Ardennes: Sedan, (UPS) ex herb. Fries. as Dasyscyphus relicinus (Fr.) Boud.

Unrecorded collector Rouen, IV. 1888 (FH) ex herb. Patouillard.

Argentina

Spegazzini, C. #28136, Isla de los Estatos (Staten Island), Tierra del Fuego on Hierochloe antarctica, II. 1882. Type of Trichopeziza insularis Speg. (LPS).

Discussion:

This fungus fits the subgenus Trichopezizella because of its exciple of "textura angularis." There is, however, a tendency for some cells to be prismatic as in subgenus Relitricha.

It is the only species of Trichopezizella found on Gramineae and is lighter in color than the other species of the genus.

In the Fries herbarium is a specimen from Montagne (724 bis) labeled Dasyscyphus relicinus (Fr.) Boud. which is typical T. horridula. Perhaps he did not recognize it as different from T. relicina, as there is no indication that he tried to name it.

TRICHOPEZIZELLA BARBATA (Kunze apud Fries) Raitv. Scripta Mycol. 1:59. 1970. [Fig. 7]

≡ Peziza barbata Kunze, Deutschlands Schwämme in Getrockneten Exemplaren. 1815-1818. (Devalidated name).

Basionym: Peziza barbata Kunze apud Fries, Syst. Mycol. 2:99. 1823.

≡ Lachnella barbata (Kunze apud Fries) Fries summa veg. Scand. p. 365. 1849.

≡ Helotium barbatum (Kunze apud Fries) Karst., Myc. Fenn. I, p. 158. 1871.

≡ Lachnea barbata (Kunze apud Fries) Gillet, Champ. de France, Disc. p. 82. 1879. non Lachnea barbata Massee 1892, nec L. barbata Vel. 1934.

≡ Dasyscyphus barbatus (Kunze apud Fries) Massee, Brit. Fung. Flora 4:361. 1895.

≡ Lachnum barbatum (Kunze apud Fries) Schroet. Schles. Kryp. Fl, p. 92. 1908.

Type:

Peziza barbata ex herb. E. Fries, leg. Kunze, Matrix: Lonicera? Flora Helvetica (packet marked "coll. orig." on a recent orange label). (UPS) (Holotype).

Apothecia sessile, often slightly submersed in host tissue, solitary to gregarious, occasionally fruiting within last year's apothecium, up to 1.0 mm diam, cup-shaped, covered with "rust" to "chestnut" hairs, disc light-colored, covered by hairs and margin in dried specimens.

Hairs 3.0-5.0 μ X up to 250 μ (320 μ), smooth, slightly thick-walled (up to 1.5 μ), cells 14-22 μ long, septate, flexuous, "pale luteous" with transmitted incandescent light. Tips hyaline, usually glandular but sometimes hemispherical or acute, 5.0-7.5 μ X 7-17 μ, often with some small irregular particles. Smaller marginal thin-walled, hyaline, tapered or cylindrical hairs present.

Ectal exciple thick or thin-walled, hyaline to "orange" "textura globulosa" to "textura angularis," cells 4-12 μ in diam. Some very short hairs are formed by chains of globose cells emanating from the surface.

Asci 50-80 μ X 4-7.5 μ cylindrical, narrowed below, tip hemispherical to almost conical pore-plug visible in some collections, not stained blue with Melzer's solution in most collections, croziers present on ascogenous hyphae but not usually at the basal septum of the ascus.

Ascospores 2.0-3.5 μ (avg. of 39 = 2.5 μ) X 8-15 μ (avg. of 39 = 11.6 μ), ellipsoidal, sometimes slightly enlarged at one end, usually one-septate, septation is usually evident before release from the

ascus, often slightly curved, hyaline, thin-walled, without conspicuous inclusions, irregularly biseriate in the ascus.

Paraphyses 2.5-5.0 μ by 7-15 μ, longer than the asci, narrowly lanceolate, blunt apices, sometimes with some adhering matter at the tips, septate except in the upper third, thin-walled, hyaline, without conspicuous inclusions.

Hosts:

Lonicera caprifolium L., L. nigra, L. periclymenum L., L. xylosteum L., Spiraea latifolia (A. T. Borkh.), Myrica gale L., also reported from Psidium sp. but specimen not seen. Oplopanax horridum (J. E. Smith) Mia.

Etymology:

From Latin barbatus = bearded.

Illustrations:

Dennis, R. W. G., Com. Mycol. Inst., Mycol. Pap. #32, fig. 52, p. 54. 1949.

Dennis, R. W. G., Brit. Ascom. pl. XIX, fig. I. 1968.

Le Gal, M., Discom. Madagascar, fig. 181, p. 328. 1953.

Naumov, N. A., fig. 75, p. 159. 1964.

Specimens examined:

Sweden

Fries, E., Lund, Lonicera xylosteum L. (UPS) herb. Fries.

Kunze, "Lonicera?" (UPS) herb. Fries. (Holotype).

Fries, E., Lund Fagelsangen (=Foglesang), Lonicera xylosteum L. as Sclerom. Suec. 333 ("332") packet notes state 1825, but the exsiccatium was mentioned in the Syst. Mycol. 1823. (UPS) ex herb. Fries.

Starbäck. 22. VI. 1888 (S). 3 collections.

Eliasson, A. G., 4. VIII. 1895, Upsala on Lonicera xylosteum L. (S) ex herb.

Eliasson, A. G., 21. V. 1889, Lonicera xylosteum L. (S).

Eliasson, A. G., 6. VI. 1928, Lonicera xylosteum L.

Johansson, P., 7. VI. 1943, Lonicera (S).

Vestergren, T., 21. V. 1911, Sodermanland Lonicera xylosteum L. (S).

France

Levieus & J. B. Mougeot. ("Lonicera?") (UPS) ex herb. Fries.

Fautry, F., Lonicera xylosteum L. as C. Roumeguere. Fungi selecti exsiccati #6550 (NY). 2 collections.

German Democratic Republic

Jaap, O., 25. IV. 1916, Thuringen: Jena, Lonicera xylosteum L. as Otto Jaap, Fungi selecti exsiccati #578 (CUP).

Switzerland

Kunze, G., Lonicera, Flora Helvetica, (UPS) ex herb. F. Fries. Type.

Austria

Fuckel, L., 1894, Lonicera xylosteum, as Herb. Barb.-Boiss. #1247 (CUP) (S).

Gelbenegger, P. L., Prope Ybbsitz as Lonicera xylosteum L. as Kryptogamae exsiccatae #1727 b. (NY).

Italy

Carestia, A., 1898, Lonicera xylosteum L. et L. nigra as D. Saccardo-Mycotheca Italica #521 (NY).

Czechoslovakia

Rehm, H., II. 1867, Sugenheim in Frankin Lonicera (S).

Siegmund, W., June, Reichenberg in Bohemia, Lonicera nigra as Rabenhorst, fungi europaei #429 (S) ex herb. Sydow (CUP).

Estonia

Raitviir, A., 10. VI. 1970, #60930, Lonicera (TU).

U.S.A.

New York:

House, H., 3. VII. 1925, Newcomb, Essex Co., Myrica gale (NYS).

House, H., 11. VII. 1925, Newcomb, Essex Co., Spiraea latifolia as Lachnella kinetii Rehm. (NYS).

Washington:

Hotson, J. W., Seattle, Fatsia (=Oplopanax) horrida (WTU).

Grant, J. M., V. 1927, Marysville. Fatsia (=Oplopanax) horrida (S).

Grant, J. M., IV. 1931, Marysville. Echinopanax (=Oplopanax) horrida (S).

Smith, A. H., #13926. 30. V. 1939, Port Ludlow, Oplopanax horrida (MICH), as Lachnum setigerum (Phill.) Rehm.

Discussion:

This is a relatively common and widespread species on woody stems of Lonicera, but collections from Myrica, Oplopanax, and Spiraea have been confirmed. It is recognized by the matted, beard-like appearance of the hairs; its broad, septate spores; and narrow, flexuous, gland-tipped hairs.

The apothecia are persistent for a year or more and new apothecia often develop within an old one, giving the specimen the appearance of having an involucre.

Taxonomically T. barbata is closest to T. horridula, but it also resembles Belonidium corticale (Pers. ex Fr.) Raitv. and may form part of a connecting link to that genus. Belonidium is distinguished from Trichopezizella by roughened rather than smooth hairs.

I have found the spores of the type and all other specimens studied to be slightly larger than the measurements given by Phillips (1893), who reported them as 5-7 X 1-2 μ, and by Dennis (1949, 1968), who gives them as 9-11 X 2 μ. All other information in the descriptions fits the material examined.

A specimen with 50% longer spores which are three-septate was brought to my attention by Dr. A. Raitviir. It is similar to the type of T. barbata in all other respects except the length of the asci and paraphyses. This may be no more than a response to environmental conditions since the host is not different from that of normal specimens of T. barbata. Unless more specimens are discovered and more consistent differences demonstrated, this specimen will be treated as an anomaly.

Shear, C. L., 17. VI. 1941, Hensonville, N. Y. on Spireae salicifolia as Lachnum leucophaeum. (P.) Karst. (BPI).

SUBGENUS RELITRICHA Raitviir, Scripta Mycologica 1:60. 1970.

Type:

Peziza relicina Fries, Syst. Myc. 2:103. 1822.

This subgenus is characterized by an ectal exciple of thick-walled prismatic cells arranged in rows. The paraphyses become encrusted with amorphous matter, and the apothecia are stipitate.

TRICHOPEZIZELLA RELICINA (Fries) Raitv. Scripta Mycol. 1:60 1970. [Fig. 8]

Basionym: Peziza relicina Fries, Syst. Mycol. 2:103. 1823.

≡ Trichopeziza relicina (Fries) Fuckel., Symb. Mycol. p. 296. 1869-1870.

≡ Lachnum relicinum (Fries) Karst., Mycol. Fenn. 1:182. 1871.

≡ Lachnella relicina (Fries) Quel., Enchirid. Fung. p. 313. 1886.

= Peziza atropae Persoon, Tentamen dispos. Meth. Fung. p. 34. 1797. (Devalidated name).

= Peziza atropae var. cacaliae Persoon, Mycol. Europ. 249. 1822.

= Peziza atropae Pers. per Pers., Mycol. Europ. p. 249. 1822.

≡ Lachnella atropae (Pers.) Quel., Enchirid. Fung. p. 313. 1886.

≡ Lachnum atropae (Pers.) Rehm, Rab. Krypt. Fl. 1(3):902. 1896.

= Exipula phaeotricha Rabenhorst, Herb. Mycol. #515. 1863.

= Peziza longipila Peck, Ann. Rep. N. Y. State Mus. 32:146. 1879.

≡ Dasyscypha longipila (Pk). Sacc., Syll. Fung. 8:463. 1889.

≡ Atractobolus longipilus (Pk.) O. Kuntze, Rev. Gen. Pl. 3(2):445. 1898.

= Dasyscypha atropila Boud. Hist et class. Discom. p. 121. 1907.

= Erinella hystrix Bubak, III Beitr. Pilz. Montenegro in Botanikai Kozlemenyek. p. 50. 1915.

Lectotype:

Mougeot, J. B. et C. Nestler, Stirpes Cryptogamae Vogeso-Rhenanae #686, 1820 as Peziza atropae (UPS) ex herb. Persoon is hereby chosen as lectotype. Other examples of Mougeot et Nestler #686 are, therefore, isotypes.

Description:

Apothecia cyathiform, briefly stipitate, up to 0.7 mm across by 1.0 mm high including hairs, light "buff" but covered with long "chestnut" to "umber" hairs which are always directed upward and often come together to form a cone over the disc of dried specimens. Disc "buff-white." Hairs 5-9 μ, tapered toward the tips to 3-5 μ, up to 400 μ long, thick-walled (up to 2 μ in optical section).

"Ochraceous" to "raw sienna" with transmitted light, multiseptate with thick, perforate septa, slightly constricted at the septa, septa forming cells 7-25 μ long, completely smooth and free of granular material and exudates, inner portion of some walls pitted in a regular pattern giving a punctate appearance. Tips of long hairs usually pointed and colored, tips of shorter hairs may be pointed or slightly bulbous, seldom hyaline. No differentiated marginal hairs observed. Ectal exciple "textura prismatica" of thick-walled, "straw," refractive, cuboid cells, 6-11 μ across, several layers thick.

Asci (45) 50-65 (80) μ by 5-7 μ cylindrical with a hemispheric apex and tapered base; pore visible, blue in Melzer's solution; crozier generally present at basal septum 8-spored.

Ascospores (8) 8.5-15 (16) μ (avg. of 66 spores 12.04 μ) X (1.7) 2 -2.5 (3) μ (avg. of 60 spores 2.4 μ), broadly fusiform with rounded ends, straight or slightly curved, very slightly enlarged at one end, never septate, without conspicuous contents, non-refractive, thin-walled.

Paraphyses narrowly lanceolate with a blunt apex, septate, 2-3 μ wide, exceeding the asci by up to 15 μ, usually with a thin covering of amorphous, non-refractive matter at the tip.

Host range:

Found on a very wide range of herbaceous and woody plants.

Etymology:

relicinus = Latin for bent or curled backward or upward.

Illustrations:

Dennis, R. W. G. # C. M. I. Mycol. pap. #32, p. 55, fig. 55. 1949 as Dasyscypha relicina.

Boudier, E. Icones. Mycol. p. 295, p. 505. 1905 as Dasyscypha atropila.

Naumov, N. A. Discom, p. 167, fig. 83. 1964 as Lachnum atropae.

Rehm, H. Rabenh. Krypt. Fl. 1(3):867, fig. 1-4. 1869 as Lachnum atropae.

Velenovsky, J. Monog. Discom. Bohemiae Vol. 2; Pl. I, fig. 22. 1934 as Lachnum atropae.

Collections examined:

Sweden

Nannfeldt, J. A. Torne Lappm., 19. VII. 1927 on Chamanerium (S).

France

Mougeot, J. B. Vosges on Sonchus alpinus as C. Roumeguere-Fungi Gallici exsiccati #3162 (CUP) (NY) as Peziza atropae.

Doassans, E., on Thalictrum, 16. VIII. 1881 Herb. Patouillard #11963 (FH).

France (cont.)

Lorton, M. Alpes, Det. E. Boudier (PC).

Hetier, D. Jura, V. 1896, Det. Boudier #546 (PC) (type of Dasyscypha atropila).

Morthier, Jura, as Fuckel, Herb. Barb.-Boissier #1235 (NY), (CUP), (MICH).

Mortier, V. 1867 (S) ex herb. Sydow.

Richon, (FH) ex herb. Patouillard as Peziza atropae.

Mougeot, J. B. et C. Nestler, Stirpes Crypt. Vogeso-Rhenanae #686, 1820 Mougeot, J. B. on Cacalia albifrons as Peziza atropa Pers. var. Cacaliae (NY) Isotype, (UPS) (Lectotype), (L) as Peziza atropae.

Chaill. on Sambubus ebulus (L) Herb. Persoon as Peziza atropae.

Chaill. on Atropa belladonna (L) Herb. Persoon as Peziza atropae.

Rehm, H. Alpes on Adenostyles (S) Herb. Rehm. as Lachnum atropae.

Germany

Arnold, on Heracleum, VII. 1881 (S) Herb. Rehm.

Krieger, W. on Ranunculus aconitifolius, 22. VII. 1911 (S) Herb. Rehm as Lachnum atropae.

Bail, T. on Adenostyles albifrons as Rabenh., Herb. Mycol. Ed II #515 (S) Herb. Sydow (isotype of Excipula phaeotricha).

Germany (cont.)

Lojka, Liebenburgen on Aconitum, VIII. 1873 as Rehm, Ascom. #2011 (NY).

Switzerland

Winter, G. on Cirsium eriophorum, VIII. 1880 (NY).

Winter, B., Luzern on Aconitum napellus as Rabenh.-Winter, Fung. Europ. #2742, 1. VI. 1882 (NY). (S).

Kazakhstan

Raitviir, A. #43846 Buhtarma, 10. VIII. 1965 (TU).

Raitviir, H. #43887 Ulba on Aconitum, 14. VIII. 1965 (TU).

Latvia

Kirulis, A. #570 on Polygonum sachalinense det. Kirschstein, 22. VI. 1933 (S) as Lachnum atropae.

Hungary

Linhart, Kohlbachthal on Aconitum napellus, IX. 1882 as Linhart, Fungi Hungarici #60 (NY).

Czechoslovakia

Hruby, J. on Adenostyles alliariae, VIII. 1927 as Petrak, II. Bohem, et Morav. exsic. II. series, 1. Abt. fig. 49, no. 2415 as Lachnum atropae (S).

Hruby, J. on Aconitum rostratum, VII. 1930 Herb. Hruby, Flora Mahrens as Lachnum atropae (S).

Czechoslovakia (cont.)

Hruby, J., VIII. 1929 Herb. Hruby, Flora Mahrens GS Lachnum atropae (S).

Hruby, J. on Adenostyles alliariae, VII. 1924 as Petrak, Fl. Bohem, et Morav. exsic. fig. 41, no. 2043. As Lachnum atropae (S).

Yugoslavia

Bubak, F. Fungi Montenegrici, 15. VIII. 1904 (type of Erinella hystrix) (BPI).

Tunisia

Bresadola Tunis 1883 (S) Herb. Bresadola as Lachnum atropae.

Bresadola on Aconitum napellis, VIII. 1883 as Lachnum atropae Herb. Bresadola.

U.S.A.

Peck, C. H. New York, Adirondack Mts. on Eupatorium maculatum, VI (NYS) (type of Peziza longipila).

Haines, J. H. #750 Colorado, Gunnison Co. on Delphinium stachydeum (Gray) Tide, 20. VII. 1967 (NYS).

Haines, J. H. #501 Oregon, Jefferson Co. on Sambucus recemosa L. 14. VI. 1967 (NYS).

Haines, J. H. #552 Oregon, Grant Co., 3. VII, 1967 (NYS).

Smith, A. H. #13801 Washington, Olympic Nat. Park, on Delphinium, 28. V. 1939 as Dasyscypha elegantula (MICH).

U.S.A. (cont.)

Haines, J. H. #775 Colorado, Gunnison Co., 20. VII. 1967 (NYS).

Haines, J. H. #918 Oregon, Linn Co., 11. V. 1968 (NYS) (PR).

Haines, J. H. #774 Colorado, Gothic, Gunnison Co., 20. VII. 1967 (NYS).

Davidson, R. W. #461-9, Colorado, Grand Mesa, on large monocot stem, 19. VI. 1930 as Trichopeziza setigera (BPI).

T. relicina var. relicina is one of the two most common species of Trichopezizella, and it is the only species with a very wide host range. It is always recognizable by the exciple of "textura prismatica" and spores averaging under 15 μ. It can be distinguished with a hand lens by the presence of a short stipe and the hairs which form a cone over the hymenium of dried specimens.

The name P. relicina takes precedence over the earlier P. atropae as it was used by Fries in the starting book for the Fungi Caeteri. It is still not clear whether the two names are nomenclatorial or taxonomic synonyms. Fries mentions three forms of P. relicina, a name which he originates: a. graminearum = P. atropae, b. chenopodiarum, and c. compositarum. Moug. et Nestl. exs. #686. Form c was chosen because it is tied to a specimen. The same

exsiccata was used by Persoon as the basis for his P. atropae var cacaliae, which is rendered unpriorable by Article 13, f. of the International Code of Botanical Nomenclature (1966).

The Moug. et Nestl. specimen is the only specimen of this taxon now in the Fries Herbarium at Uppsala. It was presumably in mind when Fries wrote the protologue to P. relicina.

There is a specimen in the Persoon Herbarium at Leiden on Atropa belladonna which could be construed as the type of P. atropae, but it is merely academic as the specimen is conspecific with Moug. et Nestl. #686.

TRICHOPEZIZELLA RELICINA var. MACROSPORA (Raitv.) Haines comb. prov. [Fig. 9]

Basionym: Trichopezizella macrospora Raitv. Eesti NSU TA Toim. Biol. 18:68. 1969.

Holotype:

RPSS. Kirghizia, Tianshan Occidentalis, Montes Tschatkal, Reservatum Sary-Tschelek, ad caulom emortum embelliferarum in prato subalpine 11 August, 1967, coll. A. Raitviir (TAA-44700) (TU).

Apothecia solitary to crowded, cyathiform, briefly stipitate, up to 1.5 mm across, light "buff," covered with long "chestnut" to

"umber" hairs. Hairs 5-7 μ wide by up to 400 μ long; tips slightly enlarged, hemispherical or tapered, hyaline.

Asci 120-147 μ X 9-11 μ cylindrical, with evident pore plug, blue in Melzer's solution, crozier usually present at basal septum, 8-spored.

Spores 11.5-27 (33) μ (avg. of 56 = 19.9) by 2.5-5.5 μ (avg. of 56 = 4.3 μ), cylindric-ellipsoid, straight, one- or three-septate; the larger ones are quite refractive, thick-walled.

Paraphyses narrowly lancolate with acute apices, distinctly encrusted with amorphous non-refractive matter in the upper portion.

Ectal exciple "textura prismatica" similar to T. relicina var. relicina.

Illustrations:

Raitviir, Eesti NSU TA Toim. Biol. 18:67, fig. 1, #5. 1969.

Collections examined:

Kirghizia

Raitviir, A., #44700, Tianschan Occidentalis, 11. VIII. 1967. Holotype. (TU).

Raitviir, A., #44694a, Tianschan Occidentalis, Montes Tschatkal, Reservatum Sary-Tschelek, on Umbelliferae, 11. VIII. 1967. (TU).

U. S. A.

Haines, J. H. #764, 10 mi. N of Rocky Mountain Biological Laboratory, Gothic, Gunnison Co., Colorado, 20. VII. 1967 on Heracleum lanatum (NYS).

Haines, J. H., D. T. Specht & W. C. Denison. #583, Mt. Lassen Natl. Pk., elev. 7500 ft., California on Veratrum californicum var. caudatum (Heller) C. L. Hitchcock. (NYS).

Cooke, W. B., 8200 ft. near Horse Camp, Mt. Shasta, Siskiyou Co., California on Arnica viscosa Gray, as Mycobiota of North America, Mycobiota of Mt. Shasta ex herb. Wm. B. Cooke #154 (CUP), (FH), (BPI) as Lachnum setigerum (Phill.) Lindau.

Meschull, C. E., #7013, Mt. Paddo, Washington. Veratrum spp., IX. 1885 as Peziza setigera Phill. (CUP).

Suksdorf, W. N., Mt. Paddo, Washington, 6000-7000 ft. elev., Veratrum spp., IX. 1885 as Ellis and Everhart, N. A. F. 2040 Peziza setigera Phill. (CUP), (K), (BPI), (FH) appears to be part of above collection.

Davidson, R. W., #638, S. B. of Mesa Lake, Grand Mesa, Colorado, 14. VII. 1930 on Aconitum sp. (?) as Trichopeziza setigera (Phill.) Sacc. (BPI) #66896.

U.S.A. (cont.)

Davidson, R. W. #234a, Mesa Lakes, Grand Mesa, Colorado, 9700 ft. elev. on herbaceous stems, 13. VI. 1930 as Trichopeziza setigera (Phill.) Sacc. (BPI).

Discussion:

This variety differs from variety relicina only in having larger hymenial features, and in occurring at higher altitudes. Several specimens, JHH 775 and JHH 766, demonstrate a range of spore sizes which is intermediate between the two varieties. It is possible that the large spores are only a response to environmental phenomena and have no genetic basis.

DOUBTFUL OR EXCLUDED TAXA:

Lachnum barbatum f. fulvescens Sacc. Mycoth. Ital. #1509.

A portion of this exsiccatum was examined, and it proved to be unrelated to T. barbata. The hairs are very light "buff," distinctly tapered, and filled with with a refractive substance so as to appear solid. The medullary exciple is gelatinous "textura intricata."

Lachnella barbata var. pellita (Pers.) Phill. Brit. Discom. p. 263. 1893.

Peziza pellita Pers. Mycol. Europ. 1:264. 1822.

Peziza barbata, P., P. pellita (Pers.) Fries. Syst. Mycol. 2:99. 1823.

Lachnella pellita (Pers.) Quel. Enchir. fung. p. 313. 1886.

Helotium pellitum (Pers.) Karst., Mycol. fenn. 1:158. 1871.

The type of P. pellita in the Persoon Herbarium (L) was examined and found to be a species of Belonidium in the B. corticale complex. The hairs are thin-walled, light buff below and hyaline above, sparsely granulate toward the apex.

Lachnella barbata var. rhodophaea Sacc. Michelia 1:66. 1879.

Authentic material from the Saccardo Herbarium (PAD) #1736 was examined. It is not related to T. barbata. It has smooth, thin-walled, hyaline hairs with reddish contents, and narrowly lanceolate paraphyses.

Lachnella subnidulans (Rehm) Boud. Hist. et Classif. Discom. Europe. p. 124. 1907.

Trichopeziza subnidulans Rehm, Hedwigia 21:102. 1882.

Lachnum nidulus var. subnidulans (Rehm) Rehm, Rabenhorst Krypt. Flora 1(3):983. 1893.

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Dennis, R. W. G. 1949. A revision of the British Hyaloscyphaceae with notes on related European species. The Commonwealth Mycological Institute, Mycological Papers, No. 32. 97 p.

_____ 1962. A reassessment of Belonidium Mont. & Dur. Persoonia 2(1):171-191.

_____ 1963. A redisposition of some fungi ascribed to the Hyaloscophaceae. Kew Bulletin 17(2):319-378.

_____ 1968. British Ascomycetes. Lehre, Cramer. 455 p.

Kanouse, B. B. 1947. A survey of the discomycete flora of the Olympic National Park and adjacent areas. Mycologia 39:635-689.

Korf, Richard P. 1958. Japanese discomycete notes I-VIII. Science Reports of the Yokohama National University 2(7):7-35.

Lanjouw, J. and F. A. Stafleu. 1964. Index Herbariorum. I. The herbaria of the world. Regnum Vegetabile 31:1-251.

Nannfeldt, J. A. 1932. Studien über die morphologie und systematik der nicht-lichenisierten inoperaculaten discomyceten. Nova Acta Regiae Societatis Scientiarum Upsaliensis Ser. IV, 8(2):1-368.

Phillips, William. 1893. A manual of the British discomycetes. 2nd ed. London, Kegan Paul, Trench, Trübner. 462 p.

Raitviir, A. 1969. Discomycetes of middle Asia. Descriptions of some new Helotiales. Eesti NSV Teaduste Akadeemia Toimetised, Bioloogia 18(1):66-69.

_____ 1970. Synopsis of the Hyaloscyphaceae. Scripta Mycologica 1:1-115.

Rayner, R. W. 1970. A mycological colour chart. Kew Commonwealth Mycological Institute Kew. Surrey & British Mycological Society. 34 p. 17 unnumbered sheets.

Saccardo, P. A. 1889. Sylloge Fungorum Ominum Hucusque Cognitorum. Patavia, J. W. Edwards, vol. 8. 1143 p.

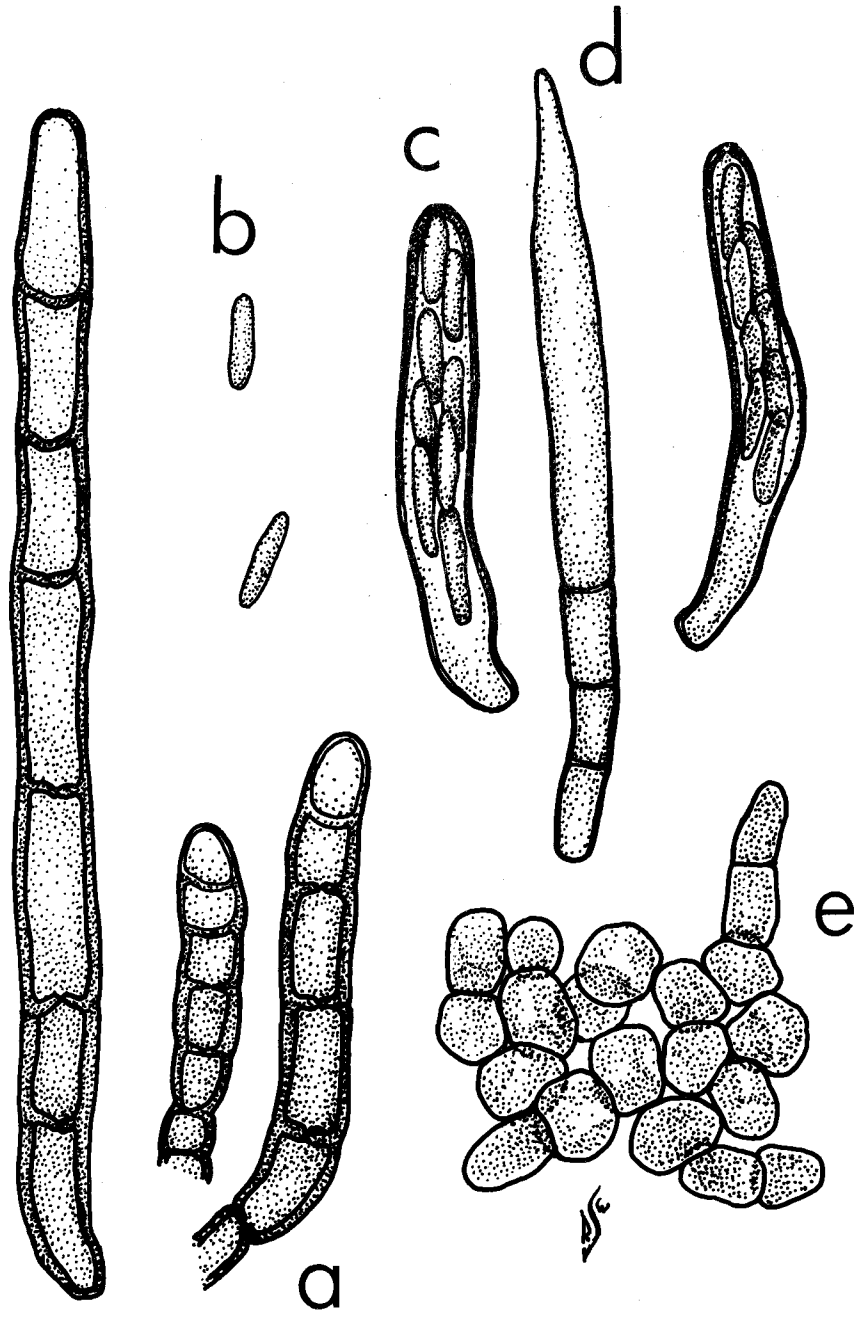

Fig. 1. Trichopezizella nidulus var. nidulus (all 1720 X). From Schmidt and Kunze # 72.
a. hairs; b. spores; c. asci; d. paraphysis; e. cells of ectal exciple.

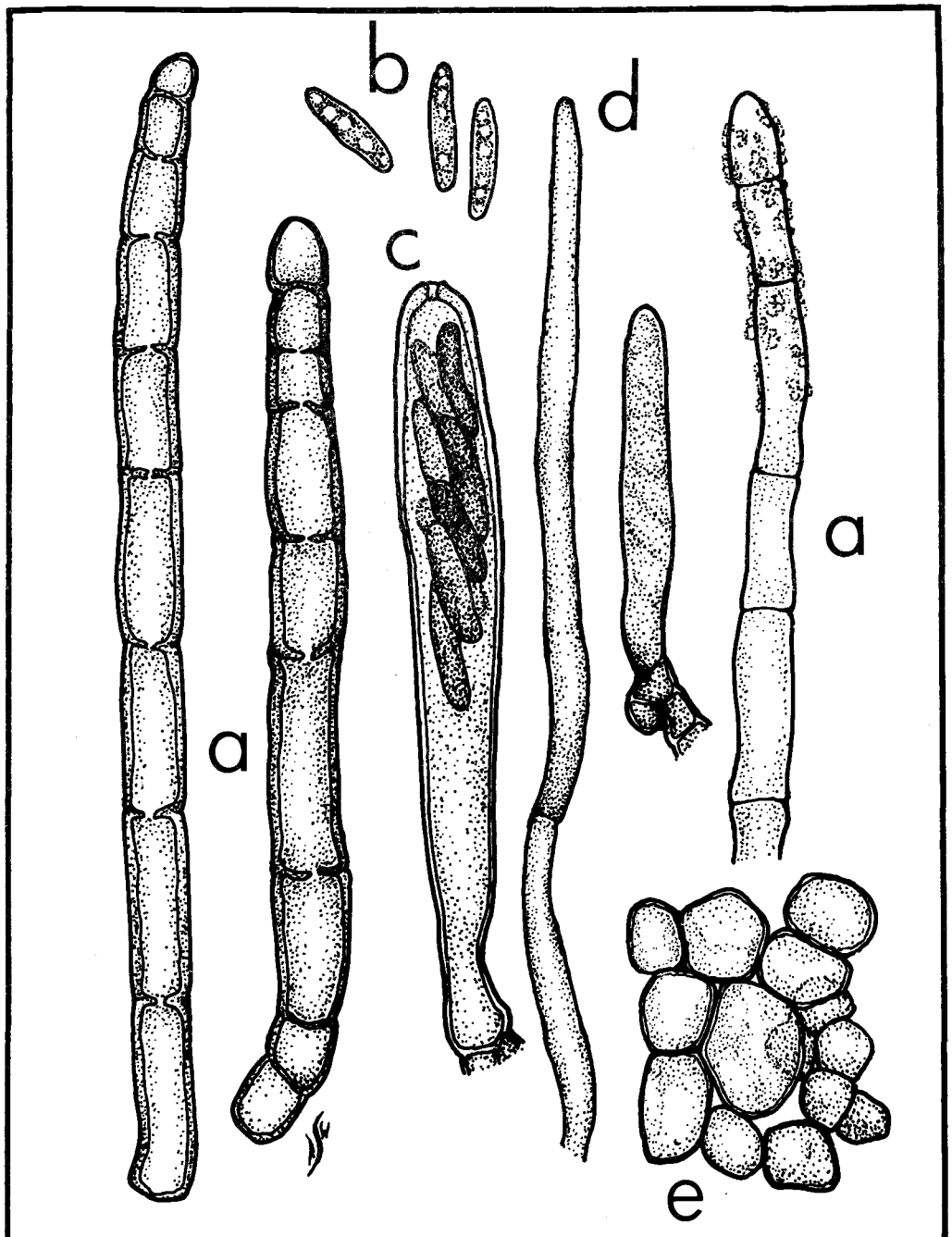

Fig. 2. Trichopezizella nidulus var. hystriculus (all 1720 X). From Karsten # 3125.
a. hairs; b. spores; c. asci; d. paraphysis; e. cells of ectal exciple.

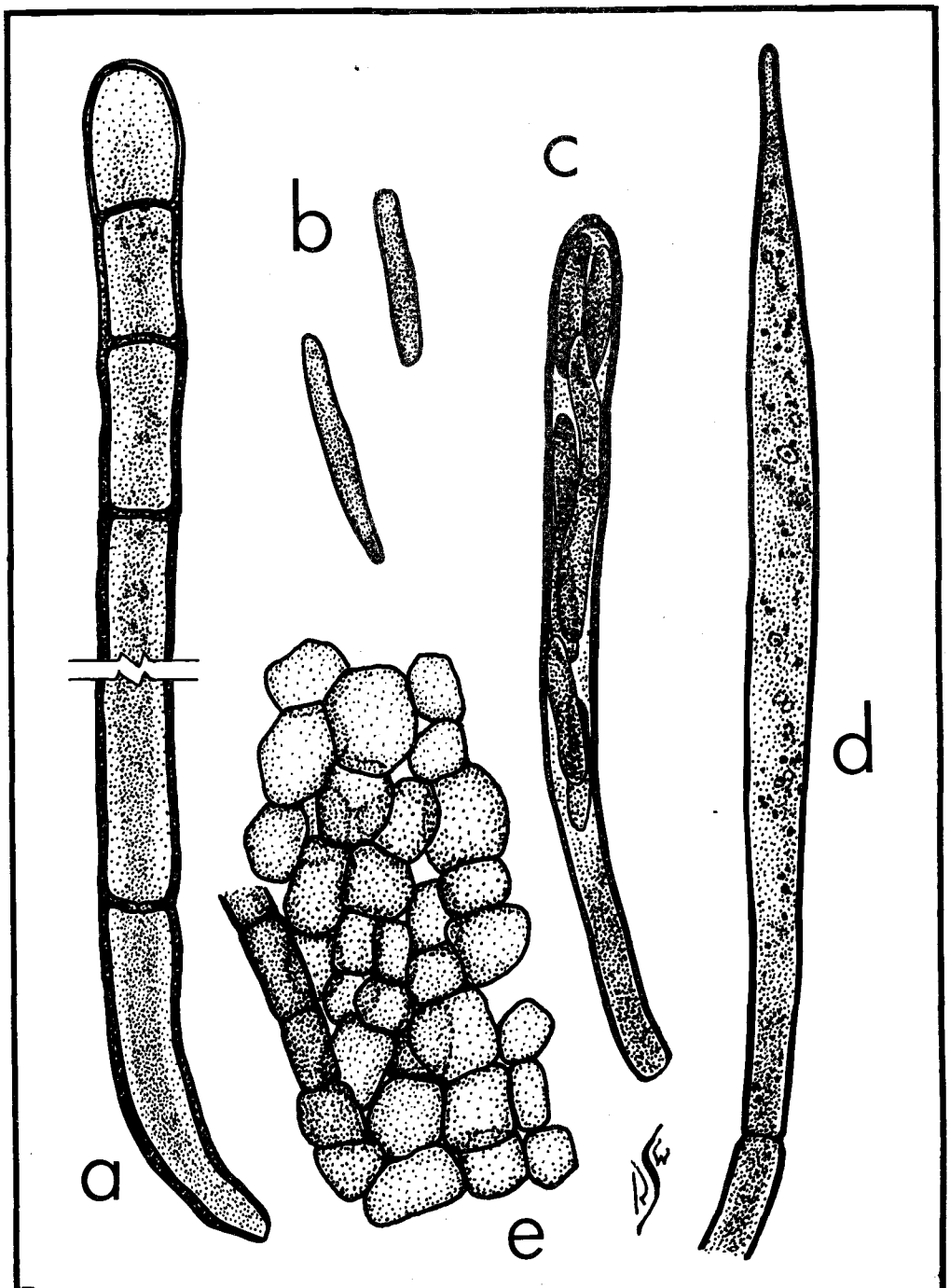

Fig. 3. Trichopezizella nidulus var. setigera (all 1720 X) From holotype of T. brunuea.
a. hair; b. spores; c. ascus; d. paraphysis; e. cells of ectal exciple.

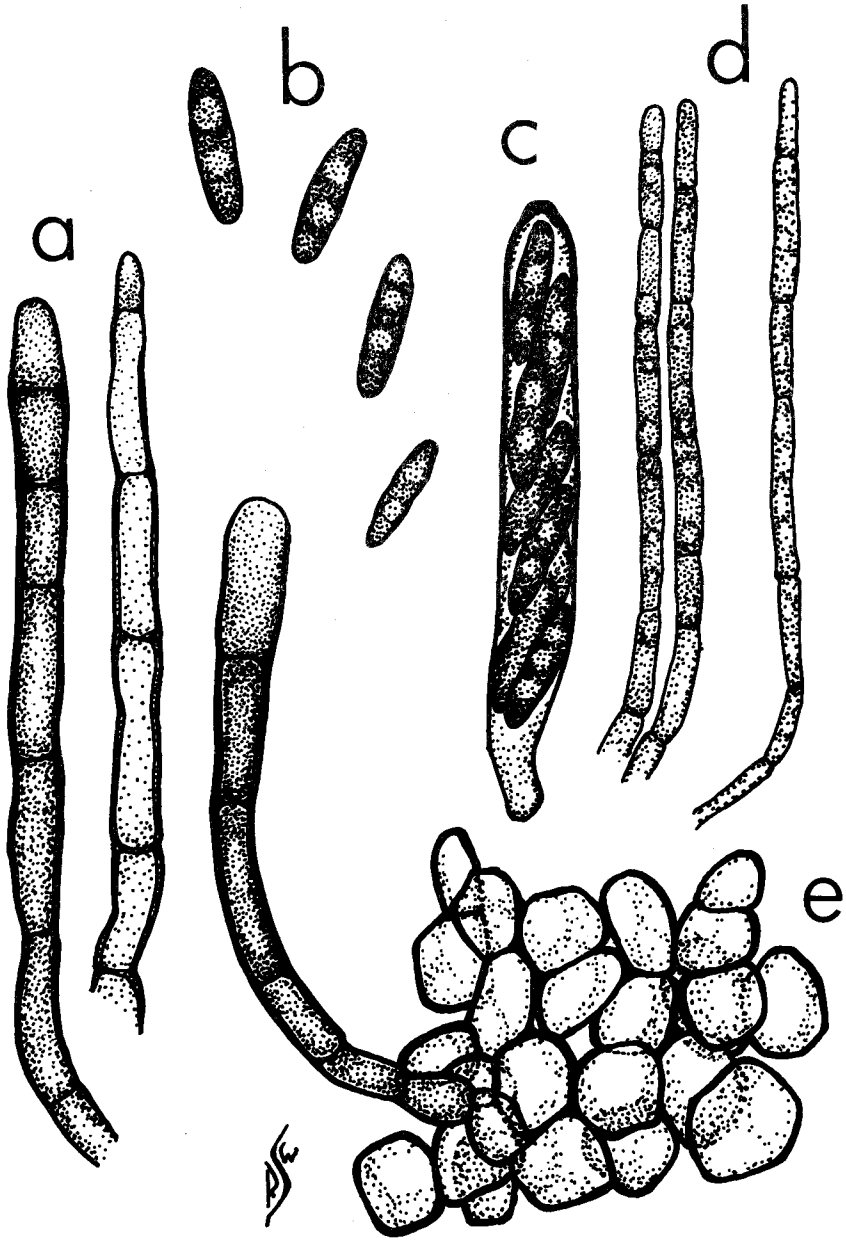

Fig. 4. Trichopezizella onocleae (all 1720 X). From Haines # 1622.
a. hairs; b. spores; c. ascus; d. paraphyses; e. cells of ectal exciple.

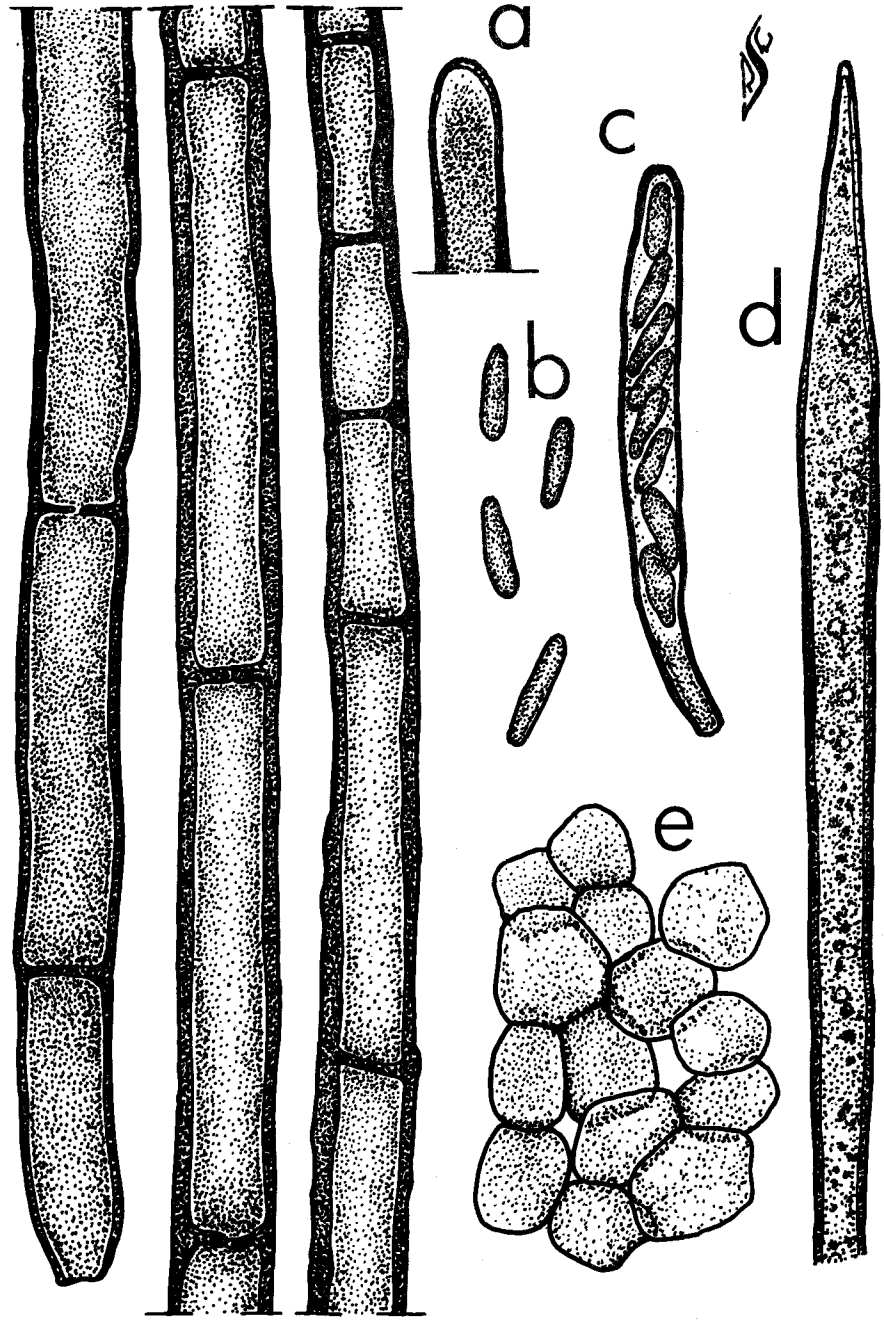

Fig. 5. Trichopezizella otanii. (all 1720 X). From Otani # 251.
a. hair; b. spores; c. ascus; d. paraphysis. e. cells of ectal exciple.

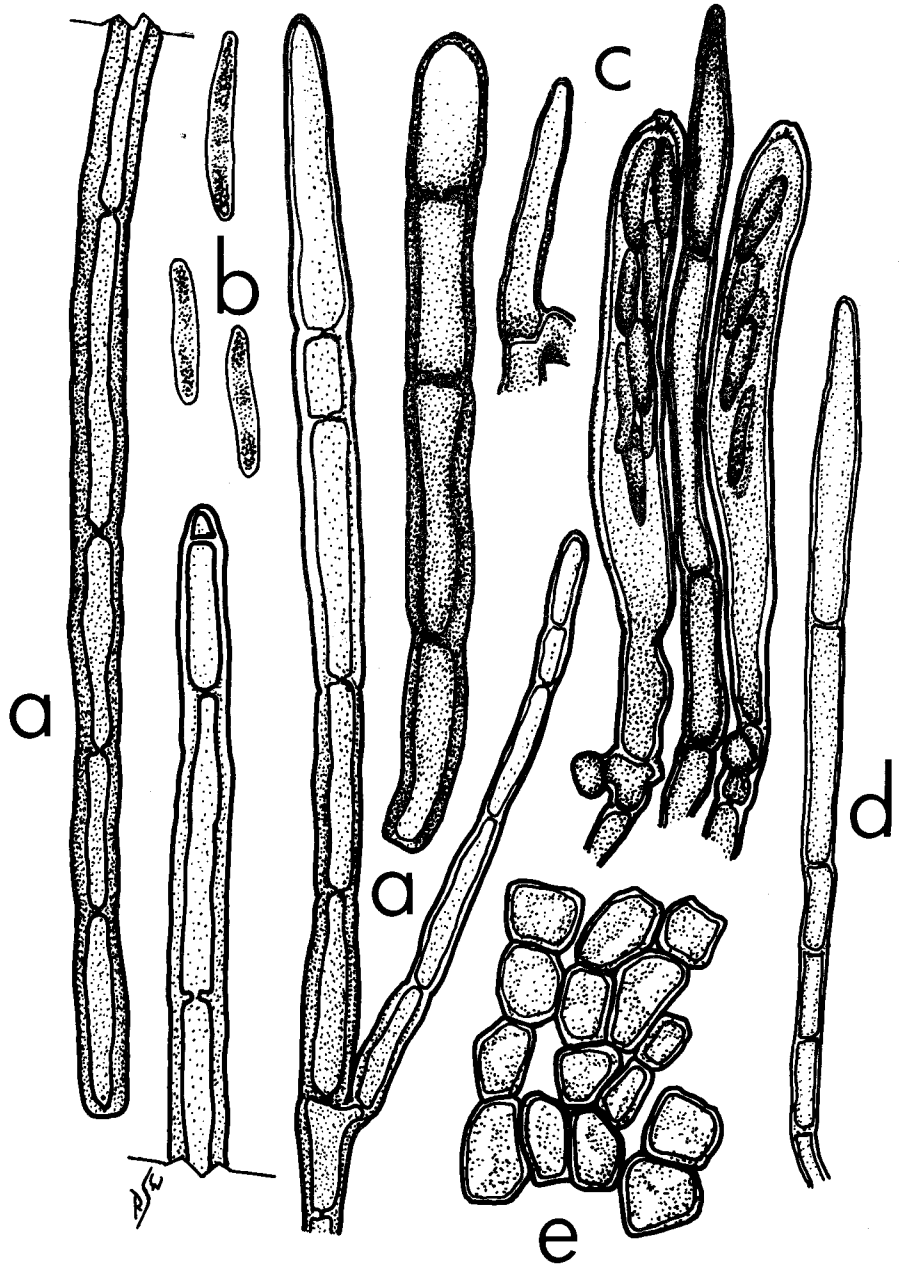

Fig. 6. Trichopezizella horridula (all 1720 X). From Desmazieres # 1740.
a. hairs; b. spores; c. asci and paraphysis; d. paraphysis; e. cells of ectal exciple.

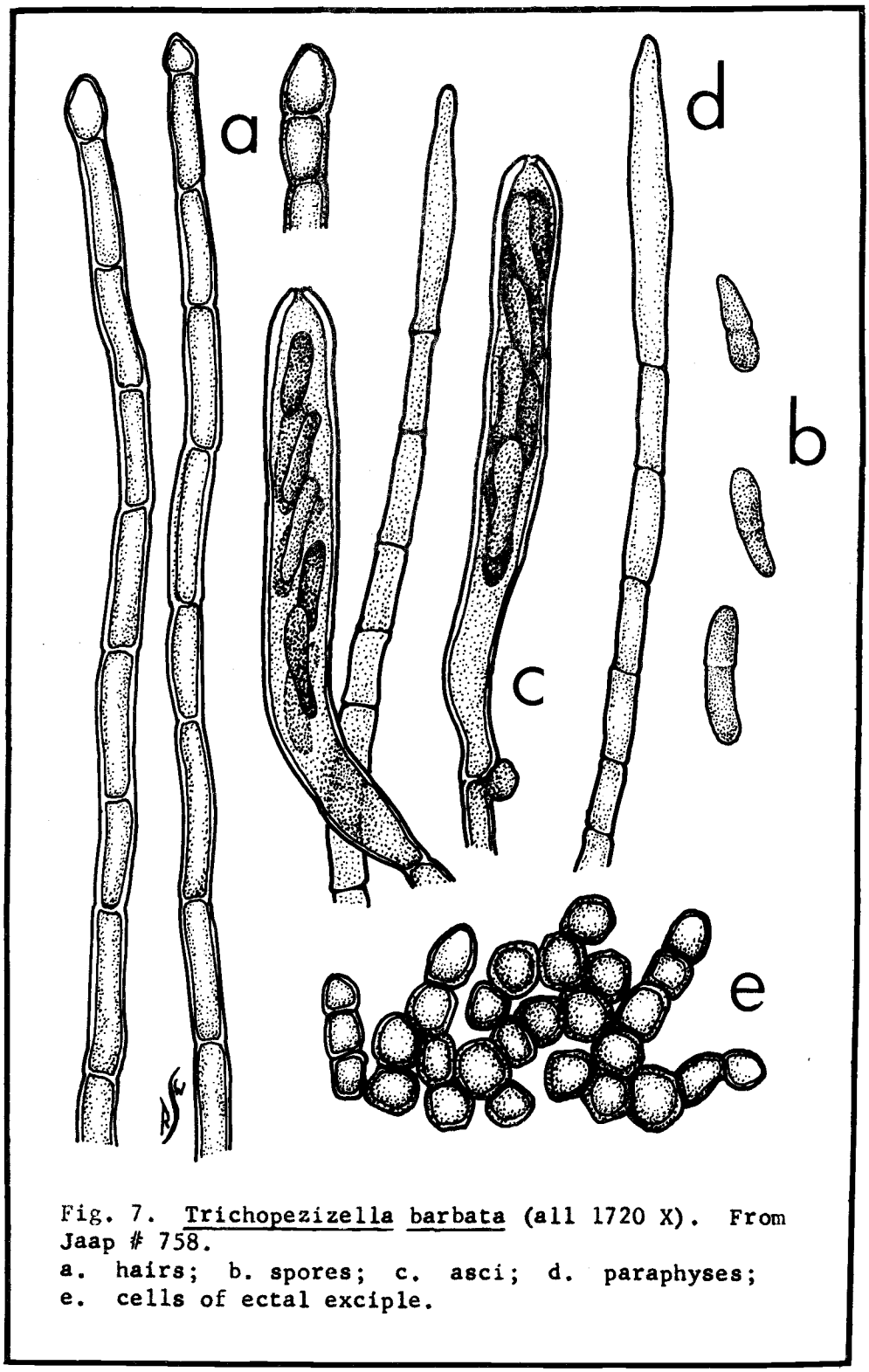

Fig. 7. Trichopezizella barbata (all 1720 X). From Jaap # 758.
a. hairs; b. spores; c. asci; d. paraphyses; e. cells of ectal exciple.

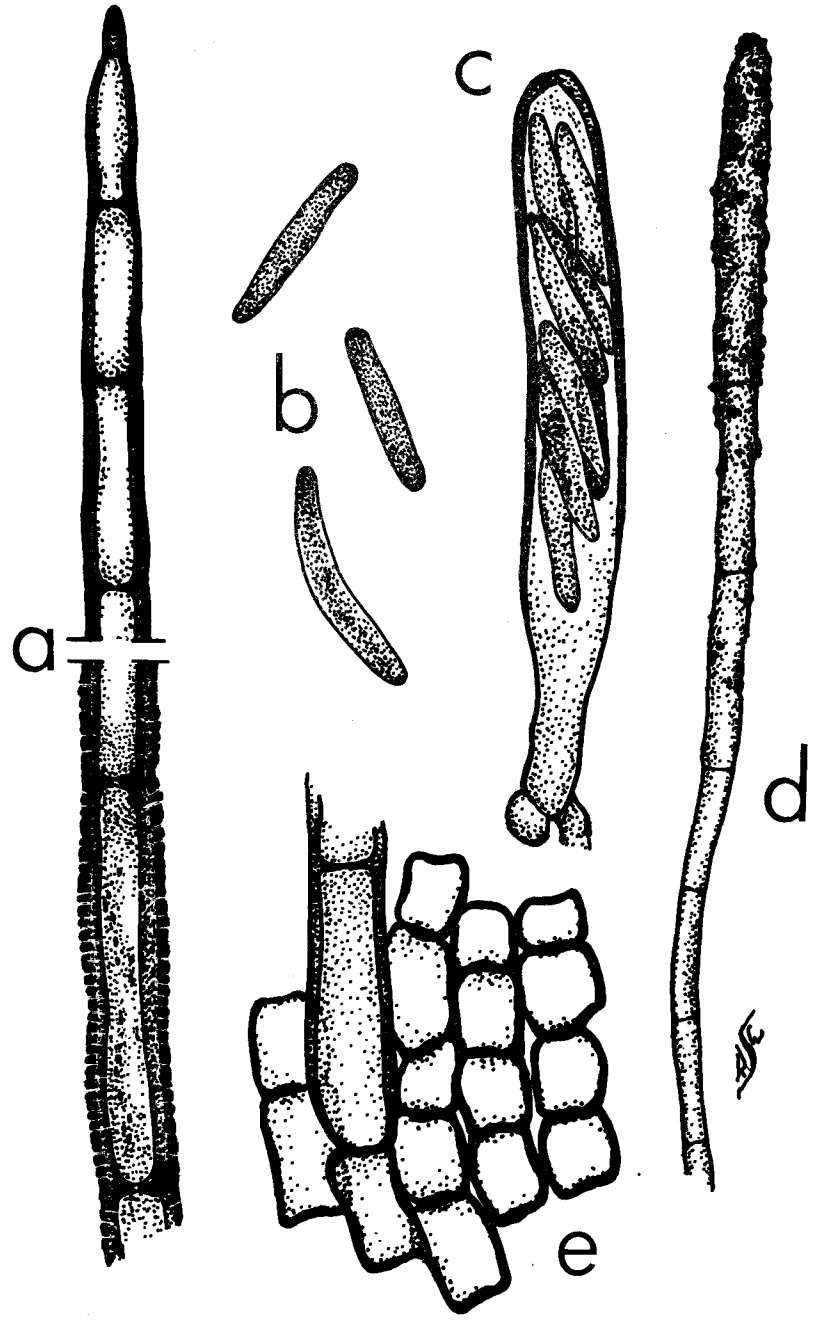

Fig. 8. Trichopezizella relicina va. relicina (All 1720 X). From Mougeot and Nestler # 686.
a. hair; b. spores; c. ascus; d. paraphysis; e. cells of ectal exciple with a hair base attached.

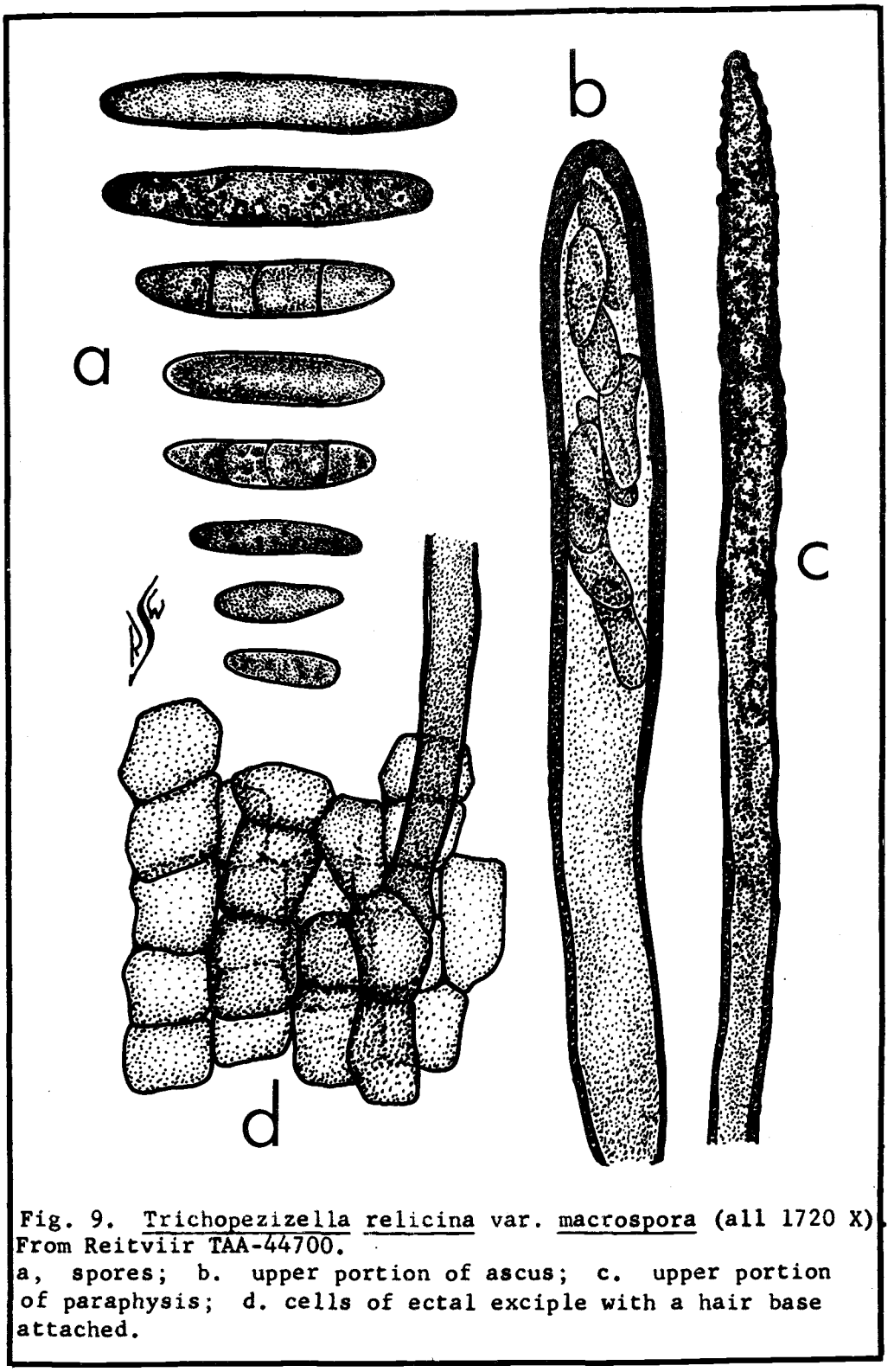

Fig. 9. Trichopezizella relicina var. macrospora (all 1720 X). From Reitviir TAA-44700.
a, spores; b. upper portion of ascus; c. upper portion of paraphysis; d. cells of ectal exciple with a hair base attached.