

ON SOME NOTEWORTHY ALPINE OR SUBALPINE *HYALOSCYPHACEAE* (*LEOTIALES*) FOUND IN THE PYRENEES.

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Abstract. Four alpine and subalpine species of the *Hyaloscyphaceae* (*Leotiales*, Ascomycotina) are described, illustrated and discussed. They were collected in Catalonia and Andorra, and they are never been previously reported from the Iberian Peninsula. These are: *Lachnum latebricola* (Rehm) R. Galán et Raitv., *Hyalopeziza nectrioidea* (Rehm) Raschle, *Incrupila dennisii* (Müller) Müller and *Lachnellula fuscousanguinea* (Rehm) Dennis.

Key words: Alpine/subalpine Fungi, Pyrenees, *Hyaloscyphaceae*, chorology.

Resumen. Se describen, ilustran y comentan cuatro especies pertenecientes a *Hyaloscyphaceae* (*Leotiales*), procedentes de comunidades alpinas y subalpinas de Cataluña y Andorra, nunca antes citadas en la Península Ibérica. Se trata de *Lachnum latebricola* (Rehm) R. Galán et Raitv., *Hyalopeziza nectrioidea* (Rehm) Raschle, *Incrupila dennisii* (Müller) Müller y *Lachnellula fuscousanguinea* (Rehm) Dennis.

INTRODUCTION

As a result of the prospections of one of us (J. V.) aimed to a best knowledge of the fungal diversity of the Pyrenean and Pre-Pyrenean areas of Catalonia and Andorra, initiated some years ago (ROCABRUNA *et al.*, 1994), four interesting species of *Hyaloscyphaceae* were found, growing at altitudes higher than 1600 m and fruiting from spring to late summer. Two of them (*Incrupila dennisii* and *Lachnellula fuscousanguinea*) were collected fruiting under a rather thick cover of melting snow, an ecological feature previously unreported for these species. The Pyrenees are mycologically very poorly investigated in comparison to the Alps, but the existing preliminary data show that there are typical alpine species of Discomycetes growing there. This was not unexpected, since many of the higher plants (i.e. *Vaccinium myrtillus*, *Pinus uncinata*, *Abies alba*, *Salix pyrenaica*, *Rhododendron ferrugineum*, etc.), acting as hosts for the saprobic discomycetes, are also shared by these mountain systems.

The Discomycetes previously recorded from these alpine/subalpine sites of the Pyrenees are *Mitrula paludosa*, *Cheilymenia fimicola*, *Helvella queletii*, *Peziza echinospora*, *Scutellinia scutellata*, *Geoglossum glabrum*, *Heyderia abietis* and *Otidea auricula* (ROCABRUNA, TABARÉS, BALLARÀ & VILA, 1994); *Cudonia circinans*, *Lachnellula subtilissima*, *L. suecica*, *Mitrula paludosa*, *Gyromitra infula*, *Lasiostictis fimbriata* (SIERRA, 1994); *Geopyxis foetida*, *Lachnellula calyciformis*, *Caloscypha fulgens* (BALLARÀ, 1995); *Durandiella gallica*, *Lachnellula subtilissima*, *Perrotia flammea*, *Rutstroemia elatina* (ROCABRUNA, VILA, TABARÉS & BALLARÀ, 1996); *Gyromitra leucoxantha*, *Lachnum bicolor*, *Cordyceps gracilis*, *Lachnum relicinum* (VILA, ROCABRUNA, LLIMONA, TABARÉS, LLISTOSELLA & SIERRA, 1996). They are, in fact, mostly species with a wide ecological range and merely found at their higher altitudinal limit. The following four species, however, seem to be restricted to high elevations.

The arctic and alpine discomycetes represent an interesting ecological group of fungi, which has caught the interest of a wide number of mycologists, as shown in the following selected list of publications: DISSING (1964; 1983), FAVRE (1955), HUHTINEN (1984, 1989), KEMPTON &

WELLS (1970), GARNWEIDNER, LOHMEYER & MARXMÜLLER (1991), MÜLLER (1967, 1977), MÜLLER, PETRINI & SAMUELS (1979), MÜLLER & SCHLAPFER-BERNHARD (1968), PALMER (1988), PETRINI & LAURSEN (1993), RAITVIIR (1985, 1993, 1995), RAITVIIR & FAIZOVA (1983), RAITVIIR & SACCONI (1987, 1991), RAITVIIR & SIRKO (1968), SCHUMACHER & MOHN-JENSSEN (1992). They are, obviously, worthwhile of more attention in the analogous habitats of the Pyrenees.

MATERIAL AND METHODS

The specimens were collected by the third author (J. V.), who also took, in situ, some of the colour slides. Dried material was studied by R. Galán and A. Raitviir, using tap water, KOH 2%, Melzer's reagent (MLZ), Aqueous cresyl blue (CRB) 0.5 %, Lugol solution (IKI) and Congo red (CR) for microscopical observations. The micrographs were taken by R. Galán with a Nikon Labophot-2 phase-contrast microscope using magnification up to 1.250x. Line-drawings were made by A. Raitviir using a Nikon Labophot-2 microscope equipped with a drawing-tube. The material is deposited in herbarium AH (Alcalá University) and TAA (Institute of Zoology and Botany, Tartu) and Herbarium of the Societat Catalana de Micologia, currently deposited in the BCC herbarium (University of Barcelona).

DESCRIPTIONS

Hyalopeziza nectrioidea (Rehm) Raschle, *Sydowia* 29: 199, 1977. (Figs. 1-9 and 33).

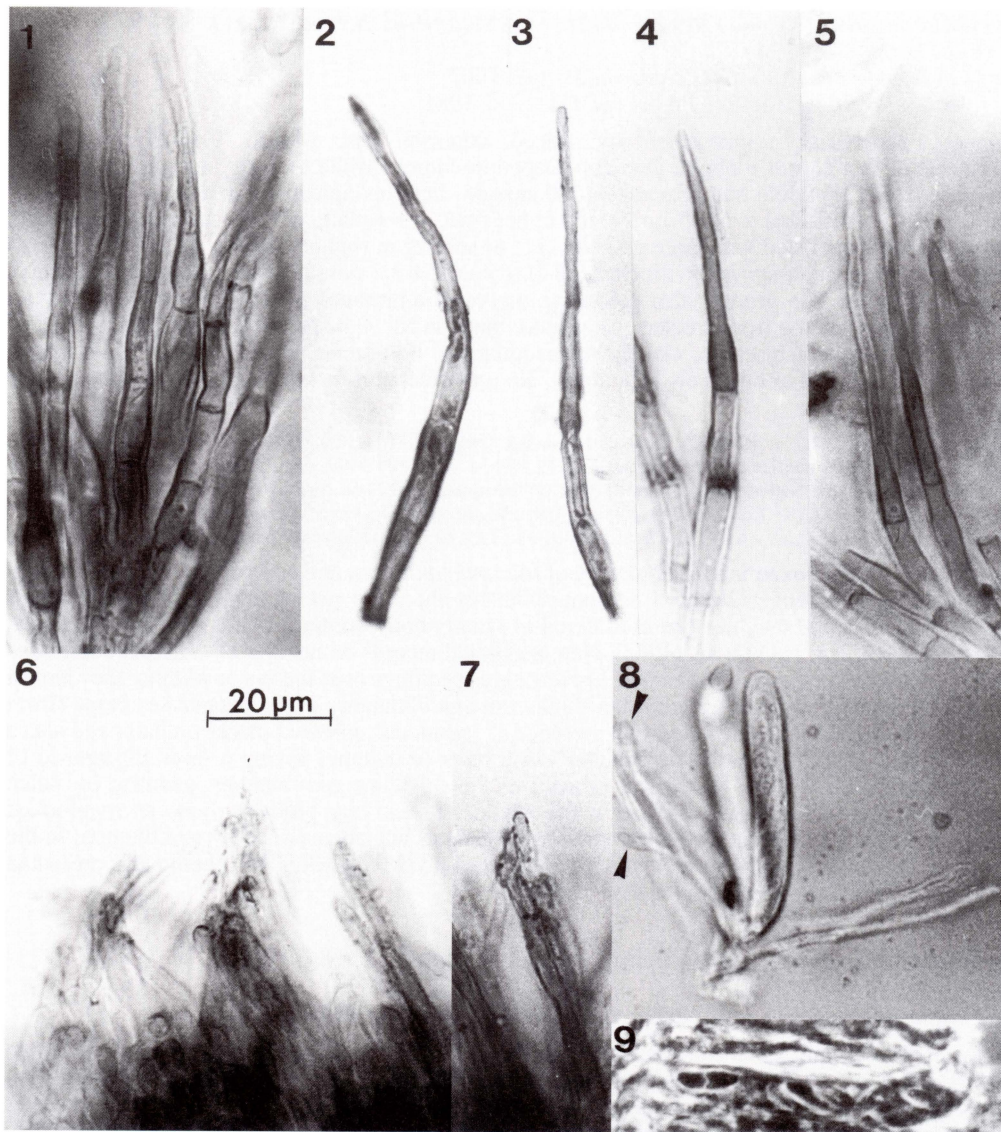
= *Trichopeziza nectrioidea* Rehm, *Hedwigia* 21: 101, 1882.

= *Dasyscypha nectrioidea* (Rehm) Rehm, *Rabenh. Krypt.-Fl.* 1(3): 829, 1896. *Urceolella nectrioidea* (Rehm) Boud. *Discom. Eur.* 130, 1907.

Apothecia superficial, sessile, crowded. Disc 0.1-0.3 mm diam., whitish. Receptacle at first almost globose, then deeply cup-shaped, pale brownish, densely covered by shining white hairs, generally apically connected in groups. Ectal excipulum of *textura prismatica* to *textura angularis*, not staining in CR, individual cells with irregularly thickened pale brown walls, superficially encrusted by dark brown granular amorphous matter. Hairs cylindrical-conical, sometimes with a slightly bulbous base, more or less regularly 3-septate, with shorter basal cells and a long apical cell, often slightly constricted at the septa, hyaline, with thick glassy walls and well-formed lumen, dextrinoid in MLZ and congophilous in CR, 70-100 x 4-6 µm, apically 1.5 µm wide and sometimes bearing loosely attached granules (visible in CR). Asci cylindrical to cylindrical-clavate or saccate, arising from simple septa, apical pore not blued in MLZ, 8-spored. Spores irregularly uniseriate, broadly ellipsoid to ovoid, 0-1-septate, hyaline, 6.4-7.6 x 2-3 µm. Paraphyses cylindrical, 1.5 µm diam., not exceeding the asci.

COLLECTION EXAMINED. ANDORRA: Basses del Port de Rat, El Serrat, UTM 31TCH7919, 2405 m, on dead, melting-snow-covered branches of *Rhododendron ferrugineum*, 10.07.1996, J. Vila, AH 7103, dupl. in SCM A-693. *Idem*, on fruits of *Rhododendron ferrugineum*, AH 7104.

REMARKS. It grows typically on *Rhododendron ferrugineum*, but also on *Alnus viridis* and *Salix* sp. (RASCHLE, 1977). It is an alpine-subalpine species, not often collected in the Alps (Switzerland, Austria and France). The present find is the first made outside the Alps. The species can be easily recognized by its septate hairs and broadly ellipsoid spores. The specimens from Andorra differs from previously known material, which showed spores becoming uniseptate when wholly mature (visible in MLZ and/or CRB). The dextrinoid reaction of hairs was described by RASCHLE (1977) as reddish-brown, but in AH 7103 the hairs turn brown, with a slight violaceous tinge. The other collection on *Rhododendron* fruits has a typical reddish-brown dextrinoid reaction but its spores become also, although later, uniseptate. In spite of these slight differences, the specimens from Andorra belong undoubtedly to *H. nectrioidea*. *H. nectrioidea* is characterized by hairs having comparatively thin walls, wide lumen and thick septa. It can be confused with *Hyaloscypha leuconica* (cf. HUHTINEN, 1989: 53, 151, fig. 131), but the latter has aseptate hairs, or rarely hairs with thin-walled septa, contrasting with the regular thick-walled glassy septa found in the former. Some similarity between the hairs of those two species shows that the difference between *Hyaloscypha* and *Hyalopeziza* is not so clear-cut as it seems in comparing the typical representatives of both genera.



Figs. 1-9. *Hyalopeziza nectrioidea* (Rehm) Raschle. 1-5. Hairs, some of them showing narrow lumina; 6-7. Inconspicuously warted apices of hairs; 8. Ascus and paraphyses (arrows); 9. One-septate spore inside ascus. Employed mountants: CR (figs. 1, 5, 6 and 7), CRB (figs. 2 and 3), MLZ (4, 8 and 9). Origins of photographs: AH 7103, excluding fig. 5 (AH 7104).

***Incrupila dennisii* (Müller) Müller, *Beitr. Kryptogamenfl. Schweiz* 15(1): 50, 1977.**

(Figs. 10-23, 34 and 37).

= *Dasyyscyphus dennisii* Müller, *Sydowia* 21: 143, 1967.= *Incrupila alataavica* Raitv., *Fol. Crypt. Est.* 12: 5, 1981.

Apothecia superficial, cespitose, shortly stalked, cupulate. Disc whitish, 0.15-0.6 mm diam. Receptacle at first almost globose, then cup-shaped to conical, white to honey-coloured when dry, densely covered by white hairs exceeding the margin. Ectal excipulum of *textura prismatica*, of hyaline cells, 6.5-12-(16) x 5-6.5 µm. Hairs cylindrical, 2-3-septate, obtuse, straight, thin-walled, hyaline, densely incrustated with large granules (not dissolving in routine mounts, i.e. KOH or MLZ) often forming a continuous yellowish crust, 30-50-(56) x 2.4-3.2 µm (x 4-6 µm including exudates), apically adpressed into groups, also producing pieces of amber-coloured "resinous" matter. Asci cylindrical-clavate, arising from croziers, apical pore blued in MLZ, 8-spored, (20)-24-32-(36) x 3.2-4 µm. Spores obliquely biseriate, claviform, inequilateral, one-celled, hyaline, 4-6 x 1.2-1.6 µm. Paraphyses cylindrical to obscurely lageniform, 1.6 µm wide, ramose below, scarcely exceeding the asci (up to 5 µm).

COLLECTIONS EXAMINED. ANDORRA: Font de la Navina, Ordino, UTM 31T CH7913, 1745 m, on dead fallen, melting-snow-covered needles of *Pinus uncinata*, 13.04.1996, J. Vila, AH 7090, dupl. in SCM A-694 and TAA. FRANCE: The Vanoise National park, l'Ecot, 1800 m, on fallen needles of *Pinus cembra*, 2.09.1992, A. Raitviir, TAA 137349. KAZAKHSTAN: Tien-Shan, the Zailiiski Alatau Range. Kara-Sha Gorge, Dzhenshchke, 2500 m, on fallen needles of *Picea schrenkiana*, 16.06.1976, A. and M. Raitviir, TAA 63531 a (Holotype of *Incrupila alataavica* Raitv.).

REMARKS. Having re-examined the holotype of *Incrupila alataavica* and compared it with two typical additional collections of *I. dennisii*, we conclude that there are not enough differential features between both taxa and they must be considered as synonymous, contrary to the position maintained by ARENDHOLZ & RAITVIIR (1988). New additional records on needles of different coniferous species are needed to check if the taxa of *Incrupila* are specific to host species or whether they have a wider substratal amplitude. Our collection shows extreme variability of the paraphyses shape (from cylindrical to lageniform), the inconstant presence of "resinous" coloured pieces on hairs and also a large variation in the deposition of granules along hairs (sometimes giving a false appearance of conical hairs). This is a further typical element of the subalpine communities, growing on fallen leaves of conifers (*Pinus*, *Abies*) close to the treeline. It has very probably been an overlooked species because of its minute apothecia, growing in habitats not often visited by mycologists. In the Alps, its range extends from the French Alps to Switzerland (MÜLLER, 1967), being also present at the Tien-Shan Mountains and now in the Pyrenees.

***Lachnellula fuscousanguinea* (Rehm) Dennis, *Persoonia* 2: 184, 1962.**

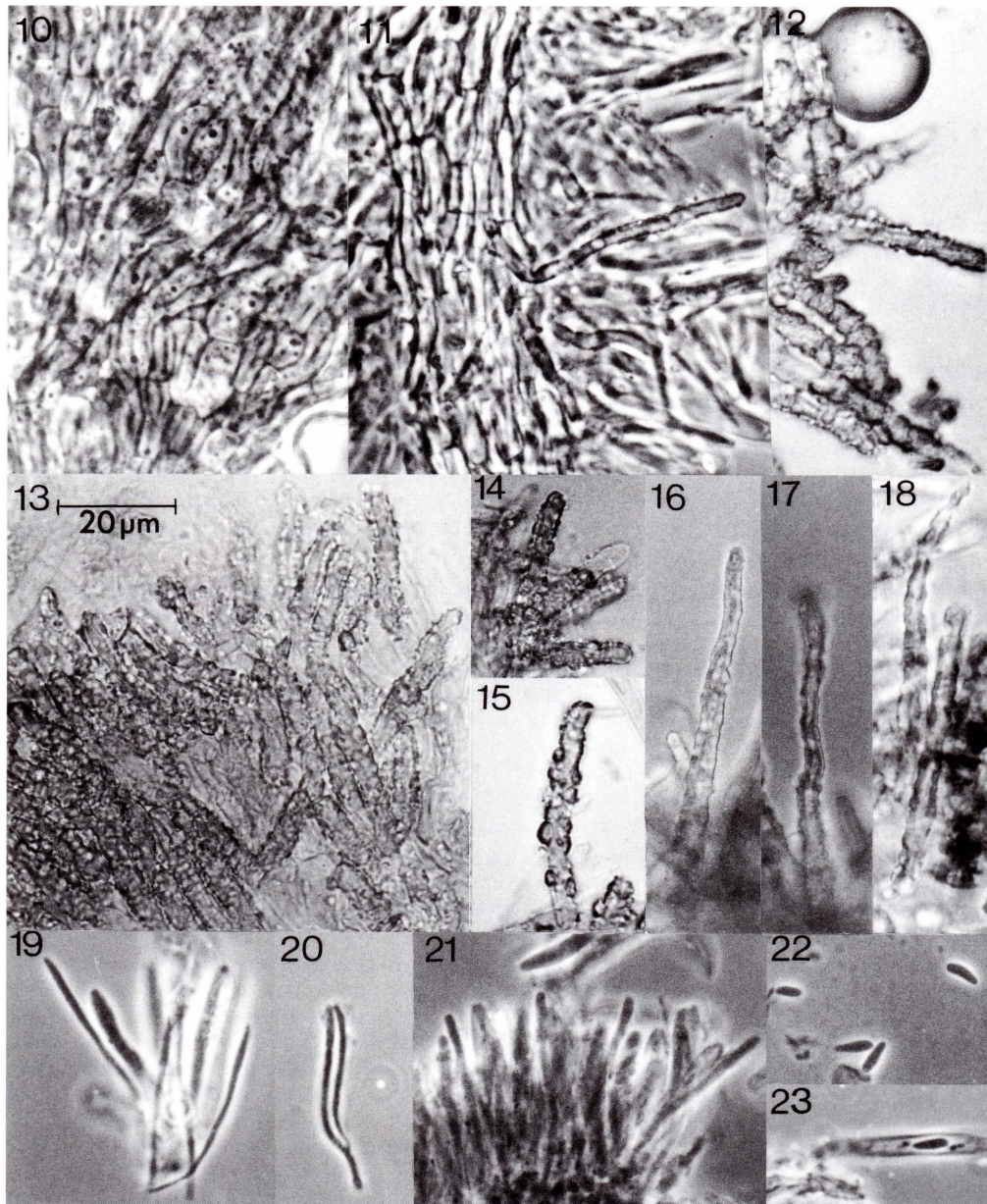
(Figs. 24-26 and 35).

= *Dasyyscypha fuscousanguinea* Rehm, *Ber. Nat. Ver. Augsburg* 26: 30 (1881).

Apothecia superficial, solitary or scattered, shortly stipitate. Disc 1-3 mm in diam., egg-yellow to reddish orange when fresh, yellowish orange when dry. Receptacle cup-shaped to shallow cup-shaped, leathery brown to olivaceous brown, densely covered with long, light brown hairs. Inner ectal excipulum well developed, composed of *textura angularis*, outer ectal excipulum poorly developed (2-3 cell layers), of *textura globulosa*, cells with yellowish-brown thickened walls. Medullary excipulum of *textura intricata*. Hairs cylindrical, pale brown or yellowish brown, firm-walled, multiseptate, finely granular, up to 150 µm long, 3-5 µm in diam. Asci arising from croziers, cylindrical, 8-spored, apical pore not turning blue in MLZ, 85-95 x 7-8 µm. Spores uniseriate, cylindrical-ellipsoid, 12-14.4 x 3.5-4.8 µm. Paraphyses cylindrical, filled with yellow oil-drops, slightly exceeding the asci, 1.5 µm in diam.

COLLECTION EXAMINED. SPAIN: Estans de Malniu, Meranges (Cerdanya), Girona, UTM 4014704, 2255 m, growing on the bark of a dead branch of *Pinus uncinata* covered by melting snow, 4.06.1996, J. Vila and X. Llimona, AH 7101, dupl. in SCM A-695.

REMARKS. This is a saprobic, subalpine species, previously known from the Swiss Alps and the Tatra Mountains (MINTER, 1981) and confined to dwarf pines (*Pinus mugo*). It has several times (i.e. DHARNE, 1965) been confused with *Lachnellula pini* (Brunch.) Dennis, the fungus causing pine canker, which is common on *Pinus sylvestris* in North America and northern Europe, with



Figs. 10-23. *Incrupila dennisii* (Müller) Müller. 10-11. External view of the ectal excipulum and protruding hair devoid of any incrustation; 12. Lump of "resinous" matter and hairs; 13-18. Encrusted hairs; 19-21. Paraphyses lageniform, ramoso and cylindrical (at the same order); 22 and 23. Spores. Employed mountants: MLZ (figs. 10, 11, 19, 20 and 23), tap water (figs. 12, 14, 16, 17, 18 and 22), CR (13, 15 and 21). Origins of photographs: AH 7090, from Andorra (figs. 10-12, 19, 20 and 23); TAA 137349, from France (figs. 13-15, 21 and 22); TAA 63531 a, holotype of *Incrupila alatavica* Raitv. (figs. 16-18).

Sweden and Norway being the southernmost countries where it grows (KURKELA & NOROKORPI, 1979; ROLL-HANSEN, 1967). The bigger ascospores found in *L. pini* (18-21 x 5-7 µm) and the outer layer of the ectal excipulum of *textura porrecta / oblita* (cf. KURKELA & NOROKORPI, 1979: 66) are enough to differentiate both species. *Lachnellula flavovirens* (Bres.) Dennis, a facultative parasite of conifers (*Larix, Picea, Pinus, Juniperus...*), reported from the Alps (Switzerland, France, according to DHARNE, 1965) and southern Finland (KURKELA & NOROKORPI, 1979) is another taxon which shares some features with the former in the outer layer of the ectal excipulum of *textura prismatica-oblita* (BARAL, 1984) and the smaller spores (7-13 x 4-5 µm) its distinctive features. The specimen from Catalonia matches rather well the descriptions by REHM (1896), DHARNE(1965) and BREITENBACH & KRÄNZLIN (1981). The only notable difference is the comparatively narrow asci, contrasting with those reported by the mentioned authors (9-12 µm).

***Lachnum latebricola* (Rehm) R. Galán et Raitv., comb. nov.**

(Figs. 27-32-36 and 38).

= *Dasyyscypha latebricola* Rehm. *Ascomyceten* 111 a, b, 1874.

= *Dasyyscypha calyculaeformis* var. *latebricola* Rehm, *Ber. Naturhist. Vereins. Augsburg.* 26: 30, 1881. *Lachnella calyculaeformis* var. *latebricola* (Rehm) W. Phillips, *Brit. Discom.*: 237, 1887. *Dasyyscypha calyculaeformis* var. *latebricola* (Rehm) Sacc., *Syll. Fung.* 8: 454, 1889. *Trichopeziza latebricola* (Rehm) F. Lamb., *Flor. Myc. Belg.*: 294, 1887. *Dasyyscyphus latebricola* (Rehm) Raitv., *Scripta Mycol.* 1: 86, 1970.

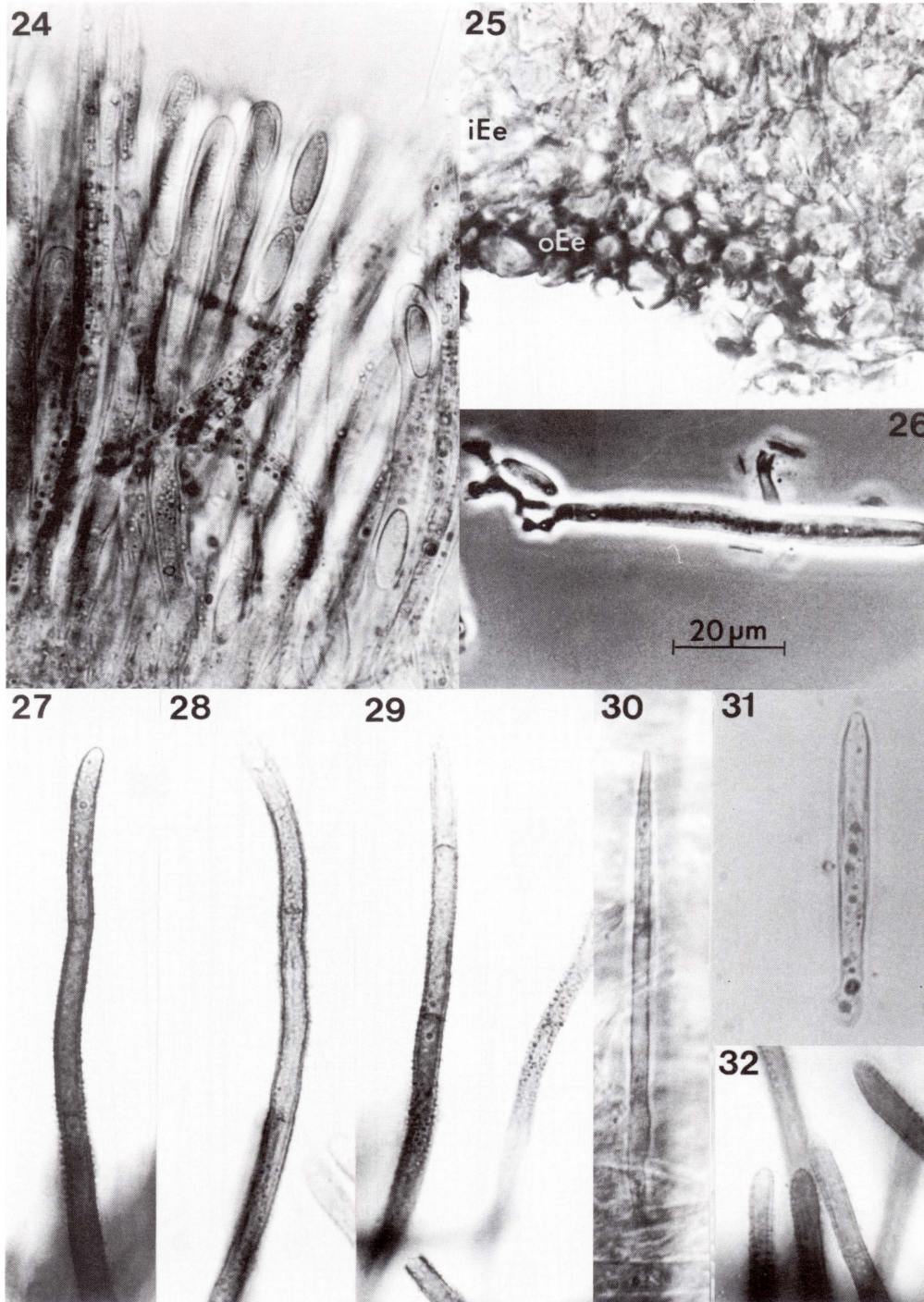
Apothecia solitary to gregarious, supported by a short, cylindrical stipe, firmly attached to the substrate. Receptacle at first almost globose, then cupulate, externally densely covered by brown hairs. Disc 0.3-0.8 mm in diameter, pale yellowish when young but found to be covered by incurved hairs on desiccation. Hairs cylindrical, pluriseptate, with dark-brown walls, relatively thick-walled (walls 0.7 µm thick), straight, granulated at all surface, with rounded but not swollen glandular tips, apically sometimes lighter and bearing scanty, easily detached crystals, 100-170 x 4-5 µm. Ectal excipulum composed of *textura prismatica*, cells thick-walled, hyaline, 12 x 4.6 µm. Asci arising from croziers, cylindrical, apical pore blue in MLZ, 8-spored, 40-50 x 4-5 µm. Ascospores irregularly biseriate, cylindrical to cylindrical-ellipsoid, straight, hyaline, aseptate, 6.4-7.4-(8.8) x 1.8-2.4 µm. Paraphyses narrow-lanceolate, septate, exceeding the asci up to 16 µm, 2.3 µm wide.

COLLECTIONS EXAMINED. ANDORRA: Basses del Port de Rat, El Serrat, UTM 31TCH7919, 2405 m, on dead, melting-snow-covered branches of *Rhododendron ferrugineum*, 10.07.1996, J. Vila, AH 7102, dupl. in SCM A-692. *Idem*, Llacs de Tristaina, 2260 m, on dead branches of *Rhododendron ferrugineum*, 15.07.1993, J. Vila, in SCM A-535, misidentified as *Lachnum fuscescens* in ROCABRUNA *et al.* (1994). *Idem*, 15.07.1995, in SCM A-696.

REMARKS. This characteristic species grows in bark fissures on Ericales (*Rhododendron, Vaccinium, Empetrum*) in European Alpine zone. The species was until now known only from the Alps, its range extendings from the French Alps (Lanslebourg) in the West to the Italian Alps (Dolomites) in the East. Crystal-free hairs are a specific character, making it distinct from the species of *Brunnipila*, a genus to which this taxon could belong, although the validity of *Brunnipila* must be proved by rDNA and transmission electron microscopy studies (A. Raitviir *et al.*, in project). Meanwhile, and considering that the generic name *Dasyyscyphus* cannot be currently maintained, we propose the new combination in *Lachnum*. Our material agrees well to the descriptions given by DENNIS (1963), BREITENBACH & KRÄNZLIN (1981) and SACCONI (1986). Anyway, it is worth noting that the hairs are not completely devoid of apical crystals, which occur occasionally in some hairs, being smaller and more easily detached than in other related species; and that paraphyses can sometimes acquire selectively violaceous tinges in contact with Lugol solution (after KOH pretreatment), a feature not previously noticed.

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Figs. 24-26. *Lachnellula fusc sanguinea* (Rehm) Dennis. **24.** Paraphyses and spores inside asci; **25.** Outer (oEe) and inner (iEe) layers of the ectal excipulum; **26.** Ascus showing the furcate base. **Figs. 27-32.** *Lachnum latebricola* (Rehm) R. Galán et Raitv. **27-29.** Hairs; **30.** Paraphysis; **31.** Immature ascus with basal crozier; **32.** Apices of hairs. Employed mountants: tap water (figs. 24-26, 28 and 32), KOH (figs. 27, 29-31). Origins of photographs: AH 7101 (figs. 24-26), AH 7102 (figs. 27-32).

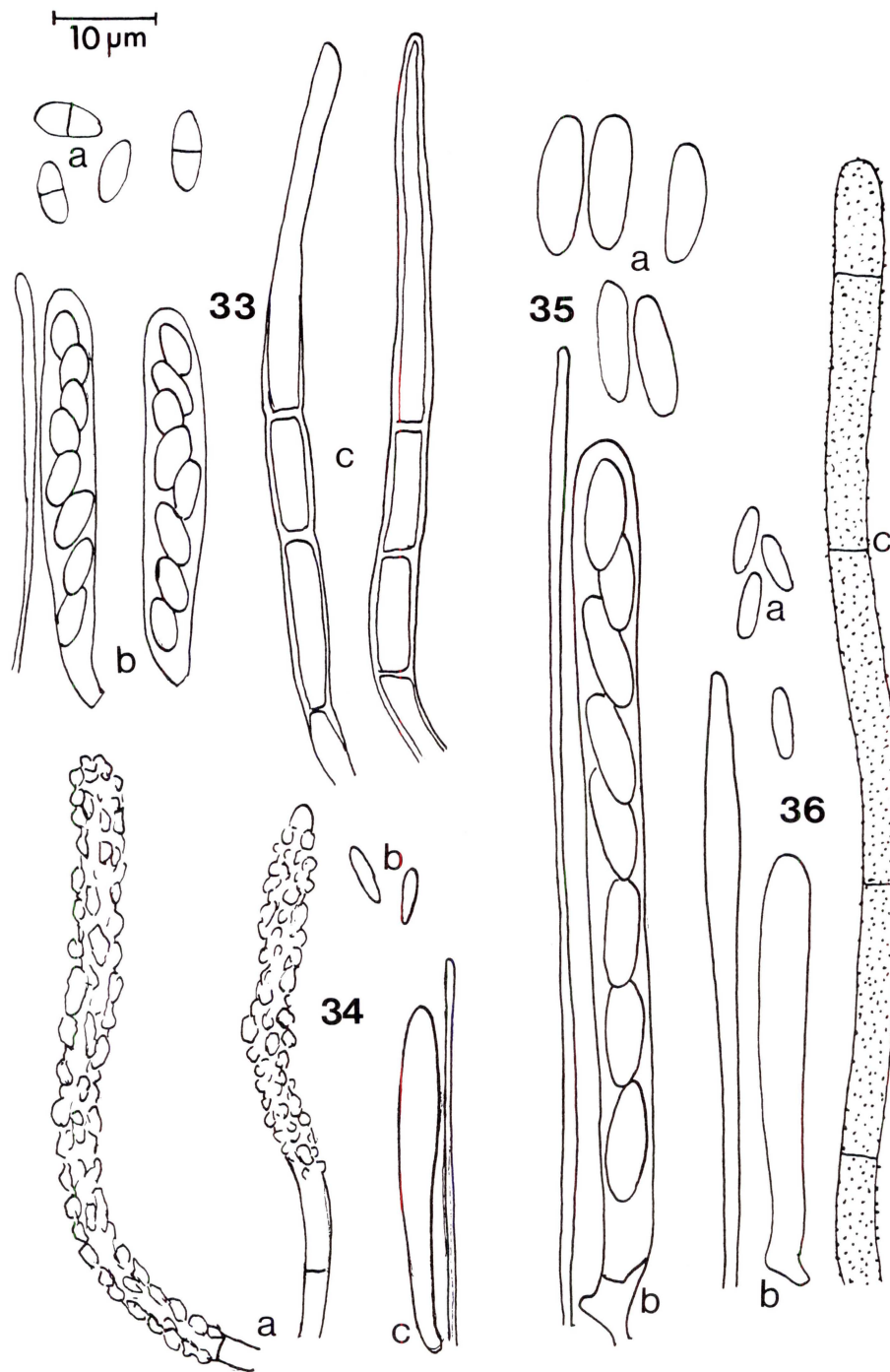


Fig. 33. *Hyalopeziza nectrioidea*: a. Spores in MLZ, b. Two asci and a paraphysis in KOH, c. Two hairs in KOH; 34. *Incrupila dennisii*: a. Two hairs, b. Two spores, c. Ascus and paraphysis. All in KOH; 35. *Lachnellula fuscousanguinea*: a. Free spores, b. Ascus and paraphysis. All in KOH; 36. *Lachnum latebricola*: a. free spores, b. Ascus and paraphysis, c. Hair. All in KOH.

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Fig. 37. *Incrupila dennisii* (Müller) Müller. 38. *Lachnum latebricola* (Rehm) R. Galán et Raitv.