V. elaeina, but they are slightly longer and wider (Fig. 6). Keller (1996) reported a thin perispore up to 0·5 µm thick from *V. praetermissa*; a similar structure has been seen in this study in *V. praetermissa*, but has not been detected in *V. elaeina*. The ecology of the two species is different, though slightly overlapping: *V. elaeina* is rarely found in the inundation zone of streams, and *V. praetermissa* is not confined to inundated rocks, but occasionally occurs on damp but not inundated rocks. Although *V. elaeina* typically grows in shaded habitats, the substratum is not usually damp, and it can grow on rather dry cliffs. A single mixed collection has been seen (*Orange* 11970 in NMW, fragment no. 1), with one thallus of *V. praetermissa* growing immediately adjacent to *V. elaeina*.

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A SYNOPSIS OF THE GENERA *SKYTTEA*, *LLIMONIELLA* AND *RHYMBOCARPUS* (LICHENICOLOUS ASCOMYCOTA, LEOTIALES)

Paul DIEDERICH* and Javier ETAYO‡

Abstract: The genus *Skyttea* is characterized by urceolate ascomata, with a narrow pore when young, a greenish or brownish, rarely reddish exciple of conglutinate hyphae with subglobose to ± cylindrical lumina, bordered near the margin by hyaline to greenish or brownish, usually smooth, straight hairs, the absence of periphyses, rarely branched and apically hardly thickened paraphyses, asci and a hymenium that are entirely I− and KI−, a thin lateral and a very thick apical ascus wall with a small ocular chamber, and normally aseptate ascospores. It is considered to belong to the Leotiales and not to the Ostropales. It comprises at least 17 species, including *S. caesii* sp. nov., *S. carboneae* sp. nov., *S. lecanorae* sp. nov., *S. mayrhoferi* sp. nov., *S. pyrenulae* sp. nov., *S. radiatilis* comb. nov., *S. tavaresae* sp. nov. and *S. thelotrematis* sp. nov. *Rhymbocarpus* is shown to be a distinct leotialean genus, distinguished from *Llimoniella* by a different excipular structure, different pigments and the presence of excipular hairs, which, in some species, are embedded in the excipular gel and thus not visible macroscopically. In addition to the type species, *R. geographici*, of which a neotype is designated, it includes *R. boomii* sp. nov., *R. cruciatus* comb. nov., *R. fuscoatrae* comb. nov., *R. makarovae* sp. nov., *R. neglectus* comb. nov., *R. pertusariae* sp. nov., *R. pubescens* comb. nov. and *R. stereocaulorum* comb. nov. *Llimoniella* s. str. comprises at least 6 species, including the type, *L. scabridula*, *L. adnata*, *L. pertusariae* sp. nov., *L. pyrenulae* sp. nov., *L. ramalinae* comb. nov. and *L. vinosa* comb. nov. Several species formerly assigned to *Skyttea* or *Llimoniella* are now included in the leotialean genus *Unguiculariopsis*, and the following new combinations are proposed: *Unguiculariopsis acrocordiae* comb. nov., *U. groenlandiae* comb. nov. and *U. lesdainii* comb. nov. A lectotype is chosen for *Lichen stictoceros*, which is shown to be a synonym of *Evernia prunastri*. Keys are given for the species of *Skyttea*, *Llimoniella* and *Rhymbocarpus*, and for the lichenicolous genera of Leotiales and Ostropales. © 2000 The British Lichen Society

Introduction

The generic name *Skyttea* was introduced by Sherwood *et al.* (1981) for a number of minuscule lichenicolous ostropalean discomycetes with urceolate apothecia, a hairy margin and generally non-septate, hyaline ascospores. In the original account, seven species were accepted. In subsequent papers (Hawksworth 1982; Diederich 1986; Kalb *Lichenes Neotropici* 449 [1988]; Zhuang & Korf 1989; Rambold & Triebel 1992; Etayo & Diederich 1998) more species were added, but at the same time the genus, which since the

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(Sherwood *et al.* 1981; Santesson 1993), but we cannot exclude that some of the specimens cited belong to *S. thelotrematis*, a species known from Europe and South America.

Observations. Skyttea nitschkei, which is the type species of the genus *Skyttea*, differs from most other species by the particular excipular pigments (see identification key). Similar pigments are found in the new species *S. carboneae* and *S. tavaresae*. The differences between these three species are explained in the key.

Interestingly, one specimen of *Thelotrema lepadinum* from the French Pyrénées-Atlantiques (*Diederich* 9342) is infected by two distinct species of *Skyttea*: *S. nitschkei*, with dark brownish ascomata, and *S. thelotrematis* with dark greenish to blackish ascomata, which are whitish around the pore. For the differences between both species, see under *S. thelotrematis*.

Additional specimens examined. **Austria:** *Niederösterreich*: Seetal SE von Lunz, Kurz S hinter dem Mittersee, 780 m, 1981, *Hafellner* 9201 (GZU); Göllergruppe, Südhänge der Weißmäuer E von Lahnsattel, 940 m, 1994, *Hafellner* 32476 (GZU); Ybbstaler Alpen, E-Abhänge des Dürrensteins, Urwald Rotwald, Großer Urwald, 1000 m, 1993, *Hafellner* 23631 (GZU); *ibid.*, 1994, *Poelt* (GZU 10-94). *Steiermark*: Salzatal, bei der Einmündung des Krimpen Baches in die Salza, 580 m, 1989, *Hafellner* 24192, 24184, 24185 (GZU); Hochschwab-Gruppe, Fölz NW von Aflenz, im untersten Teil des Mitterbachgrabens W vom Gasthof Schwabenbartl, 860 m, 1994, *Hafellner* 32573 (GZU, also distributed in Santesson *Fungi Lichenicoli Exsiccati* 285).—**Denmark:** South Jutland, Løgumkloster, viii 1975, *Christiansen* (GZU).—**France:** *Finistère*: Forêt de Cranou, route forestière de St-Conval, 1960, *Lambinon* 60/683 (LG, sub *T. lepadinum*). *Pyrénées-Atlantiques*: Gorge d'Ehujarre, 1991, *Diederich* 9589 (h) & *Etayo* 1350, 5914, 5966 (h); col de Saucusse, 1991, *Etayo* 5926 (h); gorges du Pihot, D-341 near parking, 1993, *Etayo* 666 (h); gorges de Kakouetta, 1991, *Diederich* 9575 (h) & *Etayo* 12850 (h). *Sarthe*: Parc naturel régional Normandie Maine, Forêt de Perseigne E of Alençon, Vallée d'Enfer, 1980, *Hafellner* 8782 (GZU).—**Germany:** Wolbeck prope Münster, s. d., *Lahm* (UPS); Schleswig-Holstein, Kr. Herzogtum Lauenburg, Sachsenwald, Revier Klein Viert, ix 1919, *Erichsen* (HBG).—**Great Britain:** *England*: **V.C. 11,** South Hampshire: New Forest, Frame Wood, 1979, *Hawksworth* 4934 (GZU); New Forest, 1984, *Diederich* 5418 (h). *Scotland*: **V.C. 97,** West Inverness-shire: N side of Loch Sunart, 4–5 km W of Strontian, vi 1992, *Poelt* (GZU); woods at hillside to W of Glenborrodale Castle, vi 1992, *Poelt* (GZU). **V.C. 98,** Argyll Main: Loch Creran, Glasdrum, near Inver, vi 1992, *Poelt* (GZU); *ibid.*, 1976, *Tibell* 6586 (UPS). **V.C. 104,** North Ebudes: Isle of Skye, Tokavaig Wood, 1987, *Diederich* 8032 (h); S of Kyle of Lochalsh, S of Loch Na Béiste, 1987, *Diederich* 8827 (h).—**Ireland: V.C. H2,** North Kerry: Near Ladies View S of the Upper Lake of Killarney, 1968, *Santesson* 19662 (UPS); Killarney, Cromaglan Mountain, SW of the top not far from the main road, 1968, *Santesson* 19860, 19871 (UPS).—**Spain:** *Huesca*: Hecho, valle de Hecho, selva de Oza, s. d., *Etayo* 5021 (h). *Navarra*: Vera, Collado de Ibardin, 1987, *Etayo* 2724 (h); Orbaiceta, Lizardoya, 1988, *Etayo* 5927 (h); NW Estella, Sierra de Urbasa, Pto de Urbasa, 1991, *Diederich* 9617 (h).—**Switzerland:** Obwalden, Giswil, Merliwald, close to Wang above Kleinteil, 46°50′N, 8°9′E, 1350 m, 1987, *Moberg* 7315 & *Santesson* 31660 (UPS).—**Canary Islands:** *Tenerife*: Macizo de Anaga, Monte de las Mercedes, *c.* 900 m, 1989, *Hafellner* 32835, 32869 (GZU).—**Canada:** *Nova Scotia*: Richmond Co., in Cape Breton, 1·5 km NW of North Frambo, 1980, *Maass* (BG).

Skyttea pyrenulae Diederich, Etayo & Coppins sp. nov.

Skyttea insignis ascomatibus 125–160 µm diam., margine 40–50 µm crasso, non striato, poro magno, excipulo viridibrunneo, K+ olivaceo, pilis 4–7 µm longis, ascis 45–60 × 3·5–4·5 µm, ascosporis 8–12 × 2·5–3 µm.

Typus: Great Britain, Scotland, North Ebudes (V.C. 104), Isle of Skye, Sleat Peninsula, Tokavaig Wood, alt. 10–100 m, on *Corylus*, on *Pyrenula occidentalis*, 21 May 1987, *Coppins* 11599

Ascomata initially immersed, later erumpent, blackish, inner border of ascomatal margin whitish due to the excipular hairs, roundish and 125–160 µm diam. or elongate and up to 200 µm; margin in opened ascomata 40–50 µm thick (surface view, × 80); pore up to 50% of the ascomatal diameter when mature. *Exciple* laterally greenish (outer layer darker), K+ olivaceous, except the region near the hairs, which is brownish (green pigment absent) and K−, 40–55 µm thick; basal exciple green, K+ olivaceous, 8–16 µm thick; excipular hairs hyaline, straight, wall apically not thickened and therefore not refractive, 4–7 × 2–2·5 µm. *Subhymenium* hyaline, 3–6 µm thick. *Hymenium* 50–65 µm thick. *Epihymenium* hyaline. *Paraphyses* filiform, simple or rarely branched, *c.* 1 µm thick. *Asci* subcylindrical, wall apically thicker, 4–8-spored, 45–60 × 3·5–4·5 µm. *Ascospores* hyaline, ellipsoid, non-septate, 8–12 × 2·5–3 µm.

Hosts. Pyrenula occidentalis (syn. *P. neglecta* auct. eur.) and *Pyrenula* sp.

Distribution. Great Britain (Scotland) and Azores.

Observations. This species is similar to *S. lecanorae*, which differs by the overall smaller dimensions (e.g. ascomata 90–125 µm, hymenium 45–55 µm, asci 35–50 µm long, ascospores 7–9 µm long) [except the hairs, which are slightly longer, 8–13 µm], by the distinctly striate and whitish ascomatal margin, and mainly by the much narrower ascomatal pore in mature ascomata. For differences with *S. gregaria*, see under *S. lecanorae*.

Additional specimens examined. **Great Britain:** *Scotland*: **V.C. 97,** Westerness: Morvern, N of Glenmorvern Cottage, coastal hazelwood, on *Corylus*, on *P. occidentalis*, 1992, *Coppins* 15388 (E).—**Azores:** *Faial*: Cabeço dos Trinta, edge of a ravine, *c.* 650 m, on *Ilex*, on *Pyrenula* (sterile), vi 1986, *Degelius* (UPS).

Skyttea radiatilis (Tuck.) R. Sant., Etayo & Diederich comb. nov.

Gyalecta radiatilis Tuck., *Lich. Calif.*: 30 (1866); type: USA, Rhode Island, North Kingstown, on *Pinus rigida*, on cf. *Loxospora pustulata*, 1865, *Bennett* (FH—holotypus, vid.).

(Fig. 5)

Ascomata immersed in the host, bordered by the thallus, dispersed or aggregated, blackish, roundish, 100–140 µm diam.; margin in opened ascomata 40–50 µm thick (surface view, × 80), striate, often whitish due to remnants of the host thallus, without any deep fissures; pore 20–35 µm diam. *Exciple*, except at base, internally greenish olivaceous, K+ olivaceous (rarely yellowish brown in pale ascomata), externally darker greyish or olivaceous brown, K+ (sometimes indistinctly) purple to violet, 17–45 µm thick; basal exciple yellowish brown or brownish (no green pigment), K−, 5–25 µm thick; excipular hairs hyaline to olivaceous, septate, straight, wall apically not thickened and therefore not refractive, 10–20 × 2–3 µm. *Subhymenium* hyaline, *c.* 10 µm thick. *Hymenium* 50–60 µm thick. *Epihymenium* hyaline. *Paraphyses* filiform, simple to ramified, septate, apically not thickened, 1–1·5 µm thick. *Asci* subcylindrical, wall apically thicker, (4–)8-spored,