

Short Communications

Pannaria conoplea and *P. tavaresii* (Ascomycota: Pannariaceae) new to Chile

A collection of lichens made in 1998 (by WQ) from the bark of *Austrocedrus chilensis* at a locality in southern Chile, disclosed two species of *Pannaria* not hitherto recorded from the Chilean lichen mycobiota (Galloway & Quilhot 1999): (1) the pan-temperate taxon *Pannaria conoplea* (Ach.) Bory, which is widespread in the Northern Hemisphere as well as having rare outliers in East Africa, Venezuela, Ecuador and Australia (see Jørgensen 1978; Swinscow & Krog 1988; Jørgensen & Galloway 1992; Jørgensen & Arvidsson 2004), and (2) *Pannaria tavaresii* P. M. Jørg., known earlier from North America (including Mexico and Jamaica), Portugal, Macaronesia (Jørgensen 1978), Australia (Jørgensen & Galloway 1992), Sardinia and Italy (Nimis 1993) and previously collected in 1986 from near Valdivia in Chile. The discovery of *Pannaria conoplea* and *P. tavaresii* in Chile adds to the known *Pannaria* mycobiota of Chile (Galloway & Quilhot 1999), bringing the total number of species of this genus in Chile to 23. Eleven taxa formerly placed in *Psoroma*, are now correctly accommodated in *Pannaria* (see Jørgensen 2001b; Elvebakk & Galloway 2003; Jørgensen & Sipman 2004; Passo *et al.* 2004). Both *Pannaria conoplea* and *P. tavaresii* are within the currently accepted circumscription of *Pannaria* (Jørgensen 1994, 2004a, 2004b). Descriptions of the Chilean material are given below.

Pannaria conoplea (Ach.) Bory

Illustrations. Yoshimura (1974: pl. 41, fig. 409—*Pannaria pityrea*); Moberg & Holmåsén (1982: 165);

Jørgensen (1987: 80, fig. 40A); Wirth (1987: 311); Thor & Arvidsson (1999: 296); Brodo *et al.* (2001: 477, fig. 555); Dobson (2005: 297).

Thallus orbicular to irregularly spreading, 2–3(–3.5) cm diam., closely attached, corticolous. Lobes 1–3 mm broad and 3–5(–8) mm long, deeply incised, mostly concave, ± contiguous, discrete at apices. Margins slightly thickened, shallowly rounded to delicately notched or incised, discrete to ± imbricate, ascending, generally paler than remainder of thallus, often whitish-pruinose (× 10 lens), without a protruding prothallus. Upper surface lead-grey to grey-blue when moist, pale creamish or fawnish when dry, faintly scabrid and white-crystalline-pruinose, especially towards margins, pseudosorediate. *Pseudosoredia* 0.05–0.1 mm tall and wide, grey-blue, darkening at apices, developing from decorticating lobules along the margins, sometimes ± confluent, forming a densely crowded, blue-grey, diffract-areolate crust centrally. Lower surface whitish and ± glabrous in a very narrow zone at margins, elsewhere covered with a dense felt of blue-black to brownish rhizohyphae.

Apothecia not seen in Chilean material.

Chemistry. Thallus K–, C–, KC–, PD+ orange; containing pannarin.

Distribution. Known presently from Chile only from a single locality in the VIII Region (lat. 37°23'S). Widespread in the Northern Hemisphere including Great Britain, Scandinavia, Europe, the Balkans, Madeira and the Azores, North Africa, the eastern

Carpathian Mountains, the Ukraine, Tibet, Japan, Korea and North America (Degelius 1935: 105–115—as *Pannaria pityrea* [maps 106, fig., 21; 109, fig. 22]; Yoshimura 1974; Jørgensen 1978: 22–23; Degelius 1982; Wirth 1987; Nimis & Poelt 1987; Park 1990; Purvis *et al.* 1992; Santesson 1993; Nimis 1993; Türk & Poelt 1993; Esslinger & Egan, 1995; Hafellner 1995; Egea 1996; Kondratyuk *et al.* 1996; Ohmura & Kashiwadani 1997; Hinds & Hinds 1998; Moon 1999; Thor & Arvidsson 1999; Scholz 2000; Diederich & Sérusiaux 2000; Kashiwadani *et al.* 2000; Brodo *et al.* 2001; Llimona & Hladun 2001; Jørgensen 2001a, 2002; Coppins 2002; Kurokawa 2003; Kondratyuk *et al.* 2003; Santesson *et al.* 2004; Sérusiaux *et al.* 2004; Obermayer 2004; Dobson 2005). Also in Venezuela (Jørgensen 1978); Ecuador (Jørgensen & Arvidsson 2004); East and South Africa (Swinscow & Krog 1988; Jørgensen 2003) and Hawaii (Magnusson 1956; Elix & McCarthy 1998). *Pannaria conoplea* does not occur in Australia (Jørgensen 2001b), and the published Australian records of this species (Jørgensen & Galloway 1992; Filson 1996; McCarthy 2003) are in error.

Habitat notes. Subalpine on the bark of *Austrocedrus chilensis*, an evergreen conifer occurring in Chile on the western slopes of the Andes from latitudes 32°39'S to 44°S (Rodríguez *et al.* 1983; Veblen *et al.* 1995). As a tree it tolerates more xeric conditions than species of *Nothofagus* and other rain-forest trees, and grows at altitudes of *c.* 900 m to 1800 m, and it is found also on eastern slopes of the Andes in Argentina (Veblen *et al.* 1995). *Pannaria conoplea* is found in association on this substratum with the following lichens: *Degeliella versicolor* (Galloway & James 1985; Jørgensen 2004a), *Heterodermia* sp., *Melanohalea inactiva* (Galloway & Jørgensen 1990), *Normandina pulchella*, *Pannaria tavaresii* (Jørgensen 1978), *Physconia perisidiosa* (Moberg 1977; Elvebakk & Moberg 2002; Esslinger 2002), *Pseudocyphellaria crocata* and *Teloschistes velifer* (Almborn 1992).

Distinguishing features. *Pannaria conoplea* is characterized by its particular, decorticate pseudosoredia. It is distinguished from the Australasian species *P. elixii* P. M. Jørg. & D. J. Galloway (Jørgensen & Galloway 1992) which has: thinner, more closely appressed lobes; an upper surface that is much less scabrid-areolate and not white-pruinose; distinctive, laterally compressed, gnarled to ± coralloid isidia rather than pseudosoredia; and a chemistry of vicinacin, norvicinacin, and rarely leprolomin and terpenoids (*P. conoplea* has pannarin).

Specimen examined. **Chile:** VII Region: Parque Nacional Laguna de la Laja, 1020 m, on bark of *Austrocedrus chilensis*, 1998, W. Quilhot 2144 (UV).

***Pannaria tavaresii* P. M. Jørg.**

Illustrations. Jørgensen (1978: 69, fig. 33); Brodo *et al.* (2001: 479, fig. 559).

Thallus lobate, rosette-forming, 1–2.5 (–3) cm diam., closely attached by whitish to blue-black rhizohyphae, not projecting at margins as a distinct prothallus, corticolous/muscicolous. Lobes 1–3 mm wide, adjacent to imbricate, cuneate to flabellate, apices thickened, entire to crenate or lobulate, somewhat frosted-pale, occasionally minutely isidiate. Upper surface dark slate-blue when moist, pale greyish white to fawn or creamish when dry, undulate, plane to irregularly ridged to subplicate in parts, matt, slightly roughened or minutely arachnoid to scabrid in parts ($\times 10$ lens). *Isidia* delicate, rather granular at first then ± terete, 0.1–0.15 mm tall and 0.05–0.01 mm diam., mainly laminal, rarely at margins and on thalline exciple, concolorous with thallus. Lower surface white, ecorticate in a very narrow marginal zone, pale to dark yellow-brown centrally, with frequent white to blue-black, simple to squarrosely branched, densely entangled rhizophyphae from margins to centre.

Apothecia crowded ± central, 0.5–1.5 (–2) mm diam., disc plane to subconvex, yellow-brown to pale red-brown, matt, without gyrose rings of sterile tissue. *Proper exciple* not visible. *Thalline exciple* persistent,

thin, crenulated to minutely isidiate or lobulate, concolorous with thallus or paler, to \pm whitish. *Epithecium* red-brown, to $12.5\ \mu\text{m}$ thick. *Hymenium* colourless, $100\text{--}112\ \mu\text{m}$ tall, I+ blue. *Asci* elongate-clavate, $75\text{--}90 \times 15\text{--}20\ \mu\text{m}$. *Ascospores* broadly ellipsoid, $12.5\text{--}15\text{--}(17.5) \times 7.5\text{--}9\ \mu\text{m}$, apices minutely apiculate, with a distinct perispore to $2.5\ \mu\text{m}$ thick.

Chemistry. Thallus K–, C–, KC–, PD+ orange; containing pannarin.

Distribution. Known in Chile from regions VIII, IX and X (see below). *Pannaria tavaresii* has a warm temperate, subtropical distribution being widespread in the central, southern and eastern United States (Brodo *et al.* 2001; Jørgensen 2002) and also in Mexico, Jamaica and Venezuela (Jørgensen 1978: 70). In Europe it is recorded from Portugal, Spain, Madeira, the Canary Islands and Italy (Jørgensen 1978; Hernández-Padrón *et al.* 1987; Nimis 1993; Etayo 1998; Llimona & Hladun 2001; Nimis & Martellos 2003). It occurs also in the mountains of East Africa (Krog 2000; Jørgensen 2003) and South Africa [the type of *Pannaria leucosticta* var. *isidiopsis* Nyl. from Table Mountain (Crombie 1876: 61) is referable to *P. tavaresii* (Jørgensen & Galloway 1992)], in Japan (Kurokawa (2003) and it is rare in New South Wales, Australia (Jørgensen & Galloway 1992; McCarthy 2003).

Habitat notes. A bark epiphyte of *Austrocedrus chinensis* (see above) and *Nothofagus dombeyi*.

Distinguishing features. *Pannaria tavaresii* is characterized by: a small, rosette-forming thallus; a \pm well-developed marginal prothallus; a scabrid to slightly pruinose upper surface; marginal, finger-like isidia; and pannarin as the major secondary metabolite. It is the isidiate counterpart of *P. rubiginosa*. The Chilean material seen has slightly larger apothecia [the type description gives apothecial diameter as $0.5\text{--}1\ \text{mm}$] and somewhat smaller ascospores [the type description

gives ascospore dimensions as $15\text{--}19 \times 9\text{--}10\ \mu\text{m}$; with the perispore as $20\text{--}24 \times 10\text{--}12\ \mu\text{m}$] than those reported in the type description (Jørgensen 1978: 69), but in all other respects the morphological and anatomical characters of the Chilean specimens accord with the degree of variation accepted for the species in Northern Hemisphere populations.

Specimens examined. **Chile:** VIII Region: Parque Nacional de la Laja, 1020 m, on bark of *Austrocedrus chilensis*, 1998, W. Quilhot 2148 (UV). IX Region: Parque Nacional Nahuelbuta, c. 1 km W of eastern entrance, 80 m, on lower parts of trunk of *Nothofagus dombeyi*, 2001, J. W. Bjerke 910/01 (TROMS). X Region: 23 km NNE of Valdivia, 1986, B. J. Coppins, D. J. Galloway, P. W. James & G. Guzman 5542 (BM); Parque Nacional Vicente Pérez Rosales, c. 1 km N of Petrohue, 195 m, on unknown phorophyte in the understorey vegetation in a well-developed *Nothofagus dombeyi* forest, 2001, J. W. Bjerke 543/01 (TROMS).

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