Nuytsia 6(3): 279-284 (1988)

The genus Pyxine (Physciaceae, Lichenes) in Western Australia

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Abstract

Sammy, N. The genus *Pyxine* (Physciaceae, Lichenes) in Western Australia. Nuytsia 6(3): 279-284 (1988). The genus *Pyxine* has not been previously recorded in Western Australia. The four species *P. coccifera, P. cocoes, P. petricola* and *P. subcinerea* show a limited distribution along the coastal regions of Western Australia.

Introduction

Pyxine, like the other genera in the Physciaceae, is generally a pale ashy-white, light buff or greenish-grey colour. Imshaug (1957) divided the genus into two sections with further subsections, however Swinscow & Krog (1975), by examining the type specimens, have found that these subdivisions are based on variable characters. Imshaug's observations did draw attention to the pigmentation of an internal apothecial stipe as an important taxonomic character.

Materials and Methods

Types and other specimens of species within the genus *Pyxine* housed at the British Museum (Natural History) and the Conservatoire et Jardin Botaniques, Geneva, have been examined. The Western Australian material studied included specimens held in the Western Australian Herbarium (PERTH) and in the author's personal collections now housed in PERTH (hb. Sammy).

The chemical analyses were conducted according to the procedures set out by Culberson & Kristinsson (1970), Culberson (1972) and Menlove (1974). Anatomical sections were cut with a freezing microtome and mounted in Lactophenol cotton blue.

Comparative Studies

Samples of *Pyxine* may be confused with *Dirinaria* and *Physcia* in the field but this genus is distinguished by the following characters:

Apothecium. The mature apothecium is strongly convex and has a pseudo-lecideine appearance. The thalline exciple loses algal cells and becomes dark-coloured (Swinscow & Krog 1975). In contrast, *Physcia* and *Dirinaria* have lecanorine apothecia with concolorous thalline exciples.

Epithecium. The epithecium reacts K+ purple (Swinscow & Krog 1975). The reaction is best observed on vertical sections of the apothecium; the preparation being irrigated with potassium hydroxide (K) solution while viewing under the microscope. This reaction is absent in *Physcia* and *Dirinaria* (Awasthi 1975).

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Thallus. Under long wave ultra-violet light, the thallus in most species emits a bright lemon-yellow fluorescence, due to lichexanthone present in the cortex. This substance is not produced in *Physcia* and *Dirinaria.* This is a useful aid for generic identification of sterile specimens (Swinscow & Krog 1975).

Hypothecium. In vertical sections of a mature apothecium, the region below the hymenium is composed of dark reddish-brown hyphae forming a lens-shaped hypothecium. This region also reacts K+ purple. A coloured hypothecium is absent in *Physcia* and where present in *Dirinaria* is K-.

Lower Surface. The lower surface of the thallus in *Pyxine* is always black. Generally a specimen with a pale lower surface is referable to *Physcia.*

The four species of *Pyxine* found in Western Australia are readily separated by the following characters:

	Soralia	Medulla	UV Light	Chemistry
coccifera	red	yellow	negative to white	atranorin & pyxiferin
cocoes	white	white	lemon-yellow	lichexanthone
petricola	absent	white	lemon-yellow	lichexanthone
subcinerea	white	yellow	lemon-yellow	lichexanthone

Key to the Species

1. Soralia absent ..... 2. *P. petricola*
   Soralia present 2

2. Soralia red ..... 1. *P. coccifera*
   Soralia white 3

3. Medulla white ..... 3. *P. cocoes*
   Medulla yellow ..... 4. *P.subcinerea*

Taxonomy

1. Pyxine coccifera (Fee) Nyl., Mem. Soc. Sci. Nat. Cherbourg 5: 108 (1857). *Parmelia coccifera* Fee, Essai Crypt.: 126 (1824).

Thallus on bark of trees, loosely attached; lobes grey; pseudocyphellae red, linear, on lamina and lobe margins (Figure 1H), frequently developing into soralia with bright red granular soredia (Figure 1I); medulla creamy-yellow in the upper layers, white below. Apothecia not seen.

Chemistry. Cortex UV-; atranorin and pyxiferin (red pigment).

Specimens examined. WESTERN AUSTRALIA: Prince Regent River Reserve, Kimberley, *A.S. George* 12730 p.p. (PERTH); Prince Regent River Reserve, Kimberley, *A.S. George* 12301 p.p. (PERTH).

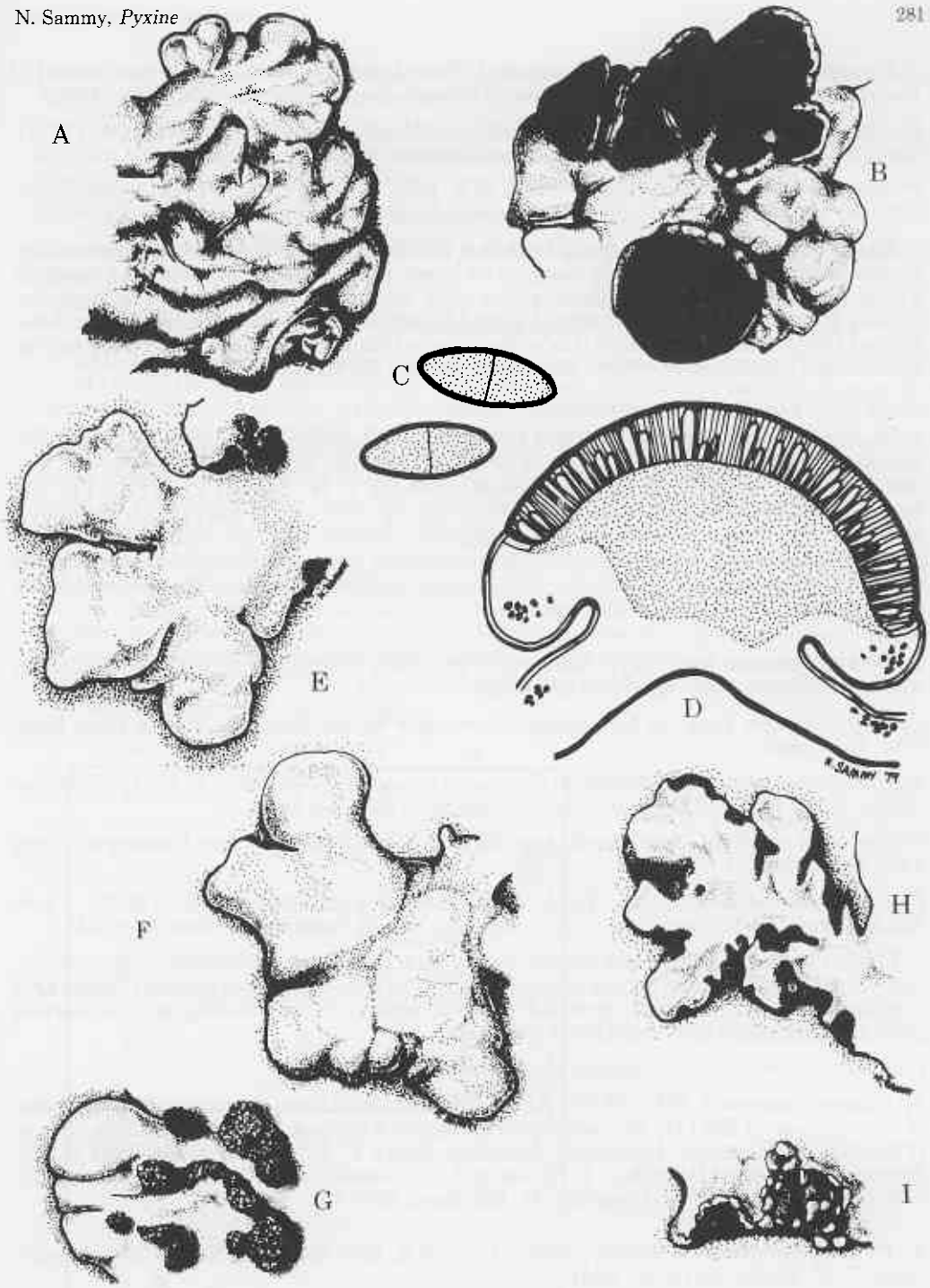

Figure 1. *Pyxine petricola.* A—Marginal thallus lobes (x20). B—Apothecia in various developmental stages (x40). C—Mature ascospores (in water). D—Longitudinal section of mature apothecium showing development of dark reddish-brown hypothecium (x100).

Pyxine subcinerea. E—Marginal thallus lobes (x20) showing marginal soralia.

Pyxine cocoes. F—Marginal thallus lobes with distinct patches of pruina (x20). G—Marginal thallus lobes showing abundant marginal soralia (x10).

Pyxine coccifera. H—Marginal thallus lobes with marginal red pseudocyphellae (x20). I—Marginal lobe with pseudocyphellae developed into red granular soredia (x40).

2. **Pyxine petricola** Nyl. ap. Crombie, J. Bot., Lond. 14: 263 (1876). *Type:* Island of Rodrigues, *Dr. I.B. Balfour* 2391, Venus Transit Expedition, 9.x.1874 (holo: BM).

Pyxine meissneri Tuck. ex Nyl. var. *endoleuca* Muell. Arg., Flora, Jena 62: 290 (1879). *Type:* In territorio africano Djur, Seriba Ghattas, *Schweinfurth* (holo: G).

Pyxine subvelata Stirton, Trans. Proc. N.Z. Inst. 30: 396 (1897). *Type:* Queensland, Jimbour on *Hakea oleifolium*, F. M. Bailey, June 1895 (iso: BM).

Thallus on bark of shrubs, rarely on rocks, firmly attached, lobes white to grey-white; pruina laminal, shiny, towards margins of lobes; soralia absent (Figure 1A); medulla white. Apothecia abundant, black, plane with distinct thalline margins at first, becoming strongly convex at maturity (Figure 1B); hypothecium dark reddish-brown,lens-shaped (Figure 1E), sometimes this colouration extends downwards to produce an "internal stipe"; ascospores brown, bilocular, 16-18 x 5.2-6.5 μM (Figure 1C).

Chemistry. Cortex UV+; lichexanthone only.

Specimens examined. WESTERN AUSTRALIA: Houtmans Abrolhos, Suomi I., *N. Sammy* s.n. (PERTH, hb. Sammy); Houtmans Abrolhos, E. Wallaby I., *N. Sammy* s.n. (PERTH, hb. Sammy); Houtmans Abrolhos, Shark I., *N. Sammy* s.n. (PERTH, hb. Sammy); Lake MacLeod, near Carnarvon, *N. Sammy* s.n. (PERTH, hb. Sammy); Monkey Mia, Peron Peninsula, Shark Bay, *N. Sammy* s.n. (hb. Sammy); Beverley Springs Homestead, Kimberley, *B.G. Muir* s.n. (hb. Sammy); Head of Walgamungun Creek, Kimberley, *B.G. Muir* s.n. (hb. Sammy); Hidden Valley, Kununurra, West Kimberley, *G.G. Smith* s.n. (hb. Sammy).

3. **Pyxine cocoes** (Sw.) Nyl., Mem. Sco. Sci. Nat. Cherbourg 5: 108 (1857). *Lichen cocoes* Sw., Nova Gen. Sp. Pl.: 146 (1788).

Pyxine meissneri Tuck. ex Nyl. subsp. *connectans* Vainio, Acta Soc. Fauna Flora fenn. 7(1): 154 (1890).

Pyxine connectans (Vainio) Vainio, Suomal. Tiedeakat. Toim., Ser. A: 70 (1914). *Type*: Vainio Lich. Brasil. Exsicc. 62, Rio de Janerio, 1885 (iso: BM).

Pyxine cocoes f. *sorediigera* Muell. Arg., Bot. Jb. 20: 262 (1894). *Type*: Usambara, *Holst* 1423 (holo: G).

Pyxine oceanica Zahlbr. ap. Rock, Coll. Hawaii publ. Bull. 4: 37 (1916). *Type*: Zalhbruckner Lich. Rar. Exsicc. 207, Oceania, insula Palmyra, *J. Rock* (iso: BM).

Thallus on bark of trees and shrubs, firmly attached; lobes ashy-white to grey-white, flat, crowded and plicate; pruina laminal, shiny, towards margins of thallus (Figure 1F); soralia abundant, marginal, crowded towards centre of thallus (Figure 1G); soralia granular; medulla white. Apothecia not seen

Chemistry. Cortex UV+; lichexanthone only.

Specimens examined. WESTERN AUSTRALIA: Geraldton, Chapman River Bridge, *N. Sammy* s.n. (PERTH, hb. Sammy); Houtmans Abrolhos, Suomi I., *N. Sammy* s.n. (PERTH, hb. Sammy); Houtmans Abrolhos, Shark I., *N. Sammy* s.n. (PERTH, hb. Sammy); Houtmans Abrolhos, E. Wallaby I., *N. Sammy* s.n. (PERTH, hb. Sammy); NW of Lake Logue, S of Eneabba, *M. Blackwell* 2873 (hb. Sammy).

4. **Pyxine subcinerea** Stirton, Trans. Proc. N.Z. Inst. 30: 396 (1897). *Type*: Queensland, *F. M. Bailey* 22 (holo: BM).

Pyxine meissneri Tuck. ex Nyl. var. *sorediata* Muell. Arg., Flora, Jena 62: 290 (1879). *Type*: Djur, Brauneisenstein, Seriba Ghattas, *Schweinfurth*, 1877 (holo: G).

Pyxine chrysantha Vainio, Cat. Afr. Pl. Welwitsch 2: 412 (1901). *Type*: Golungo Alto, Angola, ad truncos arb. vigent. in sylvis primaevis prope Sange, *Welwitsch*, 1857 (lecto: BM).

Pyxine chrysanthoides Vainio, Suomal. Tiedeakat. Toim., Ser. A, 6: 71 (1914). *Type*: Antilles, Morne Rouge, *Vainio* (lecto: TUR).

Thallus on bark of trees, firmly attached (Figure 1D); lobes pale grey-green; pruina diffused towards lobe apices; soralia marginal, orbicular to irregularly shaped; soredia powdery, fine, white; medulla yellow. Apothecia not seen.

Chemistry. Cortex UV+; lichexanthone only.

Specimen examined. WESTERN AUSTRALIA: Lake Indoon, 11 km W of Eneabba, *N. Sammy* s.n. (hb. Sammy).

Phytogeography

There are 35 species of *Pyxine* known in the tropical and subtropical regions of the world (Poelt 1973); 23 species are recorded for East Africa, nine each for Papua New Guinea and South America, six in North America and four in South-east Asia. In Australia 15 species are recorded for Queensland and four in New South Wales (Filson 1983). Only three Australian species are endemic and found in Queensland. From observations made by the author in the tropics, *Pyxine* is not an inhabitant of virgin rainforest. It can be found in open secondary rain-forest, on coastal vegetation or in the more open forest of the tropical highlands.

The seasonally wet (summer rains dominant) region of the Kimberleys, within the tropical belt of Western Australia, can be expected to be a refuge for tropical lichen species (Sammy 1985). The occurrence of three species of *Pyxine* in southern regions (winter rains dominant) may be explained by the presence of a warm oceanic current moving down the Western Australian coastline conducive to the formation of suitable microhabitats (Figure 2). The genus is absent from the large Pilbara region because it is situated in the semi-arid tropics.

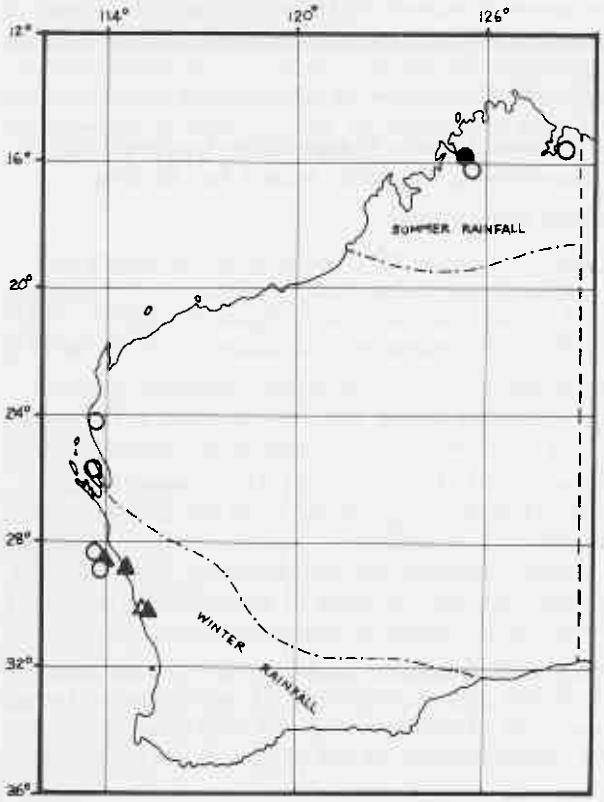

Figure 2. Distribution of *Pyxine* species in Western Australia. *Pyxine coccifera* (●), *Pyxine cocoes* (▲), *Pyxine petricola* (○), *Pyxine subcinerea* (△).

Acknowledgements

My overseas travel to examine type specimens was made possible by a grant from the Science and Industry Endowment Fund (CSIRO). The curators of the British Museum (Natural History), the Conservatoire et Jardin Botaniques, Geneva and the Western Australian Herbarium are thanked for permission to examine specimens. I wish to thank Mr Peter James (British Museum) for many useful and relevant discussions; Mr Gordon Smith (University of Western Australia), Mr A.S. George (previously of the Western Australian Herbarium) and Mr R.B. Filson (National Herbarium of Victoria) who critically read the manuscript and suggested improvements; Dr M. Sargent, Department of Chemistry, University of Western Australia, who donated samples of authentic lichen acids and discussed lichen chemistry.

I am grateful to my previous employer, Dampier Salt (Operations) Pty Ltd for allowing me time and facilities to complete this study.

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