

A SYNOPSIS OF THE FOLIICOLOUS LICHENS FROM THE NILGIRI AND PALNI HILLS, INDIA

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ABSTRACT

The paper provides a synopsis, with keys for identification, of the taxa of foliicolous lichens occurring in the Nilgiri and Palni Hills and numbering 42 species under 15 genera. Out of these, 5 species and one genus are reported for the first time from continental and peninsular India.

INTRODUCTION

Few species of foliicolous lichens from the Nilgiri and Palni hills have been mentioned by AWASTHI (1963, 1965). Comprehensive collections of the lichens from these hills resulted in the collections of a large number of foliicolous lichens, which, enumerated by AWASTHI and SINGH (1972a), comprised 29 species. 16 species of these were new reports for India. More recently 3 new taxa of foliicolous lichens from the Nilgiri and Palni hills have been described by AWASTHI and SINGH (1972 b). Determination of additional collections has resulted in an increase of the number of taxa and area of distribution in these hills. It is now surmised that the total number of taxa thus known (42 species under 15 genera) may constitute the majority of the foliicolous lichens in these hills and a synopsis with keys for identification of the genera and species may prove useful to inquisitive botanists visiting the hills.

Majority of these foliicolous lichens occur on the perennial leaves of ferns, under shrubs, young palm plants in shade along the ravines or streams, while few occur on the leaves of the lower branches of trees in shade or on branches not directly exposed to sun and wind-currents. Often, more than one taxon occur associated on the upper side of the same leaf or leaves of the same plant. The thalli in all cases are crustose in nature and vary from almost insignificant (1-2 mm across) size to a growth of 6-7 mm across, the latter may occasionally represent a single thallus or it may also be due to the confluence of the neighbouring thalli of the same species. The presence and location of the minute foliicolous lichens is usually apparent by the differential colouration of their fruiting bodies, e.g. in *Trichothelium*, *Bacidia*, *Porina*, *Catillaria*; while in the taxa with larger thalli the colour of the thallus and their conspicuous fruiting bodies clearly demonstrate their presence, e.g. in *Strigula*, *Byssoloma*, *Lopadium*, *Sporopodium*, *Mazosia*, *Gyalectidium*. However, careful examination of the leaves under lens is necessary as more than the assumed taxa may be found present on the leaves.

The different genera and the species within the genus have been arranged alphabetically. Only those taxa that are reported for the first time from India (marginally marked by an asterisk*) have usually been provided with short diagnostic descriptions. The description of other taxa is omitted here as it is given in AWASTHI (1963), AWASTHI and

SINGH (1972 a) and SINGH (1970, 1971). For full and detailed descriptions of foliicolous lichens one is advised to consult the monumental work by SANTESSON (1952).

The specimen numbers within the parenthesis are field numbers of the collections made by both or one of the authors. The specimens are preserved in LWU, unless otherwise stated.

Key to the genera known from the area

- 1a. Fruiting bodies pseudothecia (not true ascocarps)
 - 2a. Pseudothecia linear 9. *Opegrapha*
 - 2b. Pseudothecia circular 8. *Mazosia*
- 1b. Fruiting bodies true ascocarps
 - 3a. Ascocarps perithecia
 - 4a. Thallus thick gelatinous, in the form of small patches and developed below the cuticle .. 12. *Strigula*
 - 4b. Thallus thin, smooth, patches dispersed, developed above the cuticle
 - 5a. Perithecia with stiff hairs (setae) .. 15. *Trichothelium*
 - 5b. Perithecia without such hairs 10. *Porina*
 - 3b. Ascocarps apothecia
 - 6a. Apothecia lirellaeform 5. *Graphis*
 - 6b. Apothecia discoid
 - 7a. Spores transversely septate
 - 8a. Spores transversely 1-septate .. 4. *Catillaria*
 - 8b. Spores transversely 3-septate (occasionally pluriseptate)
 - 9a. Hypothecium purple or K + purple-brown
 - 10a. Apothecia adnate, sessile, excipulum spreading over the surface of thallus and formed of loose intricate hyphae 3. *Byssoloma*
 - 10b. Apothecia sessile, prominent, excipulum para- or proso- plectenchymatous 13. *Tapellaria*
 - 9b. Hypothecium colourless or brown, K –
 - 11a. Apothecia adnate on algiferous thallus tissue, excipulum indistinct .. 2. *Byssolecania*
 - 11b. Apothecia sessile, prominent, constricted, excipulum para- or proso-plectenchymatous .. 1. *Bacidia*
 - 7b. Spores muriform
 - 12a. Hymenium I –
 - 13a. Apothecia immersed in the thallus, prominent, setae absent 6. *Gyalactidium*
 - 13b. Apothecia adnate to sessile, thallus provided with numerous white stiff hairs (setae) 14. *Tricharia*

- 12b. Hymenium I + blue
 14a. Algal cells present in the epithecium .. 11. *Sporopodium*
 14b. Algal cells absent in the epithecium
 15a. Hypothecium yellowish to brown-black, K -- .. 7. *Lopadium*
 15b. Hypothecium purplish brown, K + purplish red-brown, paraphyses branched and anastomosing .. 13. *Tapellaria*

1. *Bacidia* D Not em. A. Zahlbr. (Lecideaceae)

1a. Spores transversely 3-septate

2a. Spores filiform, $20-30 \times 2 \mu$ 1. *B. apiatica*

2b. Spores fusiform

3a. Thallus greenish grey, farinose, hypothecium brown 4. *B. rhapsidophylli*

3b. Thallus whitish grey, verrucose, hypothecium colourless 3. *B. pallidula*

1b. Spores transversely 4-6 septate, fusiform to bacillar, apothecia brown, spores $18-26 \times 3 \mu$ 2. *B. fuscata*

1. *Bacidia apiatica* (Müll. Arg.) A. Zahlbr.

The species usually occurs associated with the species of *Strigula*, *Porina nitidula*, *Tapellaria phyllophila* on the leaves of shrubs, and is widely distributed in the area.

Loc.: Nilgiri hills: Konada tea estate (71.138, 71.964, 71.974, 71.982), Kodanad (71.994).

2. *Bacidia fuscata* (Müll. Arg.) A. Zahlbr.

It is associated with *Byssolma* sp. on palm leaves and is known from a single collection and locality.

Loc.: Palni hills, Perumal to Palni Road-side (70.998).

***3. *Bacidia pallidula* (Kremp.) A. Zahlbr.**

Thalli dispersed in the form of circular patches, verrucose, $28-38 \mu$ thick, bluish grey-green, verrucae hemispherical. Apothecia sessile, constricted, dirty brown, epruinose; margin slightly distinct; disc plane; epithecium colourless, without crystals; hymenium colourless, I + blue, $57-65 \mu$ high; hypothecium colourless; excipulum colourless, at margins prosoplectenchymatous, $28-38 \mu$ thick, below paraplectenchymatous, $38-50 \mu$ thick; crystals absent; apothecial base brown; asci 8-spored; spores colourless, transversely 3-septate, fusiform, $10-13 \times 2-3 \mu$.

Occurs on the leaves of herbs (acanthaceous) and trees (*Pongamia glabra*, *Gymnosporia montana*), and is well distributed in the Palni hills.

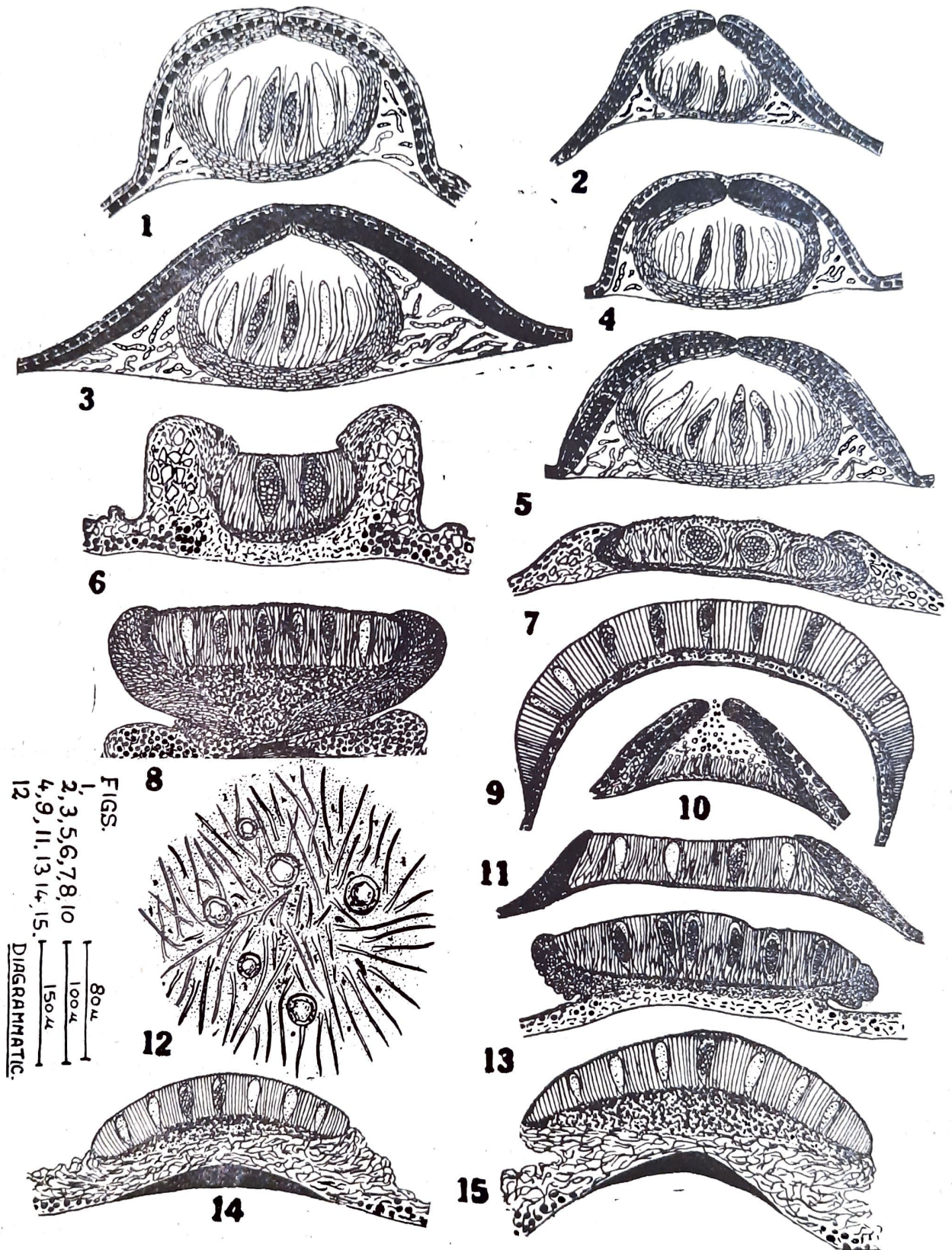
Loc.: Palni hills: Shembaganur (71.432, 71.433).

The taxon was so far known from Malesia, and is here reported from India for the first time.

4. *Bacidia rhapsidophylli* (Rehm.) A. Zahlbr.

The species occurs associated with *Bacidia pallidula*, *Tapellaria bilimbioides* on the leaves of shrubs, trees (*Ficus*, *Rhododendron*) and palms (*Caryota*), and is known from Palni hills only.

Loc.: Palni hills, Shembaganur (70.925, 71.430, 71.450, 71.452, 71.460, 71.472, 71.481, 71.488).



Text-Figs. 1-15: 1. *Porina pallescens*—V. S. through perithecium; 2. *Porina rufula*—V. S. through perithecium; 3. *Porina chrysophora*—V. S. through perithecium; 4. *Porina thaxteri*—V. S. through perithecium; 5. *Porina semecarpi*—V. S. through perithecium; 6. *Gyalectidium filicinum*—V. S. through apothecium; 7. *Gyalectidium funosonigricans*—V. S. through apothecium; 8. *Tapellaria bilimbioides*—V. S. through apothecium; 9. *Mazosia melanophthalma*—V. S. through pseudothecium; 10 & 11. *Mazosia melanophthalma*—10, section through apothecium; 11, V. S. through pseudothecium; 12 & 13. *Tricharia albostrigosa*—12, habit, 13, V. S. through apothecium; 14. *Byssolecania leucoblepharum*—V. S. Through apothecium; 15. *Byssoloma rotuliforme*—V. S.

2. *Byssolecania* Vain. (Lecideaceae)

Byssolecania fumosonicricans (Müll. Arg.) R. Sant.

The species is characterized by the presence of adnate apothecia developed over an algal tissue, indistinct excipulum, and 3-septate spores (Text-fig. 9, 16). It is usually associated with species of *Porina*, *Byssoloma leucoblepharum*, *Bacidia apiahica* and species of *Strigula* on the leaves of ferns (*Pteris*) and shrubs, and is well distributed in the area.

Loc.: Palni hills, Shembaganur (70.927, 71.455); Nilgiri hills, Avalanche (71.589, 71.590b, 71.598a, 71.601, 71.606).

3. *Byssoloma* Trev. (Lecideaceae)

1a. Apothecia generally adnate, not constricted at base,

disc grey to brown 1. *B. leucoblepharum*

1b. Apothecia generally sessile, constricted at base, disc

pure black 2. *B. rotuliforme*

1. *Byssoloma leucoblepharum* (Nyl.) Vain. em. R. Sant.

Characterized by the adnate apothecia with grey brown disc, transversely 3-septate bacillar to oblong, $10-18 \times 2.5-4 \mu$ spores (Text-fig. 14, 17). It occurs in association with *Catillaria semecarpi*, *Byssoloma rotuliforme*, *Bacidia pallidula*, *Strigula nitidula* on the leaves of shrubs, small trees (*Actinodaphne hookeri*, *Luvunga* sp., *Homodesmus indicus*) and ferns (*Pteris* sp.), and is one of the common and widely distributed species in this region.

Loc.: Palni hills: Tiger Shola (70.160), Shembaganur (71.419, 71.434, 71.467, 71.473), Palni Roadside (70.989, 71.512, 71.513, 71.515, 71.516, 71.530, 71.533, 71.534); Nilgiri hills: Konada tea estate (71.135, 71.141), Avalanche (71.583, 71.590A), Kodanad (71.987).

2. *Byssoloma rotuliforme* (Müll Arg.) R. Sant.

Characterized by the black colour of the disc and a basal constriction in the apothecia (Text-fig. 15, 18). The species is generally associated with *Byssoloma leucoblepharum*, species of *Mazosia* and *Sporopodium* on the leaves of shrubs, and occurs infrequently in the area.

Loc.: Palni hills, Silver Cascade (70.1027); Nilgiri hills: Kodanad tea estate (70.1310), Avalanche (71.147, 71.620 B, 71.699).

4. *Catillaria* A. Mass. em. Th. Fr. (Lecideaceae)

1a. Thallus bluish grey-green, sorediate .. 1. *C. bouteillei*

1b. Thallus whitish grey, smooth, esorediate.. 2. *C. semecarpi*

*1. *Catillaria bouteillei* (Desm.) A. Zahlbr.

Thallus dispersed in small circular to irregular patches, \pm farinose sorediate, bluish grey green. Apothecia constricted, greyish flesh coloured, 0.4-0.6 mm in diam., 0.15-0.2 mm thick, epruinose; hymenium colourless, 57-70 μ high, I+blue, K—; hypothecium colourless, hyphae dense, 15-20 μ thick, I+blue; exciple colourless, plectenchymatous, 20-25 μ thick at margin, 20-28 μ thick below; cells 4-6 μ in size; asci 8-spored; spores colourless, 2-celled, constricted at septum, oblong-ellipsoid, $10-16 \times 3-5 \mu$ (Text-fig. 19).

It occurs associated with *Byssoloma leucoblepharum* on the leaves of shrubs, and is known from a single collection. The taxon is well distributed in the tropical and subtropical regions of the world, and extends to temperate regions as well. It is also known earlier from Ceylon, but is reported here from India for the first time.

Loc.: Palni hills, Shembaganur (71.435).

2. *Catillaria semecarpi* Vain.

It is one of the smallest and inconspicuous foliicolous lichens, though the pale reddish to pale brown apothecia and spores constricted with somewhat unequal cells are distinct (Text-fig. 20). It occurs on the leaves of shrubs and cane-palm (*Calamus*), and is fairly widely distributed in the area.

Loc.: Palni hills; below Sacred Heart College (4383-Herb. Awasthi); Oothu (70.352), Shembaganur (70.914, 71.464, 71.465, 71.466, 71.475); Nilgiri hills, Konada tea estate (71.122, 71.597).

5. *Graphis* (Adans.) Müll. Arg. (Graphidaceae)

Graphis foliicola Vain. var. **major** Awasthi et K. Singh

Only a single species of foliicolous *Graphis* is known from the world, and the variety is distinguished from the type by larger spores and presence of crystals. It occurs on the leaves of *Piper* sp., and is known by a single collection.

Loc.: Palni hills, Shembaganur (71.429).

6. *Gyalectidium* Müll. Arg. (Asterothyriaceae)

- | | |
|---|------------------------|
| 1a. Thallus greenish grey, verrucose, algal cells present in the epithecium, spores $30-65 \times 15-20 \mu$.. | 2. <i>G. filicinum</i> |
| 1b. Thallus whitish grey, non-verrucose, algal cells absent in the epithecium, spores $38-79 \times 15-28 \mu$.. | 1. <i>G. aspidotum</i> |

1. *Gyalectidium aspidotum* (Vain.) R. Sant.

The absence of the algal cells in the epithecium and the nature of spores is characteristic (Text-fig. 6, 28). The species occurs associated with *Strigula elegans*, *Tricharia albostrigosa* and *Sporopodium xantholeucum* on the leaves of shrubs, and is frequent in the Palni hills only.

Loc.: Palni hills; Nandagarai (70.1280); Palni Road side (71.507, 71.511, 71.535), Tamtamparai (70.1284).

2. *Gyalectidium filicinum* Müll. Arg.

It is characterized by the verrucose thallus, presence of algal cells in the epithecium and the characteristic spores (Text, fig. 7, 27). It is usually associated with *Sporopodium xantholeucum* on the leaves of shrubs and scarcely occurs in the Palni hills.

Loc.: Palni hills: Shembaganur, below Sacred Heart College (4381—Herb. Awasthi) near Silver Cascade area (70.166, 70.1282).

7. *Lopadium* Körb. (Lecideaceae)

- | | |
|---|------------------------------|
| 1a. Apothecia greyish brown to dark brown | |
| 2a. Apothecia greyish brown, hypothecium yellow, epithecium pale yellow, not much distinct .. | 1. <i>L. fuscum</i> |
| 2b. Apothecia dark brown, hypothecium dark brown, epithecium yellowish brown | 2. <i>L. puiggarii</i> |
| 1b. Apothecia black to black brown, hypothecium aeruginous to dark brown, epithecium aeruginous downwards | 3. <i>L. subcoerulescens</i> |

*1. *Lopadium fuscum* Müll. Arg.

Thalli irregularly dispersed, smooth, whitish grey, 20-25 μ thick. Apothecia sessile, constricted at base, greyish brown, 0.5-0.8 mm in diam., 0.2-0.25 mm thick; margin

thin; disc plane to convex; hymenium colourless, K—, I+blue, 95-110 μ high; hypothecium yellowish brown; exciple paraplectenchymatous, colourless, 20-38 μ thick at margins, 57-76 μ thick at base; apothecial base aeruginose; asci single spored; spores, colourless, multicelled muriform, transversely 18-20-septate, longitudinally 3-4-septate, ellipsoid to oblong, 76-96 \times 18-24 μ ; paraphyses indistinctly slightly branched.

The species occurs in association of *Lopadium puiggarii* on the leaves of shrubs and trees *Actinodaphne hooker*, and is frequent in the Palni hills.

Loc.: Palni hills: Shembaganur (71.426, 71.427, 71.428, 71.431, 71.458), Palni Road side (71.520)

The taxon is generally distributed in the pantropical parts of the world and is reported from India for the first time.

2. *Lopadium puiggarii* (Müll. Arg.) A. Zahlbr.

The species is usually associated with *Porina* and *Mazosia* spp. on the leaves of shrubs, and is widely distributed in the area.

Loc.: Palni hills: Shembaganur (70.926, 71.444, 71.456, 71.477), Palni Road side (70.991A, 71.523); Nilgiri hills: Avalanche (71.698, 71.703), Konada tea estate (71.977, 71.979, 71.988).

3. *Lopadium subcoerulescens* A. Zahlbr.

The species sometimes occurs associated with *Tapellaria bilimbioides*, on the leaves of shrubs and small trees, and is widely distributed in the area.

Loc.: Palni hills: Shembaganur (4384-Herb. Awasthi, 70.913, 71.453, 71.468), Palni Road side (70.991B); Nilgiri hills: Avalanche (71.147, 71.585, 71.593), Kodanad (71.995)

8. *Mazosia* Mass. (Opegraphaceae)

1a. Thallus greenish grey to yellowish brown, verrucose .. 1. *M. melanophthalma*

1b. Thallus greenish grey to brownish grey, smooth .. 2. *M. phyllosema*

1. *Mazosia melanophthalma* (Müll. Arg.) R. Sant.

The taxon is generally associated with *Byssoloma leucoblepharum* and species of *Porina* on the leaves of fern (*Pteris*), and small shrubs, and is one of the common and widely distributed species in the area. (Text-fig. 10, 11, 25).

Loc.: Palni hills: Tiger Shola (70.1027), Shembaganur (70.929, 71.416, 71.442) Palni Road side (71.505, 71.525, 71.526, 71.532); Nilgiri hills: Avalanche (71.607) A, 71.609, 71.616, 71..700), Konada tea estate (71.976), Kodanad (70.1311, 71.991).

2. *Mazosia phyllosema* (Nyl.) A. Zahlbr.

The species occurs associated with *Opegrapha filicina*, species of *Lopadium* on the leaves of shrubs, small trees and palms and is of frequent occurrence in the area.

Loc.: Palni hills: Shembaganur (70.930), Palni Road side (70.991), Tiger Shola (70,1027); Nilgiri hills, Konada tea estate (71.966, 71. 985).

9. *Opegrapha* Ach. (Opegraphaceae)

Opegrapha filicina Mont.

It occurs in association with *Byssoloma leucoblepharum*, species of *Mazosia*, on the leaves of shrubs and palms, and is rather scarce in the area.

Loc.: Palni hills, Shembaganur (70.922, 71.476).

10. *Porina* Müll. Arg. (Strigulaceae—sensu Santesson)

Key to the 14 species of the genus known from the area:

- 1a. Spores transversely 3-septate
- 2a. Perithecial wall colourless to yellowish brown, differentiated into involucrellum (outer perithecial wall) and excipulum (inner perithecial wall), K+ yellowish to reddish brown.
- 3a. An algal layer present above the involucrellum
- 4a. Thallus green, perithecia brown .. 12. *P. rufula*
- 4b. Thallus greenish to pale brown, perithecia brown black 5. *P. limbulata*
- 3b. Algal layer present in between the involucrellum and excipulum
- 5a. Perithecia yellowish brown, base distinctly spreading 4. *P. fulvella*
- 5b. Perithecia reddish brown, base neither spreading nor constricted 13. *P. semecarpi*
- 2b. Perithecial wall brown to black, differentiated into involucrellum and excipulum, K—.
- 6a. Perithecial base constricted, involucrellum developed only in the upper part of perithecium 14. *P. thaxteri*
- 6b. Perithecial base spreading, involucrellum spreading laterally 1. *P. chrysophora*
- 1b. Spores transversely 5-11-septate
- 7a. Spores 5-septate (see 7b, 7c)
- 8a. Perithecial wall differentiated into involucrellum and excipulum, perithecia yellowish brown to reddish brown, base spreading .. 6. *P. monocarpa*
- 8b. Perithecial wall undifferentiated
- 9a. Perithecia black, globose, excipulum brown to black 8. *P. nitidula*
- 9b. Perithecia yellowish brown, excipulum colourless 10. *P. pallescens*
- 7b. Spores 7-septate (see 7c)
- 10a. Perithecia covered by a crystalline layer .. 3. *P. epiphylla*
- 11a. Perithecial top yellowish brown .. *P. epiphylla* var. *epiphylla*
- 11b. Perithecial top black bordered in ostiolar region *P. epiphylla* var. *atriceps*
- 10b. Perithecia not covered by crystalline layer
- 12a. Perithecial wall differentiated into involucrellum and excipulum 2. *P. cupreola*
- 12b. Perithecial wall without involucrellum, only excipulum present 9. *P. octomera*
- 7c. Spores 9-11-septate
- 13a. Involucrellum black, K—, spores 9-septate 11. *P. palniensis*
- 13b. Involucrellum yellowish brown, K+ reddish brown, spores 9-11-septate 7. *P. nilgiriensis*

*1. **Porina chrysohora** (Stirt.) R. Sant.

Thalli minute, smooth, greenish grey to bluish grey, usually monocarpus. Perithecia black, 0.2-0.25 mm in diam., 114-133 μ high, basally distinctly spreading, covered by thalline tissue; involucrellum black, 18-22 μ thick, covered by 4-6 μ thick algal layer; K—; excipulum brownish, prosoplectenchymatous, K—12-15 μ thick; perithecial top not impressed; asci 8-spored; spores colourless, transversely 3-septate, fusiform, 18-24 \times 3 μ ; paraphyses simple (Text-fig. 3, 21). The species is usually associated with *Mazosia melanophthalma* and *Porina* spp. on leaves of ferns, small shrubs, and is frequently distributed in the area. It is so far known from New Zealand and is here reported from India for first time.

Loc.: Palni hills, Shembaganur (71.417, 71.420, 71.421); Nilgiri hills, Konada tea estate (71.963, 71.984).

2. **Porina cupreola** (Müll. Arg.) Schilling

The species occurs on the leaves of shrubs and is rather scarce in the area.

Loc.: Palni hills, Tiger Shola (70.157)

3. **Porina epiphylla** (Fée) Fée var. **epiphylla**

The taxon is generally associated with *Byssoloma leucoblepharum*, *Mazosia melanophthalma* and other species of *Porina* on the leaves of ferns, shrubs and small trees, and is one of the common and well distributed taxa in the area.

Loc.: Palni hills, Tiger Shola (70.57), Shembaganur (71.424, 71.446, 71.478, 71.509, 71.529); Nilgiri hills; Avalanche (71.144, 71.146, 71.486 A, 71.592, 71.596, 71.603, 71.604, 71.605, 71.611, 71.613, 71.614).

Porina epiphylla var. **atriceps** Vain.

It is generally associated with other species of *Porina* on the leaves of ferns

Loc.: Palni hills, Shembaganur (71.422, 71.425), Palni Road side (71.502, 71.504).

SINGH (1970) reported the absence of any demarcation between the variety *epiphylla* (erronously stated var. 'typica') and var. *atriceps* due to the occurrence of intermediate stages in the material from Andaman islands studied by him. Specimens from Palni hills did not show any intermediate stages and the two varieties could be easily separated on the basis of the characters given in the key.

4. **Porina fulvella** Müll. Arg.

The taxon is generally associated with *Strigula nitidula*, *S. elegans*, species of *Porina* on the leaves of shrubs, and is moderately distributed in the area.

Loc.: Palni hills: Tiger Shola (70.157 G), Palni Road side (71.544, 545); Nilgiri hills: Konada tea estate (71.124, 71.136), Avalanche (71.586 B).

5. **Porina limbulata** (Kremp.) Vain.

It was found associated with other species of *Porina* on leaves of a shrub and is known from a single collection. The taxon is distributed in the pantropical parts of the world, has been reported from Andaman Islands (SINGH, 1970), and is here reported from the continental India for the first time.

Loc.: Nilgiri hills, Konada tea estate (71.961 A).

6. **Porina monocarpa** (Kremp.) Schilling

The taxon is generally associated with *Mazosia melanophthalma*, *Strigula elegans* and other species of *Porina* on the leaves of ferns and shrubs, and is well distributed in the area.

Loc.: Palni hills: Shembaganur (71.445, 71.483), Palni Road side (71.541); Nilgiri hills: Avalanche (71.600, 71.417), Konada tea estate (71.150).

7. **Porina nilgiriensis** Awasthi et K. Singh

The taxon is characterized by smooth thallus, yellowish-brown perithecia scarcely constricted at base, differentiated perithecial walls, involucrellum yellowish brown, spores 9-11-septate, ellipsoid to fusiform, $38-47 \times 9-11.4 \mu$.

Loc.: Nilgiri hills, Avalanche (71.619).

8. **Porina nitidula** Müll. Arg.

The species is associated with *Catillaria semecarpi*, *Strigula elegans* on the leaves of shrubs and trees, and is well distributed in the area.

Loc.: Palni hills: Silver Cascade (70.163 A), Palni Road side (71.503); Nilgiri hills: Avalanche (71.621), Sholurmattum (71.968, 71.973), Konada tea estate (71.71.136 pr. p., 71.980).

9. **Porina octomera** (Müll. Arg.) Schilling

Occurs on leaves of shrubs, rather scarce.

Loc.: Palni hills, Tiger Shola (70.157), Shembaganur (71.441 A).

10. **Porina pallescens** R. Sant.

The taxon is characterized by slightly constricted yellowish brown perithecia, undifferentiated perithecial walls (only excipulum present), and spores 5-septate, $20-28 \times 3-5 \mu$ (Text-fig. 1, 22). It occurs associated with *Porina limbulata*, *Mazosia melanophthalma* on leaves of shrubs. It is so far known from Africa and Andaman Islands and is here reported from continental India for the first time.

Loc.: Nilgiri hills, Konada tea estate (71.961).

11. **Porina palniensis** Awasthi et K. Singh

The taxon is characterized by black constricted perithecia, differentiated perithecial walls with black involucrellum and spores 9-septate, fusiform, $36-54 \times 6-8 \mu$. It occurs on the leaves of shrubs.

Loc.: Palni hills, Shembaganur (71.490)

12. **Porina rufula** (Kremp.) Vain.

The thalli occur in the form of monocarpous or confluent patches. The perithecia are shining reddish brown, spreading at the base, perithecial walls differentiated, and the spores 3-septate, fusiform, $14-20 \times 3 \mu$ (Text-fig. 2, 23). It occurs on the leaves of small trees. It is distributed in the pantropical parts of the world and also from Andaman Islands, but is here reported from continental India for first time.

Loc.: Nilgiri hills, Konada tea estate (71.957).

13. **Porina semecarpi** Vain.

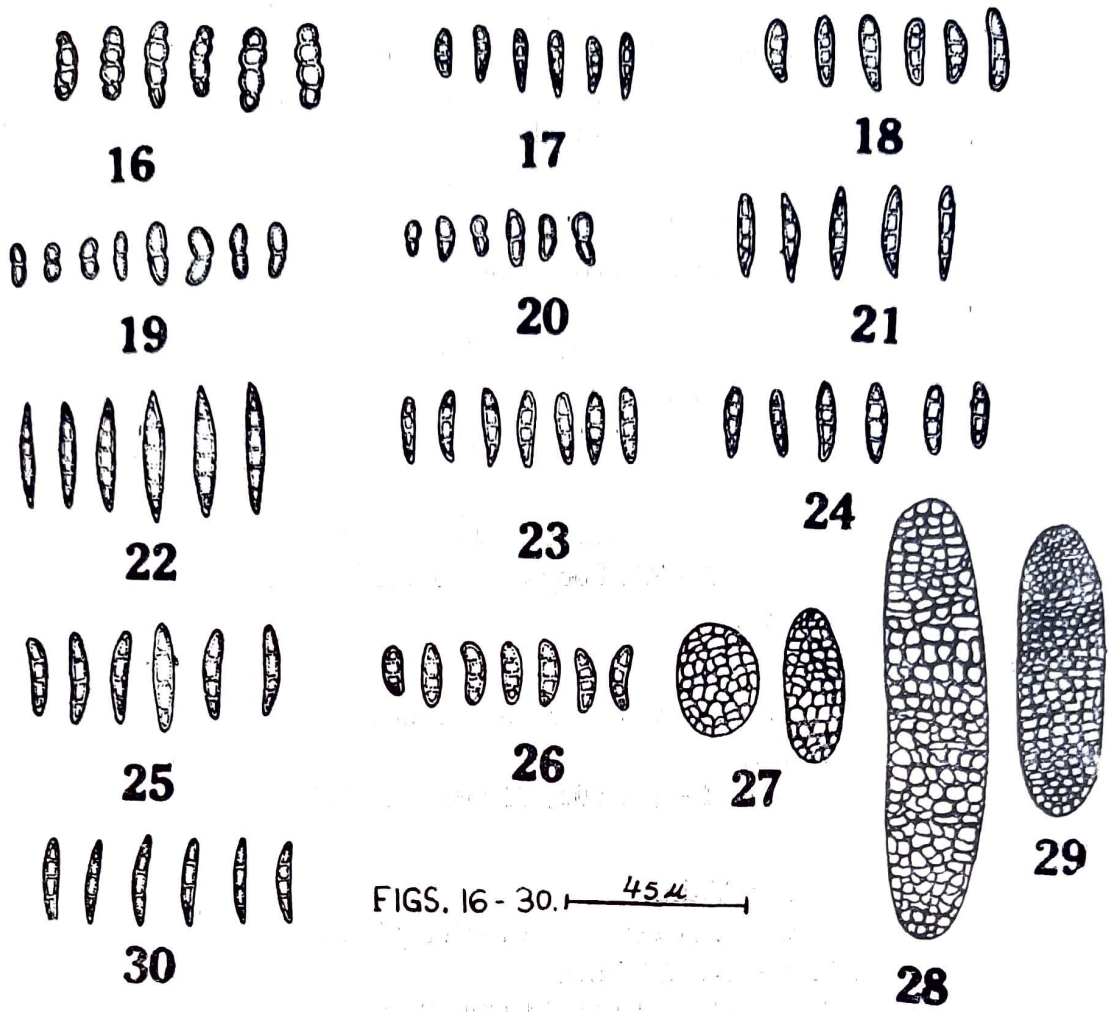
Thalli minute, rounded to irregular in outline, perithecia reddish brown, perithecial walls differentiated and an algal layer present in between the involucrellum and excipulum; spores 3-septate, fusiform, $14-20 \times 3 \mu$ (Text-fig. 5, 24). It generally occurs associated with *Byssoloma leucoblepharum* and *Strigula elegans* on the leaves of shrubs, and is rather scarce in the area. It is here reported for the first time from continental India.

Loc.: Nilgiri hills; Avalanche (71.624), Sholurmattum (71.920).

14. **Porina thaxteri** R. Sant.

Thallus smooth, perithecia constricted, involucrellum partially developed in the upper region and associated with excipulum; spores 3-septate, $18-28 \times 3-5 \mu$. (Text-fig. 4, 30). It occurs associated with *Mazosia melanophthalma* and *Porina epiphylla* on the leaves of shrubs. The taxon is known from America and Andaman Islands and is here reported for the first time from continental India.

Loc.: Nilgiri hills, Avalanche (71.600 A).



Text-Figs. 16—30: Spores of—16. *Byssolecania fumosonigricans*; 17. *Byssoloma leucoblepharum*; 18. *B. rotuliforme*; 19. *Catillaria bouteillei*; 20. *C. semecarpi*; 21. *Porina chrysophora*; 22. *P. pallescens*; 23. *P. rufula*; 24. *P. semecarpi*; 25. *Mizosia melanophthalma*; 26. *Tapellaria bilcumbioides*; 27. *Gyalectidium filicinum*; 28. *G. aspidotum*; 29. *Tricharia albostrigosa*; 30. *Porina thaxteri*.

11. Sporopodium Mont. em. R. Sant. (Lecideaceae)

Sporopodium xantholeucum (Müll. Arg.) A. Zahlbr.

The species is generally associated with *Byssoloma leucoblepharum* and *Porina epiphylla* on the leaves of undershrubs and shrubs, and is one of the conspicuous and common folii-colous lichens in the area.

Loc.: Tiger Shola (70.158), Silver Cascade (70.165), Shembaganur (4382-Herb. Awasthi, 71.457), Palni Road side (71.521, 71.524, 71.527); Nilgiri hills, Kodanad (71.992).

12. Strigula Fr. (Strigulaceae)

- 1a. Thallus margin papillate, perithecia immersed, involucrellum indistinct 2. *S. nemathora*
- 1b. Thallus margin not papillate
- 2a. Thallus margin black bordered with numerous interspaces 5. *S. subtilissima*
- 2b. Thallus margin not black bordered
- 3a. Perithecia completely exposed, the two spore-cells equal in size and easily separating from each other 3. *S. nitidula*

3b. Perithecia partially exposed

- 4a. The two cells of the spores equal in size 1. *S. elegans*
4b. The two cells of the spores unequal in size 4. *S. subelegans*

1. **Strigula elegans** (Fée) Müll. Arg.

It is usually associated with various other foliicolous lichen species on leaves of shrubs and trees, and is a common and widely distributed species in the area.

Loc.: Palni hills: near Thandikuddi (40.476), Gumparai (70.1281), Volagiri to Tamtamparai (70.1283); Nilgiri hills: Coonoor (70.1308), Avalanche (71.584), Sholurmattum (71.969), Konada tea estate (71.125, 71.978, 71.983, 71.986, 71.990).

2. **Strigula nemathora** Mont.

It occurs on the leaves of shrubs and is well distributed in the area.

Loc.: Palni hills, Moliar (70.474), Booparai (70.1152, 70.1307); Nilgiri hills, Konada tea estate (70.120).

3. **Strigula nitidula** Mont.

It occurs, sometimes associated with *Porina monocarpa*, on the leaves of small trees and is known from Nilgiri hills.

Loc.: Nilgiri hills: Avalanche (71.602, 71.608, 71.618); Konada tea estate (71.132, 71.967), Kodanad (71.993).

4. **Strigula subelegans** Vain.

The taxon occurs, generally associated with *Porina epiphylla* and *Mazosia melanophthalma*, on the leaves of shrubs in the Nilgiri hills.

Loc.: Nilgiri hills: Avalanche (71.615, 71.620 C), Konada tea estate (71.123, 71.975), Kodanad (71.129).

5. **Strigula subtilissima** (Fée) Müll. Arg.

It is somewhat scarce but occurs associated with other species of *Strigula*.

Loc.: Nilgiri hills, Konada tea estate (71.126), Avalanche (71.588).

13. **Tapellaria** Müll. Arg. em. R. Sant. (Lecideaceae)

- 1a. Asci 8-spored, spores transversely 3-septate, $10-18 \times 3-5 \mu$ 1. *T. bilimbioides*
1b. Asci one spored, spores muriform, $50-85 \times 9-18 \mu$.. 2. *T. phyllophila*

1. **Tapellaria bilimbioides** R. Sant.

The taxon is characterized by strongly constricted apothecial base, disc black, margin not distinct, hypothecium purplish brown, 6- 8-spored asci, and spores 3- septate, ellipsoid (Text-fig. 8, 26). It occurs on the leaves of shrubs and trees, and is sometimes associated with *Byssoloma leucoblepharum*.

Loc.: Palni hills; Shembaganur (70.919, 70.920, 70.928, 71.439, 71.441, 71.462).

2. **Tapellaria phyllophila** (Stirt.) R. Sant.

The taxon is of rather scarce occurrence and may sometimes be associated with *Bacidia apiahica*, on the leaves of shrubs.

Loc.: Palni hills: Shembaganur (71.459); Nilgiri hills, Konada tea estate (71.139).

*14. **Tricharia** Fée em. R. Sant. (Asterothyriaceae)

***Tricharia albostrigosa** R. Sant.

Thalli dispersed in small patches, provided with numerous long, smooth, white

hairs (Text-fig. 12). Apothecia adnate to sessile, slightly constricted, 0.4-0.6 mm in diam., epruinose; margin thin, unevenly folded; disc pale brown, concave; epithecium without algal cells; hymenium colourless, K —, I —, 76—114 μ high; hypothecium colourless, 10-15 μ thick; excipulum colourless, without algal tissue underneath; asci single spored; spores colourless, multicelled muriform, ellipsoid to oblong, 40-76 \times 15-28 μ ; paraphyses branched and anastomosing (Text-fig. 13, 29). It occurs on the leaves of shrubs. The taxon has so far been known from Africa and America and is here reported for the first time from India.

Loc.: Palni hills; Shembaganur (71.423), Palni Road side (71.501, 71.506); Nilgiri hills, Avalanche (71.607 B).

15. *Trichothelium* Müll. Arg. em. R. Sant. (Strigulaceae)

Trichothelium alboatrum Vain.

The taxon is of rare occurrence, it is associated with species of *Porina* on the leaves of shrubs.

Loc.: Palni hills, Silver Cascade (70.163 B, 71.489); Nilgiri hills, Avalanche (71.143).

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