

# ADDITIONS TO THE LICHEN FLORA OF INDIA

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## ABSTRACT

The paper deals with an addition of 7 taxa to the knowledge of lichen flora of India. Out of the 7 taxa, *Stirtonia monospora* is a new species, *Hypogymnia zeylanica* (R. Sant.) and *Physciopsis elaeina* var. *pyrithrocardia* (Müll. Arg.) are new combinations, and a new combination *Hypogymnia pseudobitteriana* (Awasthi) Awasthi is also mentioned.

During the course of investigations on the lichen flora of Palni hills (Tamil Nadu, S. India), several taxa, not yet recorded from India, have been discovered. Some of these new reports are detailed below, while others are to be communicated elsewhere for publication.

## CRYPTOTHECIACEAE

### ***Stirtonia monospora* sp. nov.**

Text-figs. 1—5

*Diagnosis*—Thallus crustaceous, effusus; pars sterilis albido-cinerea vel cinerea, laevigata vel leviter diffracta. Alga ad *Trentepohlia* pertinet. Maculae fertiles numerosae,  $\pm$  dispersae, rotundatae, leviter pustulatae, albae, 0.2—0.4 mm diam. Asci in maculae fertiles texturam laxam distributi, oblongo-ellipsoidei vel subclavatei, monospori. Sporae transversis 9—19 septatae, incoloratae, elongato-ellipsoideae vel ovoideo-ellipsoideae,  $114\text{--}185 \times 35\text{--}45 \mu$ , cellulis apicarum ceteris minoribus. Corticola.

*Description*—Thallus epiphloedal, crustaceous, effuse, usually several cm in diam. whitish grey to ashy grey. Sterile parts  $\pm$  smooth to cracked, (225) 270—410 (500)  $\mu$  thick; uppermost 20—30  $\mu$  thick region composed entirely of lax hyaline hyphae (simulating cortex); algal stratum in irregular 25-45  $\mu$  thick region, alga *Trentepohlia*, algal cells rounded, spherical to elongated,  $6\text{--}12 \times 4\text{--}6 \mu$  in size; tissue underneath the algal stratum composed of dense, 2  $\mu$  thick hyaline hyphae.

No true ascocarps present. Fertile parts of the thallus  $\pm$  uniformly and densely distributed, rounded, somewhat elevated pustulate and individually  $\pm$  concave, granular (soralia-like), 0.2-0.4 mm in diam., white to pale brown in colour. Asci few to several, immersed in between richly branched, loosely coherent tissue of elongated, 2  $\mu$  thick hyphae, which are apically pale brown; this (inter—or extra—thecial) tissue I—or  $\pm$  brown, K—. Asc: oblong ellipsoid to subclavate, monosporous, I  $\pm$  vinose,  $133\text{--}200 \times 38\text{--}57 \mu$  in size, thick walled, often produced at the top into a dome shaped structure, which becomes indistinct

in mature stages; ascus wall *ca.* 8  $\mu$  thick at the apex and gradually tapering towards base. spores transversely 10-20 celled, colourless, elongate-ellipsoid to ovoid-ellipsoid, 114-185  $\times$  35-45  $\mu$  in size, septa thin, end cells sometimes smaller in size, cell contents hyaline granular to oily in nature. In sections through fertile regions, the spores within the ascus appear constricted at the septa, but when the spores are liberated from the asci in K under pressure, constriction at the septa become  $\pm$  indistinct and the spore surface is  $\pm$  even. Thallus K+ellow to light reddish, C—, KC—, P+yellow.

*Habitat*—on bark of trees.

*Localities*—S. India Tamil Nadu, Palni Hills, along Kodaikanal road, Shembaganur, near Silver Cascade, alt. 6000 ft., Jan. 2, 1970, coll. D D. AWASTHI and K. P. SINGH No. 70.49 (Holotype: LWU); Shembaganur to Periakulum *via* short route, alt. *ca.* 5500 ft., Dec. 14, 1970, coll. K. P. SINGH No. 70:893 (Paratype:LWU).

The genus *Stirtonia* is closely allied to *Cryptothecia* (AWASTHI and AGARWAL, 1969) and due to the absence of true ascocarps they are generally considered primitive taxa of lichens. About half a dozen validly published species of *Stirtonia* are known from the world, of which two are also known from India (AWASTHI, 1965). The number of spores per ascus in these species varies from 2-8. The present find is the first *Stirtonia* in which the ascus contains a single large spore and accordingly the species has been named *monospora*.

Though the ascus in *Stirtonia* is believed to be bitunicate, our attempts to liberate the endoascus from the exoascus have not been successful. Whenever pressure is applied on to the coverglass with the complete ascus underneath, the spore gets liberated from the base of the ascus instead of an endoascus being separated out of the exoascus. Further, when the spores are in K and a little pressure is applied on to the cover glass the spore cells tend to break up and separate away from each other.

## GRAPHIDACEAE

### **Phaeographis hypoglauca** (Kremp.) A. Zahl.

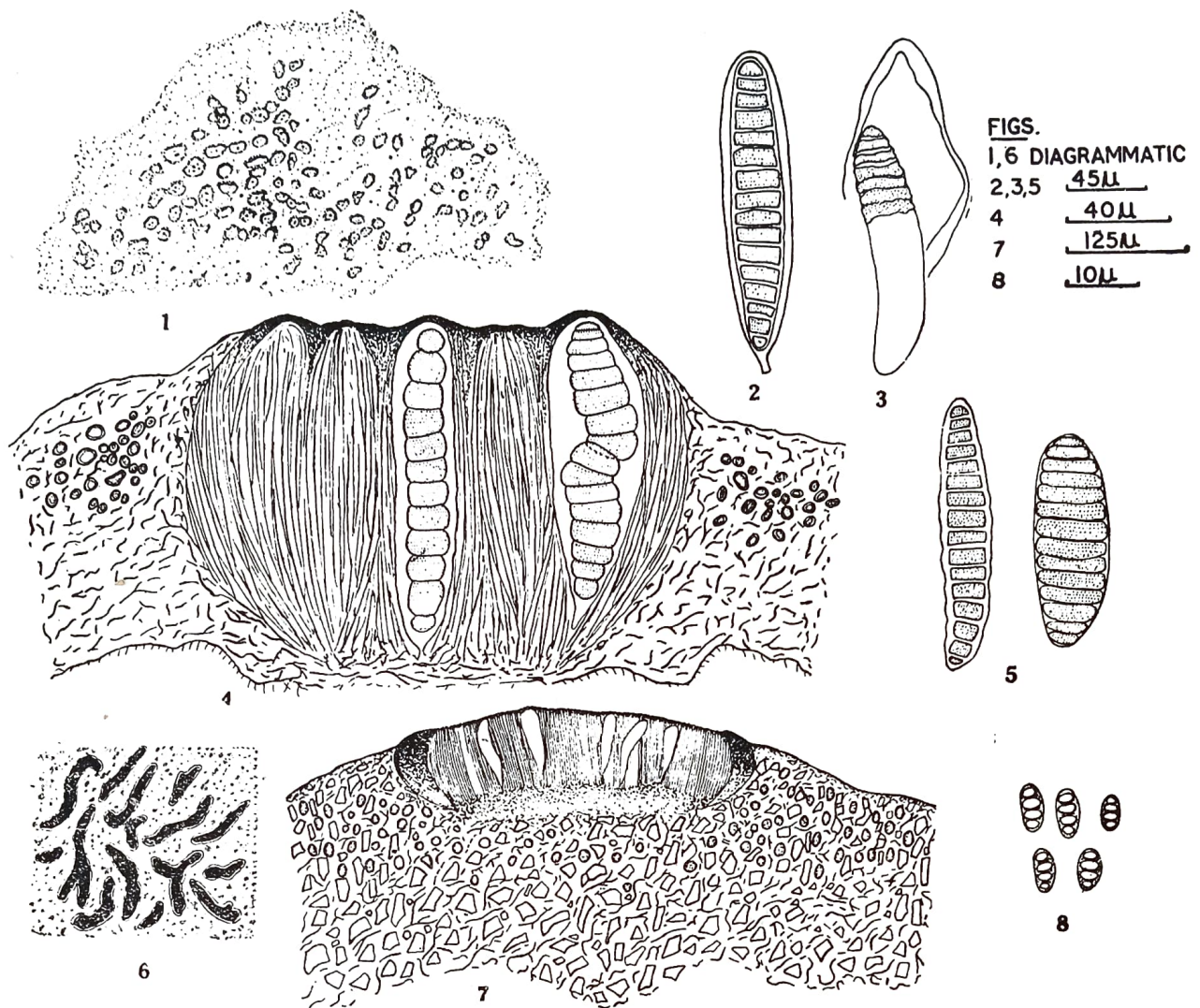
Text-figs. 6-8

Thallus crustaceous, dark ashy grey to grey brown, smooth to cracked, up to 1 mm thick with crystals inside, hypothallus absent. Apothecia lirellaeform, immersed, straight to flexuose, simple to forked, up to 1.5 mm long, 180-270  $\mu$  wide and 120-140  $\mu$  deep; disc black, epruinose; margin light brown at the upper edge, 15-22  $\mu$  thick, not covered by thallus. Epithecium pale brown, 7-10  $\mu$ , I— K—; hymenium colourless, (57) 76-95  $\mu$  high, K—, I—; hypothecium colourless, 38-60  $\mu$  thick; dispersed algal cells present in the tissue underneath the hypothecium. Asci elongate-clavate, 60-80  $\times$  12-15  $\mu$ , uniseriably or biseriably 8 spored; spores brown, transversely 4 celled, ovoid ellipsoid, 12-17  $\times$  5.7-7.6  $\mu$ . Paraphyses simple with brown obtuse apices. Pycnidia flask shaped, 140-180  $\mu$  in diam., pycnidiophores branched, pycnoconidia (microconidia) 6-9  $\mu$  long. Thallus (cortex and medulla) K—, C—, KC—, P—.

*Habitat*—On rocks.

*Locality*—Palni Hills, on way to Thandikuddi, alt. 4500 ft., coll. AWASTHI and SINGH No. 70.459 (LWU).

The taxon is characterized by the ashy brown, smooth thallus, with short immersed apothecia, 4 celled spores and saxicolous habit. It has previously been reported only from Borneo and China.



Text figs. 1-5. *Stirtonia monospora*, 1. Diagrammatic external appearance of thallus with fertile regions, 2. V. S. through fertile region showing asci and ascospores, 3. An ascus with a spore within, 4. A spore being liberated from near the base of the ascus, 5. Two spores;

Text-figs. 6-8. *Phaeographis hypoglauca*, 6. Diagrammatic surface view of the lirellae, 7. V. S. through an apothecium (lirella) showing its immersed nature, 8. spores.

## LECANORACEAE

### *Ochrolechia subpallescens* Vers.

Thallus crustaceous, whitish grey to ashy grey. Apothecia adnate to sessile, rounded, pale flesh coloured, up to 3 mm in diam. Epithecium K+yellowish then decolourized, C+red; hymenium colourless, I+deep blue (asci only). Asci 8 spored; spores simple, colourless, ellipsoid,  $38-70 \times 20-28 \mu$ , surface of spore wall uneven. Paraphyses branched, confluent. Thallus cortex K—, G+red, P—; medulla K—, C+red, KC+red, P—.

*Habitat*—On bark of trees.

*Localities*—Palni Hills, Shembaganur, on way to Tiger Shola, alt. ca., 5,500 ft., AWASTHI and SINGH No. 70.127 (LWU); Pambampuram, alt. 7500 ft., SINGH No. 70.581 (LWU); Kodaikanal, Pillar Rocks area, alt. ca. 7500 ft., SINGH No. 70.725 (LWU).

*Ochrolechia subpallescens* Vers. is closely allied to *O. pallescens* (L.) Mass., but the latter is distinguished by the C—, KC— reactions in the cortex and medulla. While *O. pallescens*

is widely distributed and is also reported from various localities in India, *O. subpallescens* has so far been reported from America and Yunnan (China) by VERSEGHY (1962, p. 118).

## PARMELIACEAE

### **Parmelia stygia** (L.) Ach.

Thallus foliose, shining brown above, and pale brown to brown black below; sparingly rhizinose; lobes small, eciliate. Soredia and isidia absent. Apothecia numerous, sessile, brown, epruinose. Asci 8 spored; spores simple, colourless, 9-13 (15)  $\times$  3.8-5.7  $\mu$ . Thallus cortex K—, C—, KC—, P—; medulla K+yellow then red, P+yellow.

*Habitat*—On rocks.

*Localities*—Palni Hills, below Perumalmai, near Hill View, alt. ca. 4300 ft., AWASTHI and SINGH No. 70.445; SINGH No. 70.1212. (LWU)

*Parmelia stygia* is a brown *Parmelia* commonly occurring on the noncalcareous rocks in the northern hemisphere. It closely resembles *P. acetabulum* (Neck.) Duby, which is distinguished by light coloured lower surface and corticolous habit. The 7 species (*Parmelia acetabulum*, *P. argentifera* Nyl., *P. exasperatula* Nyl., *P. glabra* Nyl., *P. glabratula* (Lamy) Nyl., *P. glomellifera* Nyl., and *P. olivacea* (L.) Nyl.) of the subgenus *Melanoparmelia* so far known from India are all corticolous and reported from N.W. and W. Himalayas. The occurrence of *P. stygia* in India is interesting in being the first saxicolous brown *Parmelia* and that too from the hills in S. India, remote from the area of occurrence of allied species.

### **Hypogymnia zeylanica** (R. Sant.) comb. nov.

(Basionym: *Parmelia zeylancia* R. Sant. *Bot. Notiser*, 1942:325)

Thallus foliose, laciniate lobate, laciniae narrow, often with minute lateral lobules, whitish grey to ashy brown above; black shining, erhizinose and characteristically perforated below; medulla hollow. Thallus isidiate; isidia in the central part of the thallus, elongated and branched; greater part of the thallus with dense verrucae which break open to produce granular soredia. Only a single apothecium seen. Apothecium sessile, laminal, rounded, 2 mm in diam., disc concave, shining yellowish, epruinose; margin entire, thalline. Epithecium yellowish, 5-8  $\mu$ , K—; hymenium colourless, 28-38  $\mu$ , K—, I+blue (asci only); hypothecium colourless, 9-15  $\mu$ . Asci clavate, 15-28  $\times$  12-15  $\mu$ , 8 spored; spores colourless, simple, ovoid-ellipsoid, 5-8  $\times$  3.8-5.7  $\mu$ , spore wall 1  $\mu$  thick. Paraphyses simple, 2.5  $\mu$  thick, septate and forked at apices. Pycnidia immersed and confined towards the tips of the lobes and lobules, brown black, globose, 114-152  $\mu$  in diam., pycnoconidia (microconidia) thin simple, oblong, 4-6  $\mu$  long. Thallus cortex K+brownish, C—, KC—, P—; medulla K+brownish orange, C+yellow to orange red, KC+reddish, P—.

*Habitat*—On tree trunks of *Rhododendron arboreum*.

*Localities*—Palni Hills, Kodaikanal, near Pillar Rocks, alt. ca. 7500 ft.; AWASTHI and SINGH No. 70.184 (LWU); Nilgiri Hills, on way to Doddabetta Peak, near Ootacamund, alt. ca. 7500 ft., AWASTHI and SINGH Mo. 71:131 (LWU)—scarce.

The taxon *Parmelia zeylancia* was described by SANTESSON (1942) on a sterile material from Ceylon, and he distinguished the species by the characteristically branched isidiose habit, an unusual feature in the Hypogymnias. He also mentioned the thallus to possess 'soredia evanescentia'. The Pillar Rocks' specimens are fertile but only a single apothecium

is present. At the same time the thallus is profusely verrucose sorediose in addition to the presence of the branched elongated isidia which compare favourably with the photo of the type specimen in SANTESSON (1942). It is likely that since the 'soredia evanescentia' are also comparable in the apices of the lobes, the excessively sorediate habit of the specimens examined is a more mature condition, and thus *Hypogymnia zeylanica* is also characterized by the possession of soralia developed from verrucae in addition to the branched isidia.

A purely verrucose-sorediose condition is characteristic of *Hypogymnia austerodes* (Nyl.) Räs. var. *verrucosa* (Elenk.) Räs., but this taxon is distributed in the northern boreal region, does not possess isidia, and is different in the habit of laciniae and colour of thallus. Another *Hypogymnia* occurring in the Pillar Rocks region of Kodaikanal is: *Hypogymnia pseudobitteriana* (Awasthi) Awasthi comb. nov. (basionym: *Parmelia pseudobitteriana* AWASTHI, *Current Science*, **26**: 123. 1957), which is distinguished by the diffused sorediate laciniae and absence of isidia.

## BUELLIACEAE

### **Buellia ceylanensis** A. Zahl.

Thallus crustaceous, thin, ashy grey, smooth, chinky to areolate; areoles minute, irregular in shape, flat to slightly convex, hypothallus absent. Apothecia ± immersed to slightly erumpent and sessile, rounded, up to 0.8 mm in diam.; disc plane to convex, black, epruinose. Hymenium colourless, without oil globules, K—, I+ deep blue turning blackish; hypothecium brown, 50-80 μ thick, exciple proper colourless, no algal cells in margin. Asci 8 spored; spores brown, 2 celled, ellipsoid to slightly curved bean shaped, 10-15 × 5.7-7.6 μ, rarely constricted at septum, cell wall uniformly thickened. Paraphyses simple or rarely forked, apices capitate. Thallus cortex and medulla K + light yellowish then red, C—, KC—, P—.

*Habitat*—On rocks.

*Locality*—Palni Hills, below Perumalmalai, Hill View, alt. ca. 4350 ft., AWASTHI and SINGH No. 70.452 (LWU).

The taxon has so far been known from the solitary type collection in Ceylon. It is distinguished by the dark thallus, medulla K + red, apothecia immersed and saxicolous habit. It shows some affinity to *Buellia aethalea* (Ach.) Th. Fr., which has a lighter thallus and larger spores.

## PHYSCIACEAE

### **Physciopsis elaeina** (Sm.) Poelt var. **pyrithrocardia** (Müll. Arg.) comb. nov.

(Basionym: *Physcia adglutinata* var. *pyrithrocardia* Müll. Arg. *Flora*, **63**: 278, 1880).

Thallus closely adpressed to substratum, grey brown, laciniae small, pinnatifid, laminally sorediate; underside whitish, rhizinae insignificant or absent; medulla intermittently orange red (K + violet), elsewhere white. Apothecia laminal, sessile, 0.5-1 mm in diam., red brown to dark brown, epruinose. Asci 8 spored; spores brown, 2 celled, thick walled, ellipsoid, 15-24 × 7.6-11 (13) μ. Paraphyses simple with capitate apices and rarely apically forked. Pycnidia immersed, pycnoconidia curved 11-15 μ long. Thallus cortex and medulla K—, C—, KC—, P—.

*Habitat*—On bark of *Jatropha* shrubs.

*Locality*—Palni Hills, Oothu area, alt. ca. 3500 ft., AWASTHI and SINGH No. 70.401 (LWU); on way to Perumal Peak, SINGH No. 70.1070; Perumal coffee plantation area, alt. ca 5000 ft., SINGH No. 1108 (LWU).

None of the species of the genus *Physciopsis* has so far been reported from India, though *P. elaeina* (Sm.) Poelt and *P. syncolla* (Tuck.) Poelt are two species widely distributed in the tropical and subtropical regions of the world. *P. elaeina* var. *pyrithrocardia* (Müll. Arg.) has earlier been reported from S.E. United States, Mexico and Caracas as basionym.

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