Some new records of lichenized fungi from India-1

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Six lichen taxa collected mainly from monuments and environs of Karnataka State are studied, of which, five are new to the Indian flora; and the sixth one reported earlier,exhibits an interesting feature that is new to this species.

Key-words– Lichenized fungi, New records, Karnataka,India

INTRODUCTION

INVESTIGATIONS of lichens collected from monuments and environs from Karnataka State proved to be an interesting study. Some of the treated material comes from other localities also. Five species, viz., *Caloplaca subdolosa*(Nyl.) Zahlbr., *Dirinaria africana* (Müll. Arg.) Awasthi, *Peltula impressa* (Vainio) Swinscow & Krog, *Phylliscum tenue* A. Henssen, and *Thelenella brasiliensis* (Müll. Arg.) Vainio are being reported from India for the first time. *Phylliscum testudineum* A. Henssen, from Hampi, Bellari district shows peculiar isidial or isidia-like growth on its thalline squamules. From this very locality the same condition is exhibited by a few squamules of *Peltula impressa* also. The factor responsible for promoting such a growth on thalli of these species is not known.

The cited material is lodged at the lichen herbarium of National Research Laboratory for Conservation of Cultural Property, Lucknow.

SYSTEMATIC DESCRIPTION

Family — Teloschistaceae

***Caloplaca subdolosa* (Nyl.) Zahlbr.**, Catal.lich. univ.7: 184, 1931

Pl. 1, fig. 1

Lecanora subdolosa Nyl., Acta Soc. Fenn., 26:10.1900.

Thallus saxicolous, crustose, whitish-grey to light lead grey, thin, continuous, rimulose, chinks irregular in outline, plane, K-.

Apothecia 0.3-0.4 mm in diameter, scattered (actually only a few in this material), disc somewhat concave, pale brown, epruinose, surrounded by a black proper margin, thalline margin present but thin and weakly developed; hypothecium colourless, hymenium I+blue, inspersed with oil globlues, paraphyses simple, septate, terminal cells not swollen, asci clavate, 8-spored; 45.5-49 X 10-16 µm, spores biseriate in ascus, hyaline, ellipsoid, polarilocular, similar to that of *Caloplaca haemalites* (see Wade, 1965), 8-10 X 7 µm.

The small size of thallus renders this species inconspicuous, ±hidden in the jumble of other crustose lichens. This report is based on a chance discovery while scanning some crustose forms under magnification in the laboratory.

This species is known from its type locality (Nylander, 1900) growing on rocks. Its presence in the neighbouring south Indian region is therefore not surprising.

Specimen examined: Karnataka; Raichur district, Anigundi, Anjani Parvat, 10.12.1990, Singh, Sinha & Singh 90.231A (Hb. NRLC)

Family — Physciaceae

***Dirinaria africana* (Müll.Arg.) Awasthi**, Bibliotheca Lichenologica, 2:40.1957

Pl. 1, fig. 2; Text-fig 1

Physcia africana Müll. Arg. Linnaea, 63:33.1880

Thallus foliose saxicolous, ± orbicular, 3 cm across, firmly attached to substratum, glaucous grey to yellowish grey, laciniate, laciniae up to 1 mm broad, dis-

crete and pruinose at marginal region of the patch, apices round, sometimes with brownish margin, at centre laciniae confluent, imparting verrucose appearance to the thallus, isidia and soredia absent,underside black; erhizinate; thallus heteromerous, upper cortex white opaque, K+yellow, photobiont layer prominent, continuous, medulla white in upper part, yellow in lower part, K- (upper white part) and K+reddish (lower yellow part). P-, lower cortex brownish-black.

Apothecia ± sessile, ca 1.0 mm in diameter, disc plane to slightly entire while young, somewhat crenate later, epithecium brown, K-, hypothecium brownish-black, protruded at centre into stipe-like structure, narrowed at margins; hymenium I+blue, asci aclavate, 8-spored; spores brown, 2-celled, thick-walled, oblong-ellipsoid, 13.5-16.5X 5-6.5 µm, paraphyses simple, capitate at apices.

This saxicolous species, apart from wide distribution in central and southern Africa, is also reported from Sri Lanka from a single collection (Awasthi, 1975). Its discovery in the peninsular India indicates the possibility of its wider distribution in Asia.

*Specimen examined:*Karnatka; Mysore district,growing on Chamundi temple wall (stone), Chamundi hill, 24, 11.1990, Singh, Sinha & Singh 90.108 (Hb.NRLC).

Family — Peltulaceae

***Peltula impressa* (Vainio) Swinscow & Krog,** Botany 3: 213- 224. 1979

Pl.1,fig.3

Heppia impressa Vainio, Beibl. Hedwigia 37:43.1898.

Thallus areolate-placodiform, olive green to olive brown, central part consisting of compact to somewhat dispersed ± round peltate or shield-like, irregularly lobulate, 0.3-0.8 (-1.0) mm across, plane to slightly convex, sterile to 1-2 carpous squamules, attached to the substratum by a central holdfast, peripheral part consisting of prostrate, anticlinally elongated, simple to once-furcate flat firmly adnate, sterile, 0.4-0.6 mm long, ca 0.2 mm borad squamules, rarely some sterile squamules show globular isidia-like growth (90.237 (1)).

Squamules consisting of solid paraplectenchymatous tissue, 110-120 µm thick, upper yellow to brownish, epinecral layer 8-10 µm thick, photobiont zone diffused through the paraplectenchymatous tissue, a medullary zone indistinct, lower cortex paraplectenchymatous, 6.5-15.0 µm thick.

Apothecia 1 (-2) per squamule, immersed, at first punctate but later opening into a 0.3-0.4 mm wide disc, thalline margin indistinct, epithecium yellowish-brown 16-17 µm thick, subhymenium and hypothecium clourless, each 30-35 µm high; hymenium I+vinose red, ca 115 µm high, asci nonamyloid unitunicate, multispored, with a gelatinous sheath around their apices, 55-60 X 24-27 µm; spores ± round 3-4 µm in diameter. Pycnidia not observed.

Peltula impressa is identical to *Peltula placodizans* (Zahlbr.) Wetmore. According to Büdel (1987) it is rather impossible to differentiate between the two beacause of the meagre range of character differences. He, however, observed that *P. placodizans* is characterized by smaller and darker squamules and a medulla represented by hollow medullary cavity. *P. impressa* on the other hand is characterized by larger squamules and an indistinct medulla as the photobiont layer is diffused through out the paraplectenchymatous zone occupying the entire space between upper and lower cortices. The relative size and colour of squamules do not appear as reliable distinguishing features because of their overlapping range in the two species. However, the medullary character seems more reliable. The diffused algal zone throughout the thallus thickness in *P. impressa* denotes the absence of medulla.

P. impressa was found in abundance on the exposed rocks to the extent that it appeared to cover the entire face of rocky hillocks as a monoculture growth. It was sparsely interspersed with similar looking species (to the nakedeye) like, *Peltula euplaca* and *Phylliscum testudineum*.

Specimens emamined: Karnataka: Bellari district, Hampi, 10.12.90, on exposed rocks, Singh, Sinha & Singh 90.233 (1,2,3), 90.237 (Hb. NRLC). Raichur district, Anigundi, on exposed rock-faces of hillocks around Pampa Sarovar, 10.12.90, Singh, Sinha & Singh 90.228, 90.229 (Hb. NRLC).

Family-Licheniaceae

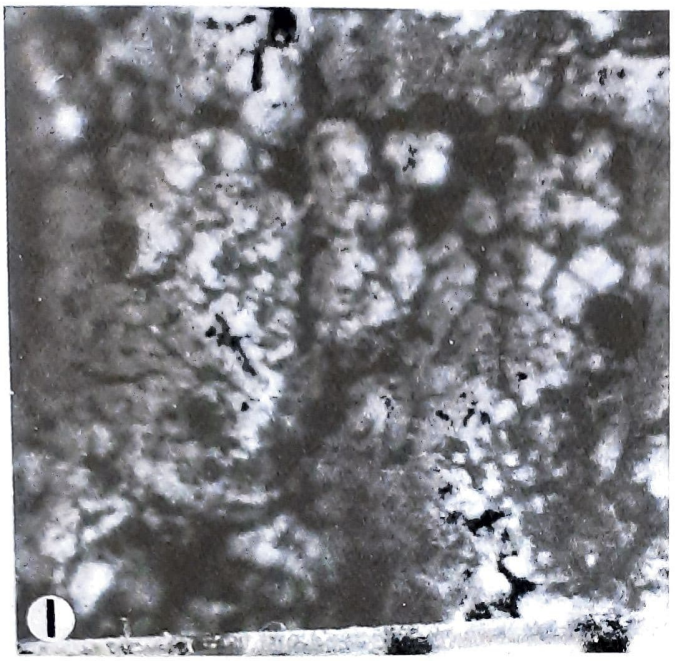
***Phylliscum tenue* A.Henssen,** Svensk. Bot. Tridskr. 57:152.1963.

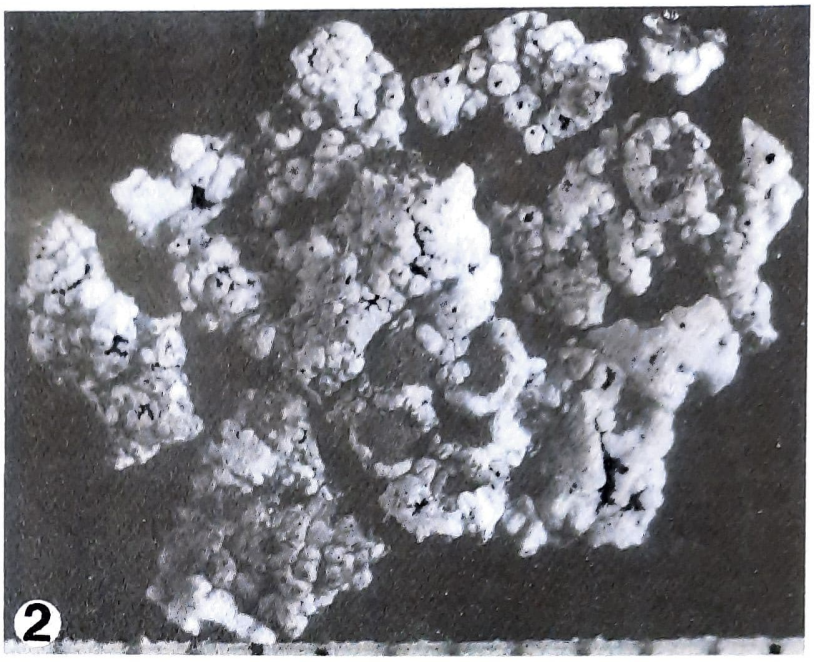
Pl.1, fig.4, Text-figs 2&3

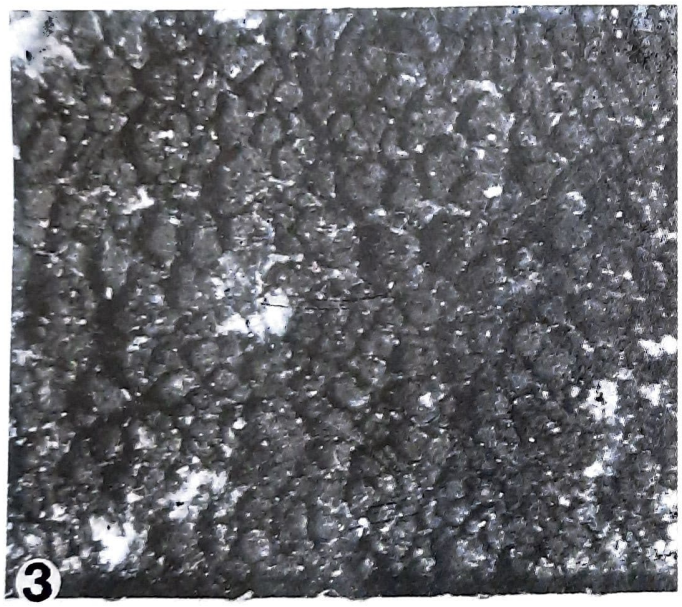
Thallus on lime plaster of roof, squamulose, black when dry, olive green, umber or blackish when wet, squamules umbilicate, usually dispersed 0.2-0.4 mm in diam, sometimes aggregated, forming somewhat compact, round to irrregular minute gelatinous masses, ca

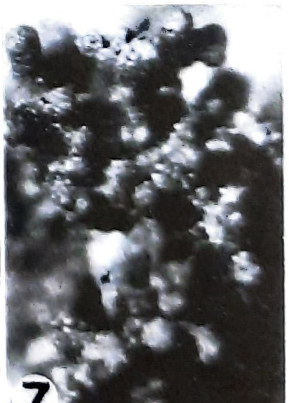
Plate 1

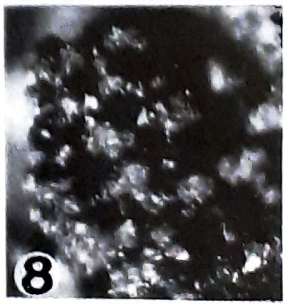
Fig. 1. *Caloplaca subdolosa*-Habit. 2. *Dirinaria africana* - Habit. 3. *Peltula impressa*- Habit. 4. *Phylliscum tenue*- Habit. 5-8 *Phylliscum testudineum*. 5. Fertile squamules (from above). 6. The same as 5 (side view). 7 & 8. Isidiate squamules. 9. *Thelenella brasiliensis* - Habit. (scale figs. 2, 3 & 9. Each division =1.0 mm).











1
5–8
4
} = 1.0 mm

PLATE 1

0.85 mm across, vegetative part very much reduced, usually represented by a number of ± globular masses (reduced lobules) attached to the apothecial thalline margin at its different levels, the basal ones spreading slightly in irregular fashion, the thalline margin of the sole apothecium in the squamule however, constituting the main mass of its vegetative part; thallus homoiomerous *photobiont a chroococcoid alga*, a few cells embedded in minute, round gelatinous masses, many of which coalescing, forming larger masses representing the thallus, mycobiont hyphae ramifying profusely in the algal gelatin.

Apothecia single in squamule, prominent, 0.2-0.3 mm in diameter, generally urn-shaped or the disc sometimes moderately expanded; thalline margin prominent, solely or largely representing vegetative part of the squamule, proper margin indistinct; disc punctate to moderately expanded, plane, light yellow-brown when wet, indistinct when dry,epruinose, hypothecium colourless, 30 µm thick; hymenium 80-85 µm high, I-; asci clavate, 8-spored 35-39 X 15-16.5 µm; spores simple,hyaline, elliptic to oblongelliptic 9-11X 6-6.5 µm paraphyses branched and anastomosing.

P. tenue is characterized by very small or reduced squamules (thallus) that are generally solitary and dispersed. Sometimes reduction of the thallus is to the extent that it is solely represented by the prominent thalline margin of the single apothecium of the squamule.

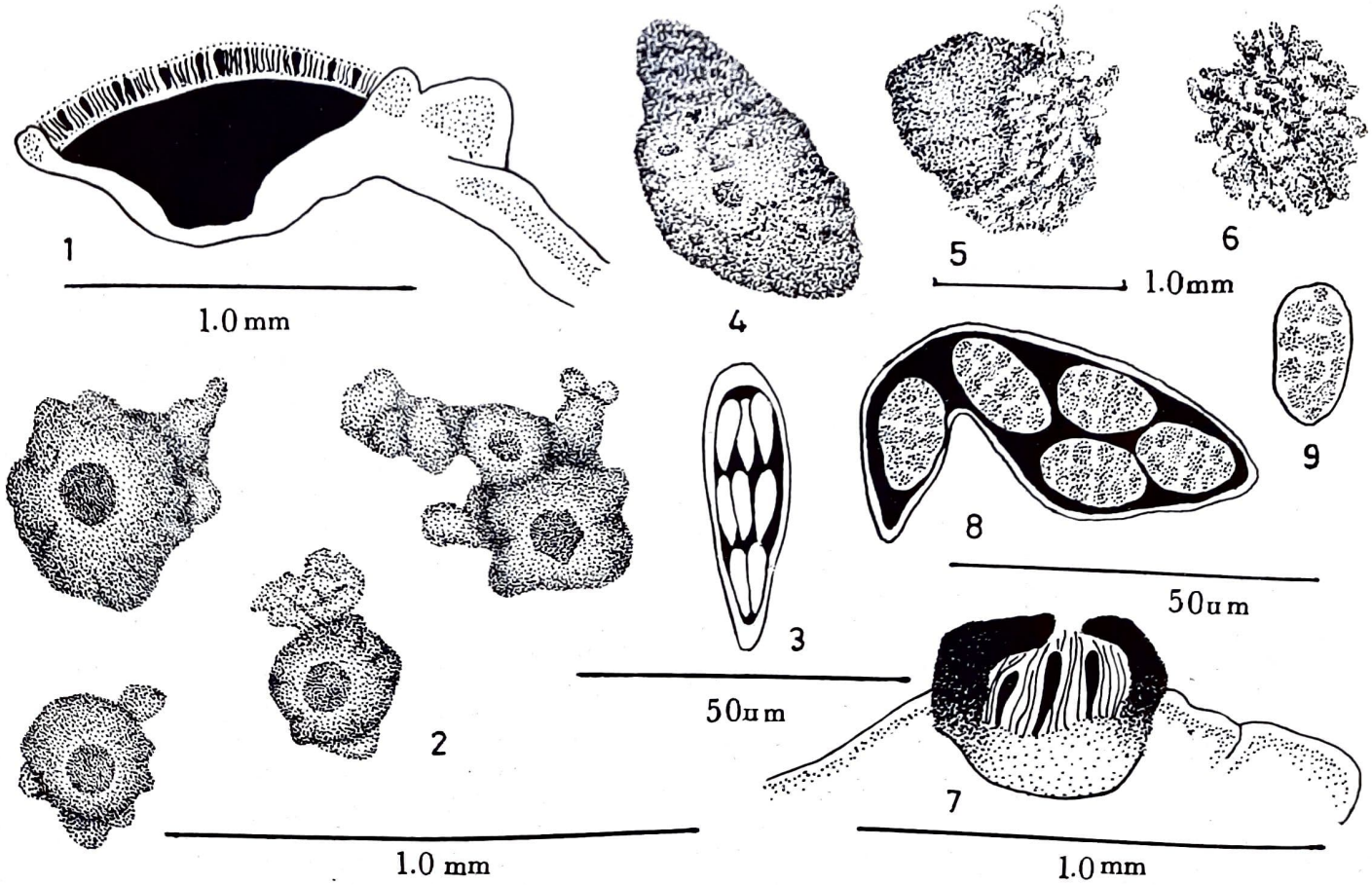
This species was originally reported from western North America (United States-California) growing occasionally on moist rocks (Henssen, 1963). Its presence in the peninsular India just on the other side of the globe exhibits an interesting distributional pattern. Poor reporting of this species may be attributed to the minute size of its thallus which in all probability escapes the eye of the collector.

Specimen examined: Karnataka; Mysore district, Somnathpur, Panchlingeshwar temple, on roof plaster, 25.11.1990. Singh, Sinha & Singh 90.122A (Hb.NRLC).

***Phylliscum testudineum* A. Henssen**, Svensk. Bot. Tidskr. 57: 153. 1963.

Pl.1, figs 5-8; Text-figs 4-6

In the description of thalline characters of this species, Henssen (1963) made no mention of the presence of isidia. From India, Awashti and Singh (1977) reported this species from Kodaikanal and environs in Palni Hills, Tamil Nadu. None of the two specimens



Text figures 1-9. 1. *Dirinaria africana*- Vertical section of apothecium and part of thallus. 2&3. *Phylliscum tenue*. 2. Habit. 3. Ascus. 4-6. *Phylliscum testudineum*. 4. Normal fertile squamule. 5. The squamule with normal fertile half and the other isidiate half. 6. Isidiate squamule. 7-9. *Thelenella brasiliensis*. 7. Vertical section of ascocarp. 8. Ascus. 9. Spore.

cited by them exhibits any isidial growth. In Karnataka, we gathered this taxon from Hampi (Bellari district) growing on dry and exposed natural rocks, that presents an interesting combination of characters. Based on additional characters found by us the description of thallus has to be emended, which is as follows:

Thallus squamulose, squamules scattered, roundish to ± irregular in outline, 0.6-1.2 mm across, generally convex, sometimes plane stipitate, margins not curved, up to 1.0 mm high blackish-brown on lower side, of three types; 1-the usual fertile multicarpous squamules, upper surface undulate to rivulate in lobule -like fashion, or with minute ± globular protuberances (seen even on the stipe), 2-sterile squamules, where the protuberences of the former type appear to develop into globuler to coralline isidia, imparting the squamules a miniature tree-like appearance, and 3-squamule (only one seen) which in one half exhibits the usual fertile non-insidiate condition and the other half is sterile and with coralline isidial growth (Text-fig. 5).

In case the third type of squamule was absent, it could have been a case of an independent subspecific taxon charactrerized by the isidiate condition of thallus. In the same way many squamules of *Peltula impressa* among whose thalli the peculiar squamules of *Phyllis-cum testudineum* are scattered also exhibit the isidiate condition (specimen no 90.237). The two species are not known for any isidial growth on their thallus. Isidia or isidia-like growth in these genera thus do not seem to constitute an important taxonomic character.

Specimens examined: Karnataka; Bellari district, Hampi, on exposed rocks, 10-12-1990, Singh, Sinha & Singh 90.233 (2), 90.237(a) (Hb.NRLC).

Family Thelenellaceae

***Thelenella brasiliensis* (Müll. Arg.) Vainio**, J. Bot. 34: 293. 1986.

Pl.1, fig.9; Text-figs 7-9

Microglaena brasiliensis Müll. Arg. Flora 71:547(1888).

Thallus saxicolous, epilithic, crustose, dark grey cracked areolate, K-; fertile areoles smaller, uni-to poly (up to 5)- carpous; hypothallus not observed; cortiform layer of epinecral layer of fungal tissue, photobiont *Trebouxia*-type.

Ascocarps perithecioid, up to 0.4 mm in diameter, ± globose, immersed in thallus or upper part of perithecia becoming exposed and dark coloured: wall colourless, upper part dark brown to blackish. Nucleus I+ vinose red; paraphyses simple, upper part sparingly branched and anastomosing, asci non-amyloid, subcylindrical, clavate, 4-6-spored, 80 X 19-20 µm, spores hyaline, ellipsoid, muriform, 16-20 X 11-13 µm, cells arranged in 6 tiers; 1-3 cells in each tier.

Pycnidia not observed. From the only species, *Thelenella luridella* (Nyl). Mayrh., reported from India. *T.brasiliensis* differs by its smaller spores with lesser number of cell tiers. *T. brasiliensis* with its dark brown to blackish upper part of the ascocarp can be confused with *Thelenella kerguelena* (Nyl.) Mayrh., which is charactrerized by the presence of dark brown involucrellum derived from thalline tissue. Other characters too of the two species are somewhat identical but their distributional pattern is distinctive. *T. kerguelena* is a subantarctic species, whereas *T. brasiliensis* is a tropical and subtropical one. As the latter has earlier been reported from the neighbouring subtropical south western part of Setschwan province of China (Mayerhofer, 1987) its report from Meghalya is not surprising.

There is some difference between the spore-length in our specimen (16-20 µm) and that reported by Mayerhofer (1987) (20-32 µm). It may be so because the spores in the Indian specimen are perhaps not fully mature.

Specimens examined: Meghalaya, Shillong district, Shorarim (Shillong-Cherrapunji Road), Singh, Chatterjee & Singh, 91.5(Hb. NRLC): Shillong, Elephant Falls, Singh, Chatterjee & Singh 91.22 (Hb.NRLC).

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