

long, white; lateral staminodes obovate-oblong, 2-2.5 cm long, 1.4-1.7 cm broad, white, subcarnose; lip 3.5-5.5 cm long, 2.5-4.8 cm broad, crumpled at margins, white with a fleshy, glossy, red median band, gradually broadening and merging upwards into a purplish red flush which ultimately becomes almost pale violet in age, the base with dense streaks of red on either side of the median band; filament *ca* 2 mm long; anther 1-1.5 cm long; connective inflexed, produced into a *ca* 1 mm large, notched crest; ovary cylindric, 7-10 mm long, white. (Figs. 1-10).

Flowering: April-September. Along forest-margins, in shady places; 150-1850 m. Like several other zingiberaceae members, in this species also fruiting has not been noticed neither in nature nor in the experimental garden, though there is free flowering.

Specimens cited: ASSAM: *Darrang*—Batasipur, M. M. Srinivasan 22411. *Halem Tea Estate*, *Burton*

21749. *Tangla*, *Nath* 13387. *Kamrup*—Gharbhanga, A. S. Rao 38791. *Lakhimpur*—Jeypore, G. K. Deka s.n. (accn. no. 93). *N. Cachar & Mikir Hills*—Garampani, *Deb* 35151. *Nowgong-Doboka*, *Balakrishnan* 39415. *Kholahat*, *De* 20327. *Sonaikuchi*, *Balakrishnan* 39222. *Sibsagar*—Panbari, *Deb* 34846. *Assam*, s.l., *Mann* 307. MEGHALAYA: *Garohills*—Norengiri, *Deb* 29287. *Rongrengiri*, *Deb* 29216. K. & J. *Hills*—Bholagonj, G. K. Deka 203260. *Nongpoh*, *De* 20326, 21089; *Joseph* 37477. *Shillong*, 'Woodlands', *Verma* 38422. *Tharia*, G. K. Deka 19668. NEFA—*Kameng*—Bhairabkunda-Amratola, *Panigrahi* 15229.

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A. S. RAO AND D. M. VERMA

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SIX NOTEWORTHY CORTICOLOUS LICHENS FROM INDIA

During the study of the lichens of 24-Parganas, Indian Botanic Garden, Sibpur and Eastern Himalayas six noteworthy lichens have been discovered which show new distribution records. Two of these are new records for Indian subcontinent and others are reported for the first time from West Bengal and Assam. The specimens are deposited in the herbarium of the Cryptogamic Unit, Botanical Survey of India, Calcutta. Duplicates of the same are deposited in the Cryptogamic Division, Vermont University, Burlington (U.S.A.).

ARTHOPYRENIACEAE

Arthopyrenia planorbella (Nyl.) Zahlbr. Cat. Lich. Univ. 1: 310, 1922. *Verrucaria planorbella* Nyl. in Bull. Soc. Linn. Normand II, 7: 181, 1873.

Thallus crustose, thin, smooth, greenish-brown. Pseudothecia crowded together, minute, 0.1-0.5 mm in diameter. Spores brown 3-septate, oblong-ellipsoid, $17-24 \times 8-11 \mu$, 8 in each ascus. Pseudoparaphyses richly branched and anastomosing forming network.

Specimen examined: West Bengal: 24-Parganas, Joypul, Dec. 1966, *Roy Chowdhury* 327.

Previously reported only from Andamans.

Trypethelium straminicolor (Nyl.) Lich. Japan. p. 115, et-1890. *Sertum Lich. Trop. Labuan et Singap.* p. 16, 1891. *Zahlbr. Cat. Lich. Univ.* 1: 500, 1922.

Thallus crustose, the superficial portion thin, rough, blackish. Pseudothecia crowded, blackish with minute ostioles. Asci thick walled. Pseudoparaphyses branched and anastomosing. Spores hyaline, oblong, $21-26 \times 6-7 \mu$, 3-septate, 8 in each ascus.

Specimen examined: West Bengal: 24-Parganas, Joypul, Dec. 1966, *Roy Chowdhury* 334; Assam: Shillong Mawsami, Sept. 1967, *Dharne* 1071.

First time reported from Indian subcontinent, previous reports are from Singapore and Japan.

OPEGRAPHACEAE

Opegrapha subsulcata Muell.-Arg. in Jour. Linn. Soc. Bot. 29: 224, 1892. *Zahlbr. Cat. Lich. Univ.* 2: 251, 1923.

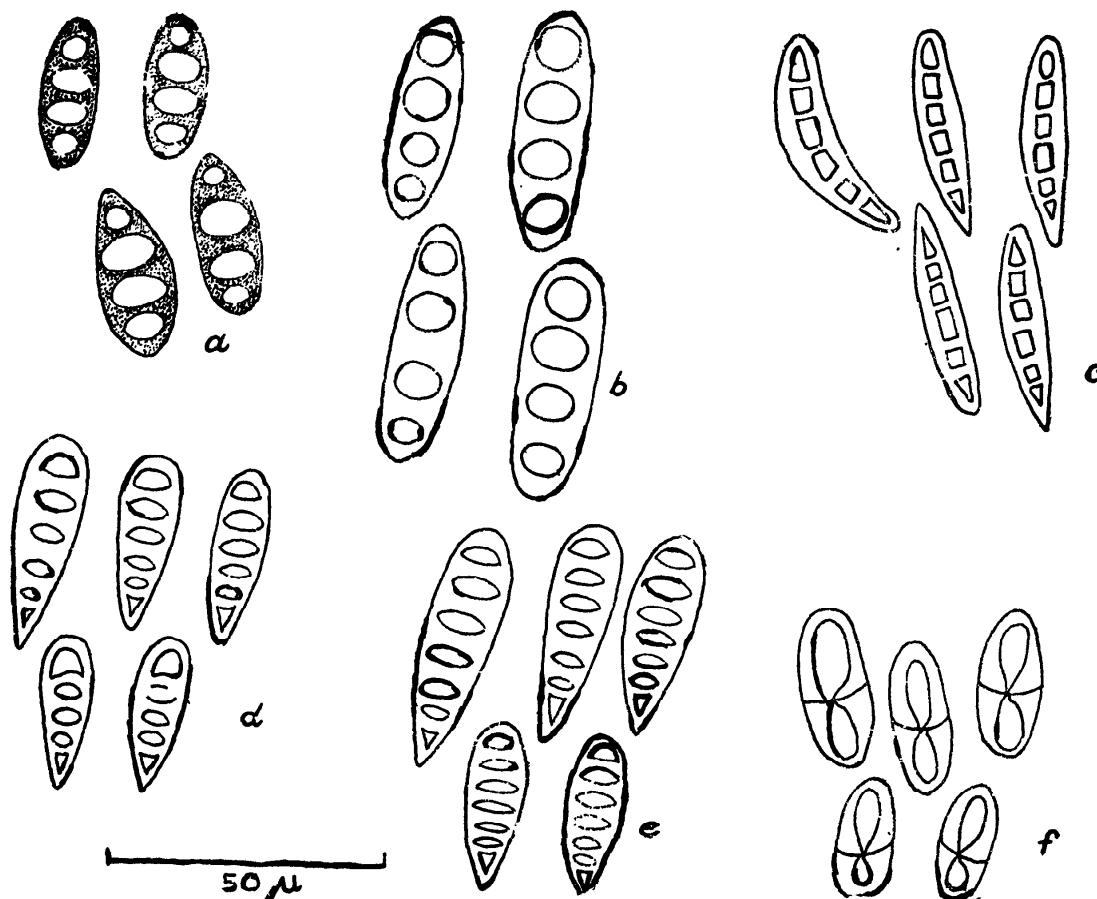
Thallus thin, greenish-grey, surrounded by blackish outlines. Ascocarp fusiform, black and indicated by blackish depressed line. Spores hyaline, $26-28 \times 4-6 \mu$, 5-septate, fusiform, 8 in each ascus.

Specimen examined: West Bengal: 24-Parganas, Joypul, Nov. 1966, *Roy Chowdhury* 343.

Previously reported only from Manipur.

GRAPHIDACEAE

Phaeographis leprosulans Muell.-Arg. in *Hedwigia* 32: 186, 1891. *Zahlbr. Cat. Lich. Univ.* 2: 378, 1923.



a. Ascospores of *Arthopyrenia planorbella* (Nyl.) Zahlbr.
 b. -do- *Trypethelium stramineicolor* Nyl.
 c. -do- *Opegrapha subsulcata* Muell.-Arg.

d. Ascospores of *Phaeographis leprosulans* Muell.-Arg.
 e. -do- *P. divaricoides* Räs.
 f. -do- *Buellia aggreiciens* (Stirt.) Zahlbr.

Thallus thin, smooth, blackish. Apothecia much branched, curved, clustered, greyish. Spores hyaline, $17-24 \times 6-8 \mu$, 3-5-septate, oblong ellipsoid, 8 in each ascus.

Specimens examined: West Bengal: Howrah, Sibpur, Indian Botanic Garden, Nov. 1966, Roy Chowdhury 339. 24-Parganas, Birati, Saptagram, Dec. 1966, Roy Chowdhury 353; Joypul, Dec. 1966, Roy Chowdhury 336.

First time reported from Indian subcontinent, previous report is from Tonkin.

Phaeographis divaricoides Räs. in Arch. Soc. Zool. Bot. Fenn. "Vanamo" 5(1): 31, 1950.

Thallus forming a thin crust upon the bark. Apothecia linear curved, \pm immersed, disk open, flat, greyish-pruinose. Hypothecium hyaline. Spores hyaline, $13-17 \times 6-8 \mu$, 6-septate, oblong-ellipsoid, cells lenticular.

Specimens examined: West Bengal: Howrah, Sibpur, Indian Botanic Garden, Sept. 1967, Roy Chowdhury 629. Assam: Shillong, Woodlands, Alt. 1375 m, Sept. 1967, Dharne 984.

Reported previously only from Sikkim.

BUELLIACEAE

Buellia aggreiciens (Stirt.) Zahlbr. Cat. Lich. Univ. 7: 333, 1931. *Lecidea aggreiciens* Stirt. in Proc. Phil. Soc. Glasgow 11: 313, 1879.

Thallus continuous, smooth, greenish-grey. Apothecia small to middle sized, 0.3-0.5 mm in diameter. Spores hyaline, $11-13 \times 4 \mu$, ellipsoid, 1-septate, 8 in each ascus.

Specimens examined: West Bengal: 24-Parganas, Birati, Saptagram, Sept. 1967, Roy Chowdhury 395. Assam: Shillong, Woodlands, Alt. 1375 m, Sept. 1967, Dharne 1341.

Previously reported only from Nilgiri.

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STUDIES ON THE LIMESTONE VEGETATION OF SAHASRADHARA NEAR DEHRA DUN (U.P.)—7. PHYTOSOCIOLOGICAL STUDIES: COMMUNITY CO-EFFICIENT

The Sahasradhara area has a number of conspicuously different habitats, such as hill tops and slopes, both calcareous and non-calcareous. The vegetation of these diverse habitats were compared. This has been done by determining the community co-efficient of a number of stands (Oosting, 1956). The community co-efficient of the different stands are tabulated below:

Sl. No.	Stands	Community co-efficient
1.	Eastern hill top and western hill top	47.3
2.	Eastern non-calcareous and western non-calcareous slopes	47.95
3.	Eastern calcareous and western calcareous slopes	67.30
4.	Eastern ravines and western ravines	56.14
5.	Eastern calcareous and eastern non-calcareous slopes	41.02
6.	Western calcareous and western non-calcareous slopes	20.27
7.	Eastern calcareous and western non-calcareous slopes	23.82
8.	Western calcareous and eastern non-calcareous slopes	24.15

As can be seen from this table, the stands have been compared mainly to find out the effect of calcium, direction and topography on the vegetation.

The vegetation of the eastern calcareous and western calcareous slopes has the highest community co-efficient *i.e.* 67.30. This indicates fairly good resemblance between the two stands. Obviously it is the calcium rich rocks which are responsible for this similarity and the less difference is due to the topography of the eastern and western slopes. Similarly the ravines, which are under stress of immense erosion on either side also have a high community co-efficient *i.e.* 56.14. The community co-efficient of eastern and western top of the hillocks is only 47.03. This indicates greater difference and less resemblance. However, this is understandable

since the Timli village is situated on the eastern top and the vegetation of the area is under stress of intense human pressure. On the contrary, the vegetation on the western top is not easily accessible and is less disturbed and comparatively richer.

The community co-efficient of vegetation on calcareous and non-calcareous rocks on the eastern and western slopes differs markedly. They are respectively 41.02 and 20.27. The difference is expected on account of the different underlying strata. The author's field observations give a plausible explanation of this conspicuous difference. The dissimilarity in the other stands as indicated above (low community co-efficient) is obviously due to the different topography.

The eastern and western non-calcareous slopes have a still higher community co-efficient, which is 47.95 but the calcareous slopes on the eastern and western sides show even much greater similarity to each other which is evident from the high value 67.30 of the community co-efficient.

The eastern and western ravines also show similarity as is evident from the high value of community co-efficient, which is 56.14.

The vegetation on the calcareous and non-calcareous slopes, however, show a lot of dissimilarity. Thus the community co-efficient of the two stands on the western calcareous slopes and western non-calcareous slopes is only 20.27. However, the community co-efficient of the eastern calcareous slopes and the eastern non-calcareous slopes is 41.02, which is higher than that on the western calcareous and non-calcareous slopes described above.

It was observed that on the western slopes, the calcareous and non-calcareous rocks are completely isolated from each other on account of the presence of deep ravines cutting vertically downwards between the two. Thus the two underlying rocks are