megasporogenesis gets arrested during further development (figures 4, 5). This results in a rudimentary obturator.

The funicular obturator was first recorded by Padhye[6] in *Kyllinga triceps*. Subsequent investigations confirmed its presence in several taxa of the family[7-14]. This structure was, however, not recorded in *F. quinquangularis*[17] and *F. dichotoma*[15], but a reinvestigation of the former species confirms the presence, though of a rudimentary type of obturator (figures 5).

The various taxa of the Cyperaceae investigated so far are classified here on the basis of the nature and extent of development of obturator.

I-Obturator well developed

(a) *Obturator compact*

Cyperus niveus, C. rotundus, Scirpus mucronatus,[4,16] *Pycrues sanguinolentus,*[11] *P. puncticulatus,*[18] *P. pumilus, Cyperus alternifolius, Mariscus paniceus, Eleocharis atropurpurea, Scirpus supinus, Fuirena cilaris* and *Scleria lithosperma* (present work).

(b) *Obturator loose*

Kyllinga triceps,[6] *K. melanospora,*[16] *Fuirena wallichiana, Cyperus tagetum, C. compressus, Eleocharis geniculata,*[8] *Cyperus alopecuroides,*[13] *Eleocharis tetragona, E. plantaqinea, Kyllinga monoćephala,*[18] and *Remirea maritima* (present work).

II–*Obturator rudimentary*

Fimbristylis milicea,[4] *F. falcata, F. tetragona, F. argentea,*[18] *F. cymosa* and *F. quinguangularis* (present work).

The constituent cells of filamentous obturator grow over the micropyle and in some cases even go beyond to reach outer integuments[5,11,12]. Patel and Shah[7] and Tiwari[11] reported entry of obturator into the micropyle. However, their figures do not appear convincing. This situation has never been observed in any of the taxon studied presently.

The obturator is believed to facilitate entry of the pollen tube into the embryo sac and also supply nourishment to the developing pollen tube. The present finding seems to confirm the role assigned to he obturator.

Schurhoff[19] opined that a structure referred to above is developed on the side of the ovule towards funiculus in place of the outer integument.

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THREE INTERESTING SPECIES OF MACRO-LICHENS FROM NORTH EAST INDIA

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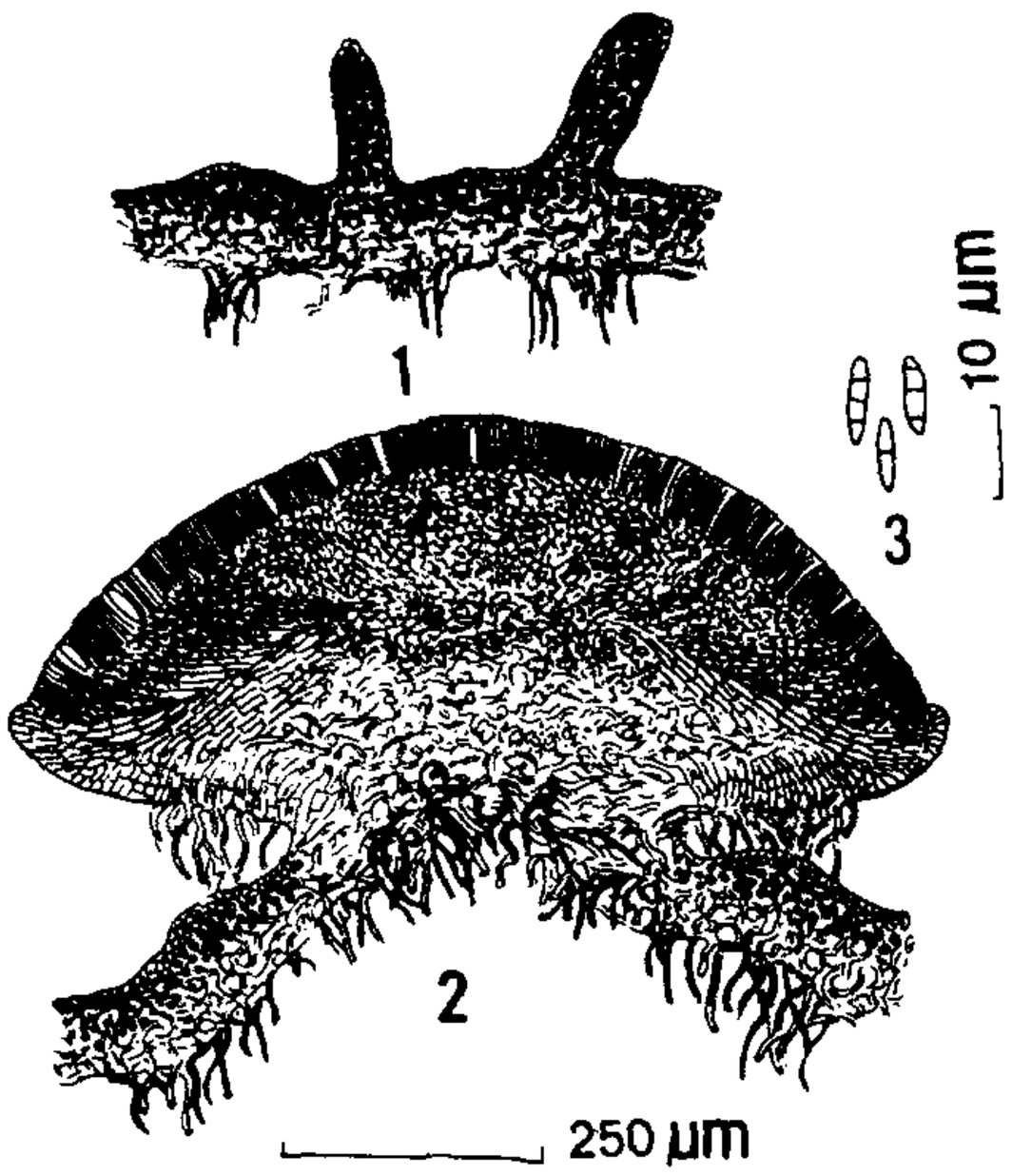
DURING our lichen collecting in the North East India, the following three interesting macro-lichen taxa were collected. *Psorella isidiza* is a new species and the remaining two taxa are new records for India.

1. *Psorella isidiza* Patwardhan & Nagarkar sp. nov. (figures 1, 2, 3)

Psorella isidiophora Awasthi et K. P. Singh affinis sed isidia non-ramosa, (haud coralliformia) cylindrica et ascosporae 1-septatae, parvior (2-3 × 8-12 μm) notabilis. Holotype: Meghalaya, Garo hills, Darugiri Reserved Forest, leg. M. B. Nagarkar, 5 December 1978—78.453 (AMH).



Figures 1-3. *Psorella isidiza* Patwardhan & Nagarkar. **1.** V.S. of the thallus. **2.** V.S. of the apothecium. **3.** Ascospores.

Thallus corticolous, greenish glaucous, effuse, minutely squamulose, isidiate; squamules about 1 mm long, 135-150 µm thick; isidia cylindrical, terete, simple, unbranched; apothecia adnate, constricted at the base, 0.7-1.0 mm in diameter; thalline margin deciduous; disc reddish brown, epruinose; epithecium K—; hypothecium yellowish brown; ascospores 8 per ascus, ellipsoid, tapering at the ends, one septate, 2-3 × 8-12 µm in size.

Chemistry: Thallus K—, P—, C—, KC—; TLC—.

Remarks: *P. isidiophora*[1] the only isidiate species in the genus *Psorella* has coralloid-branched isiidia and larger ascospores.

2. *Everniastrum neocirrhatum* (Hale & Wirth) Hale, Mycotaxon 3: 348, 1976. = *Parmelia neocirrhata* Hale & Wirth, Phyotologia 22: 37, 1971.

Specimen examined: Nagaland, Dimapur—Kohima Road, near Dhipimi—77.1458 (AMH).

Remarks: *E. neocirrhatum* differs from *E. cirrhatum* (Fr.) Hale in sparsely rhizinate thallus margin and in the presence of norstictic acid and salacinic acid in the medulla. Of the 21 species in the genus, only 4 *E. cirrhatum* (Fr.) Hale, *E. nepalense* (Tayl.) Hale, *E. sorocheilum* (Vain.) Hale and *E. vexans* (Zahlbr.) Hale, have so far been reported from Asia[2-4]. The occurrence of the present fifth species in Asia has phytogeographic significance of being America—Asia disjunct.

3. *Parmelina metarevoluta* (Asahina) Hale, Smithsonian Contrib. Bot., 33: 36, 1976. = *Parmelia metarevoluta* Asahina, Journ. Japanese Bot. 35: 97, 1960.

Specimens examined: Manipur, Kohima to Imphal road, near Mao—77.1568, 77. 1570, near Imphal—77.1636. Meghalaya, Shillong to Cherapunji road, Mowjrong—77.784 A. Sikkim, Gangatok, Tangshi View Point—77.1994.

Remarks: The present species is characterized by the marginal or submarginal pustulate soredia, yellow coloured medulla and presence of atranorine, galbinic acid and salacinic acid in the thallus. The specimens from the North East India have norstictic acid in addition to atranorine, galbinic acid and salacinic acid. The taxon is an addition to the lichens of India.

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INFLUENCE OF PESTICIDE FORMULATIONS ON NITROGENASE ACTIVITY OF THE RICE RHIZOSPHERE SOIL

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ALTHOUGH a certain degree of disease and pest control is achieved by the application of pesticides, non-target organisms of particular interest, to the soil fertility are drastically affected by indiscriminate use of agrochemicals. The importance of nitrogen fixation in paddy soils has been well established[1-4]. Although extensive studies on the influence of several pesticides in pure cultures of nitrogen-fixing microorganisms have been conducted[5-10], very few data are available on their interaction with the soil nitrogenase[1,7,8]. Most investigations, so far, concentrated on the effect of pesticides on soil nitrogenase often in a plantless system. Moreover, information is particularly lacking on the influence of pesticides upon nitrogen fixation in the dynamic region of the rice rhizosphere. The