A REVIEW OF LICHENOLOGY IN INDIA DURING 1996

During 1996, studies in lichenology at the National Botanical Research Institute at Lucknow were mainly concentrated on the taxonomy of the *Lecanora subfusca* group, the ethnobotanical uses of some lichen species and on the carotenoids and heavy metals of Antarctic lichens.

The lichen genus *Lecanora* is poorly known from the Indian sub-continent. In order to improve knowledge of its taxonomy, studies were initiated by segregating specimens of *Lecanora* on the basis of their substrate. The investigations were started on corticolous *Lecanora* after describing 19 corticolous K+ yellow species of the *Lecanora subfusca* group and 3 of the *L. pallida* group from India and a few areas of Nepal. These studies revealed 11 species as new records for the Indian flora. Further investigations were conducted on *Lecanora* species which are saxicolous, K+ yellow and have a dark hypothecium from India and Nepal. A detailed account of *Heppsora indica* and two species of *Tephromela* from India was also prepared.

A collaborative research project between the National Botanical Research Institute and the Indian Institute of Science at Bangalore, evaluating the floristics of the Nanda Devi Biosphere Reserve was completed. This found 92 species of 32 lichen genera. Ethnobotanical information on *Thamnolia vermicularis* (Swartz) Schaeerer was also collected, as the species is used by the Bhotia tribe of Nanda Devi for killing white worms of stored butter-milk. The podetia of this species are put in a wide cup containing burning coal, and smoke is directed into vessels containing the butter-milk to kill the worms.

Studies on heavy metals and carotenoids of Antarctic lichens have also been undertaken. Samples of 11 lichen species were analysed for chromium, copper, iron, lead and zinc. These studies showed that, amongst the crustose lichens, those growing on mosses had higher metal levels than those growing on rock, while the foliose and fruticose species accumulated greater amounts of metals than crustose ones. Lichens forming cushion-like mats had more metals than stipitate or substipitate forms.

Estimation of carotenoids in the thalli of 33 lichens from Antarctica was carried out with the help of column-and thin-layer chromatography, which revealed the presence of α-carotene, β-carotene, δ-carotene, ε-carotene, β-cryptoxanthin, lutein, zeaxanthin, echinenone, hydroxyechinenone, canthaxanthin, β-doradexanthin, α-doradexanthin, astaxanthin, lycopene-5, 6-epoxide, lutein epoxide, antheraxanthin, neoxanthin, violaxanthin, auroxanthin, mutatoxanthin, and capsochrome. The total contents of carotenoids ranged from 23.25 (*Leptogium puberum*) to 123.5 (*Polycauliona regalis*) µg g⁻¹ dry weight. Studies were also conducted to identify Antarctic crustose lichens,
which are very common and widespread in East Antarctica.

Until now there have been no ecological and distributional studies of epiphytic lichens in India. To remedy this omission a project entitled 'The epiphytic lichen flora of Pinus and Quercus trees in Kumaon' was started, sponsored by the Department of Science and Technology, New Delhi. The epiphytic lichens growing on Quercus dilatata, Q. leucotrichophora, Q. semecarpifolia and Pinus roxburghii at different altitudes of Kumaon area of the Central Himalayas were surveyed and collected. Field observations indicate that the distribution of lichens on trunks and twigs of trees is greatly influenced by the altitude, age, structure and condition of the forest trees and the nature of the surface of the bark.

At the Agarkar Research Institute, Pune, a group has worked on the taxonomy of the pyrenocarpous lichen genera; Tryptethelium, Porina and Arthothelium in India. These studies revealed the presence there of 30 species and one variety of Tryptethelium, 65 species and one variety of Porina, and 43 species and one variety of Arthothelium.

The lichenologist at the Botanical survey of India based in Sikkim is working on the higher altitudinal lichens of the eastern Himalayas and work on the biodiversity of lichens in mangroves is in progress at the M.S. Swaminathan Research Foundation, Madras.

D.K. Upreti

LETTER FROM AN OVERSEAS CORRESPONDENT

Romanian lichenology 1991 - 1997

In Romania there are few lichenologists, so my letter contains data of our activities extending over several years. In May 1995 we completed our studies of "Lichens and mosses as bio-indicators of radioactivity" begun in 1993 and supported by a grant from the Research Support Scheme of the Central European University, Prague. This was a collaborative project involving a lichenologist (myself), two chemists and two physicists from Romania and Hungary. The \( ^{137} \text{Cs} \) activity concentration was assessed in epiphytic and terricolous lichens and mosses in mountainous regions of Romania and Hungary. Our most significant conclusion regarding contamination of the Carpathians Mts as a result of Chernobyl was the importance of standardising methods of sample collection of biological material.

In August 1995 I had the possibility of studying the Peltigera collection of the National History Museum, Department of Botany, Budapest, Hungary. Here I benefited greatly