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Mapping of Lichens in Slovakia

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With 8 figures

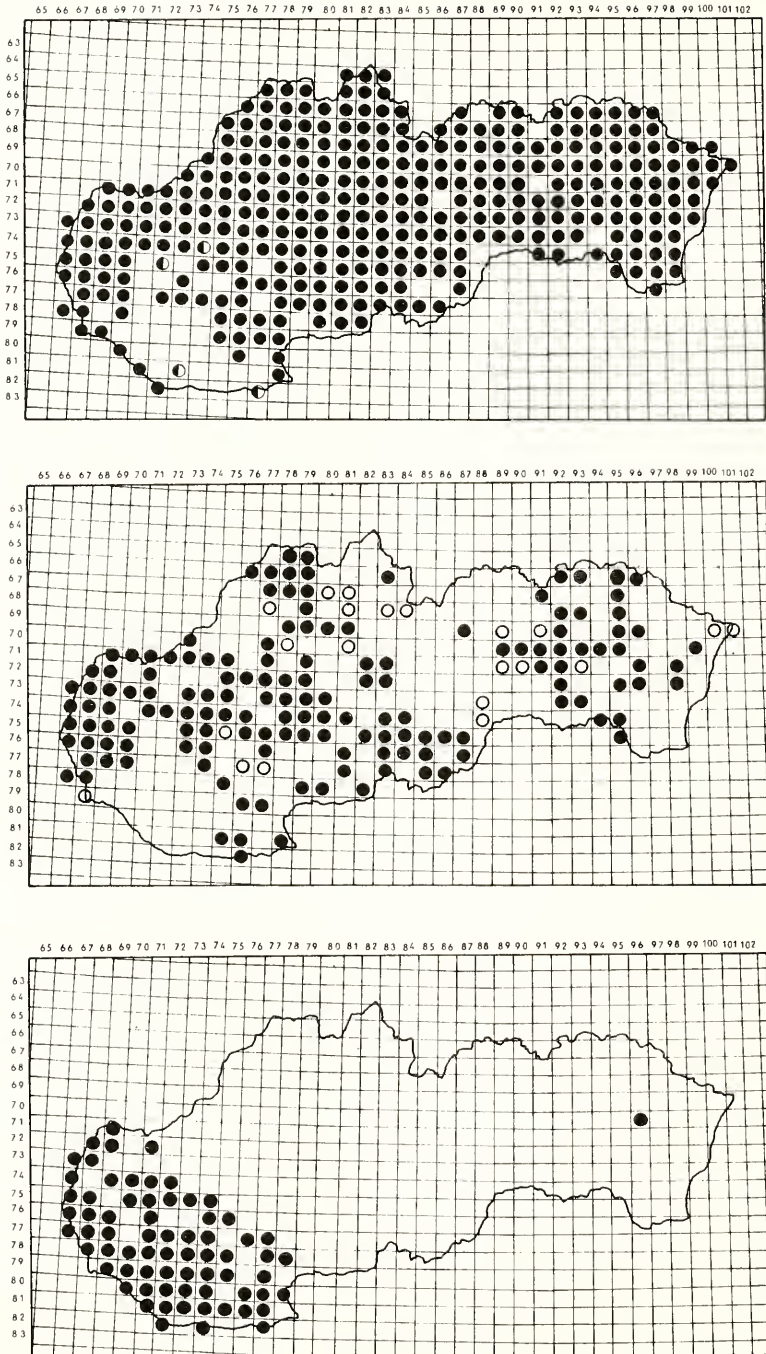
In spring 1975 a small group of persons interested in lichens of Slovakia and inspired by mapping activities in Great Britain, The Netherlands and West Germany were beginning with mapping, too.

In Slovakia, the eastern part of Czechoslovakia, a discrepancy between the number of participants, c. 5 persons, and the area of the country (49.000 km²) became obvious. Therefore they had to confine the investigation on the actual distribution of the epiphytic lichen flora. It was decided to finish mapping within a period of 5 years. But this seemingly long period turned out to be too short. For that reason also records made from 1970 to 1975 during various investigations were regarded. Until the end of 1979 the aim was almost achieved. A small number of grid squares were still investigated in 1980 and 1981. The recording period of 10, eventually 12 years was a compromise, and the epiphytic lichen flora could not be examined in full completeness. Nevertheless, the results offered an interesting and in some cases surprising insight into the true situation of many species.

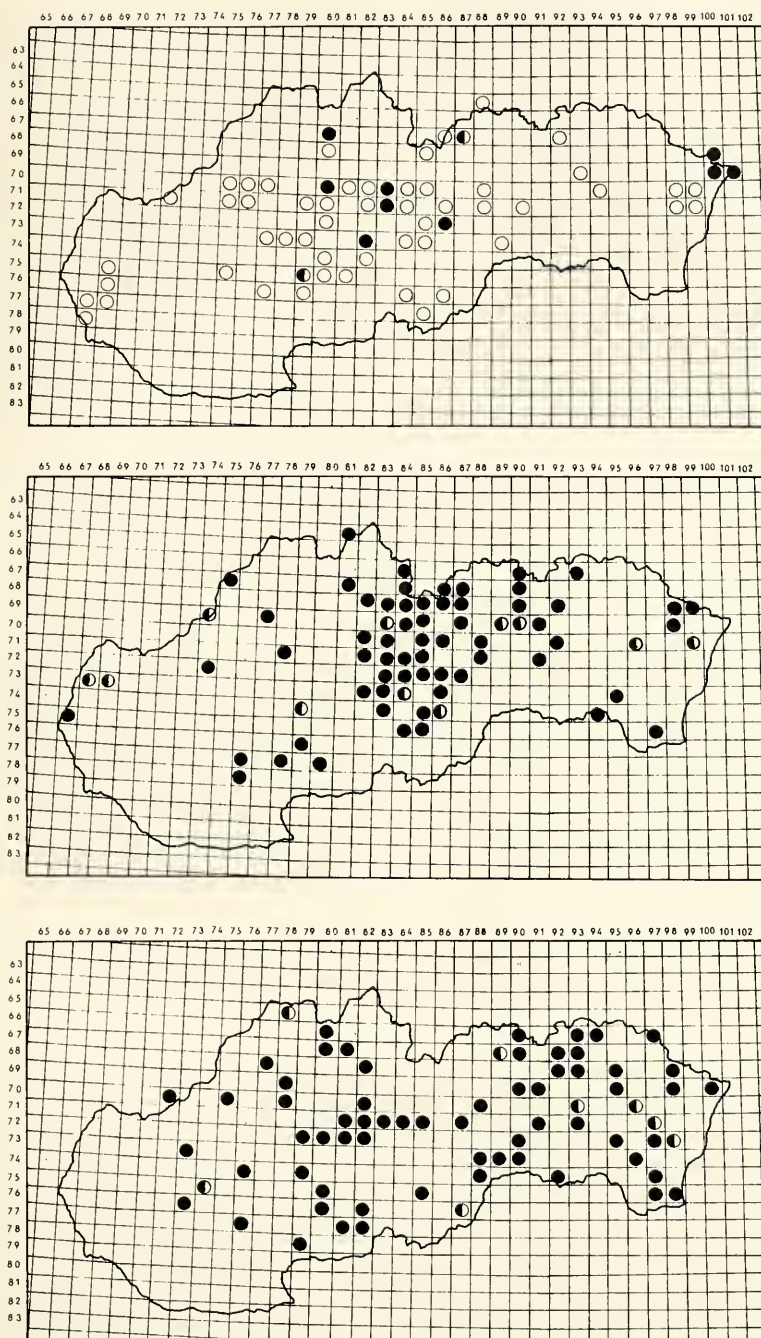
The project being based on voluntary initiative turned out to be a great advantage as no bureaucratic or administrative burden was hindering progress. But such a more or less unofficial teamwork was also connected with some difficulties, especially in the eighties, when participants were short of time in studying herbarium specimens and literature. Therefore only preliminary reports have been published yet (e. g., PIŠÚT 1981, 1985a).

Altogether 374 grid squares were visited. Practically the whole territory of Slovakia, with the exception of some inaccessible squares, e. g. close to the state borderline, was studied. Many formerly not rare species have not been found anymore, e. g. the species of the genera *Conotrema*, *Hyperphyscia*, *Sticta*, and the species *Cetraria oakesiana*, *Collema conglomeratum*, *C. fragrans*, *C. nigrescens*, *Heterodermia speciosa*, *Leptogium hildenbrandii*, *Lobaria scrobiculata*, *Nephroma bellum*, *Parmelia crinita*, *P. flaventior*, *P. revoluta*, *P. sinuosa*, *Peltigera collina*, *Ramalina thrausta* were not confirmed and they are probably extinct. All names of these species were published in the preliminary list of extinct, missing and threatened lichens in Slovakia (Pišút 1985b). Except for the species of *Usnea* and some of *Bryoria*, only about 170 epiphytes were found in the period of 1970–1981.

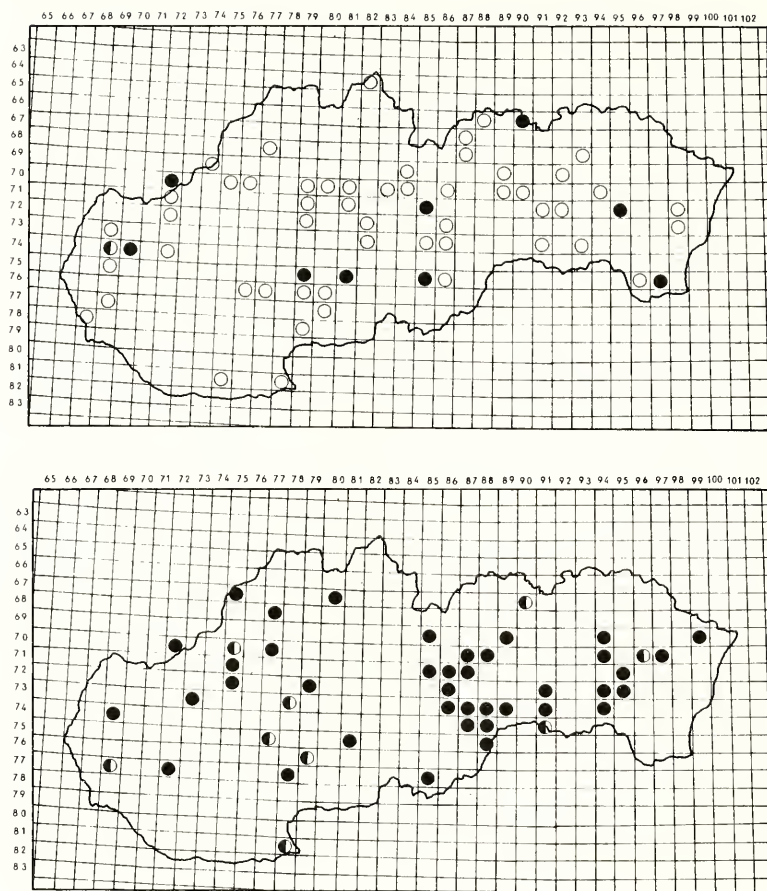
The mapped species were divided into different groups. The first one is represented by species common not only in the past but also in the present. Species belonging to this group are *Hypogymnia physodes* (Fig. 1), *Parmelia sulcata*, *Evernia prunastri* and others. But also these species of rather high resistance against air pollution declined in the lowland Podunajská nížina in Southwest Slovakia, where a combination of an enormous eutrophication and nitrate pollution occurs; they also disappeared around various pollution sources in other regions. For instance, in Spišská Nová Ves industrial agglomeration *Hypogymnia physodes* has been shown to be



Figs. 1–3. Distribution of 3 lichen species in Slovakia. — 1. (above) *Hypogymnia physodes* (L.) Nyl. (in 1970–1981); half dots: only damaged thalli. — 2. *Lecanora conizaeoides* Nyl. ex Crombie; dots: 1970–1981, circles: 1982 onward. — 3. (below) *Physcia biziana* (Massal.) Zahlbr. var. *aipolioides* Nád. (in 1970–1981).



Figs. 4–6. Distribution of some lichen species in Slovakia. — 4. (above) *Lobaria pulmonaria* (L.) Hoffm.; circles: pre 1970, dots: 1970 onward, half dots: only damaged thalli. — 5. Species of the genus *Usnea* (1970–1981); half dots: only damaged thalli. — 6. (below) *Ramalina fastigiata* (Pers.) Ach. (in 1970–1981); half dots: only damaged thalli.



Figs. 7–8. Distribution of 2 lichen species in Slovakia. – 7. (above) *Ramalina fraxinea* (L.) Ach.; symbols as in Fig. 4. – 8. *Anaptychia ciliaris* (L.) Koerber (in 1970–1981); half dots: only damaged thalli.

extinct in an 300 km² area. Yet, even such a phenomenon had often no visible consequences on the used large-scale grid map (Fig. 1).

The second group is formed by some very remarkably spreading and relatively toxitolérant species. On the one hand there were acidophilous species like *Lecanora conizaeoides* (Fig. 2) or *Scoliosporum chlorococcum*, both spreading off from polluted areas, and on the other hand nitrophilous ones, concentrated mainly in lowlands with intensive agriculture. Among them a peculiar distribution pattern is shown by *Physcia biziana* (Massal.) Zahlbr. var. *aipolioides* Nád. (Fig. 3).

The last and largest group is composed by more or less distinctly threatened or declining taxa. First of all there is a number of strongly endangered and threatened species. Most of them are hygrophilous species, restricted to the belt of mountain forests, e. g. *Pachyphiale cornea*, *Thelotrema lepadinum*, *Mycoblastus affinis*, *Lecanactis abietina*, *Cetraria laureri*, *Lobaria pulmonaria* (Fig. 4), *L. amplissima*, *Evernia divaricata*, *Menegazzia terebrata*.

Less endangered species show two types of decline. They either are occurring mainly in the mountain regions of western and eastern parts of Slovakia as the species of *Usnea* (Fig. 5), *Platismatia glauca*, *Parmelia saxatilis*, *Pseudevernia furfuracea*, or they are occurring mainly in the eastern part of Slovakia, having already become rare in the west, as *Parmelia caperata*, *Ramalina farinacea*, *R. fastigiata* (Fig. 6), *Cetrelia olivetorum*, *Pertusaria albescens*.

What did the mapping reveal? The critical state of the Slovakian epiphytic lichen flora was demonstrated (Fig. 7, 8). An asymmetrical deterioration taking place on the territory of Slovakia was confirmed. Besides the well known influence of short-distance immissions further factors of decline were observed. The surprising regression of epiphytes in Western Slovakia results from an acidification caused either by short or far range pollution combined with effects of modern methods in agriculture and forest management.

Despite international conventions there is little hope for the level of pollutants in Slovakia to sink rapidly in the near future. The proportion of low quality solid fuel – the main source of sulphur dioxide – probably will not decrease significantly in Czechoslovakia, Poland and Hungary. The same holds true for emissions from traffic. Therefore it may be expected that the decline of the majority of epiphytic lichens will even accelerate.

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