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Mapping of Threatened Lichens in USSR and General Considerations on a European Project

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With 3 tables

1. Lichen mapping of threatened species in USSR

Among the variety of living organisms, lichens probably are the most sensitive ones to environmental changes. We don't know exactly how many species we have lost already in total (may be some hundreds, or one thousand?), but regional losses are partly known. In Estonia, a small country on the Baltic seashore (45 100 km²) with a lichen flora of about 700 species, 15 species have become extinct during the last 40 years and approximately 150 species are endangered (Trass 1978, 1984; Trass & Randlane 1983, 1986, 1987).

The number of species registered in the Red Data Books (RDB) of different countries can be taken as an indicator of the degree of endangerment of the lichen flora. In some countries a great number of species has been included in RDB. In Germany this number is 288 (Wirth 1978), in Sweden 214 taxa have been classified according to national red data categories (FLORAVÅRDSKOMMITTEN 1987): 17 vanished species, 46 endangered, 30 vulnerable, 102 rare, 19 care-demanding. In Finland 79 species are included in the list of threatened species (10 extinct, 13 severely endangered, 13 endangered, 26 care-demanding) (Koistinen et al. 1986). In the USSR the second edition of RDB which was published in 1984 includes 29 species (Table 1) of macrolichens out of approximately 3500 species of the whole flora.

Table 1. Threatened lichen species in the RDB of USSR (2nd ed. 1984).

Asahinea scholanderi
Aspicilia oxneriana
Bryoria fremontii
Cetraria alvarensis
C. komarovii
Cladonia graciliformis
Cl. vulcani
Coccocarpia cronia
C. erythroxyli
Coriscium viride
Glossodium japonicum
Hypogymnia hypotrypella
Leptogium corticola
Letharia vulpina
Lobaria amplissima
L. pulmonaria
Parmelia borisorum
P. mougeotii
Pyxine endochrysoides
Ramalina evernioides
R. maciformis
Rocella fucoides
Stereocaulon saviczii
Sticta limbata
Teloschistes flavicans
Tornabenia atlantica
Umbilicaria esculenta
U. subpolyphylla
Usnea florida

All RDB species will be mapped and studied on the base of the recently published special program (Trass et al. 1988). Actually, the number of threatened species is remarkably greater. Supposing that all species occurring only in a single locality are under certain risk the number of endangered species in USSR would be more than 500. Yet not all rare species are endangered. *Aspicilia oxneriana*, e. g., growing only in two small localities in high mountains without any considerable human influence, is not threatened. The third edition of the RDB of USSR will list c. 100 endangered lichen species (in prep.). Mapping will be concentrated on these species.

Outstanding Russian, Ukrainian, Byelorussian and other lichenologists of the twenties and thirties, e. g. A. Elenkin, V. Savicz, A. Oxner and M. Tomin paid little attention to the exact mapping of lichen species. The first lichenologist with special interest in this problem was K. A. Rassadina (1950), a specialist for *Cetraria*, *Hypogymnia* and *Parmelia*. After World War II many lichen species were mapped regionally by a new generation of lichenologists, but very few all-union maps were published. Most interest has been paid to lichen mapping in Ukraine, Latvia and Estonia. In Ukraine M. Makarevicz mapped all 800 lichen species of the Ukrainian Carpathian Mountains (Makarevicz & Yudina 1982), A. Piterans (1982) all 480 species of the Latvian lichen flora, and H. Trass (1968, 1970) all 683 species of Estonia. Altogether, based on a distribution catalogue compiled by the Department of Botany and Ecology at Tartu University (Estonia), approximately 100 distribution maps of all-union species, and 1100 regional maps, covering e. g. Chukotka, Southern Far East, Lake Baikal Region, Central Asia, Caucasus, Ukraine, Latvia, Estonia, are available.

There exist no special lichen mapping projects in the USSR. Only the editorial board of the RDB is planning mapping for all RDB species.

In spite of this situation there are many lichenologists in the USSR who are interested in lichen mapping and capable to cooperate in European lichen mapping projects.

2. General considerations

In order to start an internationally coordinated mapping of lichens of Europe we must come to an agreement determining the general principles of the program, including the selection of species, which are to be considered. My suggestions concerning this topic are:

(1) In order to start a coordinated European mapping of lichens we shall have to organize specialists from all European countries.

(2) It is necessary to establish a European Lichen Mapping Committee (ELMC) with subcommittees (of data collection, map compilation, taxa supervision, perhaps one coordinating Eastern European studies, etc.), which would coordinate all mapping activities. Of course, this committee would work in close contacts with the International Union for Conservation of Nature and Natural Resources (IUCN), Threatened Species Committee, Lichen Subcommittee. The main tasks of this committee would be:

(a) to sketch the basic mapping methods and the processing of records for the data-transfer sheets by computer programs (Seaward & Hitch 1982);

(b) to decide about the basic mapping grid system. I think, that there should be three grid levels: local (10 km x 10 km), regional (50 km x 50 km), and comprehensive (100 km x 100 km);

Tab. 2. Groups of threatened lichen species in Estonia (examples)

Threatened species groups		Habitat types A: Natural habitats without noticeable human influence		B: Seminatural habitats with moderate human influence		C: Urban and industrial habitats with strong human influence	
I	Vanishing species (some occur in single localities with reduced vitality)	IA	*Heterodermia speciosa*, *Parmelia subrudecta*	IB	*Cladonia brevis*, *Bryoria bicolor*, *Parmelia sinensis*	IC	*Alectoria sarmentosa*
II	Severly endangered	IIA	*Usnea glauca*, *U. articulata*	IIB	*Parmelia caperata*, *Usnea glabrata*	IIC	*Parmelia acetabulum*
III	Moderately endangered species	IIIA	*Thelotrema lepadinum*, *Schismatomma abietinum*	IIIB	*Lobaria pulmonaria*, *Thelomma ocellatum*	IIIC	*Parmelia tiliacea*
IV	Vulnerable species	IVA	*Hypocenomyce friesii*, *Cyphelium notarisii*	IVB	*Cetraria cucullata*, *Menegazzia terebrata*, *Stereocaulon incrustatum*	IVC	*Endocarpon psorodeum*
V	Care demanding species (occuring in a few localities; rare, relic or endemic species)	VA	*Ramalina siliquosa*, *Lobaria scrobiculata*, *Pycnothelia papillaria*	VB	*Cetraria alvarensis*, *Opegrapha ochrocheila*, *Peltigera venosa*	VC	*Pertusaria hemispaerica*

(c) to form an active, busy and competent "European mapping team";
(d) to organize special mapping excursions, to guarantee the recurrent mapping of selected species groups (after each 10?, 15? years);
(e) to compile the species list proposed for mapping, taking into account and discussing the proposals coming from different countries and lichenological centres;
(f) to organize the technical processing of data and publishing of generalized maps.

(3) A very important task is to compile a preliminary list of species of interest. This list should not be too long. It may consist of one to two hundred species. If work starts successfully, new species may be added.

(4) It is suggested that greatest attention should be paid to the vanishing and endangered species. For instance, the 150 species of the lichen flora of Estonia which need protection, are divided into five main groups and 15 subgroups. The main

Table 3. North European threatened lichens species common for Sweden, Finland and Estonia. – *0* = vanished, *1* = endangered, *2* = vulnerable, *3* = rare, *4* = care-demanding.

Species	Sweden	Finland	Estonia
Bryoria bicolor	4	2	0
B. nadvornikiana	3	1	1
Cetrelia olivetorum	1	2	0
Chaenotheca coniophaea	3	4	1
Cladonia incrassata	3	1	1
Collema subnigrescens	4	1	3
Coniocybe farinacea	4	4	1
Cyphelium notarisii	0	4	1
Evernia divaricata	2	4	3
Gyalecta ulmi	4	4	1
Heterodermia speciosa	1	2	0
Leptogium cyanescens	2	4	1
L. rivulare	1	0	1
Menegazzia terebrata	2	2	4
Nephroma laevigatum	4	2	2
Parmelia caperata	1	0	1
P. tiliacea	3	2	3
Ramalina calicaris	4	4	4
R. obtusata	4	4	3
R. sinensis	3	4	4
R. thrausta	1	2	1
Stereocaulon incrustatum	3	4	4
Usnea longissima	1	0	0

attention is being paid to the groups I–III and to subgroups C of each group (Table 2).

(5) The success of lichen mapping depends on some important practical problems. Detailed maps showing areas where endangered species concentrate are indispensable for organizing of special lichen reserves. In Estonia we have founded two lichen microreserves, one with *Cetraria cucullata* on the Isle of Vormsi, another one on the Isle of Saaremaa with rich xerocontinental Alvar flora. The establishment of two further areas is under progress.

3. Conclusions

I made an attempt to compare the threatened species lists of three Northern European countries, i. e. Sweden, Finland and Estonia. Altogether there are 352 species in these lists. Only 23 species (Table 3) are included in the lists of threatened species of all three countries. There are 43 species common to the lists of Sweden and Estonia, 39 to the lists of Sweden and Finland and 33 to the lists of Finland and Estonia. If we seek for a criterion for a compilation of European lists, we could start with those species considered to be threatened in the highest number of countries. For this purpose we have to compile a comparative list of all European countries having lichen RDBs and select the most common species. There may, of course, arise difficulties as the

lists of different countries are based on varying theoretical and methodical approaches.

Finally, I hope that an era is over for now and ever, during which „Europe" ended at the western borderlines of Poland, Czechoslovakia and Hungary, and that the scientific isolation of Northern and Eastern European states, especially the one of those incorporated in USSR as Estonia, Latvia and Lithuania, is broken for all times. We shall join the free European scientific community with real hunger for true scientific contacts.

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