

RED LIST OF LICHENS OF HUNGARY* (A PROPOSAL)

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Abstract: Adapting the latest IUCN categories to the recent Hungarian lichen flora, extinct, critically endangered, endangered and vulnerable species were separated. In lack of sufficient information on population or habitat size the problematic species were not categorized, they were simply omitted from the list or were placed into a fifth group ("rare") needed more information for categorization.

Introduction

Nowadays red (data) lists of extinct, endangered, rare, threatened or vulnerable species are prepared world-wide for conservation biological purpose, even in case of cryptogams (Clerk *et al.* 1992, Cieslinsky *et al.* 1986, Hauck 1992, Jacobsen *et al.* 1992, John 1992a, 1992b, Kappen & Müller 1982, Kashiwadani & Kurokawa 1995, Pisút 1985, Pisút *et al.* 1993, Scholz 1992a, 1992b, Siebel *et al.* 1992, Tschabanenko 1995, Trass & Randle 1987, Türk & Wittmann 1987, Wirth 1977, 1984, Wirth *et al.* 1996). Due to their usually inconspicuous appearance and the difficulties of their identification in practice cryptogams have simply regarded to be unimportant to deal with also in Hungary. However, they also play an important role in particular places, and need protection especially in case of species living in vanishing habitats, endangered by air pollution, and those subject to mass gathering for decoration, food, therapeutic or perfume industry.

Protected habitats, characterized by high number of endangered animal species or vascular plants, are not necessarily also rich in threatened lichens. Management methods, conservation techniques elaborated for preservation of the higher plants and animals are not appropriate for lichens in all cases. Lichens colonize special habitats. Protection of their habitats, like various stones, old trees, etc., is enough for their survival, but protection of a particular species is also very important. The relatively small growth rate of lichen thalli increases their vulnerability, but on the other hand their dispersion might be very rapid. Their relatively high sensitivity for disturbance (e.g. air pollution) also makes them vulnerable, but they have extreme tolerance for climatic factors.

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A red list is often not more than a status list but it could help nature conservation agencies for habitat evaluation and to elaborate appropriate management practice. It also calls the scientists' attention to the little known groups of lichens and areas.

Very few lichens are under legal protection: 2 lichen species in the United States, 26 in the United Kingdom and a lichen community as a natural monument in Japan. The awareness of importance of lichens increased slowly in the last years, not only the scientists, but the government nature protection agencies started to understand the contribution of lichens to the biological diversity, their role in ecosystems, the threats they suffer from and the possibility to use them as tools for biomonitoring.

In Hungary cryptogams have been also neglected by the nature conservation measures and omitted from the red data lists for a long time (Rakonczay 1989). However, 84 bryophytes were also included in the Red Data Book, but only 20 are protected by law. Siller & Vasas (1993, 1995a, b) prepared the first red lists on Hungarian macrofungi. Versegthy (1994) published the first list on the rare (18), endangered (16) and vulnerable (30) lichen species in Hungary, but the categories she used are defined in a different way.

Although the protection of biological diversity got into focus of the nature conservation programme of the Government, the legal protection of the cryptogams has not been solved in Hungary so far. The extinction of a lichen species means the same loss of the biological diversity as the extinction of any other living organism.

The International Committee for Conservation of Lichens (ICCL) was set up by the International Association of Lichenologists (IAL) to collect information about endangered lichens, prepare a list of threatened species, develop conservation strategies and encourage researches on endangered species following the guidelines of Species Survival Commission of the International Union for Conservation of Nature and Natural Resources (IUCN) in 1992. A questionnaire was elaborated in order to survey the conservation status of lichens and their habitats on a global scale. The information from lichenologists from all over the world were analysed by G. Thor and P. Wolseley, and the results show the critical points of work for conservation of lichens (Thor 1995, Wolseley 1995). For example:

- the knowledge on conservation status of lichens is not in the same level in the different parts of the world,
- there are great number of poorly investigated taxa in uncertain situation,
- there are large poorly investigated areas,
- lack of detailed information of the ecology of threatened species.

Preliminary world-wide Red Data List was prepared and presented at the Conservation Workshop of General Assembly of IAL in 1996 in Salzburg.

Joining to the international lichen red list initiative with adapting the latest IUCN categories (1994) to the recent Hungarian lichen flora, extinct, critically

endangered, endangered and vulnerable species were separated to make an attempt to compile the Hungarian lichen red list.

Materials

The list proposed here based on primarily Versegly's recent lichen flora (1994), on our own experiences and observations, and on the lichen records from the following Hungarian herbaria: BP, EGR, SZE, SZO and VBI. The nomenclature of names also based on Versegly's lichen flora (1994).

Definitions for the IUCN categories are rather unusual in the Hungarian lichenology, so we had to face serious lack of information on distribution, population size, habitat size or the changes of these. Comprehensive mapping studies are necessary to eliminate these insufficiencies and to promote an adequate categorisation.

In addition, records of the above mentioned herbaria are inhomogeneous, frequently irrelevant, burdened with several misidentified specimens. In several cases collections were made only at a popular, particular locality in different time by various collectors with different purpose and thoroughness.

Discussion

The categorisation were performed with great difficulties under these circumstances. We could separate 30 extinct, 24 critically endangered, 44 endangered and 45 vulnerable species. About 260 lichen species were impossible to arrange into any categories. For future judgement a fifth group (rare) was set up for the problematic species. Literature data without voucher specimens and the new findings with no further information on the distribution are also belonging to this category.

The proposed red list of lichens of Hungary

Extinct

Acarospora gallica, *Anema nummularium*, *Bacidina sphaeroides*, *Biatorella hemisphaerica*, *Buellia margaritacea*, *Dermatocarpon cinereum*, *Endocarpon adscendens*, *Fulgensia schistidii*, *Heppia lutosa*, *Lecidea hypnorum*, *Lobaria pulmonaria*, *Micarea cinerea*, *Micarea lignaria*, *Microglaena modesta*, *Microthelia micula*, *Pachyphiale carneola*, *Peltigera leucophlebia*, *Peltigera venosa*, *Phaeophyscia pusilloides*, *Rinodina archaea*, *Rinodina polyspora*, *Rinodinella dubyanoides*, *Solorinella asteriscus*, *Staurothele ambrosiana*, *Staurothele hymenogonia*, *Umbilicaria cylindrica*, *Verrucaria floerkeana*, *Verrucaria macrostoma*, *Verrucaria veronensis*, *Verrucaria viridula*

Critically endangered

Bacidia rosella, *Calicium quercinum*, *Cetraria aculeata*, *Chaenotheca brunneola*, *Gyalecta truncigena*, *Gyalecta ulmi*, *Haematomma ochroleucum*, *Menegazzia terebrata*, *Nephroma parile*, *Nephroma resupinatum*, *Parmelia hypoclysta*, *Parmelia perlata*, *Phaeocalicium populneum*, *Sphinctrina turbinata*, *Umbilicaria deusta*, *Umbilicaria grisea/hirsuta*, *Umbilicaria*

polyphylla, *Usnea ceratina*, *Usnea diplotypus*, *Usnea filipendula*, *Usnea florida*, *Usnea fulvoreagens*, *Usnea subfloridana*, *Usnea wasmuthii*

Endangered

Acarospora irregularis, *Acarospora miskolensis*, *Calicium adspersum*, *Calicium salicinum*, *Calicium trabinellum*, *Caloplaca vitellinaria*, *Caloplaca vitellinoidea*, *Cetraria chlorophylla*, *Cetraria islandica*, *Chaenotheca ferruginea*, *Chaenotheca furfuracea*, *Chaenotheca hispidula*, *Chaenotheca trichialis*, *Cladonia coccifera*, *Cladonia floerkeana*, *Cladonia pleurota*, *Cladonia polydactyla*, *Cladonia strepsilis*, *Cladonia verticillata*, *Mallotium tomentosum*, *Mölleropsis nebulosa*, *Ochrolechia pallescens*, *Pannaria leucophaea*, *Pannaria pezizoides*, *Parmelia exasperata*, *Parmelia loxodes*, *Parmelia pastillifera*, *Parmelia protomatrae*, *Parmelia pulvinaris*, *Parmelia ryssolea*, *Parmelia subdiffuens*, *Parmelia tinctoria*, *Peltigera collina*, *Peltigera denegi*, *Peltigera elisabethae*, *Peltigera hymenina*, *Peltigera lepidophora*, *Peltigera malacea*, *Peltigera neckeri*, *Peltigera polydactyla*, *Pycnothelia papillaria*, *Solorina saccata*, *Usnea glabrata*, *Usnea glabrescens*

Vulnerable

Acarospora macrospora, *Anaptychia ciliaris*, *Anema decipiens*, *Arthroraphis citrinella*, *Bryoria chalybeiformis*, *Bryoria implexa*, *Bryoria subcana*, *Calicium glaucellum*, *Cetraria pinastri*, *Cetrelia olivetorum*, *Chaenotheca chrysocephala*, *Chrysopsora testacea*, *Cladonia arbuscula*, *Cladonia botrytes*, *Cladonia cenotea*, *Cladonia cornuta*, *Cladonia crispata*, *Cladonia gracilis*, *Cladonia mitis*, *Cladonia rangiferina*, *Cladonia uncialis*, *Gyalecta jenensis*, *Hypogymnia bitteriana*, *Hypogymnia tubulosa*, *Lecanora demissa*, *Lecanora garovaglii*, *Lecanora riparia*, *Lempholemma botryosum*, *Lempholemma chalazanum*, *Leptogium diffractum*, *Leptogium plicatile*, *Leptogium schraderi*, *Leptogium sinuatum*, *Parmelia caperata*, *Parmeliopsis aleurites*, *Peltula euploca*, *Peltula tenebrata*, *Petractis clausa*, *Phaeophyscia luganensis*, *Physcia biziana*, *Placocarpus schaeferi*, *Squamarina lentigera*, *Verrucaria hydrela*, *Xanthoparmelia angustiphylla*, *Xanthoria papillifera*

Rare

Acarospora atrata, *Acarospora inaequalis*, *Acarospora suzai*, *Acarospora umbilicata*, *Agonimia tristicula*, *Arthonia didyma*, *Arthonia galactites*, *Arthonia punctiformis*, *Arthonia tumidula*, *Arthonia exilis*, *Arthonia lapidicola*, *Arthonia patellulata*, *Arthonia spadicea*, *Arthopyrenia analepta*, *Arthopyrenia biforme*, *Arthopyrenia cerasi*, *Arthopyrenia fraxini*, *Arthopyrenia grisea*, *Arthopyrenia rhyponia*, *Arthothelium ruanum*, *Arthothelium spectabile*, *Aspicilia ceracea*, *Aspicilia gibbosula*, *Aspicilia microspora*, *Aspicilia mutabilis*, *Aspicilia silicea*, *Aspicilia viridescens*, *Bacidia acclinis*, *Bacidia arceutina*, *Bacidia arnoldiana*, *Bacidia beckhausii*, *Bacidia friesiana*, *Bacidia fusca*, *Bacidia hegetschweileri*, *Bacidia incompta*, *Bacidia inundata*, *Bacidia laurocerasi*, *Bacidia naegeli*, *Bacidia phacodes*, *Bacidia polychroa*, *Bacidia trachona*, *Bactrospora corticola*, *Buellia aethalea*, *Buellia alboatra*, *Buellia ambigua*, *Buellia chloroleuca*, *Buellia chlorophaea*, *Buellia erubescens*, *Buellia heppiana*, *Buellia hungarica*, *Buellia lutosa*, *Buellia pharctica*, *Buellia schaeferi*, *Buellia sororia*, *Caloplaca agardhiana*, *Caloplaca balatonica*, *Caloplaca biatorina*, *Caloplaca chrysodeta*, *Caloplaca chrysophthalma*, *Caloplaca gialolechiaformis*, *Caloplaca granulosa*, *Caloplaca hungarica*, *Caloplaca likensis*, *Caloplaca macrocarpa*, *Caloplaca necator*, *Caloplaca nubigena*, *Caloplaca obliterans*, *Caloplaca percrocata*, *Caloplaca polycarpa*, *Caloplaca rubelliana*, *Caloplaca scotoplaca*, *Caloplaca steropea*, *Caloplaca viridirufa*, *Candelariella reflexa*, *Candelariella viae-lacteeae*, *Catillaria chalybeia*, *Catillaria globulosa*, *Catillaria griffithii*, *Catillaria nigroclavata*, *Cetraria sepincola*, *Cladonia cariosa*, *Cladonia conista*, *Cladonia decorticata*, *Cladonia glauca*, *Cladonia ochrochlora*, *Cladonia phyllophora*, *Cladonia pityrea*, *Cladonia polycarpoides*, *Cladonia rei*, *Cladonia scabriuscula*, *Collema callospium*, *Collema coccophorum*, *Collema fragrans*, *Collema leptogioides*, *Collema multipartitum*, *Collema tuniforme*, *Collema undulatum*, *Cyphelium notarisii*, *Dermatocarpon bachmannii*, *Dermatocarpon michelii*, *Dermatocarpon moulinsii*, *Dermatocarpon subcrustosum*, *Dermatocarpon trachyticum*, *Diploicia canescens*,

Diploschistes ochrophanes, *Dirina stenhammari*, *Epilichen scabrosus*, *Hyperphyscia adglutinata*, *Hypocenomyce friesii*, *Jonaspis epulotica*, *Lecanactis dilleniana*, *Lecania cyrtellina*, *Lecania dubitans*, *Lecania fuscella*, *Lecania koerberiana*, *Lecanora agardhiana*, *Lecanora atra*, *Lecanora campestris*, *Lecanora cenisia*, *Lecanora coilocarpa*, *Lecanora expallens*, *Lecanora gangaleoides*, *Lecanora grumosa*, *Lecanora hypoptoides*, *Lecanora intricata*, *Lecanora leptyroides*, *Lecanora magyrica*, *Lecanora pinastri*, *Lecanora piniperda*, *Lecanora populicola*, *Lecanora subcarnea*, *Lecanora subcarpineae*, *Lecanora subintricata*, *Lecanora subplanata*, *Lecanora subradiosa*, *Lecanora varia*, *Lecidea distans*, *Lecidea erratica*, *Lecidea fuscocinerea*, *Lecidea insularis*, *Lecidea lithophila*, *Lecidea monticola*, *Lecidea plana*, *Lecidea sarcogynoides*, *Lecidea segregula*, *Lecidea speirea*, *Lecidea tessellata*, *Lecidea uliginosa*, *Lecidea viridescens*, *Lecidella laureri*, *Lecidella scabra*, *Lecidella subincongrua*, *Lepraria lobificans*, *Lepriloma vouauxii*, *Leptogium minutissimum*, *Leptogium tenuissimum*, *Leptogium tremuloideae*, *Leptoraphis amygdali*, *Leptoraphis parameca*, *Leptoraphis quercus*, *Leptoraphis tremulae*, *Melasilea gibberulosa*, *Micarea melaena*, *Micarea misella*, *Micarea nitschkeana*, *Microthelia marmorata*, *Mosigia gibbosa*, *Mycocalicium subtile*, *Opegrapha chevallieri*, *Opegrapha devulgata*, *Opegrapha mougeotii*, *Opegrapha personii*, *Opegrapha saxicola*, *Opegrapha variaeformis*, *Opegrapha viridis*, *Pertusaria chiodectonoides*, *Pertusaria coccodes*, *Pertusaria dealbescens*, *Pertusaria flavicans*, *Pertusaria flavida*, *Pertusaria hemispherica*, *Pertusaria hymenea*, *Pertusaria leioplaca*, *Pertusaria leucosora*, *Pertusaria leucostoma*, *Pertusaria pustulata*, *Phaeophyscia ciliata*, *Phaeophyscia endococcina*, *Phaeophyscia endophoenicea*, *Phaeophyscia hirsuta*, *Phaeophyscia sciastra*, *Phlyctis agelaea*, *Physcia dubia*, *Physcia semipinnata*, *Placynthiella dasaea*, *Placynthiella icmalea*, *Placynthiella uliginosa*, *Placynthium filiforme*, *Placynthium garovaglii*, *Placynthium hungaricum*, *Placynthium subradiatum*, *Platismatia glauca*, *Polyblastia albida*, *Porina aenea*, *Porina affinis*, *Porina chlorotica*, *Porpidia albocoerulescens*, *Porpidia cinereoatra*, *Porpidia glaucophaea*, *Porpidia macrocarpa*, *Porpidia tuberculosa*, *Protoblastenia calva*, *Protoblastenia incrustans*, *Protoblastenia schaeeri*, *Pyrenopsis rhodosticta*, *Pyrenula corylii*, *Pyrenula laevigata*, *Pyrenula leucoplaca*, *Pyrenula nitidella*, *Ramalina baltica*, *Ramalina calicaris*, *Rhizocarpon alpicola*, *Rhizocarpon cinereovirens*, *Rhizocarpon geminatum*, *Rhizocarpon grande*, *Rhizocarpon petraeum*, *Rhizocarpon polycarpum*, *Rinodina albana*, *Rinodina calcarea*, *Rinodina dubyana*, *Rinodina efflorescens*, *Rinodina exigua*, *Rinodina gennari*, *Rinodina immersa*, *Rinodina occulta*, *Rinodina oxydata*, *Rinodina sophodes*, *Rinodina subglaescescens*, *Rinodina teichophila*, *Rinodina trachytica*, *Sarcogyne simplex*, *Staurothele clopima*, *Staurothele fissa*, *Stereocaulon tomentosum*, *Strangospora moriformis*, *Strangospora ochrophora*, *Thelidium acrotellum*, *Thelidium austriacum*, *Thelidium decipiens*, *Thelidium immersum*, *Thelidium incavatum*, *Thelidium olivaceum*, *Thelidium papulare*, *Thelidium pyrenophorum*, *Thelidium umbrosum*, *Thrombium epigaeum*, *Thyrea pulvinata*, *Tomasellia arthonioides*, *Toninia caradocensis*, *Toninia cinereovirens*, *Toninia toniniana*, *Toninia tristis*, *Toninia tumidula*, *Toninia zsákii*, *Trapelia mooreana*, *Trapelia obtegens*, *Verrucaria baldensis*, *Verrucaria calciseda*, *Verrucaria elaeomelaena*, *Verrucaria fuscella*, *Verrucaria glaucina*, *Verrucaria hochstetteri*, *Verrucaria laevata*, *Verrucaria parmigera*, *Verrucaria sphinctrinella*

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