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THE SWEDISH LICHENOLOGISTS AND THE ESTONIAN FLORA

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The Estonian lichen flora has been investigated over 120 years already. The earliest papers dedicated specially to lichens were written by Andreas Bruttan and published in 1870 and 1889. The circumstance that even nowadays we cannot do without citing these works gives doubtless credit to his high professionality. The lichen flora of our country has been studied by scientists of several nationalities, the main investigators in the 20-es and 30-es of this century being primarily our neighbours from the north (Häyren, 1930, 1937; Åberg, 1935; Räsänen, 1931). 563 species were known in our lichen flora by 1940 (Trass, 1962). After World War II only local specialists have dealt with the study of the composition, formation, communities and indicational characters of the Estonian lichen flora. During these years we have had ample opportunities of expanding our special studies over vast distances, viz. of collecting lichens and performing floristic or indicational investigations in the Far North, Siberia, the Far East, Central

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Asia and other areas of the Soviet Union. Good cooperation has also been established with a number of Soviet lichenologists in Leningrad, Moscow, Kiev, Vladivostok etc. As a result, the lichenological herbarium of Tartu University contains about 30.000 specimens at present, occuping in this respect the third place after the herbaria of Leningrad and Kiev. However, the same period is characterized by almost complete isolation from the western science. Notwithstanding rather frequent correspondence and exchange of reprints, we lacked common investigations as well as the possibilities to work in scientific centres abroad and to participate in international conferences. Personal contacts have been very rare. All this has left its mark on the contents of our work. Therefore the monographic study of Estonian lichen flora, requiring contemporary literature on the systematics and taxonomy of lichens, intensive exchange of herbarium materials and consultations of specialists from other countries, but also strength of purpose as well as conviction of its necessity, has been left on the background. We must admit that our herbaria contain several species new to Estonian flora. For different reasons, however, the publishing of these finds has been delayed for years.

1989 constituted a turning point in the study of lichen flora. A group of Swedish lichenologists came to Estonia. We had the opportunity of carrying out floristic investigations together with Stefan Ekman, Lars Fröberg, Ingvar Kärnefelt, Jan-Eric Mattsson, Rikard Sundin and Göran Thor in North-West and West Estonia and on the islands of Saaremaa (Ösel), Muhumaa (Moon) and Kõinastu. The results of the studies of our Swedish colleagues have been summarized in the paper "New or interesting lichens from Estonia", where 317 taxa have been presented, 75 of them being new to the Estonian flora according to the statements of the authors. Taking into account that the list of the Estonian lichen flora contained 711 species in 1988 (Trass, 1991), the whole number of lichen species has now risen up to about 800 which is a surprisingly great number for such a small territory as Estonia. As the Swedish colleagues did not have the whole literature treating the Estonian lichen flora at their disposal and neither did they study the herbaria in Tartu and Tallinn, we must add a few complementary notes to the list presented by them.

A few species marked as new have been defined in the lichenological herbarium of Tartu University, though not published. They are as follows:

Pertusaria coronata - 1) District Pärnu, forest district Urissaare, Kuuselohu, in a spruse and common alder wood, on the stem of Fraxinus excelsior. Leg., det. T. Piin 1969;
2) District Saaremaa, the Sõrve peninsula, Koltsi, on the stem of Malus silvatica. Leg. H. Trass 1982, det. T. Randlane 1984.

Sclerophora coniophaea - District West-Virumaa, the Vinni oakwood. Leg. A.-L. Sõmermaa 1965, det. A. Titov 1984.

Sclerophora farinacea - District Saaremaa, the island of Abruka, on the stem of Ulmus laevis. Leg. V. Räsänen 1929, det. A. Titov 1984.

Porina aenea. - the island of Abruka, in a deciduous forest, on the stem of Ulmus scabra. Leg. et det. T. Randlane 1981.

Lecanora macrocyclos - the island of Saaremaa, the alvar of Lõo, on a granite rock. Leg. et det. H. Trass 1984.

Bacidia bagliettoana haa been mentioned for Estonia under the name of B. muscorum (Sw.) Mudd (Trass, 1970; Randlane, 1986).

Rinodina immersa has been known on the islands of Saaremaa and Muhumaa under the name of R. bischoffii var. immersa Koerb. (Bruttan, 1870, p. 75).

A few species presented as new to Estonia have been given by Bruttan (1870), however, without a definite locality, i.e., it is not known for sure whether they have been found in Estonia or North Latvia (the former has assumably a higher probability as most of A. Bruttan's herbaria come from Estonia; A. Bruttan has mostly not indicated the definite locality of the species found by him during several expeditions), e.g., Arthopyrenia cerasi, Arthonia byssacea, Farnoldia jurana, Lecidea tesselata, Verrucaria viridula.

And last, we shall also correct a small misprint negelected by the Swedish colleagues. The species Trapelia flexuosa and T. granulosa given in the list belong to the genus Trapeliopsis.

The greatest work by Estonian lichenologists of late has been the compilation of "Macrolichens of Estonia" (Trass, 1991; Trass, Randlane, 1988). In this collection of writings 376 species have been described, 327 of which are known to have definite localities in Estonia. 38 species of the former number have not been found after World War II. The work lying ahead, viz. the list of

microlichens and their key, will be still more voluminous. The paper by our Swedish colleagues published below will be of great help to Estonian investigators in their further work. It gives lots of new data on the composition of the flora of Estonian microlichens. However, we must appreciate to the same extent or even more the inspiration got during our common expeditions, conversations and discussions, experiencing Ingvar's critical professionality, Stefan's extraordinary knowledge of lichens, Lars's phlegmatic penetration into epilithes, Jan-Eric's philosophical treatment of things, Rikard's quiet practicality and Göran's amazingly keen glance as a taxonomist.

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NEW OR INTERESTING LICHENS FROM ESTONIA

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A list of lichens collected on two field trips to Estonia by botanists from the universities of Stockholm and Lund in 1989 is presented. 74 species are reported for the first time from Estonia. Several other species have previously been reported only a few times.

From the 11th to the 20th of June 1989 nine botanists from Stockholm visited Estonia and Latvia, and four lichenologists from Lund visited Estonia from the 8th to the 15th of July. The aim of the visits was to study the vascular plants and the lichens. Prof. Hans Trass, Tartu University, arranged both excursions in Estonia. Both botanist groups visited the western part of Estonia only, and most of the time was spent on and near the island of Saaremaa. Since some interesting lichens were collected during the two excursions, a list of the collected species from the localities in Estonia is presented here. The collections from Latvia will be dealt with in a separate publication.

Acknowledgements

We wish to thank Prof. H. Trass for arranging the excellent excursions to Estonia and the following persons for identifying and/or confirming material: B. Coppins (*Arthonia apatetica, Bacidia arnoldiana, Caloplaca ulcerosa*, one collection of *Micarea prasina*), M. Mayrhofer (some *Lecania* spp.), L. Tibell (some *Caliciales*) and

E. Timdal (one collection each of Hypocenomyce caradocensis and H. sorophora). Financial support was given by The National Swedish Board of Universities and Colleges (UHÄ).

Results

A total of 317 taxa were collected, 74 of which are new to Estonia. There are also several findings of species previously collected only a few times. Among others, a few species which have been considered extinct or endangered were found, viz. Cetraria alvarensis, Mycobilimbia berengeriana, M. lobulata, Sclerophora nivea, Squamarina lentigera, Stereocaulon incrustatum, Thelotrema lepadinum and Xanthoria calcicola (Trass & Randlane, 1986, 1987). In order to find out which species are new to Estonia, we have checked our list of species against the checklist of Estonian lichens (Trass, 1970) and later additions (Sõmermaa, 1970, Randlane, 1978, 1986, 1988 and Kondratyuk, 1989). However, no voucher specimens have been examined by us.

The collections are deposited in the Swedish Museum of Natural History, Stockholm (S; collections by Rikard Sundin and Göran Thor), or the Botanical Museum, Lund (LD; collections by Stefan Ekman, Lars Fröberg and Ingvar Kärnefelt). There are also some duplicates in the lichen herbarium of the Tartu University (TU). The manuscript was compiled by G. Thor.

Discussion

The lichen flora in western Estonia is only slightly affected by air pollution. The complete lack of Lecanora conizaeoides on the twigs and branches of deciduous trees is very different from the situation in southernmost Sweden, where this species is often dominant in such habitats. Some examples of pollution-sensitive species that have become rarer in southernmost Sweden, but still can be found in Estonia are Bacidia polychroa, Bactrospora dryina, Physcia stellaris, Rinodina sophodes and Schismatomma abietinum.

Kasekülа alvar on the western mainland, and Lõo, Atla and Eeriksaare alvars on Saaremaa were studied in particular. These alvars are to a large extent covered with shrubs of Juniperus communis, and Pinus sylvestris also occurs frequently. Thus, they are similar to the alvars on Gotland (Sweden), while the Great Alvar on southern Öland (Sweden) is more open with extensive pavements in several areas. Karst areas, where the calcareous substrate is weathered to a large extent, and the bedrock frequently interseced also occur frequently on Oland. Such places possess a rich lichen flora, and some species which are typical of these habitats are not found in Estonia, e. g. Acarospora glaucocarpa, Clauzadea immersa, Lecania rabenhorstii and Protoblastenia testacea. The main calcareous habitats in the Estonian alvars are small rocks and dry pavement patches. Many colonizers are found on the rocks, e. g. Caloplaca lactea, Clauzadea metzleri, Rinodina bischoffii and Verrucaria muralis. Also Sagiolechia protuberans occurs frequently on pebbles and smaller rocks, just as it occurs on Gotland. On Öland, however, it is less common and occurs on shaded rock surfaces instead (Fröberg, 1989).

The species list

The list contains collected material only, and it should be noted that several common species were not collected at all localities. The family Mycocaliciaceae, all Arthopyrenia species, and a few lichenicolous fungi have been included.

In most cases, we have tried to use up-to-date names. We have listed the names used by Santesson (1984) as synonyms, when they deviate from the names in our list.

Species marked with an (*) are new to Estonia. In addition, the collector and collection number are given for these species. Material collected by the participants from Stockholm has been marked with (S), by the participants from Lund with (LD). Each locality has been given a number (from 1 to 31). The localities are presented after the species list including short notes on the habitats.

Acarospora cervina: 11 (LD+S). - Acarospora cervina is closely related to A. glaucocarpa, and the two species have often been confused. However, A. cervina is characterized by having a thin, sqamulose, greyish brown, epruinose thallus and immersed, distinctly pruinose apothecia. A. glaucocarpa has a thick, non-squamulose, brownish, sometimes pruinose thallus and slightly immersed, epruinose apothecia. It is uncertain whether A. cervina (Wahlenb.) Massal. is an illegitimate name or not. According to material in LD and observation by L. Fröberg on Öland, Gotland and Saaremaa, A. glaucocarpa only occurs on Öland in the Baltic region.

A. fuscata: 11 (LD), 24 (LD).
A. macrospora: 11 (LD), 26 (LD), 27 (LD).
A. veronensis: 8 (LD), 20 (LD).
Acrocordia gemmata: 12 (LD), 13 (S), 14 (S), 20 (S), 31 (LD).
A. cavata*: 2 (S; Sundin 226c), 20 (S; Sundin 372).
Agonimia tristicula*: 11 (LD+S; Ekman 489, Thor 8002), 16 (S; Thor 8027), 27 (LD; Ekman 450). - This species often lacks perithecia but is always easily recognized by the very small, brownish green squamules which grow on shaded calcareous rocks, often over other lichens or on mosses.
Anaptychia ciliaris: 2 (S), 4 (S), 8 (S), 20 (S).
Anisomeridium nyssaegenum*: 2 (S; Sundin 229, Thor 7894, both c. per.). - Overlooked and common in Central and South Sweden at bases of old, broad-leaved deciduous trees. It is characteristic with the cone-shaped, small, black pycnidia from which often a white string of conglutinated conidia protrude.
Arthonia apatetica*: 16 (S; Thor 8041). - On Pinus sylvestris. Similar to Arthonia leucodontis but the spores are larger and the paraphysoids usually have distinct, dark brown apical caps (Coppins, 1989).
A. byssacea*: 2 [LD+S; Ekman 346 & 375 (c. ap.), Thor 7891c (c. ap.)]. - The species is often found only with pycnidia. In these cases it is also easily recognized since the pycnidia are surrounded by a white ring of calcium oxalate crystals.
A. didyma*: 17 (S; Thor 8044). - The species is separated from

A. spadicea by its larger spores and the I+ blue hymenium. This coloration is, however, concentration-dependent and is therefore in high concentrations followed by a I+ red coloration.

A. leucodontis* (Bryostigma leucodontis): 20 (S; Thor 8054). On mosses at base of Quercus robur. For comments, see also A. apatetica.

A. mediella: 8 (S), 31 (LD).

A. punctiformis: 2 (S), 20 (LD+S).

A.radiata: 2 (S), 9 (S), 17 (S), 20 (S).

A. spadicea: 2 (S), 14 (S), 15 (LD+S), 20 (S).

A. vinosa: 20 (S).

Arthopyrenia antecellans*: 20 (S; Sundin 377).

A. cerasi*: 20 (LD; Ekman 559).

A. punctiformis: 2 (S), 20 (LD).

Arthothelium ruanum*: 2 (S; Sundin 230b, Thor 7890), 15 (LD+S; Ekman 478, Sundin 337). 20 (LD+S; Ekman 541, Sundin 368). - On smooth bark of e.g. Corylus avellana or Fraxinus excelsior in dense, shady, deciduous forests. The species is easily overlooked and it is often difficult to find spores in the ascocarps.

Aspicilia calcarea: 20 (LD).

A. cinerea: 2 (S), 11 (LD), 20 (LD), 24 (LD).

A. contorta ssp. contorta: 11 (LD+S). - A. contorta ssp. contorta is characterized by a white thallus consisting of rounded, up to 3 mm wide areoles, separated by narrow fissures, and when young usually divided into groups of areoles ("islands"); the areoles often contain several apothecia, which are immersed and only covering a small part of the areole.

A. contorta ssp. hoffmanniana Ekman & Fröberg ined. (A. hoffmanni auct.): 11 (LD).- A. contorta ssp. hoffmanniana has a grey or brownish grey, continuous thallus, consisting of sharp-angled, up to 1,5 mm wide areolea, separated by broad fissures; the apothecia are usually only one per areole, when fully developed elevated and often completely covering the areole. The new combination will be made by Ekman & Fröberg in a forthcoming paper.

A. contorta (intermediates between the two subsp.): 11 (LD), 20 (LD), 26(LD). - Intermediates are common and they possess characters from both subspecies mingled in different ways (cf. Ekman & Fröberg, 1988).

A. excavata: 20 (LD). 23 (S) - A. excavata was reported for the first time from Estonia (Tartu) by Kondratyuk (1989).

A. leprosescens*: 24 (LD; Kärnefelt 8912-2).

Bacidia arceutina: 8 (LD), 17 (S).

B. arnoldiana: 4 (S).

B. bagliettoana*: 16 (S; Thor 8030), 20 (S; Thor 8076), 24 (LD; Ekman 356, 357 & 368).

B. fraxinea*: 2 (S; Sundin 219), 8 (S; Sundin 272), 14 (S; Sundin 332), 20 (LD+S; Ekman 527, Thor 8068), 29 (LD; Ekman 462), 30 (LD; Ekman 509), 31 (LD; Ekman 516). - B. fraxinea was briefly mentioned from Estonia, Puhtu (locality 2) by Kärnefelt (1989). It is closely related to B. rubella, but differs largely in thallus structure. The thallus of B. rubella is finely granular, almost coralloid, whereas B. fraxinea has larger, dissected scales adherent to the substrate. Both species seem to be rather common in western Estonia. Sometimes they can be found growing together and then the difference between them becomes obvious.

B. naegelii: 12 (LD), 16 (S), 24 (LD), 31 (LD).

B. polychroa: 2 (LD).

B. rubella: 3 (S), 8 (S), 12 (LD), 14 (S), 20 (S), 30 (LD), 31 (LD). - For comments, see B. fraxinea.

B. subincompta: 15 (LD), 20 (S).

Bactrospora dryina*: 2 (LD+S; Ekman 369, Sundin 200, Thor 7871 & 7909).

Baglietto steineri* (Verrucaria steineri): 20 (LD; Fröberg 1008).

Biatorella monasteriensis*: 20 (LD+S; Ekman 539, Thor 8062).

Bryoria capillaris: 18 (S).

B. fuscescens: 8 (S).

Buellia disciformis: 3 (S), 9 (S).

B. epipolia: 11 (LD).

B. griseovirens: 2 (L+S), 3 (LD+S), 8 (LD+S), 9 (S), 16 (S), 20 (S).

B. punctata: 2 (S), 3 (S), 8 (S).
B. schaereri: 28 (LD).
Calicium adspersum: 2 (S).
C. glaucellum*: 8 (S; Thor 7957), 18 (LD+S; Ekman 469, Sundin 346), 20 (S; Thor 8104), 25 (LD; Kärnefelt 8913-2). - C. abietinum is mentioned by Trass (1970). It is unclear what this refers to since C. abietinum often has been confused with C. denigratum, C. glaucellum and C. parvum. None of these species are mentioned by Trass.
C. salicinum: 2 (S), 3 (S), 20 (S).
C. viride: 2 (S), 8 (S), 20 (S).
Caloplaca alociza: 11 (S).
C. cerina: 12 (LD).
C. chlorina: 30 (LD).
C. chrysophthalma*: 20 (S; Sundin 371). - C. chrysophthalma was reported from Estonia by Sõmermaa (1970). T. Randlane has checked this collection and found it to be incorrectly determined (T. Randlane pers. comm.).
C. citrina: 11 (LD), 16 (S), 20 (LD+S), 24 (LD), 26 (LD).
C. decipiens: 20 (LD).
C. ferruginea: 20 (LD).
C. flavorubescens: 11 (LD), 12 (LD), 14 (S), 24 (LD).
C. holocarpa: 8 (S), 24 (LD).
C. lactea: 8 (LD), 20 (LD), 23 (S), 26 (LD), 27 (LD).
C. lucifuga*: 2 (S; Thor 7873). - On old Quercus robur in a dence, deciduous forest near the Baltic sea. C. lucifuga was recently described (Thor, 1988) and it is characterized by its endophloedic thallus, sometimes forming small blisters breaking up in yellow soralia.
C. obscurella*: 20 (S; Thor 8078). - Probably overlooked when growing at basea of deciduous trees in rather open habitats. For comments, see also C. ulcerosa.
C. saxicola: 3 (S), 11 (LD), 19 (S), 20 (LD), 26 (LD).
C. scopularis: 24 (LD).
C. sinapisperma: 27 (LD).
C. subathallina*: 11 (S; Sundin 286, Thor 7993), 16 (S; Thor 8037).
C. ulcerosa*: 29 (LD; Ekman 460 on old Acer platanoides, c. ap.).

Related to C. holocarpa s. lat., but with distinct ulcerous soralia similar to those in C. obscurella. Unlike that species C. ulcerosa has orange apothecia (sometimes few or lacking, though) and grows in nutritous sites, mostly old deciduous trees in parks, along gravel roads, in churchyards etc. C. ulcerosa was described from the British Isles by Coppins & James (1979) and has recently been found in Sweden (Arup & Ekman unpubl.).

C. variabilis: 11 (LD), 20 (LD), 26 (LD), 27 (LD).

C. velana*: 16 (S; Thor 8034).

Candelariella aurella: 11 (LD), 20 (LD), 23 (S).

C. coralliza: 3 (S).

C. xanthostigma: 2 (LD+S), 3 (S), 8 (LD+S), 12 (LD), 20 (S), 31 (LD).

C. vitellina: 20 (S).

Catillaria chalybeia*: 16 (S; Thor 8031), 20 (LD; Fröberg 1012).

C. globulosa: 2 (S), 12 (LD), 20 (S), 25 (LD).

Cetraria alvarensis: 11 (LD+S), 26 (LD), 27 (LD).

C. ericetorum ssp. ericetorum: 26 (LD).

C. islandica: 8 (S).

C. pinastri: 1 (S), 11 (S), 24 (LD), 25 (LD).

C. sepincola: 24 (LD).

Chaenotheca chlorella (C. carthusiae): 2 (LD).

C. chrysocephala: 8 (S), 17 (LD).

C. ferruginea: 3 (S), 12 (S), 17 (S), 18 (LD+S), 25 (LD).

C. hispidula: 2 (S), 20 (S).

C. trichialis: 2 (LD+S), 3 (S), 20 (LD+S).

C. subparoica*: 18 (S; Thor 8047b). - On the thallus of Chrysothrix chrysophthalma, discolouring the thallus.

C. vainoiana*: 2 (S; Thor 7913).

Chrysothrix candelaris: 20 (S).

C. chrysophthalma*: 18 (S; Sundin 348, Thor 8047a). - In Sweden and Estonia the species is found on large, dead, decorticated, still standing, slightly shaded trunks of Pinus sylvestris close to lakes or the sea. The thallus is leprose and apothecia are lacking. It can be difficult to distinguish from Psilolechia lucida but Chrysothrix chrysophthalma has rhizo-

carpic acid and an unidentified substance (Laundon, 1981). Psilolechia lucida only has rhizocarpic acid.

Cladonia botrytes: 1 (S).
C. cariosa: 8 (LD).
C. chlorophaea: 1 (S).
C. foliacea: 11 (S).
C. macilenta ssp. floerkeana: 17 (LD).
C. portentosa (Cladina portentosa): 25 (LD).
C. pocillum: 11 (S), 20 (S).
C. rangiferina (Cladina rangiferina): 18 (S).
C. rangiformis: 11 (S).
C. stellaris (Cladina stellaris): 18 (LD).
C. stygia (Cladina stygia): 25 (LD).
C. sulphurina: 25 (LD).
C. symphycarpa: 11 (S).
Clauzadea metzleri (Lecidea metzleri): 11 (LD), 20 (LD+S).
C. monticola (Lecidea monticola): 11 (LD), 24 (LD), 27 (LD).
Cliostomum graniforme (Catillaria graniformis): 30 (LD).
C. griffithii (Catillaria griffithii): 10 (LD), 20 (S).
Coelocaulon aculeatum: 8 (S), 20 (S), 24 (LD).
C. muricatum: 26 (LD).
Collema cristatum: 11 (S).
C. fuscovirens (Collema tuniforme): 11 (LD).
C. parvum*: 11 (LD; Fröberg 996).
C. polycarpon: 11 (LD).
C. tenax: 16 (S), 23 (S).
Dermatocarpon miniatum: 11 (LD).
Didymella sphinctrinoides*: 11 (LD; Fröberg 957), 24 (LD; Fröberg 934).- Parasymbiont on Protoblastenia rupestris.
Dimerella pineti: 2 (S).
Diploschistes muscorum: 11 (LD+S), 24 (LD).
D. scruposus: 11 (LD).
Endocarpon pusillum*: 11 (S; Thor 7983), 27 (LD; Ekman 448).
Farnoldia jurana* (Lecidea jurana): 11 (LD; Fröberg 997), 20 (LD; Fröberg 1015), 24 (LD; Fröberg 930 in collection of Clauzadea monticola), 27 (LD;Fröberg 976).
Fulgensia bracteata: 11 (LD+S), 20 (S).

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Graphis scripta: 2 (S), 3 (S), 15 (S), 20 (S).
Gyalecta jenensis: 7 (S).
Haematomma ochroleucum: 11 (LD), 20 (LD).
Hypocenomyce caradocensis*: 4 (S; Thor 7927), 17 (LD; Kärnefelt 8920-3, 8920-4), 18 (LD; Ekman 467, 20 (LD+S; Ekman 537, Kärnefelt 8924-1, 8924-7, Sundin 384).
H. scalaris: 13 (S), 17 (LD), 18 (LD), 20 (S).
H. sorophora*: 20 (S; Sundin 389c, Thor 8107).
Hypogymnia physodes: 2 (S), 17 (S), 22 (S).
Imshaugia aleurites (Parmeliopsis aleurites): 8 (S), 9 (S), 25 (LD).
Ionaspis carnosula*: 11 (LD+S; Fröberg 998 & 999, Thor 7986 in collection of Protoblastenia rupestris).
I. heteromprpha*: 11 (LD; Fröberg 1000).
I. rhodopis*: 11 (LD+S; Fröberg 958 & 1001, Sundin 315).
I. rhodopis has earlier been regarded as a variety of I. epulotica, but is treated as a separate species by Jørgensen (1989). It is distinguished by having an epilithic, cracked areolated thallus, whereas the thallus of I. epulotica is endolithic.
Lecanactis abietina: 15 (S).
Lecania cyrtella: 5 (S), 24 (LD), 27 (LD).
L. erysibe s. str.: 7 (LD).
L. fuscella: 20 (S).
L. turicensis: 29 (LD).
Lecanora albescens: 20 (LD).
L. allophana: 30 (LD).
L. atriseda: 11 (LD).
L. cadubriae: 17 (S), 18 (S).
L. campestris: 11 (LD).
L. carpinea: 2 (S), 3 (S), 4 (S), 9 (S), 11 (LD), 20 (LD+S).
L. cenisia: 10 (LD) 20 (LD).
L. chlarotera: 2 (S), 3 (S), 4 (S), 9 (S), 20 (LD), 31 (LD).
L. crenulata: 11 (LD), 20 (LD).
L. dispersa: 11 (LD), 20 (LD).
L. expallens: 2 (S), 10 (S; c. ap.), 25 (LD).
L. hagenii: 8 (S), 12 (LD), 20 (S), 24 (LD), 27 (LD).

L. hypoptoides*: 24 (LD; Ekman 355).
L. macrocyclos*: 11 (LD; Kärnefelt 8922-9), 24 (LD; Kärnefelt 8911-13 & 8911-14).
L. muralis: 11 (S), 20 (S).
L. polytropa: 11 (LD).
L. pulicaris: 24 (LD), 27 (LD).
L. rupicola: 2 (S).
L. saligna: 6 (S), 13 (S).
L. sambuci: 5 (S).
L. subfuscata: 2 (S), 9 (S).
L. subrugosa: 2 (S), 12 (S).
L. symmicta: 3 (S), 20 (LD+S), 25 (LD), 27 (LD).
L. umbrina: 26 (LD).
L. varia: 8 (LD+S), 20 (S), 25 (LD).
Lecidea albohyalina*: 2 (S; Sundin 226a).
L. deustata*: 11 (LD; Ekman 494).
L. efflorescens: 14 (S), 15 (LD+S), 20 (LD).
L. epixanthoidiza auct., non Nyl.: 2 (S). - Thallus C+ red (gyrophoric acid).
L. erythrophaea: 2 (S), 20 (S).
L. fuscoatra: 24 (LD).
L. insidiosa*: 20 (LD; Ekman 540), 25 (LD; Ekman 387, Fröberg 947).
L. lactea: 20 (LD).
L. lapicida: 11 (LD).
L.sulphurea: 20 (LD+S).
L. tesselata*: 24 (LD; Ekman 359, 360).
L. turgidula: 12 (LD).
Lecidella elaeochroma: 2 (S), 3 (S), 11 (S), 12 (LD), 20 (S), 24 (LD).
L. euphorea: 2 (S), 20 (S).- Includes material with oil drops in the hymenium ("Lecidella achristotera").
L. stigmatea: 11 (LD), 16 (S), 20 (LD), 24 (LD), 26 (LD).
Lempholemma isidiodes*: 11 (LD; Kärnefelt 8916-1).
Lepraria incana coll.: 2 (S), 14 (S), 20 (S).
Leptogium lichenoides: 11 (LD+S), 27 (LD).
Lobaria pulmonaria: 2 (S).
Micarea denigrata: 3 (LD), 8 (S), 24 (LD), 25 (LD).

M. lignaria*: 9 (LD; Ekman 404).

M. misella*: 1 (S; Thor 7866), 9 (LD; Ekman 407), 18 (LD; Ekman 472).- Lecidea asserculorum sensu Th. Fries (non Ach.) is stated as a synonym of Micarea misella by Coppins (1983). Trass (1970) reports Lecidea asserculorum Ach. from one locality in Estonia, but it is unclear what species this find refers to. Thus, Micarea misella is here reported as new to Estonia.

M. prasina: 2 (S), 9 (S).

Microcalicium disseminatum* (M. subpedicellatum): 2 (LD+S; Ekman 374, Thor 7912).

Mycobilimbia accedens (Bacidia accedens): 2 (S), 16 (S).

M. berengeriana (Lecidea berengeriana): 11 (LD+S), 27 (LD).

M. lobulata (Toninia lobulata): 11 (LD).

M. hypnorum (Lecidea hypnorum): 20 (LD).

M. sabuletorum (Bacidia sabuletorum): 2 (LD), 20 (LD), 29 (LD).

Mycoblastus sterilis*: 3 (S; Thor 7917a), 8 (LD; Ekman 394), 9 (LD+S; Ekman 408, Thor 7975 & 7976), 12 (LD+S; Ekman 422, Sundin 325, Thor 8011), 25 (LD; Ekman 390).

Mycocalicium subtile: 8 (LD), 18 (LD).

Ochrolechia androgyna: 2 (S), 17 (LD), 20 (S).

O. arborea: 3 (S), 8 (LD), 9 (LD), 24 (LD).

O. microstictoides: 9 (LD), 12 (LD), 18 (LD). - Closely related to O. turneri but differs chemically, morphologically and ecologically. In addition to variolaric acid, O. microstictoides also contains lichesterinic acid (lacking in O. turneri). O. microstictoides has (almost) only diffuse soralia, whereas O.turneri has distinct soralia at least near the edge of the thallus. O. turneri grows in fairly nutritious sites such as the bark of Acer,Fraxinus etc, while O. microstictoides is confined to poor bark (Betula,Pinus) and lignum. Our three Estonian finds of O. microstictoides were on lignum.

O. pallescens: 11 (LD), 20 (LD).

O. turneri: 20 (S). - On Fraxinus excelsior. For comments, see also O. microstictoides.

Opegrapha atra: 2 (S).

O. niveoatra: 3 (S), 7 (LD).

O. ochrocheila*: 2 (S; Sundin 202).
O. rufescens: 2 (S), 3 (S), 9 (S), 20 (LD+S).
O. varia: 2 (LD+S), 7 (S), 20 (S).
Ophioparma ventosa (Haematomma ventosum): 24 (LD).
Pachyphiale fagicola: 25 (LD).
Parmelia conspersa: 20 (S).
P. exasperata: 20 (LD+S).
P. exasperatula: 8 (LD).
P. glabratula: 20 (S).
P. incurva: 24 (LD).
P. olivacea: 2 (S), 15 (LD), 25 (LD).
P. pulla: 2 (S).
P. saxatilis: 20 (S).
P. somloensis (P. taractica): 20 (S), 24 (LD).
P. subaurifera: 12 (LD).
P. sulcata: 8 (S), 10 (S), 20 (S), 21 (S).
Parmeliopsis ambigua: 1 (S), 11 (S).
P. hyperopta: 18 (LD).
Peltigera praetextata: 2 (S), 3 (S).
P. rufescens: 11 (S), 20 (S).
Pertusaria albescens: 12 (LD), 20 (S), 30 (LD).
P. amara: 2 (S), 9 (S), 13 (S).
P. coccodes: 2 (LD), 3 (S).
P. coronata*: 2 (LD; Ekman 373), 3 (S; Sundin 252), 20 (S; Thor 8077).
P. flavida 2 (S).
P. hemisphaerica: 2 (S).
P. leucostoma: 2 (S), 9 (S), 20 (LD+S).
P. pertusa: 9 (S).
Petractis clausa*: 20 (LD; Fröberg 1022).
Phaeophyscia orbicularis: 5 (S), 24 (LD), 31 (LD).
P. sciastra: 20 (S).
Phlyctis agelaea: 2 (S), 7 (LD), 12 (LD), 15 (LD+S), 20 (S).
P. argena: 2 (S), 3 (S), 9 (S), 20 (S).
Physcia adscendens: 2 (S), 20 (S).
P. aipolia: 20 (S).
P. caesia: 20 (S), 24 (LD).

P. stellaris: 2 (S), 20 (LD+S), 24 (LD).
P. tenella: 3 (S), 4 (S), 20 (S).
Physconia distorta (P. pulverulacea): 10 (S), 20 (S).
P. enteroxantha: 31 (LD).
P. perisidiosa: 12 (LD).
Placynthiella icmalea*: 8 (LD+S; Ekman 395, Thor 7958), 12 (LD+S; Ekman 430, Thor 8007), 20 (LD; Ekman 558), 21 (S; Thor 8120), 25 (LD; Ekman 383). - This speciee was found mainly on different kinds of lignum, most often of Pinus sylvestris. It was also found on soil and on sand. Its close relative P. uliginosa has a more narrow ecological range and is usually to be found on pure sand. Placynthiella icmalea was separated from P. uliginosa by Coppins & James (1984).
P. uliginosa (Lecidea uliginosa): 17 (LD).
Placynthium nigrum: 11 (LD+S), 20 (LD), 24 (LD).
Platismatia glauca: 18 (S).
Polyblastia albida: 11 (LD).
P. cupularis*: 20 (LD; Fröberg 1024).
P. fuscoargillacea*: 20 (LD; Fröberg 1025).
P. gelatinosa*: 27 (LD; EKman 456).
P. nidulans*: 11 (LD; Fröberg 1003).
Polysporina simplex: 24 (LD).
Porina aenea*: 16 (S; Thor 8039).- On Pinus sylvestris.
P. chlorotica*: 20 (LD; Ekman 548).
P. linearis*: 16 (S; Thor 8032).
Porpidia crustulata (Huilia crustulata): 9 (S), 24 (LD).
P. nigrocruenta* (Huilia nigrocruenta): 20 (LD;Kärnefelt 8924-11).
P. tuberculosa (Huilia tuberculosa): 20 (LD).
Protoblastenia calva: 11 (LD+S), 20 (LD+S).
P. incrustans: 27 (LD).
P. rupestris: 11 (LD+S), 20 (LD), 24 (LD), 26 (LD).
Protoparmelia badia (Lecanora badia): 11 (LD), 24 (LD).
Pseudevernia furfuracea: 2 (S), 8 (S).
Psora decipiens: 11 (S), 20 (S), 26 (LD).
Psorotichia schaereri*: 11 (LD; Fröberg 961).
Pyrrhospora quernea* (Lecidea quernea): 2 (S; Thor 7901), 3 (S;

Sundin 250), 8 (S; Thor 7962), 13 (S; Sundin 328), 14 (S; Thor 8020), 16 (S; Thor 8038).

Ramalina fraxinea: 10 (LD+S), 20 (LD).

R. subfarinacea: 11 (LD).

Rhizocarpon concentricum: 20 (LD).

R. distinctum: 20 (LD), 24 (LD).

R. gemmatum: 20 (S).

R. geographicum: 20 (LD).

Rimularia insularis (Lecidea insularis): 20 (LD), 24 (LD).

Rinodina bischoffii: 11 (LD), 20 (LD).

R. exigua: 2 (S), 27 (LD).

R. gennarii: 20 (LD).

R. immersa*: 20 (LD; Fröberg 1029).

R. pyrina: 4 (S).

R. sophodes: 20 (LD+S).

Sagiolechia protuberans: 20 (LD), 27 (LD).

Sarcogyne regularis (S. pruinosa auct.): 8 (LD), 11 (S), 24 (LD), 27 (LD).

Schaereria tenebrosa: 24 (LD).

Schismatomma abietinum: 3 (S).

Sclerophora coniophaea* (Coniocybe coniophaea): 2 (S; Sundin 208, Thor 7875).

S. farinacea* (Coniocybe farinacea): 2 (LD; Ekman 376).

S. nivea (Coniocybe pallida): 30 (LD), 31 (LD).

Scoliciosporum chlorococcum: 2 (S), 6 (S), 20 (LD).

S. sarothamni*: 3 (S; Sundin 244), 23 (S; Thor 8198).

S. umbrinum: 2 (S), 11 (LD), 20 (LD+S), 24 (LD).

Squamarina lentigera: 11 (LD+S).

Stenocybe pullatula (S. byssacea): 17 (S).

Stereocaulon incrustatum: 17 (LD), 18 (LD).

Tephromela atra (Lecanora atra): 2 (S; on rocks), 9 (S; on Fraxinus excelsior), 20 (S; on Tilia cordata).

Thelidium decipiens*: 11 (LD; Fröberg 1005 & 1006), 20 (LD; Fröberg 1030).

T. incavatum*: 20 (LD; Fröberg 1031).

Thelomma ocellatum*: 6 (S; Thor 7939), 20 (S; Sundin 385).

Thelotrema lepadinum: 15 (LD).

Toninia caeruleonigricans: 11 (S).

T. cervina*: 11 (LD; Ekman 500).

Trapelia flexuosa (Lecidea aeruginosa): 1 (S), 13 (S), 17 (LD), 18 (LD), 24 (LD).

T. granulosa (Lecidea granulosa): 17 (LD), 18 (LD+S), 21 (S).

Usnea hirta: 8 (S), 20 (S).

Verrucaria calciseda: 8 (LD), 11 (LD), 20 (LD), 27 (LD).

V. foveolata: 11 (LD).

V. fuscella: 11 (LD), 26 (LD), 27 (LD). - V. fuscella and V. glaucina auct., non Ach. have usually been treated as one species, but they are quite different from each other. V. fuscella has rather small and thin areoles, each with only 1-3 perithecia which are clearly visible as 0.1-0.25 mm wide patches. V. glaucina auct., non Ach. has larger and thicker areoles with several perithecia, visible as minute dots, and dark lines crossing the areoles (= the dark hypothallus penetrating the areoles). V. glaucina Ach., which does not belong to the group, is synonymous with V. caerulea DC. (cf. Fröberg, 1989).

V. glaucina* auct. non Ach.: 11 (LD; Fröberg 996 in collection of Collema parvum), 24 (LD; Fröberg 944), 27 (LD; Fröberg 982). For comments, see V. fuscella.

V. muralis: 7 (LD), 11 (LD), 20 (LD) 24 (LD), 27 (LD).

V. nigrescens: 11 (LD), 20 (LD), 24 (LD), 27 (LD).

V. obscura*: 7 (LD; Ekman 523, Fröberg 1042). - V. obscura was described by Th. M. Fries on material collected by Stenhammar from Öland and Gotland. It is characterized by a greyish brown, epilithic thallus and large, half-immersed perithecia with spreading involucrellum, and large spores (25-48 x 10-22 µm) (cf Fröberg, 1989). The specimens from Estonia deviate somewhat in having a greenish white thallus, due to the shaded habitat where they occurred.

V. velutinoides*: 24 (LD; Ekman 363).

V. viridula*: (incl. V. obductilis and V. griseorubens): 20 (LD; Fröberg 1037).

Xanthoria calcicola: 19 (S).

X. candelaria: 11 (LD).

X. parietina: 11 (LD), 20 (LD+S), 24 (LD).
X. polycarpa: 2 (S), 3 (S), 4 (S), 11 (LD), 20 (S).
Xylographa abietina: 24 (LD), 27 (LD).
X. vitilago*: 4 (S; Thor 7928), 9 (LD; Ekman 406), 13 (S; Thor 8014), 20 (LD+S; Ekman 549, Thor 8111), 24 (LD; Ekman 365 & 366), 26 (LD; Ekman 438), 27 (LD; Ekman 443 & 451). - Only found sterile.

List of localities

1. Haapsalu District, Marimetsa bog, at the road Tallinn-Virtsu just S of Risti. 58°59'N 24°04'E, 11 June 1989 (S). Open raised bog with scattered, small Pinus sylvestris.
2. Haapsalu District, c. 3 km SSE Virtsu, at the ornithological field station at Puhtu. 58°34'N 23°33'E, 11- 12 June 1989 (S), 8-9 July (LD). Dense, old, broad-leaved deciduous forest at the Baltic Sea.
3. Haapsalu District, Laelatu forest meadow c. 2 km E Virtsu. 58°35'N 23°35'E, 12 June 1989 (S), 10 July (LD). Open forest meadow with deciduous trees.
4. The island Muhu, at the village Koguva. 58°36'N 23°05'E, 12 June 1989 (S). Small village at the Baltic Sea.
5. Saaremaa (Ösel), in the village Orissaare. 58°34'N 23°04'E, 12 June 1989 (S). Malus avenue in the village.
6. Saaremaa (Ösel), Põide ancient stronghold. 58°30'N 23°02'E, 12 June 1989 (S). Open grassland with old pole.
7. Saaremaa (Ösel), the meteorite crater lake at Kaali. 58°22'N 22°40'E, 12 June 1989 (S), 14 July (LD). Dense, old, broad-leaved deciduous forest and limestone rocks surrounding the crater.
8. Saaremaa (Ösel), Järve sand dunes, NNE of the Sõrve peninsula. 58°13'N 22°20'E, 13 June 1989 (S), 11 July (LD). Sand dunes with open Pinus sylvestris forest at the Baltic Sea.
9. Saaremaa (Ösel), Sõrve peninsula, Viieristi rich fens. 58°03'N 22°13'E, 13 June 1989 (S), 11 July (LD). Rich fen, partly covered with Alnus glutinosa and Fraxinus excelsior.

10. Saaremaa (Ösel), Sõrve peninsula, Jämaja church yard. 58°00'N 22°02'E, 13 June 1989 (S), 11 July (LD). Broad-leaved deciduous trees and stone fence.
11. Saaremaa (Ösel), Sõrve peninsula, Lõo alvar. 58°06'N 22°11'E, 13 June 1989 (S), 13 July (LD). Alvar vegetation with shrubs of Juniperus communis, small patches of limestone pavements and gravel. Calcareous rocks along the Baltic Sea.
12. Saaremaa (Ösel), Viidumäe State Nature Reserve. 58°19'N 22°07'E, 13 June 1989 (S), 11 July (LD). Damp calcareous meadow at the Baltic Sea with scattered conifers and deciduous trees. Avenue of Acer and solitary Quercus around Audaku. Pinus sylvestris forest and an Alnus glutinosa marsh.
13. Saaremaa (Ösel), Kuusnõmme W of Kihelkonna. 58°21'N 22°00'E, 14 June 1989 (S). Rich fen surrounded by mixed coniferous/deciduous forest at the Baltic Sea.
14. Saaremaa (Ösel), Tagala forest meadow just W of Veere. 58°28'N 21°59'E, 14 June 1989 (S). Open forest meadow with deciduous trees.
15. Saaremaa (Ösel), Sepise just S of Veere. 58°27'N 22°00'E, 14 June 1989 (S), 12 July (LD). Dense Picea abies forest with scattered Alnus glutinosa , Corylus avellana, Fraxinus excelsior, Pinus sylvestris and Taxus baccata.
16. Saaremaa (Ösel), Panga Pank limestone cliffs at the sea. 58°34'N 22°18'E, 14 June 1989 (S). Limestone cliffs at the Baltic Sea surrounded by grassland and scattered Pinus sylvestris.
17. Saaremaa (Ösel), Odalätsi springs. 58°25'N 22°09'E, 14 June 1989 (S). Springs surrounded by forest dominated by Alnus glutinosa and Pinus sylvestris.
18. Saaremaa (Ösel), sand dunes near Odalätsi. 58°25'N 22°09'E, 14 June 1989 (S), 12 July (LD). Sand dunes with Pinus sylvestris forest.
19. Saaremaa (Ösel), Orissaare harbour. 58°34'N 23°04'E, 14 June 1989 (S). Small building, partly built by cement.
20. Kõinastu island (W of Muhu). 58°38'N 23°02'E, 15 June 1989 (S), 14 July (LD). Open and dense broad-leaved deciduous forest. Scattered solitary deciduous trees around a farmhouse. Embankments with siliceous boulders and marl stone. Dry grazed meadows with

Juniperus communis, siliceous stone fences, fence poles and remnants of old buildings.

21. Pärnu District, on the road M 12 from Pärnu to Riga c. 40 km S Pärnu, Rannamõisa dunes. 57°55'N 24°25'E, 15 June 1989 (S). Sand dunes with Pinus sylvestris forest.

22. Pärnu District, on the road M 12 from Pärnu to Riga c. 50 km S Pärnu. 57°56'N 24°26'E, 15 June 1989 (S). Pinus sylvestris forest on sandy soil.

23. Tallinn Botanical garden, Kloostrimetsa. 59°28'N 24°52'E, 20 June 1989 (S). Limestone wall and deciduous trees.

24. Haapsalu District, Kaseküla alvar. 58°37'N 23°37'E, 9 July 1989 (LD). Grassy alvar with rather dense shrub vegetation of mainly Juniperus communis. Scattered siliceous and limestone boulders, and areas with limestone gravel and pebbles.

25. Saaremaa (Ösel), W of Pöide, N-most part of Kareda- Koigi raised bog, 58°31'N 22°59'E, 10 July 1989 (LD). Open raised bog with scattered Betula pubescens. Pinus sylvestris along the edge. Fraxinus excelsior in the drier slopes towards the bog.

26. Saaremaa (Ösel), Eriksaare alvar on the peninsula N of Atla, 58°13'N 22°07'E, 12 July 1989 (LD). Alvar habitat with rather dense shrub and grass vegetation. Scattered limestone boulders and stones.

27. Saaremaa (Ösel), Atla alvar, 58°13'N 22°08'E, 12 July 1989 (LD). Alvar with limestone pavements, boulders and gravel. Juniperus communis rather abundant.

28. Saaremaa (Ösel), SW of Kihelkonna, Vesiku, 58°17'N 22°07'E, 12 July 1989 (LD). Calcareous fens and grazed meadows by the sea.

29. Saaremaa (Ösel), Kihelkonna, the churchyard, 58°14'N 22°10'E, 12 July 1989 (LD). Old deciduous trees along the edge of the churchyard.

30. Saaremaa (Ösel), Viki, Mihkli Farm Museum, 58°14'N 22°11'E, 12 July 1989 (LD). Old farmhouse with surroundings, including scattered trees of Fraxinus excelsior.

31. Saaremaa (Ösel), Kuressaare (Kingissepa), Castle City Park, 58°25'N 22°29'E, 13 July 1989 (LD).

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Appendix

When the present issue of Folia Cryptogamica Estonica had already been prepared for press, a letter arrived from Dr. G. Thor, suggesting a few complements and corrections, viz.:

"1. Agonimia tristicula : Thor 8027 shall be 8027a.

2. Rhizocarpon gemmatum shall be Rhizocarpon geminatum.

3. One new species can be added to the list:

Leptogium schraderi : 16 (S; Thor 8027b). It should also be added under acknowledgements, that P.M. Jørgensen identified this collection."

SOME CHEMOSYSTEMATICAL DATA ABOUT THE LICHEN GENUS NEPHROMOPSIS IN THE U.S.S.R.

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Introduction

The lichen genus Nephromopsis Müll. Arg. is approved newly only some time ago (Lai, 1980; Goward, 1985) in the course of phylogenetic studies on the enourmous heterogenous group of cetrarioid lichens. In the soviet lichenological literature the species having nephromoid apothecia on the underside of the folious thallus are treated as the section Nephromopsis Rassad. of the genus Cetraria Ach. (Rassadina, 1948). Other important characters of that group are nowadays considered to be the following: paraplectenchymatous upper cortex; presence of sparse rhizines; laminal pseudocyphellae over the lower surface of the thallus; absence of soredia or isidia; occurrence of different medullary compounds (orcinol depsides and depsidones, anthraquinones and higher aliphatic acids excluding caperatic acid). All the species are distributed in the eastern and south-eastern Asia, mainly in China, Nepal, Taiwan and Japan. Only some Nephromopsis species occur more widely - from the eastern Siberia up to India and the Philippines. The genus includes on the grounds of modern studies some 12-13 species (Lai, 1980). In the Soviet Union there are known up to now 4 lichens from that group (under the genus Cetraria): C. asahinae Sato - in the soviet Far East; C. endocrocea (Asah.) Sato - on the Kuril islands; C. ornata Müll. Arg. - in the soviet Far East; C. pseudocomplicata Asah. -- on the island of Sahhalin (Rassadina, 1971). This short paper is presented to add some specified data about the chemical composition and the range of distribution of Nephromopsis species in the Soviet Union.

Methods

50 Nephromopsis specimens form the U.S.S.R. (in the herbaria of TU, KW and LE) were analysed by TLC according to the standard methods (Culberson, C., Kristinsson, 1970; Culberson, C. 1972). Six specimens from Japan (N. asahinae, N. endocrocea, N. ornata, N. pseudocomplicata and N. rugosa) were also tested as for comparison (TU, H). The main emphasis is on the orcinol depsidones and anthraquinonic pigments in this paper. The fatty acid were recorded but not identified.

Results.

1. N. asahinae (Sato) Räs. - 11 specimens analysed. Ten of them were collected in the Primorje Region (Kedrovaya Padj, Suputinka, the Kuril Islands) and one from Japan. Fumarprotocetraric, protocetraric and physodalic acids are announced to contain in the species (Yoshimura, 1979; Lai, 1980). Two first substances cause the reddish reaction of Pd on the medulla. Fumarprotocetraric and protocetraric acids were detected in all 11 specimens tested, in addition usnic acid in 5 specimens and physodalic in one.

2. N. endocrocea Asah. - 5 specimens analysed, two from Japan and other three from the Kuril Islands (Kunashir, Gorjaschi Pljaz, leg. E. Parmasto, 1960; islands of Iturup and Shikotan, leg. O. Blum, 1965). According to the literature data the species contains endocrocin and fatty acids of nephrosteranic and nephrosterinic type (Culberson, C., 1969; Lai, 1980). Endocrocin belongs to the anthraquinonic pigments, causing the orange colour of the medulla and violet reaction with K on it. All tested specimens included endocrocin and two fatty acids.

3. N. ornata (Müll. Arg.) Hue - 36 specimens from Primorje and Habarovsk Regions and one form Japan analysed. This species contains usually fumarprotocetraric acid and secalonic acid C (Yosioka et al., 1972; Culberson, C., Culberson, W., Johnson, 1977). The last compound is a yellow pigment that also belongs to the anthraquinones. It gives the yellowish colour to the medulla.

Endocrocin, which is known to be the precursor of secalonic acid and derivates,is found in N. ornata as traces (Yosioka et al., 1972; Lai, 1980). Two specimens from Taiwan were tested to contain usnic acid and secalonic acid C,but lacked fumarprotocetraric acid (Lai, 1980). Our material was not chemically homogenous. It can be divided into two different chemotypes (33+4 specimens). The more numerous chemotype in the USSR contains secalonic acid A as the major pigment. This substance was identified in the comparison of the chromatograms of N. ornata and Parmelia entotheiochora which is the main source for that compound. This is the first report of eecalonic acid A in N. ornata. The second chemotype (3 specimens from the USSR and 1 from Japan) includes secalonic acid C as the major pigment. It was identified in the comparison of the chromatograms of the soviet material and a Japanese specimen. The latter (Lich Jap. Exs. by Y. Asahina no. 6 from H) had been analysed earlier by Dr. Gao. Secalonic acid C, endocrocin and protolichesterinic acid type fatty acid had been determinated in it. According to our data secalonic acid A and C have quite similar spots (properly columns) on the chromatograms extending into the classes 4-5 but the Rf value of the C isomer is still a bit greater. We may aditionally report that fumarprotocetraric acid was found in one specimen only and usnic acid was detected in 6 cases. The traces of endocrocin were also noticed.

4. N. pseudocomplicata (Asah.) Lai - one specimen from Japan (prov. Suruga, Fuji San, leg. et det. W.L. and C.F. Culbersons, 1961) analysed. The species contains alectoronic acid and usnic acid as a trace (Culberson, C., 1969). M. J. Lai (1980) has detected also α-collatolic acid. This is probably an accessory substance and may be absent in some specimens. Our chromatogram showed alectronic acid only.

5. N. rugosa Asah. - one specimen from Primorje Region (Kedrovaya Padj, leg. Guriljova, 1951) and one from Japan (Lich. Rar. et Crit. Exs. by S. Kurokawa, no. 154) analysed. According to the literature data (Yoshimura, 1979) the species has two different chemotypes: the usual form contains physodic acid (J.M. Lai adds here conphysodic acid) and the rarer one includes olivetoric acid. Both chemotypes show the presence of usnic acid as major substance

in the cortex. The soviet specimen contains usnic and olivetoric acids, the Japanese one - usnic, physodic and conphysodic acids.

As it is the first report of N. rugosa in the Soviet Union we submit the description of the species here.

Thallus foliose, greenish yellow, about 10 cm in diam., somewhat reticulate on the upper surface and conspicuously rugose below. Numerous spines occur along the lobe margins. Soredia and isidia absent. The underside is light brown with tiny white pseudocyphellae. Rhizinae sparse. Medulla white. Apothecia are situated at the lobe tips. The reticulation of the thallus is a good character that makes N. rugosa morphologically different from the other species in this group.

The distribution of N. rugosa is also somewhat unclear. It is declared to be a Japanese endemic (Yoshimura, 1979; Lai, 1980) but has still been found also in Mongolia (Schubert, Klement, 1971; Golubkova, 1981) and now in the U.S.S.R.

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ASPICILIA EXCAVATA IN THE U.S.S.R.

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A new species for the lichen flora of the USSR - Aspicilia excavata Thor et Timdal - was found in the Ukraine last year (Kondratjuk, 1989). Later it was recognized also in the Baltic republics and we announce now this species for Estonia, Latvia and Lithuania for the first time.

The Scandinavian lichenologists G. Thor and E. Timdal, the authors of the species A. excavata, mark that the newly described lichen frequently grows in south-facing, dry, open habitats. It was collected from the natural localities (steep faces of limestone or calcareous schists) as well as from the anthropogenous habitats (on the mortar of old walls and buildings). A. excavata is uaually accompanied by only a few or no other lichens (Thor, Timdal, 1986).

In the USSR A. excavata is found up to now mainly on the vertical surfaces of cement or concrete of different buildings. Sometimes it may expand also to the inclined planes and in a few cases - to the horizontal surfaces (in Tartu, Estonia and in Lutsk, the Ukraine). A. excavata covers about 100 cm^2 of the horizontal surface in the last case. We have not found the speciesfrom really natural habitats. It prevailingly grows on the substratum of cement but once it was collected even on the remains of an old cotton material on the concrete building (in Vyshgorod, the Ukraine).

We suppose that A. excavata turns out to be a pioneer in colonizing the cement substrata together with Candelariella aurella, Lecanora crenulata, Caloplaca decipiens, Sarcogyne pruinosa etc. but is probably more strict in some of its ecological demands than the rest. It seems that besides the conditions of humidity and light the area of surfaces colonized by the lichen is of certain importance. If the cement surfaces are of area 0.5-1 m^2, the thallus of A. excavata covers only some cm^2 -s. In the presence of extensive cement walls the colonies of the lichen may reach up

to 1 m^2 (e.g. in Vyshgorod, the Ukraine) and have then a characteristic grayish appearence.

A. excavata is probably the species that may grow also in the conditions of considerable atmospheric pollution - it was collected on the main streets of Riga and Tartu.

The main factors, limiting the distribution of A. excavata in the natural conditions possibly are the qualities of the habitat - the chemistry of the substratum, its area and location.

List of the localities.

Estonia: Tartu, riverside of the Emajõgi, on the market building on the houses of Riga Street, 20.02.1989, S. Kondratjuk, T. Randlane. Latvia: Riga, Sport Street, A. Amtman - Briedişa Street, Smilsu Street, on the walls and staircases, 28.04.1989, S. Kondratjuk. Lithuania: Jajodove station, on the railway platform, 28.04.1989, S. Kondratjuk.
The Ukraine: Ternopol, the Pioner Hydropark, on the bridge, 20.01.1989, S. Kondratjuk. Kiev region, in the vicinity of Vyshgorod, close to the Kiev Hydroelectric Powerstation, on the railing, 12.03.1989; in the vicinity of Kiev, close to the ponds of Svjatoshinsk, 20.05.1989, S. Kondratjuk. Kirovogradsky region, Lozovatoje village, on the buildings close to the pond, 10.06.1989, S. Kondratjuk. Volynsky region, Lutsk, Dimitrova Street, near lake, on the bench, 25.06.1989, S. Kondratjuk.

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