

Gunneria

58



Astri Botnen og Tor Tønsberg

*ADDITIONS TO THE LICHEN FLORA OF
CENTRAL NORWAY*

TRONDHEIM 1988

EDITORS

Harald Nissen (Librarian)
Jon-Arne Snøli (Zoology/Marine biology)
Birgitta Wik (Archaeology)
Eli Fremstad (Botany)
Hans Jørgen Lønne (Secretary)

INFORMATION FOR CONTRIBUTORS

"Universitetet i Trondheim, Vitenskapsmuseet, Gunneria", will mainly present original papers within the area of work and responsibility covered by University of Trondheim, Museum of Natural History and Archaeology, - i.e. archaeology, cultural history, botany and zoology. The series is printed in offset.

LANGUAGE

Contributions are accepted in English and Norwegian or exceptionally in other languages.

MANUSCRIPTS

Authors should submit the original manuscript to the editors and the authors are requested to retain one complete and corrected copy.

Manuscripts should be typed double-spaced on one side of the paper, with top and left-hand margins at least 3 cm wide.

Separate sheets should be used for the following:

- 1) title pages, with the authors name and institution;
- 2) an abstract in English not exceeding 200 words;
- 3) a summary not exceeding 3% of the original manuscript;
- 4) references;
- 5) Tables with their headings;
- 6) legends to Figures.

In case of papers submitted in a language other than English, the title page, summary, table headings and figure legends must also be translated into English.

ILLUSTRATIONS

All illustrations and diagrams other than Plates are to be considered as Figures. Line drawings should be drawn with black Indian ink, in size allowing for reductions. Photographs should be unmounted glossy enlargements showing details. The authors name and number of the figure should be written on the back of each.

REFERENCES should be quoted in the text as Brown (1957), Brown & White (1961) or if more than two authors, Green et al. (1963). Multiple references should be given as "Several authors have reported (Brown 1957, Brown & White 1961, Green et al. 1963)," i.e. in chronological order, no comma between name and year.

List of references are to be unnumbered and in alphabetical order. The international alphabetical order of Scandinavian and German vowels is: Å = AA, Æ and Ä = AE, Ø and Ö = OE, Ü = UE. Indicate 1st, 2nd, 3rd, etc. works by the same author in the same year by a, b, c, etc. (White 1966a). Titles of journals should generally be abbreviated according to the last edition of World List of Scientific Periodicals.

Examples:

Brøgger, A.W. 1925. *Det norske folk i oldtiden*. Oslo.

Gjærevoll, O. 1963. Survival of plant on nunataks in Norway during the pleistocene glaciation. pp. 261-283 in A. & D. Löve (ed.); *North Atlantic Biota and Their History*. Oxford.

Sivertsen, E. 1935. Über die chemische Zusammensetzung von Robbenmilch. *Nytt Mag. Naturvid.* 75: 183-185.

PROOFS

The author will receive one copy of the proofs, which should be carefully corrected and returned within the specified time.

OFFPRINTS

Authors will receive 100 offprints gratis. Additional copies can be ordered.

CORRESPONDENCE concerning manuscripts, offprints, subscription and other editorial matters should be addressed to: Universitetet i Trondheim, Vitenskapsmuseet, Gunneria, N-7004 Trondheim.

Starting at No 26 the name of this series is changed from *Miscellanea* to GUNNERIA. The numerical order will continue (see cover page 3). The name GUNNERIA is in memory of Johan Ernst Gunnerus (1718-73), one of the founders of this institution, professor of theology at the University of Copenhagen, bishop in Trondheim from 1758, vice president and Director Perpetuus of the Society from 1767-73, scientist with basic research in zoology and important botanical publications ("Flora Norvegica").



Administrasjonen

Gunneria

58

Universitetet i Trondheim
Vitenskapsmuseet

Astri Botnen og Tor Tønberg

**ADDITIONS TO THE LICHEN FLORA OF
CENTRAL NORWAY**

TRONDHEIM 1988

Journal

88

Universitet i Trondheim

Vitenskapstidsskrift

Volume 88, No. 1, 1985
Published by the University of Trondheim
ISSN 0332-8554

INDEX

The index will cover all articles published in this volume.

OFFPRINTS

Authors will receive 50 offprints free of charge.

Arvi Børnsøe og Tor Tvedberg

ADDITIONS TO THE LICHEN FLORA OF

CENTRAL NORWAY

ILLUSTRATIONS

All illustrations and figures must be submitted on separate sheets. Line drawings should be drawn with black Indian ink. Photographs should be mounted on glossy paper. The author's name and number of the figure should be written on the back of each.

ISSN 82-7126-421-4

ISSN 0332-8554

TRONDHEIM 1985

1	INTRODUCTION
2	MATERIAL AND METHODS
3	THE SPECIES
4	SUMMARY
5	REFERENCES

ABSTRACT

Botnen, A. & Tønsberg, T. 1988. Additions to the lichen flora of central Norway. *Gunneria* 58: 1-43.

New distribution data are given for 34 species of lichens in Norway. The records are mainly a result of field work, particularly in central Norway (Trøndelag and adjacent regions). *Bactrospora corticola*, *Lecania baeomma*, *L. nylanderiana*, *Lecanora cateileia*, *Opegrapha vermicellifera*, *Porina grandis* and *Psilolechia clavulifera* are new to Norway, while *Lecania baeomma* and *Psilolechia clavulifera* are new to Scandinavia. In addition, 10 species are new to northern Norway, and one is new to southern Norway. Distribution maps are provided for the following species in Norway: *Arthothelium norvegicum*, *Belonia nidarosiensis*, *Cladonia alpina*, *Lecanora ochrococca*, *Opegrapha gyrocarpa*, *O. zonata* and *Parmelia acetabulum*.

Astri Botnen, University of Bergen, Botanical Institute, Allégt. 41, N-5007 Bergen, Norway
Tor Tønsberg, University of Bergen, Botanical Institute, Allégt. 41, N-5007 Bergen, Norway.

CONTENTS

1	INTRODUCTION
2	MATERIALS AND METHODS
3	THE SPECIES
20	RESULTS
40	DISCUSSION

1 INTRODUCTION

Studies of the Norwegian lichen flora have been intensified during the last decade, and several species new to the country, or parts of it, have been discovered and reported. The present contribution mainly includes species new to central Norway (Møre og Romsdal, Sør-Trøndelag, Nord-Trøndelag and southernmost part of Nordland). Recent papers dealing with the lichen flora of this area include e.g. Coppins & Tønsberg (1984), Holien (1982, 1986), Jørgensen (1978), Timdal (1982), Tønsberg (1978, 1979, 1980, 1983), Tønsberg & Ahti (1980), Tønsberg & Holien (1984), and Tønsberg & Øvstedal (1982).

Acknowledgements. Thanks are due to the curators of the herbaria in Helsinki (H), Oslo (O), Stockholm (S), Trondheim (TRH), and Uppsala (UPS) for loan of material and/or for working facilities. We thank Mr H.H. Blom, Mr H. Holien and Mr P.S. Sommervold for placing recently collected lichens from Trøndelag at our disposal. We are especially grateful to Mr L. Källsten, Uppsala, who allowed us to use his lists of recently revised herbarium material of *Opegrapha gyrocarpa* and *O. zonata* from Norway. Thanks are also due to Dr B.J. Coppins, Edinburgh, Mr P.W. James, London, and Mr O. Vitikainen, Helsinki, for help with identification of some specimens, and to Prof. P.M. Jørgensen, Bergen, for comments on the manuscript.

2 MATERIAL AND METHODS

This study is primarily based on recent collections (BG) made by the authors. Herbarium material for some species which was deposited in BG, O, TRH, and UPS have also been included. Type material of *Lecanora ochrococca* and *Pertusaria sorediana*, both H, were examined.

Thin-layer chromatography (TLC) was carried out according to Culberson & Kristinsson (1970), Culberson (1972), and White & James (1985). Tests for amyloid reactions were made in

Lugol's iodine solution (I), or in a modified version where H₂O was replaced by lactic acid. The latter solution was used after pre-treatment of the preparations with K (10 % KOH), and is denoted K&I.

The nomenclature of the lichens mainly follows Santesson (1984).

Sør-Norge (the counties S of Nordland) is here recorded as southern Norway, Østlandet (the E part of southern Norway S of Trøndelag) as eastern Norway, Vestlandet (Rogaland, Hordaland, Sogn og Fjordane, Møre og Romsdal) as western Norway, whereas Nord-Norge (Nordland, Troms, Finnmark) is recorded as northern Norway.

3 THE SPECIES

Anisomeridium biforme (Borr.) Harris

Hordaland: Os, Haljem, Bjørnen, 1978, L. Tibell 8063 (UPS).
Møre og Romsdal: Smøla, Kuli, alt. 0-20 m, MR 5419 (1321 I),
1983, T. Tønsberg 8299.

New to Hordaland and Møre og Romsdal.

Anisomeridium biforme was recently reported as new to Norway from localities in Vest-Agder and Rogaland by Tønsberg & Øvstedal (1982). The presently cited locality in Smøla represents a new northern limit in Europe.

The species was collected on smooth bark of *Corylus avellana*. It grew in abundance on Smøla and was closely associated with *Opegrapha vermicellifera*.

Arthonia granitophila Th. Fr.

Nord-Trøndelag: Namdalseid, S of lakelet Altvatn, alt.
70-80 m, PS 0640 (1623 I), 1985, A. Botnen 85/58.

New to central Norway.

Arthonia granitophila was previously known in Norway from Hordaland and Sogn og Fjordane. In Sweden it occurs as far north as Jämtland (Santesson 1984). Outside Scandinavia it only seems to be known from W-Germany: Schwarzwald (Wirth 1980). The locality in Namdalseid therefore represents a new northern limit for the species.

It was found on rock under an overhang, along with *Parmelia saxatilis*, *Racodium rupestre* and *Fuscidea* spp.

Arthothelium norvegicum Coppins & Tønsb.



Fig. 1. The known distribution of *Arthothelium norvegicum*.

Nord-Trøndelag: *Flatanger*, E-facing slope W of lake Dalavatnet, alt. 40-100 m, NS 9349 (1623 I), 1983, T. Tønsberg 8459, 8469, 8471, 8475. - *Grong*, Ekermyra, alt. 60-80 m, UM 7047 (1823 IV), 1983, T. Tønsberg 8496. - *Namdalseid*, N-facing slope S of Altvatn, alt. 100-110 m, PS 0640 (1623 I), 1983, T. Tønsberg 8436, 8440, 8441, 8444; E-facing slope NW of Buvika, alt. 10-50 m, PS 0547 (1623 I), 1983, T. Tønsberg 8451; along brooks S of Utheim, alt. 0-60 m, PS 0947 (1723 IV), 1984, T. Tønsberg 8935; NE-slope of Mt. Sundsborga, alt. 40-60 m, PS 0748 (1723 IV), 1985, T. Tønsberg 9158a. - *Namsos*, Svedalen, alt. 20-40 m, PS 1956 (1724 III), 1985, T. Tønsberg 9176. - *Snåsa*, between lake Heimsjøen and Nordheim, alt. 120-160 m, UM 6126 (1723 II), 1983, T. Tønsberg 8498.

Arthothelium norvegicum was recently described on the basis of material from a single locality in Nord-Trøndelag: *Namdalseid* (Coppins & Tønsberg 1984). It has subsequently been collected at several localities (Fig. 1). So far it is only known from Nord-Trøndelag. *A. norvegicum* is a species native to humid, coastal *Picea abies*-forests. It has exclusively been found on *Sorbus aucuparia*, where it prefers the lower parts of the trunks.

Bacidia absistens (Nyl.) Arn.

Nord-Trøndelag: *Flatanger*, Mt. Røythaugfjellet, alt. 80-100 m, NS 8548 (1623 I), 1981, T. Tønsberg 5499; SE of Røddal, W-facing slope, alt. 20-50 m, MS 9251 (1623 I), 1981, T. Tønsberg 5511. - *Leksvik*, the ravine W of Breidvik, SW of Vanvikan, alt. 55 m, NR 5946 (1522 II), 1981, T. Tønsberg 5924. - *Namsos*, between Mt. L. Ekornen and Vetrhusbotn, alt. 60-80 m, PS 338655 (1724 II), 1981, T. Tønsberg 5572; Almdalen, S of river Duna, alt. 0-50 m, PS 3365-3465 (1724 II), 1981, T. Tønsberg 5584; alt. 0-90 m, PS 3566 (1724 II), 1985, A. Botnen 85/92, 85/98c.

New to central Norway.

Bacidia absistens is characterized by a brown to reddish-brown subhymenial layer, a deeply reddish- to bluish violet K⁺ aeruginose epihymenial pigment, needle shaped, straight, multiseptate spores 43-64 x 2.5-3.5 µm, and a corticolous habit. The epihymenial pigment is particularly diagnostic. The same pigment also occurs in *Schaereria tenebrosa*.

In Norway, *B. absistens* was previously known only from Hordaland (Santesson 1984). It is recorded in the southern parts of Sweden as far north as Värmland and Upland. In central Norway, *B. absistens* was collected on the bark of *Sorbus aucuparia* (most specimens) and *Corylus avellana*, in shaded and sheltered localities mostly forested with *Picea abies*. The specimen from Hordaland was collected on *Quercus* sp. In Sweden the species has also been collected on *Alnus* sp., *Fagus sylvatica* and *Picea abies* (Malme 1895, Santesson 1984).

Bactrospora corticola (Nyl.) Almq.

Sør-Trøndelag: Malvik, Homla River gorge, near Storfossen, alt. c. 100 m, NR 8928 (1621 I), 1985, T. Tønsberg 9130; Slåttmyrdalen, alt. 100 m, NR 9131 (1621 I), 1987, T. Tønsberg 9961, 9967; Høybydalen, alt. 100-140 m, NR 9131 (1621 I), 1987, T. Tønsberg, 9979, 9982, 9984. - Trondheim, Skjøla, Damtjørnbekken gorge, alt. 300 m, NR 7021 (1621 IV), 1987, T. Tønsberg 10004, 10005, 10012.

Nord-Trøndelag: Namsos, along the brook Dølaelva W of Klinga, alt. 40 m, PS 1844 (1723 IV), 1985, T. Tønsberg 9147.

New to Norway.

Bactrospora corticola has an ecorticate thallus with *Trentepohlia* as photobiont; small (up to 0.4 mm diam.), epruinose, immarginate or indistinctly marginate ascocarps; and bitunicate asci with multiseptate, acicular, parallel spores which soon become fragmented into small part spores up to 3-4 µm long (see e.g. Almqvist 1869). In the specimens cited above, the thallus was I-, K&I± weakly blue, excipulum I-, K&I-,

and parts of subhymenium I± blue, K&I+ blue. In the asci a distinct K&I+ blueing was seen in the apical dome (tholus) adjacent to the ocular chamber. In the related species *B. dryina* (not known from Norway), the apothecia are sometimes slightly larger (up to 0.6 mm diam.); the spores break up into larger spore parts (9-15 µm long) and, except for the hymenium, all apothecial tissues are I+ blue, even without pre-treatment with K (see Almqvist 1869, Brodo 1984). In a specimen of *B. dryina* (Sweden, Västmanland, 1969, L. Tibell 3825 (UPS)) examined by us, the strongest amyloid reaction was found in the excipulum ("receptacle" according to Brodo 1984) and the lowermost part of the subhymenium, the part spores were 7-13 µm long, and the thallus was I-, K&I+ slightly blue.

In Scandinavia the genus *Bactrospora* was previously thought to be restricted to Denmark and southernmost Sweden (Almborn 1948, Santesson 1984). *B. corticola* was known as far north as Östergötland. The present finds from central Norway considerably extend the range of this genus to the north. The Norwegian specimens were collected on trunks (usually on shaded parts near the base) or branches of *Picea abies* in humid, mostly north facing spruce forests. The specimen from Malvik, Homla gorge, grew on the sheltered side of a trunk about 2 m above the ground, in the spray-zone of a large waterfall. This particular specimen was associated with *Ochrolechia androgyna*, *Parmeliella plumbea*, *Pertusaria coronata* and *Schismatomma pericleum*. *Collema furfuraceum*, *Hypogymnia vittata*, *Lobaria amplissima*, *L. hallii*, *Nephroma laevigatum* and *Parmeliella plumbea* occurred on twigs of the phorophyte.

B. corticola is largely restricted to old trunks of *Quercus* sp. in the southern parts of its distribution area in Scandinavia (Almborn 1948, Almqvist 1869). The climate is warm and rather dry, - and contrasts sharply with that of the shaded and humid *Picea abies*-forests of central Norway. Several other lichen species show a similar ecological switch when southern and central Scandinavian localities are compared. One example is *Pertusaria hemisphaerica* which in

southern Scandinavia is a photophilous lichen chiefly restricted to open *Fagus sylvatica* and *Quercus* forests or to free-standing trees (Almborn 1948). In Sweden this species occurs in one isolated locality in Jämtland (Santesson 1984) where it was collected on *Picea abies* near a waterfall (Magnusson 1927). Another plant with much the same behaviour is *Pannaria ignobilis* (see Jørgensen 1978). It is difficult to provide an ecological explanation for such a drastic switch in habitat choice (see however Jørgensen 1978:102). *B. corticola* may grow on *Betula* sp. in Scotland (Coppins 1984).

Belonia nidarosiensis (Kindt) P.M. Jørg. & Vezda

- Sør-Trøndelag: *Malvik*, Høybydalen, NR 9131 (1621 I), 1985, A. Botnen 85/50. - *Trondheim*, Ladehammeren, alt. 20 m, NR 7136 (1624 IV), 1985, A. Botnen 85/29, 85/30. - *Åfjord*, Sekken, Sekkelona, alt. 340-360 m, NR 8392 (1622 IV), 1985, A. Botnen 85/52a.
- Nord-Trøndelag: *Flatanger*, W of Dalavatnet, alt. 100 m, NS 9349 (1623 I), 1985, A. Botnen 85/69, 85/71, 85/72. - *Stjørdal*, 1 km SW of Langstein, NR 9247 (1622 I), 1985, A. Botnen 85/146, 85/147e.
- Nordland: *Bodø*, Tverrlandet, just S of Ilstad, alt. 30 m., VQ 8862 (2029 I), 1986, A. Botnen 86/127. - *Gildeskål*, alt. c. 30 m, VQ 5837 (1929 II), 1986, A. Botnen 86/148. - *Saltdal*, Evenesdalen, in the river gorge, near the bridge, alt. 180 m, exp. NE, WQ 1725 (2128 IV), 1986, A. Botnen 86/242.
- Troms: *Skånland*, N-slope of Mt. Miklevollkollen, alt. c. 20 m, WS 8419 (1332 II), 1986, A. Botnen 86/314.

New to Nord-Trøndelag and northern Norway.

The taxonomy, distribution and ecology of *Belonia nidarosiensis* were recently discussed by Jørgensen et al. (1983) and Botnen (1984). The previously known range in Norway included localities in Rogaland, Hordaland, and Sør-Trøndelag (Trondheim). Its presently known distribution in Norway is given in Fig. 2.

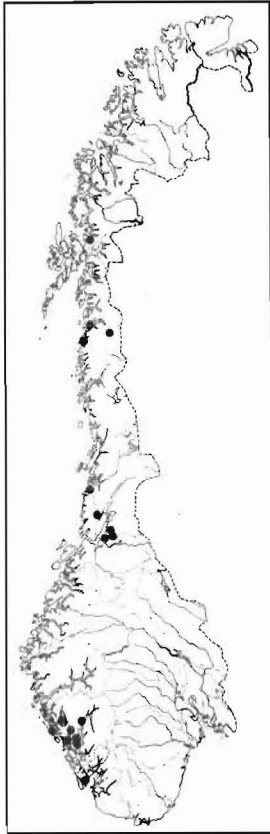


Fig. 2. The known distribution of *Belonia nidarosiensis* in Norway.

Belonia nidarosiensis is probably not a rare lichen in suitable habitats in western, central and northern Norway as far north as Troms. Its northernmost known locality is Troms, Skånland. In Norway its vertical distribution ranges from about sea-level to about 180 m, excluding the specimen from Sør-Trøndelag (Åfjord), which was collected at 340-360 m.

The type specimen of *B. nidarosiensis* was collected by Kindt in Trondheim, Ladehammeren, in 1884. The species was still found growing in this locality in July 1985, during a short visit by the authors of this paper. Several of the other lichen-species listed by Kindt (1881, 1885) were rediscovered e.g. *Gyalecta geoica*, *G. jenensis*, *G. ulmi*, *Diploschistes gypsaceus*, *Catillaria chalybeia*, *Lecidella stigmatea*. *Lecania baeomma* and *Micarea botrytes*, which do not appear to

have been previously recorded from the site, were also recorded. Although mostly sterile, *B. nidarosiensis* was present in abundance in some shaded, ± vertical and overhanging, N-NW facing rocks in NW parts of the hill.

Bryoria bicolor (Ehrh.) Brodo & Hawksw.

Nordland: *Sømna*, W of state road 17, just S of the brook c.
1 km S of Sandvåg, alt. 20 m, UN 6641 (1725 I), 1985,
T. Tønsberg 9208.

New to northern Norway.

The distribution of *Bryoria bicolor* was mapped by Degelius in 1935. At that time it was known as far north as Møre og Romsdal county in Norway, and Jämtland in Sweden. Later its range was extended northwards in Norway to include Trondheim (Tønsberg & Øvstedal 1982). The present record from Nordland constitutes a new northern limit for the species in Scandinavia. The species occurred in great quantities on an E-facing, humid rocky wall and was closely associated with *Cladonia bellidiflora*, *C. coccifera*, *C. squamosa*, *Platismatia glauca*, *P. norvegica* and *Sphaerophorus globosus*.

Catillaria sphaeroides (Massal.) Schuler

Oppland: *Ringebu*, Bergdøla river gorge, alt. 300-500 m,
1985, P.M. Jørgensen 9507 (BG).
Sør-Trøndelag: *Trondheim*, Byneset, Høgstein, alt. 60 m, NR
5525 (1521 I), 1981, P.W. James (BG).

New to Oppland and Trøndelag.

Catillaria sphaeroides was presented by Jørgensen & Øvstedal (1975) as new to Norway from a locality in Hordaland, and characterized as an oceanic species. Later, additional records from western Norway (Rogaland and Hordaland) were given by Øvstedal (1979) and Santesson (1984). It is here recorded as new to eastern and central Norway.

The presently cited locality in Trøndelag is apparently a new northern limit for the species. The occurrence in Oppland includes *C. sphaeroides* in the group of oceanic/suboceanic species that also grow in humid river gorges in the valleys of eastern Norway. Interestingly *Arthonia leucopel- laea*, another suboceanic species, was also found at the same locality.

Cladonia alpina (Asah.) Yoshim.

Hordaland: *Bergen*, Åsane, between Mt. Nordgardsfjell and Mt. Tellevikfjell, alt. c. 300 m, KN 9612 (1115 I), 1984, T. Tønberg 8591, 8592. - *Osterøy*, E of Kossdalsvatn, alt. 30-60 m, LN 0818 (1216 III), 1983, T. Tønberg 7760.

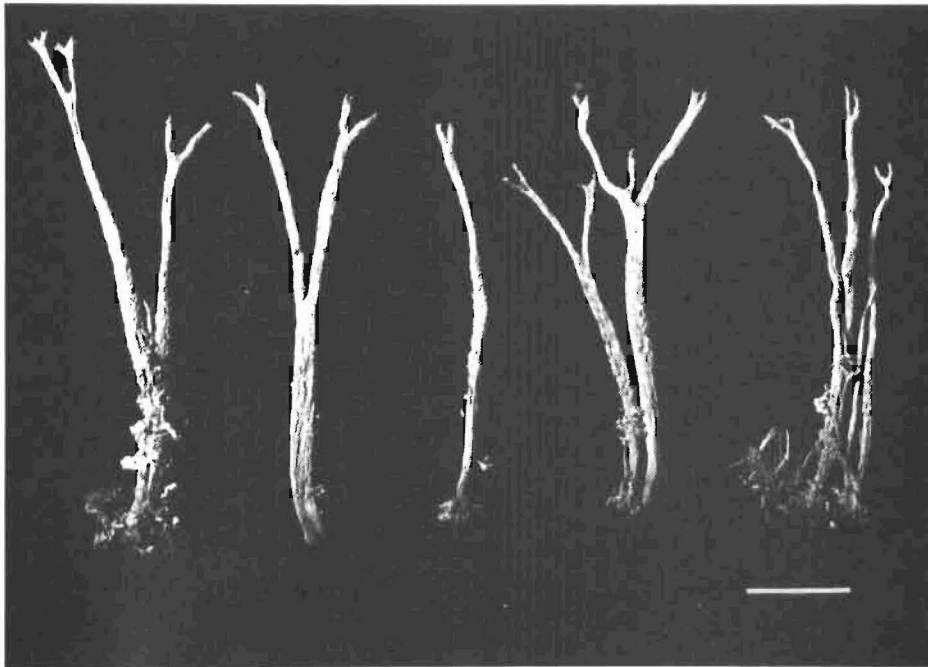


Fig. 3. *Cladonia alpina* Norway, Hordaland, Osterøy, 1983, T. Tønberg 7760 (BG). Rule 1 cm.

Sogn og Fjordane: *Førde*, Skei, alt. 100 m, LP 3318 (1217 I), 1985, T. Tønsberg 9357.

Sør-Trøndelag: *Rissa*, E of lake Osvatnet, alt. 120-140 m, NR 6171 (1622 IV), 1983, H. Holien 35-83 (TRH).

Nord-Trøndelag: *Namdalseid*, NW of Daltjørna, alt. 160-180 m, PS 2128 (1723 IV), 1981, H. Holien 869-81 (TRH). - *Namsos*, along brook Dølaelva, Klinga, alt. 40-60 m, PS 1845 (1723 IV), 1981, H. Holien 570-81 (TRH).

New to western Norway and to Nord-Trøndelag.

Within the Sect. *Cocciferae*, *Cladonia alpina* is easily recognized on account of its up to 5 cm high, blunt and cupless podetia, which in upper parts are farinosely sorediate and dichotomously branched (Fig. 3), and its chemistry involving barbatic, 4-0-demethylbarbatic, and porphyritic acids. Most of the specimens cited above also contained the accessory substance thamnolic acid, which is new to the species.

C. alpina was previously known from Japan (Yoshimura 1968), and from a single locality in Norway: Sør-Trøndelag (Tønsberg 1978). The known European distribution of *C. alpina* is shown in Fig. 4.

C. alpina is apparently a species of an oceanic climate. The disjunctive Eurasiatic range - including the eastern and western coasts of this continent - may thus prove to be real. The species seems to be rather rare in Norway. It grows on soil rich in humus and has mostly been found in sites forested with *Picea abies*, sometimes in young plantations. In Bergen it occurred in an treeless heath dominated by *Calluna vulgaris* and *Juniperus communis*.



Fig. 4. The known distribution of *Cladonia alpina* in Europe.

Dirina massiliensis Durieu & Mont. f. *sorediata* (Müll. Arg.)
Tehler

Møre og Romsdal: *Tingvoll*, *Aspøy*, *Bokksaspa*, alt. 0-20 m,
MQ 4686 (1320 I), 1980, P.W. James & T. Tønsberg s.n.
(BG).

New to Møre og Romsdal.

The genus *Dirina* was recently discussed on a world wide basis in a monograph by Tehler (1983). For *Dirina massiliensis*, which is mainly distributed in the Mediterranean region, central- and western Europe, he includes localities as far north as the Bergen area in Norway. The present find

from Møre og Romsdal is therefore the northernmost known in Europe (and in the world). The lichen is currently known in western parts of Norway from Rogaland to Møre og Romsdal. It was first recorded as new to Norway by Skjolddal (1982). It occurred on shaded, siliceous, overhanging rock in Tingvoll. That locality represents one of the most northern sites for spontaneous *Quercus robur* groves in the world. Two other lichens, the corticolous species *Chrysothrix chrysophthalma* (see Laundon 1981), and the muscicolous species *Gyalideopsis muscicola* (see Santesson 1984) also have their northernmost known sites at this locality.

Gyalecta kukriensis (Räs.) Räs.

Sør-Trøndelag: *Oppdal*, Kongsvoll, in a small ravine NE of the biological station, alt. c. 980 m, NQ 3108 (1519 IV), 1985, A. Botnen 85/162.

New to southern Norway.

Gyalecta kukriensis was previously known in Norway from two localities in Finnmark (Lettau 1937). Outside Norway it is only known from the type locality on the island Kukri in Ladoga-sea, USSR (Räsänen 1927), and from the West-Sudet mountains in Czechoslovakia (Vezda 1958). It is an arctic-alpine species with a distribution in mainland Europe which corresponds to that of, e.g. *Pannaria hookeri* (Jørgensen 1978: 25, 105).

In Kongsvoll the species grew on steep to overhanging, schistose, and moist rock in a narrow ravine. Associated species were e.g. *Xanthoria elegans* and *Belonia russula*. The latter is also associated in one of the localities in Finnmark ("In Alten, Storbekken", (0)) cited by Lettau (1937).

Gyalidea fritzei (B. Stein) Vezda

Nordland: *Saltdal*, Evenesdalen, in the river, alt. 340 m,
WQ 1923 (2128 IV), 1986, A. Botnen 86/240.

New to northern Norway.

Gyalidea fritzei was previously known from Sogn og Fjordane and Møre og Romsdal in Norway, and Härjedalen and Jämtland in Sweden (Santesson 1984).

The specimen from Saltdal grew on acidic rock, in close association with *Polyblastia cruenta* and *Verrucaria* sp., in the inundation zone of a river.

Lecania baeomma (Nyl.) P. James & Laundon

Hordaland: *Askøy*, S of lake Askevatnet, alt. 60 m, KN 9010 (1115 I), 1984, T. Tønsberg 8835b (corticolous). - *Bergen*, Store Milde, S of lakelet Mørkevatnet, alt. 0-20 m, KN 9386 (1115 I), 1985, P.M. Jørgensen & T. Tønsberg. - *Fjell*, Langøy, 1984, A. Botnen 84/30b. - *Fusa*, Femanger, along the river Femangerelva, exp. W-NW, LM 20-21.69 (1215 III), 1985, A. Botnen 85/12b. - *Os*, Bjørnen, several localities, A. Botnen 1980-1981, some specimens det. P.W. James (1981).

Sør-Trøndelag: *Trondheim*, Ladehammeren, alt. 20 m, NR 7136 (1624 IV), 1985, A. Botnen 85/23.

Nord-Trøndelag: *Flatanger*, Mt. Røythaugfjellet, the ravine, alt. 100-110 m, NS 8548 (1623 I), 1985, A. Botnen 85/79b.

Nordland: *Gildeskål*, W of Grimstad, along state road 17, (map 1928 IV), exp. N-NW, 1986, A. Botnen 86/161.

New to Scandinavia.

Among the saxicolous species of *Lecania*, *L. baeomma* is distinguished by the sorediate, bluish grey coloured thallus, containing atranorin and gangaleoidin.

Lecania baeomma appears to be a coastal, lowland species in Norway. Outside Norway it is known from the western parts of Great Britain: the Channel Islands, western Ireland and western Scotland as far north as the Isle of Mull (James 1970, 1978), where the species appears to be restricted to maritime situations. The locality in Gildeskål is presently the northernmost known limit for the species.

Lecania baeomma grows on shaded, acidic to slightly calciferous, steep rock under overhangs, mostly on uneven surfaces. Common associates are *Haematomma ochroleucum* var. *porphyrium* and/or *Opegrapha* species. In Norway, it has once been found corticolous on the base of a trunk of *Salix caprea*, growing adjacent to overhanging rock.

Lecania nylanderiana Massal.

Hordaland: Os, Bjørnen, S of Vargavågen, LM 0273 (1115 II),
1982, A. Botnen.

Troms: Skånland, N of Annamoen, near bridge nedre Revelv,
WS 9211 (1332 II), 1986, A. Botnen 86/305.

New to Norway.

In Scandinavia *L. nylanderiana* was previously known only from Sweden (see Santesson 1984, Ramkær 1978).

L. nylanderiana is a species found on shaded, ± overhanging, basic rock. In Os it grew on species-poor serpentine; in Skånland it was found on calcareous rock associated with e.g.: *Belonia* sp. (sterile) and *Caloplaca obliterans*.

Lecanora cateilea (Ach.) Massal.

Hedmark: Tynset, along brook Tysla, alt. 600 m, NP 9294
(1619 II), 1983, T. Tønsberg 8175b.

Buskerud: Sigdal, Nordbygda, Urdetjernbekken rivulet gorge,
NM 1481 (1715 IV), 1981, T. Tønsberg 6404.

Nord-Trøndelag: *Namsskogan*, Børgefjell National Park, Namskroken N of river Namsen, alt. c. 340 m, VN 2619 (1925 III), 1978, T. Tønsberg 3514. - *Snåsa*, 1 km NE of lakelet Heimsjøen, alt. 130 m, UM 6026-6126 (1723 II), 1980, T. Tønsberg 4785.

Most specimens det. O. Vitikainen, 1983.

New to Norway.

Lecanora cateilea is a member of the *L. pallida* group which includes species with a pruinose disc and an ecorticate apothecial margin (see Imshaug & Brodo 1966, Magnusson 1932). *L. cateilea* is distinguished by the polysporous asci and a PD+ sulphuric yellow apothecial margin caused by the presence of psoromic acid. The present specimens contained atranorin and zeorin in the thallus and the apothecia; psoromic acid (with satellite substances) was found only in the apothecia. *L. intumescens* is another, more widespread and common species in this group. Some specimens, mainly from central Norway which were studied for comparison had apothecia up to about 2 mm diam. (up to 1 mm in *L. cateilea*), a distinct, thick and often prominent margin, and octosporous asci. Chemically the two species proved to be similar, but in apothecia of *L. intumescens* an unidentified major substance - "intumescens unknown" - occurred, which may prove to be diagnostic. It is represented by UV+ vivid white spots on untreated plates, and the Rf-classes are A:4, B:5, C:5. "Intumescens unknown" and psoromic acid overlap in solvent C and partly in solvent A; in solvent B it yields a spot above that of psoromic acid.

In Norway *L. cateilea* has been collected on smooth bark of *Alnus incana* and *Sorbus aucuparia* at altitudes between 130 and 600 m. It seems to prefer somewhat shaded habitats. *L. cateilea* is a northern species (Magnusson 1932); in Scandinavia it was previously known from Värmland to Lule Lappmark (Santesson 1984).

Lecanora ochrococca (Nyl.) Clauz. & Roux

- Rogaland: *Sauda*, Saudasjøen, Storflotåsen, alt. 90 m, LM 47.14-15 (1314 III), 1986, A. Botnen 86/8, 86/16.
- Sogn og Fjordane: *Bremanger*, Svelgen, LP 032535, 1979, D. Aamlid (BG). - *Førde*, Skei, along the brook from Skeistølen, alt. 40 m, LP 3318 (1217 I), 1984, T. Tønsberg 8690.
- Nord-Trøndelag: *Leksvik*, N of Bjørktjørnene in river Ramslielva, alt. 210 m, NR 6561 (1622 III), 1981, T. Tønsberg 5862. - *Namdalseid*, S of lake Altvatn, alt. 80-100 m, PS 0640 (1623 I), 1981, T. Tønsberg 5432. - *Namsskogan*, Smalåsen, S of lake Smalvatn, alt. 250-300 m, VN 21.17-18 (1925 III), 1981, T. Tønsberg 5811a.
- Nordland: *Grane*, Majavatn, W-facing slope of Mt. Lillefjellet, alt. 340-410 m, VN 2327 and VN 2328 (1925 III), 1981, T. Tønsberg, 5991, 6028, 6063a; Lake Majavatn, peninsula 327, alt. 310-320 m, VN 2228 (1925 III), 1982, T. Tønsberg 6571. - *Hamarøy*, Innhavet, near Litlevatn, alt. 40-50 m, WR 4039 (2130 I), 1982, T. Tønsberg 7676a. - *Rana*, Mo, N-NW facing slope of Mt. Vestre Mofjell, alt. 40-60 m, VP 6153 (1927 I), 1982, T. Tønsberg 7633b; Along the brook at Fallhei, NE of Mo i Rana, alt. 60 m, VP 6858 (2027 IV), 1982, T. Tønsberg 7640. - *Tysfjord*, NE of Skarberget, alt. 30 m, WR 5269 (1331 III), 1986, T. Tønsberg 9768.

New to Rogaland, Sogn og Fjordane, central and northern Norway. The known distribution in Scandinavia is shown in Fig. 5.

In Norway *L. ochrococca* was previously known only from Oppland (the type locality), and Hordaland (Santesson 1984). It has not been recorded in Denmark (see Ramkær 1978) and Sweden (see Santesson 1984). In Europe outside Scandinavia it is only known from Scotland, where it is mainly found on *Pinus sylvestris* in the highlands (Duncan 1970). It is also known from western North-America, where it has been collected in British Columbia (Noble 1982), California and Washington (Fink 1935). Havaas, Lich. Exs. Norv. No. 23, distribut-

ed under the name *Psora cladonioides* (Fr.) Th. Fr. is *Lecanora ochrocoeca*.



Fig. 5. The known distribution of *Lecanora ochrocoeca* in Scandinavia.

The generic position of *L. ochrocoeca* has been disputed. Santesson (1984) listed it as *Lecidea ochrocoeca* Nyl. Since parts of the apothecial margin contain some algae, it was recently transferred to *Lecanora* by Clauzade & Roux (1985: 826). It is however more closely related to *Protoparmelia badia* (Hoffm.) Hafellner (see Hafellner 1984) and has to be transferred to that genus (H. Hertel pers. comm. to P.M. Jørgensen). In Norway the species is corticolous mainly on the conifers *Picea* and *Pinus*, but also on the deciduous trees *Alnus incana*, *Betula* sp., *Salix caprea* and *Sorbus aucuparia*. Lignicolous specimens are known from Oppland (on *Pinus sylvestris*, the type), and Hordaland (on *Quercus* sp.).

Lecanora subrugosa Nyl.

- Akershus: *Frogn*, Drøbak, Seierstein, alt. 100 m, NM 92.15-16 (1814 II), 1977, T. Tønsberg 1875b.
- Aust-Agder: *Birkenes*, NW of Bjorvatn, alt. 70-100 m, MK 4961 (1511 I), 1978, T. Tønsberg 3283. - *Froland*, N of Seljestølvatnet, along the rivulet, alt. 100 m, MK 83-84.89 (1612 III), 1978, T. Tønsberg 3278.
- Nord-Trøndelag: *Leksvik*, S slope of Tinghaugen N of Kråkmoss, alt. 290-315 m, NR 65.61-62 (1622 III), 1981, T. Tønsberg 5868. - *Steinkjer*, Byhalla, alt. 80-90 m, PS 2504 (1723 III), 1980, T. Tønsberg 4798.
- All specimens determined by O. Vitikainen, 1983.

New to Akershus, Aust-Agder, and central Norway.

Lecanora subrugosa was previously known in Norway from Vest-Agder to Møre og Romsdal; in Sweden it occurs from Skåne to Lule Lappmark and Norrbotten (Santesson 1984). The presently cited specimens were found on *Acer* sp., *Corylus avellana*, *Fraxinus excelsior*, *Quercus* sp. and *Ulmus glabra*.

Leproplaca chrysodeta (Vain. ex. Räs.) Laundon

- Hordaland: *Fusa*, Hopslia, LM 15.90-91 (1215 IV), 1983, A. Botnen 83/41, 83/42; *Femanger*, LM 2069 (1215 III), 1985, A. Botnen 85/10b. - *Os*, Bjørnen, several localities, 1980-1981, A. Botnen.
- Sør-Trøndelag: *Trondheim*, S of brook Leirelva, 50-150 m from E part of lake Leirsjøen, alt. 200-230 m, NR 64-65.29 (1621 IV), 1983, T. Tønsberg 8140; Between Tomset and Tømmerholt, alt. 200 m, NR 7229 (1621 IV), 1983, T. Tønsberg 8123; *Ladehammeren*, alt. 20 m, NR 7136 (1621 IV), 1985, A. Botnen 85/23.
- Nord-Trøndelag: *Flatanger*, W of Dalavatnet, alt. 100 m, NS 9349 (1623 I), 1985, A. Botnen 85/71. - *Stjørdal*, 1 km SW of Langstein, NR 9247 (1622 II), 1985, A. Botnen 85/146, 85/147d, 85/148.

Nordland: *Bodø*, Tverrlandet, S of Ilstad, alt. 20 m, VQ 8862 (2029 I), 1986, T. Tønsberg 9606.

Troms: *Skånland*, N of Annamoen, near bridge nedre Revelv, WS 9211 (1332 II), 1986, A. Botnen 86/307.

New to Hordaland, central Norway, Nordland and Troms.

In Norway *Leproplaca chrysodeta* was previously known from Oppland (Nordin 1972), Rogaland (Skjolddal 1982), and from Finnmark (Søchting & Alstrup 1986). In Sweden it is a southern species known as far north as Härjedalen (Santesson 1984). In Finland its range includes Kuusamo immediately south of the Arctic circle (Ahti 1981).

The species is exclusively sterile and is easily overlooked. It grows on shaded, vertical, schistose rock under overhangs. It often occurs on mosses intermixed with other sorediate lichen species. Species found within the Norwegian collections cited above are *Belonia nidarosiensis*, *Caloplaca citrina*, *Haematomma ochroleucum* var. *porphyrium*, *Lecania baeomma*, *Lecanora dispersa* coll., *Lecidea monticola*, *Opegrapha herbarum*, *Ramalina pollinaria* and *Sarcogyne distinguishenda*.

Lobaria hallii (Tuck.) Zahlbr.

Sør-Trøndelag: *Malvik*, Homla river gorge, near Storfossen, alt. 100 m, NR 8928 (1621 I), 1985, T. Tønsberg 9121.

New to Sør-Trøndelag.

Lobaria hallii was previously known in Norway from Nord-Trøndelag, Nordland and Troms counties (Santesson 1984). The presently reported locality in Sør-Trøndelag constitutes a new southern limit in Norway. In Sweden the lichen extends as far south as Dalarna (Santesson 1984), and it should therefore be sought after in the *Picea abies*-forests in adjacent parts of Norway. Outside Scandinavia it occurs in western North America and Greenland (Jordan 1973).

In Norway *L. hallii* is a species occurring on trunks of *Alnus incana*, *Salix nigricans* and *Sorbus aucuparia*, and twigs of *Picea abies* (Ahlner 1948, Holien 1982, Øvstedal 1980, and herb. BG). In Malvik it occurred on *Picea abies* in the spray-zone of a large waterfall in close association with *Hypogymnia vittata*, *Nephroma laevigatum*, *Lobaria amplissima*, *L. pulmonaria*, *L. scrobiculata*, *Parmeliella plumbea*, and *P. triptophylla*.

Lopadium disciforme (Flot.) Kullh.

Nord-Trøndelag: Numerous localities in *Flatanger*, *Grong*, *Leksvik*, *Namdalseid*, *Namsos*, *Namsskogan*, *Nærøy* and *Snåsa*; leg. T. Tønsberg.

Nordland: *Bindal*, *Åbygda*, E of *Kvernelva*, alt. 20-40 m, UN 8414-8513 (1825 III), 1982, T. Tønsberg 6811f.

New to Nord-Trøndelag and northern Norway.

Lopadium disciforme was previously known in Norway as far north as *Sør-Trøndelag* (Santesson 1984).

It is found on the bark of *Alnus incana* and less frequently, *Betula pubescens*, *Salix caprea*, *Sorbus aucuparia*, *Juniperus communis* and *Picea abies*. Nearly all sites were forested with *Picea abies*. Outside our area, *Quercus* sp. and *Picea abies* are reported as being the main phorophytes for the species (Poelt & Vezda 1981).

Micarea misella (Nyl.) Hedl.

Nord-Trøndelag: *Namsskogan*, *Børgefjell National Park*, *Namskroken*, N of river *Namsen*, alt. c. 340 m, VN 26.18-19 (1925 III), 1982, T. Tønsberg 7454. Det. B. Coppins.

New to central Norway.

Micarea misella is widely distributed in Europe and is known as far north as Pite Lappmark and Norrbotten in Sweden (Santesson 1984). In Norway it was previously only known from Akershus (Santesson 1984).

The material from Trøndelag is sterile, but has numerous stalked pycnidia containing mesoconidia c. 3.5-4 x 1.2-1.4 μm , and \pm immersed pycnidia with microconidia c. 4-5 x 0.8 μm .

According to Coppins (1983), *M. misella* is exclusively lignicolous, especially on conifer lignum. The present specimen was collected on bark of *Picea abies*, at the base of a trunk, closely associated with *Cladonia coniocraea*, *Lecidea porphyrospoda*, *Pertusaria oculata*, *Lopadium pezizoidum*, *Parmeliopsis ambigua* and *P. hyperopta*.

Opegrapha vermicellifera (Kunze) Laundon

Hordaland: Bergen, Store Milde, KM 9385 (1115 I), 1985,

A. Botnen 85/2. - Lindås, the SW-facing slope W of Storset, alt 60-150 m, LN 0628 (1116 II), 1984, T. Tønsberg 8609, 8611.

Møre og Romsdal: Smøla, Kuli, alt. 0-20 m, MR 5419 (1321 I), 1983, T. Tønsberg 8300.

New to Norway.

Opegrapha vermicellifera is endemic to central and western Europe (Almborn 1948, Laundon 1963). It was previously only recorded from the southernmost parts of Scandinavia north to Halland in Sweden (Almborn 1948:139, Santesson 1984). Smøla is therefore a new northern limit for the species.

O. vermicellifera occurred in abundance on Smøla on smooth bark of *Corylus avellana* closely associated with *Anisomeridium bifforme*. The lichen was collected at Lindås on smooth bark of root branches of *Fraxinus excelsior* under overhanging rock. Richly fertile specimens occurred on the north side

of an old trunk of *Carpinus betulus* in a park in Bergen.

Opegrapha zonata Koerb.

Møre og Romsdal: *Tingvoll, Aspøy, Bokksaspa, MQ 467861*
(1320 I), 1979, T. Tønsberg & P.W. James.

Sør-Trøndelag: *Trondheim, between Tomset and Tømmerholt,*
alt. 200 m, NR 7329 (1621 IV), 1983, T. Tønsberg 8130.



Fig. 6. The known distribution of *Opegrapha zonata* in Norway.

Nord-Trøndelag: *Flatanger, Mt. Røythaugfjellet, the ravine,*
alt. 100-110 m, NS 8548 (1623 I), 1985, A. Botnen 85/
79a.

Nordland: *Gildeskål, Mevikstranda, alt. 0-20 m, VQ 4627*
1928 I), 1986, T. Tønsberg 9638. - *Hamarøy, the SW-bank*

of the river from Svartevatnet, E of Sagpollen, WR 4142 (2130 I), 1986, T. Tønberg 9751. - *Nesna*, N-bank of the river S of Herset, alt. 30-60 m, VP 1447 (1827 II), 1986, T. Tønberg 9693. - *Rødøy*, c. 2 km S of Kilbognesset, alt. 20-40 m, VP 2173 (1927 IV), 1986, T. Tønberg 9675. - *Saltdal*, Junkerdalen, S of State road 77, S of Engesneset, alt. 240 m, WQ 2311 (2128 IV), 1986, T. Tønberg 9719.

New to Møre og Romsdal, central and northern Norway.



Fig. 7. The known distribution of *Opegrapha gyrocarpa* in Norway.

Herbarium material of *O. zonata* from Norway has recently been revised by Leif Källsten, Uppsala. Including specimens collected during the last few years by the present authors, the species is at present known from Akershus and the coastal counties from Vest-Agder to Nordland (Fig. 6). *Opegrapha gyrocarpa*, with which it often grows, occurs throughout most of the country, including Finnmark (Fig. 7).

Opegrapha zonata is a species of shaded rock under overhang. It often grows in small patches between other species. The chemical constituents include confluent acid and/or an unknown, apparently related substance in RF-classes A:5, B:2-3, C:5.

Parmelia acetabulum (Neck.) Duby

Sogn og Fjordane: *Førde*, Førde churchyard, alt. 0-30 m, LP 3217 (1217 I), 1984, T. Tønsberg 8681.

Sør-Trøndelag: *Trondheim*, Trondheim city, Øya, alt. 0-10 m, NR 6933 (1621 IV), 1983, T. Tønsberg 7768, 7790.

New to Sogn og Fjordane and central Norway.



Fig. 8. *Parmelia acetabulum* in Norway (Krog et al. 1980, updated).

Parmelia acetabulum is a southern species in Scandinavia (Almborn 1948, Krog et al. 1980). The previously known range in Norway included the Oslofjord-area and a few localities on the southernmost and southwesternmost coast. In Sweden it is distributed as far north as Dalsland and Gästrikeland (Santesson 1984). The find in Trondheim has moved the northern limit for *P. acetabulum* in Scandinavia considerably. Fig. 8 shows the known distribution in Norway.

P. acetabulum is a species of broad-leaved deciduous trees, mostly eutrophiated road-side or churchyard trees. In Trondheim the species was collected on a trunk of *Acer platanoides* growing along a road with heavy traffic. In Førde the lichen grew on a trunk of *Tilia cordata* in the churchyard. The latter locality is the northernmost known site for *Ramalina fastigiata* in Norway (Tønsberg 1980).

Pertusaria flavicans Lamy

Nordland: *Gildeskål*, c. 1 km S of Gildeskål church, alt.

30 m, VQ 5837 (1929 II), 1986, T. Tønsberg 9639. -

Rødøy, c. 2 km S of Kilbogneset, alt. 20-40 m, VP 2173 (1927 IV), 1986, T. Tønsberg 9677.

New to northern Norway.

The Eurasian saxicole *P. flavicans* (Dibben 1980, Erichsen 1940, Oshio 1968) was previously known in Norway from Vest-Agder to Hordaland (Santesson 1984). However, the specimens from Sogn og Fjordane: Selje (Stadtlandet) cited as *P. solediana* by Havås (1936) represent *P. flavicans*. The specimen of *P. solediana* from France, Arvenia, Bragerac, IV. 1897, leg. Fre Gasilien (herb. Nylander - 23100 (H!)) cited by Hanks (1983) as type material of *P. solediana*, is *P. flavicans*. The locality in Gildeskål cited above is a new northern European limit for the species (cf. Hanks 1983: Karte 1 & 2, Erichsen 1940).

In Norway *P. flavicans* is a species found on calciferous, sloping rock in the coastal lowlands.

Chemistry (all specimens): Thiophaninic acid, O-Methylmonocloronorlichexanthone (trace).

Central- and southern-European populations always also contain stictic acid (Hanko 1983).

Porina grandis (Koerb.) Zahlbr.

Hordaland: *Fjell*, Langøy, 1984, A. Botnen 84/24. - Os, Bjørnen, E of Bjørnaåsen, LM 02.71-72 (1115 II), 1980, A. Botnen; W of Bjørnatrynet, LM 0271 (1115 II), 1981, A. Botnen.

Nordland: *Gildeskål*, W of Grimstad, along state road 17, map 1928 IV, 1986, A. Botnen 86/150.

New to Norway.

Porina grandis was previously known in Scandinavia from one locality in Östergötland, where it was collected in 1874 (Santesson 1984). Outside Scandinavia it has been found in Scotland, and west-Germany (Schwarzwald and "Riesengebirge") (Poelt & Vezda 1977).

The Norwegian specimens grew on \pm vertical, shaded and somewhat moist, acidic or \pm calciferous rock under overhangs, associated with e.g. *Haematomma ochroleucum* var. *porphyrium*, *Huilia glaucophaea*, *H. macrocarpa* coll., *Scoliciosporum umbrinum*, *Lecidella scabra*, *Opegrapha gyrocarpa* and *Catillaria chalybeia*.

Psilolechia clavulifera (Nyl.) Coppins

Hordaland: *Fjell*, Langøy, 1984, A. Botnen 84/30a. - Os, Innerøy, alt. 1-5 m, LM 0173 (1115 II), 1982, A. Botnen 82/10 (det. B. Coppins); Bjørnen, alt. 40 m, LM 0272

(1115 II), 1983, A. Botnen 83/104. - Osterøy, Kossdalen, alt. 30 m, LN 0719 (1216 III), 1983, A. Botnen 83/04.

Nord-Trøndelag: *Flatanger*, W of Dalavatnet, alt. 60-100 m, NS 9349 (1623 I), 1985, A. Botnen 85/70.

New to Scandinavia.

Within the genus *Psilolechia*, *P. clavulifera* is characterized by the greenish-white, granular-leprose thallus reacting C-, and the greenish pigmentation in the hymenium and sometimes also in the hypothecium (Coppins & Purvis 1987).

Outside Norway *Psilolechia clavulifera* is known from Great Britain, Finland, W-Germany, Czechoslovakia, Tasmania and New Zealand (Coppins & Purvis 1987).

The Norwegian specimens were collected on rock under overhangs, associated with e.g. *Coniocybe furfuracea* (on mosses), *Lecanactis umbrina*, *Lepraria* spp. The species is often a member of the lichen association *Micareetum sylvicolae*, preferring shaded, humid overhangs. Outside Norway *Psilolechia clavulifera* has also been found on root systems and soil connected with up-ended trees or overhangs (Coppins 1983).

Psilolechia leprosa Copping & Purvis

Sør-Trøndelag: *Røros*, Sextus grube, 1939, Eilif Dahl (0).
Det. T. Tønsberg (1987).

Nordland: *Fauske*, near Tverrelva, WQ 3152 (2129 II), alt. c. 140 m, 1986, A. Botnen 86/81, 86/85.

New to northern Norway.

Psilolechia leprosa was recently described on the basis of material from the British Isles, Norway, Sweden and Greenland (Coppins & Purvis 1987). In Norway it was reported from Hordaland: *Os*, and Sør-Trøndelag: *Røros*. We publish

here an additional specimen from Røros (see above) - the first known collection of the species - made by E. Dahl as early as 1939.

P. leprosa is a species found on copper-rich, basic or calciferous substrates (Coppins & Purvis 1987). In Nordland it grew on rock under overhangs. The following taxa occurred nearby: *Acarospora* sp., *A. sinopica*, *Micarea sylvicola* and *Stereocaulon vesuvianum* f. *sessile*.

Rinodina occulta (Koerb.) Sheard

Nordland: *Brønnøy*, Tilrem, S of Mosakselen, UN 7469 (1826 III), 1985, A. Botnen 85/111b, 85/112, 85/113.

New to northern Norway.

R. occulta was previously known in Norway from Rogaland and Hordaland. It is known in Sweden from Östergötland, Bohuslän and Värmland (Santesson 1984). The locality in Nordland is therefore a new northern limit for this species in Scandinavia. According to Mayrhofer & Poelt (1979: 126), *R. occulta* is a suboceanic species in Europe.

Rinodina occulta was found on rock under overhangs, associated with *Haematomma ochroleucum* var. *porphyrium*, *Opegrapha gyrocarpa*, *Lecidella scabra*, *Fuscidea gothoburgensis*, *Lepraria* spp., *Racodium rupestre* and *Rinodina* sp.

Sarcogyne distinguenda Th. Fr.

Nord-Trøndelag: *Stjørdal*, 1 km SW of Langstein, NR 9247 (1622 II), 1985, A. Botnen 85/148.

New to central Norway.

The specimen was found on a \pm overhanging, schistose, moist rock, associated with *Lepraria* spp., *Leproplaca chrysodeta*

and *Verrucaria* sp. The calciferous species *Belonia nidarosiensis* and *Lecidea monticola* occurred in the vicinity.

In Scandinavia the species was previously only known from Akershus and Finnmark in Norway, and Västergötland in Sweden (Santesson 1984). The presently cited locality in central Norway indicates that the species is more widespread than previously regarded. Further localities may be discovered when suitable habitats are investigated.

Schismatomma pericleum (Ach.) Branth & Rostr.
(Syn. *S. abietinum* (Humb.) Massal.)

Sør-Trøndelag: *Malvik*, Homla river gorge, near Storfossen,
alt. 100 m, NR 8928 (1621 I), 1985, T. Tønsberg 9129.

New to central Norway.

Schismatomma pericleum has previously been published from Vestfold in Norway (Santesson 1984), but we were unable to find any specimens. The specimen from *Malvik* grew on a trunk of *Picea abies* in the spray-zone of a large waterfall. It was closely associated with e.g. *Bactrospora corticola*, *Ochrolechia androgyna*, *Parmeliella plumbea* and *Pertusaria coronata*. In Sweden *S. pericleum* is known north to Lule Lappland (Santesson 1984).

Stereocaulon pileatum Ach.

Nord-Trøndelag: *Namsskogan*, Smalåsen, N bank of river Namsen,
alt. 250 m, VN 2116 (1925 III), 1975, T. Tønsberg 1464;
S bank of river Namsen N of Mt. Steinfjellet, alt.
300 m, VN 2418 (1925 III), 1978, T. Tønsberg 2599;
Børgefjell National Park, Namsen river gorge, alt.
350-400 m, VN 2717 (1925 III), 1978, T. Tønsberg 3450;
Namskroken, alt. c. 340 m, VN 2618 (1925 III), 1979, T.
Tønsberg 4292.

New to Trøndelag.

Stereocaulon pileatum was previously known only from Akershus, Hordaland, Møre og Romsdal and Troms (Santesson 1984). The species grows on rock, preferably schistose rock, often near water. All the above cited specimens grew on the banks of rivers.

Thelidium aeneovinosum (Anzi) Arn.

Nordland: Grane, Sløykskaret, alt. 740-750 m, VN 2931 (1925 III), 1985, A. Botnen 85/132b. - Rana, Sølvbekken SE of Bolna, alt. 675 m, WP 1270 (2127 IV), 1986, A. Botnen 86/209, 86/210.

New to Nordland.

The species was previously known in Norway from Hordaland and Finnmark, while in Sweden it is a northern species extending south to Jämtland (Santesson 1984). Insufficient lichenological investigations are certainly responsible for the scattered Norwegian records of *Thelidium aeneovinosum*.

The species grew on steep, calciferous, moist rock along with *Aspicilia leucophyma*.

Thelotrema lepadinum (Ach.) Ach.

Sør-Trøndelag: Agdenes, Dyregrova, NE slope, alt. 50 m, NR 3252 (1522 III), 1985, H.H. Blom s.n. (TRH). - Malvik, Homla river gorge, alt. 20 m, NR 9031 (1621 I), 1985, H.H. Blom & P.S. Sommervold s.n. (TRH); Slåttmyrdalen, alt. 100 m, NR 9131 (1621 I), 1987, T. Tønsberg 9955, 9956; Høybydalen, alt. 80-100 m, NR 9131 (1621 I), 1987, T. Tønsberg 9991a.

Nord-Trøndelag: Namdalseid, Utheim, alt. 0-60 m, PS 0947 (1723 IV), 1984, T. Tønsberg 8931, 8933.

New to Nord-Trøndelag.

Thelotrema lepadinum is a southern lichen in Scandinavia (Almborn 1948), but apparently with some oceanic tendencies (Degelius 1935). In Norway it was previously known north to Sør-Trøndelag (Blom 1987). In Sweden it has been recorded as far north as Uppland (Santesson 1984). The locality in Nord-Trøndelag therefore constitutes a new northern European limit for the species. In Trøndelag, *T. lepadinum* was found in humid and sheltered sites. At its northernmost locality, Namdalseid, it occurred in a ravine forested with *Picea abies*, where it grew on the under side of leaning trunks of *Alnus incana* and *Sorbus aucuparia* growing on the bank of a brook. Close associates on the latter phorophyte included *Arthothelium norvegicum*, *Catinaria pulverea*, *Lobaria amplissima*, *L. pulmonaria*, *L. scrobiculata*, *Ochrolechia androgyna*, *O. pallescens*, *Phlyctis argena*, and the mosses *Blepharostoma trichophyllum* and *Mnium hornum*. In Agdenes it was found on the lower part of a trunk of *Sorbus aucuparia* in a shaded and sheltered *Betula pubescens* forest; in Malvik it grew on *Picea abies* (trunks and twigs), and on the lower parts of trunks of *Salix caprea* and *Sorbus aucuparia*, in humid and shaded *Picea abies* forests.

4 SUMMARY

New distribution data are given for 34 species of lichens in Norway. The records are mainly a result of field work, particularly in central Norway (Trøndelag and adjacent regions). New to Norway are: *Bactrospora corticola* (Trøndelag), *Lecania baeomma* (widespread), *L. nylanderiana* (western Norway (Vestlandet) and northern Norway (Nord-Norge)), *Lecanora cateilea* (eastern Norway (Østlandet) and Trøndelag), *Opegrapha vermicellifera* (western Norway), *Porina grandis* (western and northern Norway) and *Psilolechia clavulifera* (western Norway and Trøndelag), while *Lecania baeomma* and *Psilolechia clavulifera* are also new to Scandinavia.

The following species are new to northern Norway: *Belonia nidarosiensis*, *Bryoria bicolor*, *Gyalidea fritzei*, *Lecanora ochrococca*, *Leproplaca chrysodeta*, *Lopadium disciforme*, *Opegrapha zonata*, *Pertusaria flavicans*, *Psilolechia leprosa*, and *Rinodina occulta*, *Gyalecta kukriensis* is new to southern Norway (Sør-Norge). New to Trøndelag are: *Arthonia granithophila*, *Bacidia absistens*, *Catillaria sphaeroides*, *Lecanora ochrococca*, *L. subrugosa*, *Leproplaca chrysodeta*, *Micarea misella*, *Parmelia acetabulum*, *Sarcogyne distinguenda*, *Schismatomma pericleum* and *Stereocaulon pileatum*. *Catillaria sphaeroides* is new to eastern Norway, and *Cladonia alpina* is new to western Norway.

Bactrospora corticola is recorded in Trøndelag as an epiphyte of *Picea abies* in shaded and moist sites - a habitat strongly contrasting with that of southern Scandinavian populations.

Thamnolic acid is reported as a new chemical constituent of *Cladonia alpina*.

Pertusaria solediana is regarded as synonymous with *P. flavicans*.

Distribution maps are provided for *Arthothelium norvegicum*, *Belonia nidarosiensis*, *Cladonia alpina*, *Lecanora ochrococca*, *Opegrapha gyrocarpa*, *O. zonata*, and *Parmelia acetabulum*.

5 REFERENCES

- Ahlner, S. 1948. Utbredningstyper bland nordiska barrträds-lavar. *Acta Phytogeogr. Suec.* 22.
- Ahti, T. 1981. Lichenized Ascomycotina. In: Ulvinen, T., Ohenoja, E., Ahti, T. and Alanko, P. 1981. A checklist of the fungi (incl. Lichenes) of Koillisma (Kuusamo) biological province, N.E. Finland. *Oulanka Rep.* 2.
- Almborn, O. 1948. Distribution and ecology of some south Scandinavian lichens. *Bot. Not. Suppl.* 1(2).
- Almqvist, S. 1869. *Om de skandinaviske arterna af lafsläktena Schismatomma, Opegrapha och Bactrospora.* Uppsala.
- Blom, H.H. 1987. Kryptogamekskursjon til Høybydalen, Hommelvik, Malvik. *Blyttia* 45: 86-87.
- Botnen, A. 1984. *Lavfloraen i steilvegg og overheng på Bjørnen, Os, Hordaland.* Cand. real. thesis, Univ. Bergen. (Unpubl.).
- Brodo, I.M. 1984. Lichenes Canadenses Exsiccati: Fascicle III. *Bryologist* 87: 97-111.
- Clauzade, G. & Roux, C. 1985. Likenoj de Okcidenta Europo. Illustrita determinlibro. *Bull. Soc. Bot. Centre-Ouest Nouv. sér. No Special* 7.
- Coppins, B.J. 1983. A taxonomic study of the lichen genus *Micarea* in Europe. *Bull. Br. Mus. nat. Hist. (Bot.)* 11: 17-214.
- 1984. Epiphytes of birch. *Proced. Royal Soc. Edinb.* 85B: 115-128.
- Coppins, B.J. & Purvis, O.W. 1987. A review of *Psilolechia*. *Lichenologist* 19: 29-42.
- Coppins, B.J. & Tønsberg, T. 1984. A new species of *Arthothelium* from Norway. *Nord. J. Bot.* 4: 75-77.
- Culberson, C.F. 1972. Improved conditions and new data for the identification of lichen products by a standardized thin-layer chromatographic method. *J. Chromat.* 72: 113-125.
- Culberson, C.F. & Kristinsson, H. 1970. A standardized method for the identification of lichen products. *J. chromat.* 46: 85-93.
- Degelius, G. &. 1935. Das Ozeanische Element der Strauch- und Laubflechtenflora von Skandinavien. *Acta Phytogeogr. Suec.* VII.
- Dibben, M.J. 1980. The chemosystematics of the lichen genus *Pertusaria* in North America north of Mexico. *Milwaukee Public Mus. Publ. Biol. & Geol.* 5.

- Duncan, U.K. 1970. *Introduction to British lichens*. T. Buncle & co. Ltd. Abroath.
- Erichsen, C.F.E. 1940. Neue Pertusarien nebst Mitteilungen über die geographische Verbreitung der europäischen Arten. *Ann. Mycol.* 38: 16-55.
- Fink, B. 1935. *The lichen Flora of the United States*. Ann Arbor, Univ. of Michigan Press.
- Hafellner, J. 1984. Studien in Richtung einer natürlicheren Gliederung der Sammelfamilien Lecanoraceae und Lecideaceae. pp. 241-371 in Hertel, H. & Oberwinkler, F.: Festschrift J. Poelt. *Nova Hedwigia. Beih.* 79.
- Hanko, B. 1983. Die Chemotypen der Flechtengattung *Pertusaria* in Europa. *Bibl. Lich.* 19.
- Havås, J.J. 1936. Om lichenvegetasjonen på Stadtlandet. *Bergens Mus. Årb. nat. vit. Rk.* 1935, 16.
- Holien, H. 1982. *Makrolavfloraen i fuktige granskoger i Nord-Trøndelag*. Cand. real. thesis, Univ. Trondheim (Unpubl.).
- 1986. *Bryoria tortusa* new to northern Europe. *Lichenologist* 18: 265-268.
- Imshaug, H.A. & Brodo, I.M. 1966. Biosystematic studies on *Lecanora pallida* and some related lichens in the Americas. *Nova Hedwigia* 12: 1-59.
- James, P.W. 1970. The lichen flora of shaded acid rock crevices and overhangs in Britain. *Lichenologist* 4: 309-322.
- 1978. Lichenes. In Jeremy A.C. & Crabbe, J.A. (eds.). *The Island of Mull*. Br. Mus. (Nat. Hist.).
- Jørgensen, P.M. 1978. The lichen family Pannariaceae in Europe. *Opera Botanica* 45.
- Jørgensen, P.M., Vezda, A. & Botnen, A. 1983. *Clathroporina calcarea*, a misunderstood lichen species, and a note on the genus *Clathroporina* in Europe. *Lichenologist* 15: 45-55.
- Jørgensen, P.M. & Øvstedal, D.O. 1975. Nye vestnorske lavfunn. *Blyttia* 33: 11-16.
- Jordan, W.P. 1973. The genus *Lobaria* in North America north of Mexico. *Bryologist* 76: 225-251.
- Kindt, C. 1881. Bidrag til kundskab om Trondhjems lavvegetation. *K. norske Vidensk. Selsk. Skr.* 1880: 25-41.
- 1885. Fortsættelse af bidrag til kundskab om Trondhjems lavvegetation. *K. norske Vidensk. Selsk. Skr.* 1884: 1-5.
- Krog, H., Østhagen, H. & Tønsberg, T. 1980. *Lavflora, Norske busk- og bladlav*. Oslo, Bergen, Tromsø.

- Laundon, J. 1963. The taxonomy of sterile crustaceous lichens in the British Isles. 2. Corticolous and lignicolous species. *Lichenologist* 2: 101-151.
- 1981. The species of *Chrysothrix*. *Lichenologist* 13: 101-121.
- Lettau, G. 1937. Monographische Bearbeitung einiger Flechtenfamilien. - *Feddes Repert. spec. nov. reg. veg., Beih.* 69.
- Magnusson, A.H. 1927. New or interesting Swedish lichens IV. *Bot. Not.* 1927: 115-127.
- 1932. Beiträge zur Systematik der Flechtengruppe *Lecanora subfusca*. *Medd. Göteborgs bot. trädgård* 7: 65-87.
- Malme, G.O. 1895. Lichenologiska notiser IV: Adjumenta ad *Lichenographium Suecice meridionalis*. *Bot. Not.* 1895: 207-213.
- Mayrhofer, H. & Poelt, J. 1979. Die saxicolen Arten der Flechtengattung *Rinodina* in Europa. *Bibl. Lich.* 12.
- Noble, W.J. 1982. *The lichens of the coastal douglas-fir dry subzone of British Columbia*. Thesis. Dr. Ph., Brit. Columbia. (Unpubl.).
- Nordin, I. 1972. *Caloplaca* sect. *Gasparrina* i Nordeuropa. Uppsala.
- Øvstedal, D.O. 1979. Contribution to the lichen flora of Lindås and Austrheim, Western Norway. *Univ. Bergen, Lindåsprosj. Rapp.* 22: 1-22.
- 1980. Lichen communities on *Alnus incana* in North Norway. *Lichenologist* 12: 189-197.
- Oshio, M. 1968. Taxonomical studies on the family Pertusariaceae of Japan. *J. Sci. Hiroshima Univ. Ser. B, Div. 2 (Bot.)* 12: 81-163.
- Poelt, J. & Vezda, A. 1977. *Bestimmungsschlüssel Europäischer Flechten, Ergänzungsheft I*. Vaduz.
- Poelt, J. & Vezda, A. 1981. *Bestimmungsschlüssel Europäischer Flechten, Ergänzungsheft II*. Vaduz.
- Ramkær, K. 1978. *Fortegnelse over laver angivet fra Danmark med litteraturhenvisninger*. Inst. for sporeplanter, Københavns Univ. 1978.
- Räsänen, V. 1927. Über Flechtenstandorte westl. Nordfinlands. *Ann. Bot. Vanamo* 7.
- Santesson, R. 1984. *The lichens of Sweden and Norway*. Uppsala & Stockholm.

- Skjolddal, L.H. 1982. Lavflora og lavsamfunn på Kårstø og Ognøy, Tysvær og Bokn kommuner i Rogaland. Pp. 1-78 in Blom, H.H., Røsberg, I. & Skjolddal, L.H. 1982. Vegetasjon og flora på Kårstø, Tysvær kommune, Rogaland. *Univ. Bergen, Bot. Inst. Rapp.* 22.
- Söchting, U. & Alstrup, V. 1986. Lichens from North Norway. *Graphis scripta* 1: 42-48.
- Tehler, A. 1983. The genera *Dirina* and *Roccellina* (Roccellaceae). *Opera Botanica* 70.
- Tindal, E. 1982. Bidrag til Norges lavflora. *Blyttia* 40: 179-185.
- Tønsberg, T. 1978. *Cladonia alpina* new to Europe. *Norw. J. Bot.* 25: 243-246.
- 1979. Noen interessante lavfunn. *Blyttia* 37: 127-131.
 - 1980. Noen interessante lavfunn II. *Blyttia* 38: 159-163.
 - 1983. Bidrag til lavfloraen i Trøndelag og Nord-Norge. *Blyttia* 41: 22-23.
- Tønsberg, T. & Ahti, T. 1980. *Cladonia umbricola*, a new lichen species from NW Europe and western North America. *Norw. J. Bot.* 27: 307-309.
- Tønsberg, T. & Holien, H. 1984. *Cladonia* (Sect. *Cocciferae*) *norvegica*, a new lichen species. *Nord. J. Bot.* 4: 79-82.
- Tønsberg, T. & Øvstedal, D.O. 1982. Noen interessante lavfunn III. *Blyttia* 40: 59-63.
- Vežda, A. 1958. Die Tschechoslowakischen *Gyalecta*- und *Pachyphiale*-Arten nebst Bestimmungsschlüssel der Europäischen Arten. *Acta Univ. Agric. Sylvicult. Brno C*, 1: 21-56.
- White, F.J. & James, P.W. 1985. A new guide to microchemical techniques for the identification of lichen substances. *Brit. Lich. Soc. Bull.* 57 (Suppl.).
- Wirth, V. 1980. *Flechtenflora: Ökologische Kennzeichnung und Bestimmung der Flechten Südwest-Deutschlands und angrenzender Gebiete*. Ulmer.
- Yoshimura, I. 1968. The phytogeographical relationships between the Japanese and North America species of *Cladonia*. *J. Hattori Bot. Lab.* 31: 227-246.