A Sphagnum Collection from Norrbotten, Northern Sweden

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ABSTRACT

The *Sphagnum* flora has been investigated in a part of Norrbotten Province. Between the Lule and Kalix Rivers, northwards to the Arctic Circle, 44 peatland localities were visited. Twenty-eight species were collected and two more are reported from other parts of the province. Woodland species, however, are under-represented with respect to number of localities. *S. pulchrum*, new to Norrbotten, is here at its northernmost known station in Sweden.

INTRODUCTION

The *Sphagnum* flora of Sweden is quite well known but especially in the northern part large areas remain which have not yet been visited by sphagnologists. Norrbotten Province (see Fig. 1) is one of these areas in which the *Sphagnum* flora was until recently almost unknown, except near the Torne River where unpublished collections have been made by Mr. O. LÖNNQVIST, Övertorneå.

In August 1967, we made extensive collections of *Sphagnum* in the part of Norrbotten situated between the Kalix and Lule Rivers (see Fig. 2). A total of 44 peaty areas (see Table 1) have been visited but time did not permit us to investigate moist forest to which certain species are restricted; for example *Sphagnum wulfianum* GIRG.

All the determinations of *Sphagnum* samples have been made by the author while the doubtful ones have been revised by Prof. H. SJÖRS, Uppsala University. Nomenclature of *Sphagnum* follows that of ISOVIITA (1966). Duplicates of a part of the collection have been deposited as voucher specimens in the *Sphagnum* herbarium of Växtbiologiska Institutionen, Uppsala.

THE INVESTIGTED AREA

The investigated area is situated in the Province of Norrbotten, Northern Sweden, between latitudes 65°35′N and 66°34′N. The Lule

Fig. 1. Map of Northern Sweden showing provinces and investigated area. (From The Plant Cover of Sweden. Acta Phytogeogr. Suec. 50.)

and Kalix Rivers border the area to the west and to the east respectively. This territory belongs to the low coastal region; altitude varies from sea level to 300 m in the northern part. In the south, it consists of an undulating plain with gently sloping low hills. Towards the north, the hills increase in number and elevation.

The bedrock mainly consists of Pre-Cambrian silicious rocks mostly covered by glacial drift. As the ice border retreated, the region was nearly all under water: silt and clay sediments accumulated at the bottom of the sea. When the land emerged from the sea by uplift, these sediments were washed away from the hills and re-deposited in the lower parts where later peat formation took place.

The peat areas are generally minerotrophic, i.e. with fen vegetation (DU RIETZ 1949). "Poor fen" prevails over "rich fen". In the interior many of the mires have well-developed ridges ("string-bogs"). Wet parts in these mires are termed "flarks". See, e.g., SJÖRS, BJÖRKBÄCK & NORDQVIST 1965.

According to SJÖRS (1963, 1965), the area belongs to the Main Boreal sub-zone of the Boreal forest region of Northern Europe. It is largely covered by *Pinus silvestris* and *Picea abies* forest intermingled with wooded or open peatlands.

THE SPHAGNUM FLORA

Sphagnum magellanicum BRID.

This species is distributed all over the area but never forms extensive mats. It occurs mostly on ridges of the string bog formation and in *Pinus silvestris*

bog forest where *Betula nana* covers an important part of the surface. It is also present on hummocks together with *Sphagnum fuscum* but very seldom grows in very wet places.

Sphagnum centrale C. JENS.

We have collected *Sphagnum centrale* only in seven of our localities (nos. 8, 11, 22, 28, 30, 41, 44, see Table 1). The species grows in small cushions, in relatively rich sites, and is mostly associated with *Salix lapponum* and *Betula nana* bushes. It has also been found in *Pinus silvestris* forest near the mire border.

Sphagnum papillosum LINDB.

Associated with *Scheuchzeria palustris, Carex limosa, C. rostrata, C. livida, C. lasiocarpa* and *Eriophorum vaginatum*, this species of *Sphagnum* is nearly restricted to the flarks of the string bog formations where it often forms large and dense carpets. We noted too that it can grow in small cushions in pine forest bordering the mire.

The species is much more frequent than evident from the map by SONESSON (1967).

Sphagnum compactum DC.

Restricted to pools where it grows in quite small cushions, this species tends to spread out after drainage of the bog. Its frequency is relatively low: it has been found in fifteen localities only (13, 15, 20, 25, 26, 29, 30, 33, 34, 35, 36, 37, 40, 41, 42).

Sphagnum squarrosum CROME

This *Sphagnum* species colonizes rich sites such as moist *Betula pubescens* forest, *Alnus incana* and *Salix lapponum* scrub and lake borders together with *Sphagnum riparium*. It was not very frequent in our collections, because, as previously mentioned, we did not have time to visit moist forests where one can expect its presence (localities: 1, 2, 4, 5, 9, 12, 18, 21, 30, 39, 41).

Sphagnum teres (SCHIMP.) ÅNGSTR.

Sphagnum teres is also a species restricted to rich sites such as lake edges and rich fens. It can also occur under *Betula nana* and *Salix lapponum* bushes and in moist *Betula pubescens* forest. It has not been found frequently within the area but it would not be impossible to find this species in moist forest that we did not visit (localities: 1, 2, 12, 13, 21, 22, 25, 28, 29, 39, 44).

Sphagnum aongstroemii C. HARTM.

Very scattered in the area, *Sphagnum aongstroemii* has been found in only six of our localities (18, 20, 27, 36, 39, 44) where it was growing in small and flat cushions. We collected it in a rich fen and in moist *Betula pubescens* forest, also in relatively poor sites such as *Carex chordorrhiza* and *Carex rostrata - C. limosa* communities. We also collected it northeast of our area, in Korpilombolo parish (see below).

Table 1. Location of the mires visited and numbers of *Sphagnum* species found in the mire (in parenthesis).

1. — Nederluleå parish, N. Sunderbyn. On Lule River bank. (2)
2. — Do., 3 km S of Rutvik. (6)
3. — Do., 2 km NE of Sundom. (8)
4. — Råneå parish, Lake Laviken. Along road E4, 8 km E of Råneå. (3)
5. — Do., Högsön. On the shore of Högsöfjärden. (1)
6. — Do., Jämtön. On the shore of Metträsket. (1)
7. — Töre parish, Långrätmyren, 4.5 km SW of Töre. (10)
8. — Do., mire along E4 road, 2 km E of Ökvattnet. (11)
9. — Råneå parish, Vitån, Degermyren. (4)
10. — Do., Oppmyren, 2 km NW of Vitåfors. (5)
11. — Do., mire 4 km SW of Prästholm. (6)
12. — Nederluleå parish, Höträsket, 4.5 km SW of Vibbyn. (5)
13. — Edefors parish, Nybyn, Stormyren. (14)
14. — Do., Sandträsk, Svanamyren. (7)
15. — Do., mire 4 km SE of Gullträsk stn. (8)
16. — Do., Randatjärn, 4.5 km W of Gullträsk stn. (9)
17. — Do., little mire along the road, 5 km W of Lakaträsk. (7)
18. — Do., mire 5 km N of Lakaträsk stn. (12)
19. — Do., little lake along the road, 4 km E of Lakaträsk stn. (5)
20. — Råneå parish, Mårdsel. (15)
21. — Do., mire 3 km S of Välvträsk, along Råne river. (5)
22. — Do., Myrträsk, Myrträskmyren. (6)
23. — Do., Sörbyn, Skorvmyren. (4)
24. — Do., Grundträsk, mire S of Mörttträsket. (11)
25. — Do., Grundträsk, mire S of Storträsket. (12)
26. — Do., mire 4 km SW of Flakaberg. (5)
27. — Do., Rismyrtjärn, 4 km S of Lake Stuor Saivets. (5)
28. — Överkalix parish, S of Dockarträsket, 5 km SE of Lake Stuor Saivets. (11)
29. — Råneå parish, Tallberget, mire along Vitån, 2 km S of Grönforssel. (13)
30. — Do., Långsund, mire between the road and Vitån. (15)
31. — Do., Lillberg, near Lillbergsselet. (11)
32. — Do., 1 km S of Avafors. (14)
33. — Do., E of Avafors, 1.5 km N of Hataträsket. (11)
34. — Do., Långsel, Holmbergsmyren. (14)
35. — Överkalix parish, mire 3 km SE of Mugglom, E of Tallån. (10)
36. — Do., 3.5 km NE of Talljärv, Pörtmyren. (8)
37. — Do., Bredträsk, Körvägmyren. (11)
38. — Do., Kölmjärv, Kölmmyren. (8)
39. — Do., mire 9 km NE of Marsjärv, E of Bönälven. (11)
40. — Do., between Långträsket and Kopparsjärv. (10)
41. — Råneå parish, Sörbyn, S of Katisträsket (2)
42. — Do., mire 4 km S of Flakaberg. (11)
43. — Do., Livasudden, Livasmyren. (8)
44. — Överkalix parish, 10 km NW of Gyljen, Anttjärnmyren. (12)

Sphagnum platyphyllum (BRAITHW.) WARNST.

We have not seen this species within our investigated area but we collected it during a visit with Prof. SJÖRS to a mire situated farther north-east: No. 429, Korpilombolo parish, south of Lake Vankajärvi, in a rich fen. In the Herbarium of Naturhistoriska Riksmuseet in Stockholm is kept a specimen of *S. platyphyllum* collected by CONR. INDEBETOU in 1868 at Hedenfors, Över-

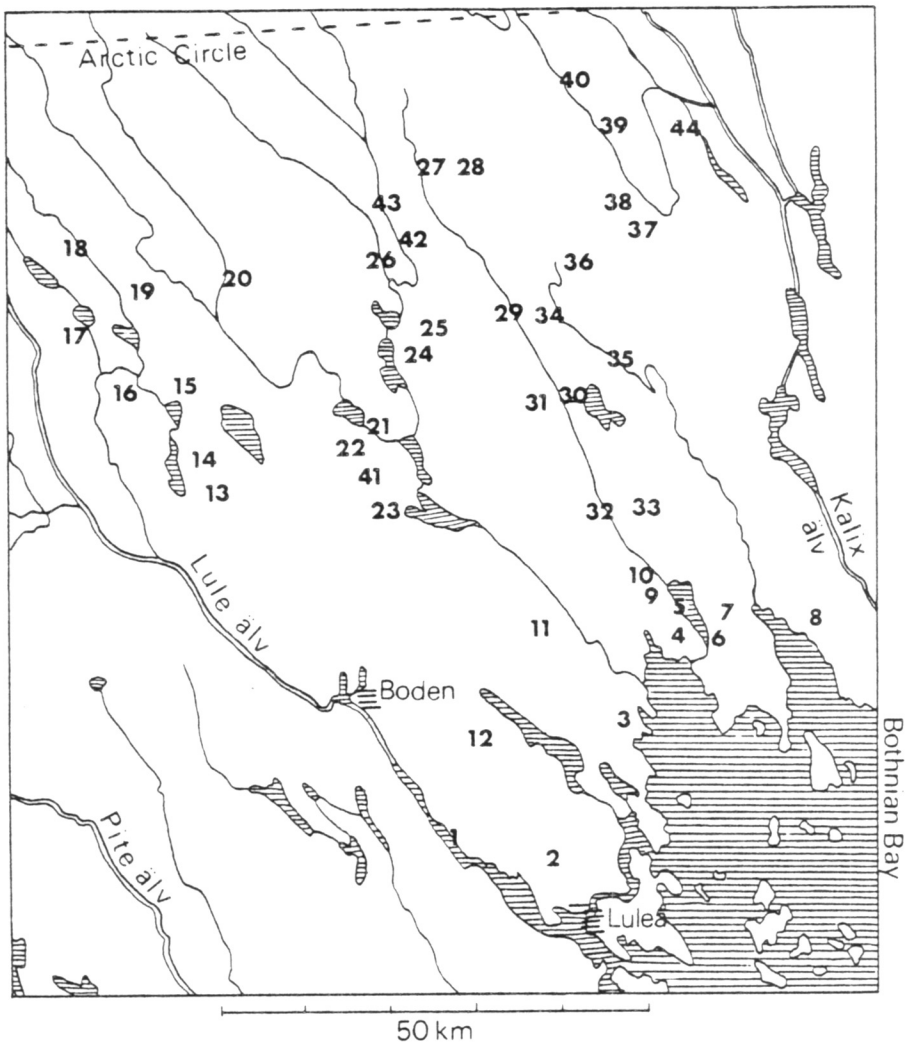

Fig. 2. Map of the investigated area. Each locality visited is indicated by a number which refers to Table 1.

luleà parish. Judging from the appearance of the specimen, it has probably been collected within the inundation zone of Lule River.

Sphagnum subsecundum NEES

This species is mostly restricted to "flarks" of rich fens where it grows in small tufts often submerged in water. It is a common species throughout the area. We collected this *Sphagnum* in nearly all the rich fens we visited.

Sphagnum tenellum (BRID.) BRID.

This species seems to be uncommon in Norrbotten (SONESSON 1967). Our three collections are the following: No. 766, Råneå parish, 1.5 km south of Avafors (32), in a pool of a steeply sloping string bog; No. 789, Råneå parish, Holmbergsmyren, 3 km north-east of Långsel (34), in an *Eriophorum vaginatum - Sphagnum balticum - S. lindbergii* community; No. 798, Överkalix parish, 3 km south-east of Mugglom (35), in an *Eriophorum vaginatum - Sphagnum papillosum - S. compactum* community. A fourth collection was made by E. MARKLUND also in 1967: Överkalix parish, Bredträsk, Bredträskmyren.

Sphagnum majus (RUSSOW) C. JENS. [*S. dusenii* C. JENS. ex RUSSOW & WARNST.]

Widespread throughout the area, this species is restricted to very wet habitats. It grows in pools of string bog formations associated with *Carex* spp., *Scheuchzeria palustris* and *Eriophorum vaginatum* (poor fen). It is uncommon in rich fen and in *Pinus* forest bordering the mires, where a few individuals can be found in deep wet hollows.

Sphagnum jensenii H. LINDB.

Like the preceding species, *Sphagnum jensenii* grows under very wet conditions, within the same plant communities. However, it is much less common than *Sphagnum majus* and has never been found in *Pinus* bog forest (localities: 8, 13, 18, 19, 20, 29, 30, 32, 34, 38, 42).

Sphagnum balticum (RUSSOW) C. JENS.

This *Sphagnum* seems here to have about the same habitat requirements as the two preceding species and it belongs to the same plant communities. It is not a common species in our area, and we have found it in only 10 of our localities (10, 25, 28, 29, 31, 32, 33, 34, 38, 40).

Sphagnum pulchrum (BRAITHW.) WARNST.

Sphagnum pulchrum is new to the *Sphagnum* flora of Norrbotten Province. The only specimen collected (No. 796) has been found in Holmbergsmyren (34), 3 km north-east of Långsel in Råneå parish. It was growing in quite dense mats, on the low ridges of a string fen formation where *Molinia coerulea* was the dominant species. *Carex echinata*, *Menyanthes trifoliata*, *Oxycoccus palustris* were the other important species of the community. In the bottom layer, we noted the presence of very small tufts of *Sphagnum magellanicum* and *S. robustum*. *Sphagnum papillosum* was of a little more importance than these two species.

Sphagnum fallax (KLINGGR.) KLINGGR. [*S. apiculatum* H. LINDB.]

Found in only six of our localities (9, 18, 23, 27, 31, 36), this species seems not to be common within the area. We collected it in moist forests of *Betula*

pubescens, and of *Pinus silvestris* and *Picea abies*. It was also present in open poor fen with *Carex rostrata*, *C. limosa*, and *C. lasiocarpa*. Once we collected it in a ditch.

Sphagnum angustifolium (RUSSOW) C. JENS. [*S. parvifolium* (WARNST.) WARNST.]

This common species is mostly restricted to borders of mire, growing in *Pinus silvestris* bog forest with *Betula nana* and *Ledum palustre*. It can also be found in moist *Betula pubescens* forest and under *Betula nana* and *Salix* bushes where it forms extensive mats. Less often, it grows in open *Carex* fens.

Sphagnum flexuosum DOZY & MOLK. [*S. amblyphyllum* (RUSSOW) ZICK.]

It seems that this *Sphagnum* species prefers moderately wet habitats. We have collected it in only seven localities (16, 20, 24, 31, 32, 33, 40) in different plant communities: *Carex chordorrhiza* comm.; *C. lasiocarpa* comm.; *Salix lapponum* - *Betula nana* - *Sphagnum riparium* comm.; wet hollows of moist *Betula pubescens* forest and *Pinus silvestris* forest bordering the mire; on low hummock with *Sphagnum fuscum*, *Betula nana* and *Empetrum hermaphroditum*; on a ridge of a "string-bog" formation with *Pinus silvestris*, *Calluna vulgaris*, *Empetrum hermaphroditum* and *Sphagnum fuscum*.

Sphagnum obtusum WARNST.

Sphagnum obtusum is another uncommon plant in this part of Norrbotten where we collected it in only six localities (10, 12, 16, 17, 43, 44). It was growing in small cushions in a rich fen, in a pool of a string bog and in flarks within *Carex limosa* communities. It can also occur under *Betula nana* - *Salix lapponum* bushes or in open fens with *Carex rostrata*, *C. limosa* and *C. canescens*. It was first recorded from Norrbotten by O. LÖNNQVIST (unpublished) and also H. SJÖRS has collected it more to the east (Karl Gustav parish: Kaartivuoma, Koivuvuoma, Veitsivuoma).

Sphagnum riparium ÅNGSTR.

Moderately common in the investigated area (localities: 4, 5, 8, 9, 12, 16, 18, 19, 20, 21, 28, 29, 30, 44), *Sphagnum riparium* was forming extensive mats on every lake's edge we visited. Large colonies have also been seen under *Salix lapponum* and *Betula nana* bushes. We also collected this species in wet hollows of *Pinus silvestris* forest where it grows in small tufts. We noted the presence of a few individuals in a flark of a rich fen and in moist *Betula pubescens* forest.

Sphagnum lindbergii SCHIMP.

Mostly restricted to open bog or poor fen together with *Carex limosa*, *C. rostrata*, *C. lasiocarpa* and *Eriophorum vaginatum*, this species can also be found in wet hollows in the *Pinus silvestris* forest bordering the mires. We also collected it under dense bushes of *Salix lapponum*, where it formed a dense carpet. It is a species well distributed throughout the area.

Sphagnum wulfianum GIRG.

We have not collected this *Sphagnum* in Norrbotten, because, as previously stated, moist forests have not been visited. One specimen seen is from the herbarium of Naturhistoriska Riksmuseet, Stockholm. It has been collected by HJ. MÖLLER in 1912, at Kengis in Pajala parish. We have also seen one specimen from Övertorneå parish and two specimens from Hietaniemi parish, in O. LÖNNQVIST's private herbarium.

Sphagnum subnitens RUSSOW & WARNST. [*S. plumulosum* RÖLL s.str.]

Very rare in the area, this species has been found in only three localities: No. 795, Råneå parish, Långselet, Holmbergsmyren (34), in a *Carex lasiocarpa - Sphagnum papillosum* community; No. 644, Råneå parish, Mårdsel (20), on low ridges colonised by *Trichophorum alpinum*; No. 572, Edefors parish, Nybyn, Stormyren (13), near the base of a ridge. The first mentioned collection is a very typical specimen for this species but the two others are doubtful and may belong to *S. subfulvum*. Another typical collection was made in Övertorneå parish by O. LÖNNQVIST in 1964, and is kept in his private herbarium.

Sphagnum subfulvum SJÖRS

Quite common in the investigated area, *Sphagnum subfulvum* is nearly restricted to flarks where it grows in small cushions but sometimes can form dense carpets. Very seldom, a few individuals can be found in wet hollows in *Pinus* forest bordering the mires. It was earlier collected in many places by O. LÖNNQVIST.

Sphagnum nemoreum SCOP.

Common all over the area, this species is growing in rather dry places such as the ridges of "string bogs", *Pinus* bog forest and under *Betula nana* bushes.

Sphagnum warnstorfii RUSSOW [*S. warnstorffianum* DU RIETZ]

Occurring mostly in or near flarks of fens, this species is probably common throughout the area even though we collected it from only four localities (7, 13, 21, 30) and noted its presence in some other localities.

Sphagnum rubellum WILS.

Only one specimen of this species has been collected: No. 804, Överkalix parish, in the mire 3 km south-east of Mugglom, east of Tallån (35). In fact, we are doubtful as to the identity of this specimen, to be a *S. rubellum* or not. It might be a type of the very variable *S. nemoreum* to which belong most of the collections from northernmost Sweden believed to be *S. rubellum*, as stated by MÅRTENSSON (1955—56). We have also seen a specimen from O. LÖNNQVIST's herbarium which is likely to be a green form of *S. rubellum*. It was collected in Karl-Gustav parish.

Sphagnum fuscum (SCHIMP.) KLINGGR.

Very common all over the area. *Sphagnum fuscum* mostly occurs in *Pinus* bog forest and on ridges of "string bogs" where it often forms dense carpets. It also forms small hummocks in the flarks of fens.

Sphagnum russowii WARNST. [*S. robustum* (WARNST.) CARD.]

This is also a very common *Sphagnum* in Norrbotten, occurring in all *Pinus* bog forests where it forms numerous small tufts. It is also present, but to a lesser extent, on ridges of "string bogs" and on hummocks in the flarks of fens.

Sphagnum girgensohnii RUSSOW

Restricted to moist forests, this species was observed to grow in large carpets. It is probably a common species in the area (cf. MARTENSSON 1955—56) even though we collected it only from four localities (2, 3, 14, 18).

Sphagnum fimbriatum WILS.

Quite common, this *Sphagnum* species occurs under *Salix* and *Betula nana* bushes and in moist *Betula pubescens* forest. It is less common in rich fen where small cushions can be found. Very seldom, we collected it in flarks of fen where it forms small cushions above the water level. It is equally common in more eastern parts of Norrbotten (O. LÖNNQVIST's and H. SJÖRS' collections).

ACKNOWLEDGEMENTS

The work has been carried out at Växtbiologiska Institutionen of Uppsala University, Uppsala.

Material from the following herbaria has been examined: Naturhistoriska Riksmuseet, Stockholm; Växtbiologiska Institutionen, Uppsala; Botaniska Museet, Uppsala; Botaniska Museet, Lund; part of O. LÖNNQVIST's private herbarium.

My wife aided very efficiently in both field and laboratory work.

I wish to express my sincere gratitude to Professor HUGO SJÖRS who provided me with so much help and criticism during all the time I spent at the Institute, working on *Sphagnum* mosses.

Thanks, too, to the Swedish Institute and to the National Research Council of Canada for financial support.

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