

## FURTHER DATA ON ANTARCTIC USNEACEAE

By D. C. LINDSAY

ABSTRACT. New records are reported for the geographical distribution of many species of Antarctic Usneaceae, together with additional habitat information. The first apothecia to be found on *Usnea sulphurea* are also described.

SINCE the publication of Lamb's (1964) monograph on the Antarctic Usneaceae, a number of extensive collections of lichens have been made in various parts of the Scotia Ridge. Examination of these and other collections, all housed in the British Antarctic Survey's herbarium, at present in the Department of Botany, University of Birmingham, has yielded additional information on the distribution and habitats of the Usneaceae within the Scotia Ridge-Antarctic Peninsula sector of the Antarctic botanical zone as defined in Greene (1964). Data for the more conspicuous *Usnea* and *Himantormia* species are extensive but there is little new information on the less prominent species such as *Cornicularia epiphorella*.

The nomenclature of the taxa follows that of Lamb (1964), but for ease of reference the genera and species are arranged alphabetically. All specimens examined have been cited under the appropriate species heading, but collecting information has only been provided for those which form the basis of new distribution records. An asterisk (\*) after a specimen citation indicates that the identification has been confirmed by Dr. I. M. Lamb.

### *Alectoria chalybeiformis* (L.) Gray

This species has been seen in many localities in the South Orkney Islands, and it was noted at many sites in the South Shetland Islands by the present author during the 1965-66 summer, but it appears to be absent farther south.

*A. chalybeiformis* is found mainly on dry stable *Dicranum* or *Dicranum-Polytrichum* turves, rarely associated with other lichens. Occasionally it is found growing over stones, soil and epiphytically over *Usnea antarctica*. No fertile specimens were seen in the collections.

#### *Specimens examined*

South Orkney Islands:

Signy Island

Lindsay 874\*, 895, 910, 1191, 1312; Longton 1096;  
R. Smith 309

South Shetland Islands:

Half Moon Island

Lindsay 584

This species has not previously been reported from the South Shetland Islands and further details of Lindsay 584 are given in Table I.

### *Alectoria minuscula* (Nyl. ex Arn.) Degel.

From the data given by Lamb (1964), this species appears to be mainly continental Antarctic in distribution in the Antarctic Peninsula region, being commonest on the east coast of the peninsula; on the west coast, no specimens were cited for north of lat. 64°S. It is thus of considerable interest to report *A. minuscula* from Coronation Island, South Orkney Islands, and King George Island, South Shetland Islands (Table I).

This species occurs on stable rocks and boulders which are resistant to frost-shattering, normally situated at some distance from the sea and from bird-nesting sites.

No fertile material was present in the collections.

#### *Specimens examined*

South Orkney Islands:

Coronation Island

Lindsay 1369b

South Shetland Islands:

King George Island

Lindsay 849\*

TABLE I. COLLECTING DATA OF *Alectoria* SPECIES FROM NEW LOCALITIES

| Species                  | Locality   | Habitat   | Collection number | Date of collection |
|--------------------------|--|---|-------------------|--------------------|
| <i>A. chalybeiformis</i> | South Shetland Islands:<br>Half Moon Island                    | On basaltic rock facing west-north-west (50 m.)       | Lindsay 584       | 5 January 1966     |
| <i>A. minuscula</i>      | South Orkney Islands:<br>Coronation Island, above Shingle Cove | On boulders (440 m.)                                  | Lindsay 1369b     | 8 November 1966    |
|                          | South Shetland Islands:<br>King George Island, Crépin Point    | On rocks in moraine (45 m.)                           | Lindsay 849       | 29 January 1966    |
| <i>A. nigricans</i>      | South Orkney Islands:<br>Coronation Island, above Shingle Cove | On moraine (260 m.)                                   | Lindsay 1343      | 21 October 1966    |
|                          | Moe Island, above central cape on west coast                   | On <i>Dicranum</i> turf (105 m.)                      | Lindsay 1618      | 3 February 1967    |
|                          | Signy Island, Mooring Point, Borge Bay                         | On <i>Dicranum</i> - <i>Polytrichum</i> banks (15 m.) | Holdgate 266      | 20 January 1962    |

## Antarctic Peninsula:

|                   |                                   |
|-------------------|-----------------------------------|
| Hope Bay          | Brading 177a, 178b, 179, 181, 188 |
| Argentine Islands |                                   |
| Galindez Island   | Corner 528, 538, 813, 857         |
| Graham Coast      | Corner 858                        |
| Marguerite Bay    |                                   |
| Bennett Islands   | Killingbeck 171b, 182, 243a       |
| Blaiklock Island  | R. Smith 870b                     |
| Horseshoe Island  | Longton 1270; R. Smith 835b       |

*Alectoria nigricans* (Ach.) Nyl.

The new records for this species, together with those of Lamb (1964), suggest a wide distribution in the South Orkney Islands. It is locally abundant on dry moderately sloping *Dicranum* or *Dicranum*-*Polytrichum* banks on Signy and Moe Islands, usually forming a pure stand over the moss turf. Although only a few specimens have been collected from the Antarctic botanical zone, its habitat requirements and altitudinal range up to 260 m. on Coronation Island suggest that it may occur in suitable localities in the South Shetland Islands and on the west coast of the Antarctic Peninsula. All Antarctic material seen has been sterile.

*Specimens examined*

|                       |   |
|-----------------------|---|
| South Orkney Islands: |   |
| Coronation Island     | Lindsay 1343  |
| Moe Island            | Lindsay 1618  |
| Signy Island          | Holdgate 266; Lindsay 1626*; Longton 1164; R. Smith 311 |

*Alectoria pubescens* (L.) Howe jr.

This lichen is widely distributed in the South Orkney Islands, South Shetland Islands and along the west coast of the Antarctic Peninsula as far south as Marguerite Bay. On the east coast of the peninsula it is found only as far south as lat. 66°S.

*A. pubescens* usually grows on rocks and stones some distance inland and away from bird-nesting sites, up to 260 m. altitude. Several specimens were collected from dry *Dicranum* turf, and in the South Orkney Islands it appears to be rather frequent in this habitat together with *A. chalybeiformis*.

No fertile material was seen.

*Specimens examined*

|                         |   |
|-------------------------|---|
| South Orkney Islands:   |   |
| Coronation Island       | Lindsay 1033, 1341, 1367  |
| Lynch Island            | Lindsay 953   |
| Signy Island            | Lindsay 873, 875*, 876, 877, 882, 911, 912, 919, 1271, 1300; Longton 1094 |
| South Shetland Islands: |   |
| King George Island      | Lindsay 723, 730, 841; Taylor 318   |
| Half Moon Island        | Lindsay 583   |
| Livingston Island       | Lindsay 140   |
| Antarctic Peninsula:    |   |
| Argentine Islands       |   |
| Galindez Island         | Corner 479, 814   |
| Graham Coast            | Corner 856  |
| Marguerite Bay          |   |
| Blaiklock Island        | R. Smith 870a   |
| Horseshoe Island        | Longton 1274  |
| Foyen Coast             | Tindall 33, 37  |

*Cornicularia aculeata* (Schreb.) Ach.

The distribution suggested by Lamb (1964) for this species, i.e. that it is fairly widespread in the northern part of the Antarctic Peninsula, the South Shetland Islands and South Orkney Islands, has been confirmed by material in recent collections from these areas. Here it is reported from Litchfield Island and from its southernmost locality yet known, Uruguay Island (Table II).

*C. aculeata* grows mainly on *Polytrichum* and *Dicranum* turves in dry situations with a northerly aspect, and it is particularly associated with *Sphaerophorus globosus* (Huds.) Vain. and several species of *Cladonia*. However, it has been found growing with *Prasiola crispa* in nitrogenous melt-water drainage channels. Its altitudinal range in the South Orkney and South Shetland Islands is from near high-tide level to over 185 m.

*Specimens examined*

|                       |  |
|-----------------------|--|
| South Orkney Islands: |  |
| Lynch Island          | Lindsay 952                            |
| Signy Island          | Lindsay 916*, 1224, 1313; R. Smith 313 |
| Moe Island            | Lindsay 1617                           |
| Antarctic Peninsula:  |  |
| Anvers Island         |  |
| Litchfield Island     | Corner 363, 376                        |
| Argentine Islands     |  |
| Uruguay Island        | Corner 816b                            |

*Cornicularia epiphorella* (Nyl.) Du Rietz

The only previous firm report of this species from the Antarctic botanical zone was the single record from Laurie Island in the South Orkney Islands (Lamb, 1964, table XVI). It can

TABLE II. COLLECTING DATA OF *Cornicularia* SPECIES FROM NEW LOCALITIES

| Species               | Locality  | Habitat   | Collection number | Date of collection |
|-----------------------|---|---|-------------------|--------------------|
| <i>C. aculeata</i>    | Antarctic Peninsula:<br>Anvers Island,<br>Litchfield Island           | On <i>Polytrichum</i><br>humus (12 m.)                  | Corner 363        | 4 April 1964       |
|                       | Argentine Islands,<br>Uruguay Island                                  | On <i>Dicranum</i> mats<br>(15 m.)                      | Corner 816b       | 14 March 1965      |
| <i>C. epiphorella</i> | South Orkney<br>Islands:<br>Signy Island,<br>Observation Bluff        | On <i>Dicranum</i> bank<br>(105 m.)                     | Lindsay 928       | 9 March 1966       |
|                       | Knife Point   | On <i>Polytrichum</i><br><i>alpinum</i> (15 m.)         | Lindsay 1127      | 12 September 1966  |
|                       | Factory Bluffs  | On <i>Dicranum</i> turf<br>(35 m.)                      | Lindsay 1205      | 20 September 1966  |
|                       | Berntsen Point  | On <i>Dicranum</i> bank<br>(45 m.)                      | Lindsay 1225      | 20 September 1966  |
|                       | South Shetland<br>Islands:<br>King George Island,<br>Barton Peninsula | On pebbles of raised<br>beach (10 m.)                   | Lindsay 732       | 19 January 1966    |
|                       | Robert Island,<br>Edwards Point                                       | On <i>Dicranum</i> bank<br>(50 m.)                      | Lindsay 604       | 5 January 1966     |
|                       | Livingston Island,<br>Byers Peninsula                                 | On scree slope<br>(60 m.)                               | Lindsay 501       | 24 December 1965   |
|                       | Antarctic Peninsula:<br>Argentine Islands,<br>Galindez Island         | Rock surfaces in<br><i>Usnea</i> community<br>(20 m.)   | Corner 517        | 21 April 1964      |
|                       | Galindez Island   | Rock surfaces with<br><i>Usnea antarctica</i><br>(8 m.) | Corner 831        | 20 March 1965      |

now be reported from a number of localities in the South Orkney Islands, the South Shetland Islands and the Argentine Islands (Table II).

*C. epiphorella* is quite abundant on dry north-facing *Dicranum* banks in the South Orkney Islands, but it grows on small moss cushions and rocks with some lichen growth in the South Shetland Islands and the Argentine Islands. So far, no fertile specimens have been recorded from the Antarctic.

#### Specimens examined

|                         |                                |
|-------------------------|--------------------------------|
| South Orkney Islands:   |                                |
| Signy Island            | Lindsay 928, 1127*, 1205, 1225 |
| South Shetland Islands: |                                |
| King George Island      | Lindsay 732                    |
| Robert Island           | Lindsay 604                    |
| Livingston Island       | Lindsay 501                    |
| Antarctic Peninsula:    |                                |
| Argentine Islands       |                                |
| Galindez Island         | Corner 517, 831                |

*Himantormia lugubris* (Hue) M. Lamb

This species was thought by Lamb (1964) to be endemic to the South Orkney Islands, South Shetland Islands and the Antarctic Peninsula. The absence of specimens in collections from the South Sandwich Islands, South Georgia and the Falkland Islands tends to confirm this view.

The species is typically montane, that is, it is found mainly on dry inland rocks above 30 m. and it is very rarely found below 15 m. *Himantormia* appears to be nitrophobous, never being found in the vicinity of bird-nesting sites. It usually forms a prominent association with *Usnea fasciata* Torr. on dry exposed boulders above 45 m. altitude.

Some specimens collected in the South Orkney Islands and South Shetland Islands were growing on damp shallow *Drepanocladus* carpets. Such plants are quite unlike the ordinary form and may be mistaken for an *Alectoria*, since the laciniae are reduced to less than 1 mm. in width with the whole plant less than 2 cm. in diameter.

*Specimens examined*

## South Orkney Islands:

|                   |  |
|-------------------|--|
| Matthews Island   | R. Smith 172   |
| Lynch Island      | Lindsay 958  |
| Moe Island        | Lindsay 1610   |
| Coronation Island | Lindsay 1166, 1340; R. Smith 154, 299  |
| Signy Island      | Holdgate 220, 223, 233, 252, 256, 257; Lindsay 868*, 1315, 1483; Longton 1095; Taylor 384, 385, 386, 387, 390, 408, 501, 504; R. Smith 316 |

## South Shetland Islands:

|                    |  |
|--------------------|--|
| King George Island | John and Sugden 37, 43a, 46; Lindsay 659, 772; Taylor 311, 323 |
| Robert Island      | Lindsay 603  |
| Greenwich Island   | Lindsay 638  |
| Half Moon Island   | Lindsay 595  |
| Livingston Island  | Lindsay 128, 206   |

## Antarctic Peninsula:

|                   |              |
|-------------------|--------------|
| Anvers Island     | Longton 1310 |
| Argentine Islands |              |
| Irizar Island     | Corner 701   |

*Ramalina terebrata* Hook. & Tayl.

Lamb (1964) recorded this species from the South Shetland Islands and islands off the west and north-west coasts of the northern part of the Antarctic Peninsula, and remarked "not yet found in the South Orkneys but almost certainly occurs there". The presence of *Ramalina terebrata* in the South Orkney Islands has been confirmed by the collection of a number of specimens from Signy Island (Table III).

TABLE III. COLLECTING DATA OF *Ramalina terebrata* Hook. & Tayl. FROM NEW LOCALITIES IN THE SOUTH ORKNEY ISLANDS

| Locality                     | Habitat                                     | Collection number | Date of collection |
|------------------------------|---|-------------------|--------------------|
| Signy Island:<br>North Point | Dry vertical north-facing rocks (60 m.)     | Longton 1203      | 10 January 1965    |
| Knife Point                  | On dry north vertical face of cliff (12 m.) | Lindsay 1021      | 14 June 1966       |
| Berntsen Point               | On boulders near shore (5 m.)               | Lindsay 1041      | 16 August 1966     |
| Thule Islands                | On cliff facing south-west (6 m.)           | Lindsay 1061      | 26 August 1966     |

This lichen is prominent on dry coastal cliffs and boulders adjacent to penguin rookeries and other bird-nesting sites. It is most frequent between 3 and 15 m. altitude, forming a conspicuous association with the colourful *Xanthoria elegans* (Link) Th. Fr., *X. candelaria* (L.) Th. Fr., and species of *Buellia* and *Haematomma*.

No fertile specimens are known from the Antarctic botanical zone.

*Specimens examined*

South Orkney Islands:

Signy Island

Lindsay 1021, 1040, 1050, 1061, 1062, 1063, 1064, 1065, 1066, 1067\*, 1108, 1109, 1125; Longton 1203

South Shetland Islands:

Gibbs Island

Cameron and Kennett 39

Penguin Island

Lindsay 803

Half Moon Island

Lindsay 573

Livingston Island

Lindsay 114, 192, 243, 306, 405

Deception Island

Cameron and Kennett 32; F.I.D.S. Misc. 13; Killingbeck 31, 54, 61; Longton 21; Taylor 28, 169

*Usnea antarctica* Du Rietz

This widespread Antarctic lichen is here reported for the first time from Bouvetøya and the South Sandwich Islands (Table IV). It is widely distributed throughout the latter group, and, to judge from material collected during the South Sandwich Islands surveys (Holdgate, 1963; Baker and others, 1964), it appears to be the only macrolichen of any ecological importance.

*U. antarctica* grows on dry or slightly damp rocks and stones, occasionally mosses, at altitudes ranging from 5 to 685 m. It appears to be slightly tolerant of nitrogenous melt water and salt spray, growing to within 2 m. of high-tide level in some localities in the South Shetland Islands.

Fertile specimens were found only in the collections from the Argentine Islands, perhaps indicative of more favourable climate and habitats in this area.

*Specimens examined*

Bouvetøya:

Kapp Circonsicion

Holdgate 868

South Sandwich Islands:

Bellingshausen Island

Holdgate 423, 427, 432, 812b, 818, 823, 825c

Candlemas Island

Archibald 34; Holdgate 475; Longton 535, 562, 604, 605, 625, 663

Freezeland Rock

Holdgate 809a

Montagu Island

Holdgate 801

Vindication Island

Longton 721, 722, 731

Visokoi Island

Archibald 35; Longton 767, 777

South Orkney Islands:

Powell Island

R. Smith 218, 262, 263

Reid Island

Lindsay 1024

Lynch Island

Lindsay 972

Coronation Island

Lindsay 1168, 1365

Signy Island

Holdgate 207, 208, 280d; Lindsay 1017\*, 1020, 1041, 1048, 1189, 1255, 1307a, 1476; Longton 1092, 1093; R. Smith 429

South Shetland Islands:

Gibbs Island

Cameron and Kennett 40

King George Island

John and Sugden 10; Lindsay 768

Greenwich Island

Lindsay 542, 545

Livingston Island

F.I.D.S. Misc. 23; Lindsay 15, 23, 33, 34, 158, 271, 393, 147

Deception Island

Cameron and Kennett 34; Killingbeck 1, 15, 23, 30, 50, 51, 68; Longton 19, 20, 862; Taylor 29

TABLE IV. COLLECTING DATA OF *Usnea antarctica* Du Rietz FROM NEW LOCALITIES

| Locality   | Habitat   | Collection number | Date of collection |
|--|---|-------------------|--------------------|
| <i>Bouvetøya</i> :<br>Kapp Circoncision                  | On big rocks near seaward fringe of debris belt of new lava flow (c. 15 m.) | Holdgate 868      | 31 March 1964      |
| <i>South Sandwich Islands</i> :<br>Bellingshausen Island | Outer zone of vegetation around fumarole (120 m.)                           | Holdgate 818      | 9 March 1964       |
|  | North-facing steep lava rocks (75 m.)                                       | Holdgate 823      | 8 March 1964       |
|  | On boulders moistened by steam but away from fumarole (185 m.)              | Holdgate 825c     | 10 March 1964      |
| Candlemas Island,<br>Sea Serpent Cove                    | Near skua's nest on surface of lava (altitude unknown)                      | Archibald 34      | 9 January 1961     |
| Candlemas Island   | On stones near giant petrel nests (60 m.)                                   | Holdgate 475      | 14 March 1962      |
|  | On rocks on summit ridge (185 m.)   | Longton 535       | 5 March 1964       |
|  | On stones in outer zone of fumarole vegetation (61 m.)                      | Longton 561       | 8 March 1964       |
|  | On bare rocks (30 m.)   | Longton 604       | 10 March 1964      |
|  | On stones on ash knoll (46 m.)  | Longton 663       | 13 March 1964      |
| Freezeland Rock  | Cliffs (5-30 m.)  | Holdgate 809a     | 7 March 1964       |
| Montagu Island,<br>Allen Point                           | Boulders and small stones (altitude unknown)                                | Holdgate 801      | 7 March 1964       |
| Vindication Island                                       | On stones on knolls and ridges (170 m.)                                     | Holdgate 436      | 13 March 1962      |
|  | On rocks at cliff top (90 m.)   | Longton 722       | 17 March 1964      |
|  | On boulders on east-facing slope (120 m.)                                   | Longton 731       | 17 March 1964      |
| Visokoi Island,<br>Finger Point                          | On columnar basalt (6 m.)   | Archibald 35      | 9 January 1961     |
|  | On scoria projecting through fumarole vegetation (30 m.)                    | Longton 767       | 18 March 1964      |

## Antarctic Peninsula:

|                   |  |
|-------------------|--|
| Hope Bay          | Brading 83a, 93a, 130, 139a, 140; Taylor 336, 480, 485                           |
| Brabant Island    | Cameron and Kennett 21, 27, 50   |
| Anvers Island     | Longton 1308   |
| Wiencke Island    | F.I.D.S. Misc. 8, 24, 27; Cameron and Kennett 48; Taylor 178                     |
| Petermann Island  | Corner 803; Kennett 68   |
| Argentine Islands |  |
| Galindez Island   | Corner 477, 534, 535, 541, 766, 828, 829, 841; Taylor 159, 190                   |
| Graham Coast      | Corner 588a, 855; Kennett 58   |
| Marguerite Bay    |  |
| Adelaide Island   | Killingbeck 129, 195a, 206a, 207b, 240, 250; Longton 920, 922, 924; R. Smith 104 |

|                 |   |
|-----------------|---|
| Jenny Island    | Hodson 77, 86; Killingbeck 216a               |
| Bennett Islands | Killingbeck 161                               |
| Henkes Islands  | Killingbeck 213                               |
| Oscar II Coast  | Kennett 5, 13, 15, 17, 21; Tindall 17, 18, 21 |
| Foyn Coast      | Kennett 2, 50; Tindall 52, 65                 |
| Bowman Coast    | Kennett 1                                     |
| Wilkins Coast   | Cousins, 22, 30                               |

*Usnea sulphurea* (Koenig) Th. Fr.

This species appears to be more continental in its distribution in the Antarctic Peninsula than the other Usneaceae in that it has not yet been collected from either the South Orkney or South Shetland Islands. It is found on dry inland rocks and scree, usually with *Alectoria minuscula* and occasionally *A. pubescens*.

Lamb (1964) stated that apothecia are unknown in this species. A specimen collected from Horseshoe Island, Marguerite Bay, by R. I. L. Smith in February 1967 (R. Smith 829) has two apothecia from which the following description was prepared:

Apothecia lateral but apparently terminal, 6-9 mm. diameter, concave. Discs alutaceous, undulating; receptacle yellow, forming a thin persistent margin, the latter possessing numerous black or variegated, occasionally sorediate branches up to 1.5 mm. long. Underside of receptacle reticulate-papillate in the smaller (and presumably younger) apothecium to reticulate with blackening ridges in the larger (and presumably older) apothecium. Laciniae on receptacle few, recurving over disc.

The light brown apothecial discs contrast strongly with the jet black discs of *Usnea antarctica*, *U. fasciata* and *U. acromelana*.

*Specimens examined*

Antarctic Peninsula:

|                    |                                |
|--------------------|--------------------------------|
| Marguerite Bay     |                                |
| Adelaide Island    | Killingbeck 152, 186, 190, 191 |
| Jenny Island       | Taylor 444b                    |
| Horseshoe Island   | Longton 1275; R. Smith 829*    |
| Trinity Peninsula  |                                |
| Cape Longing       | Killingbeck 84, 85, 86         |
| Nordenskjöld Coast |                                |
| Larsen Inlet       | Brading 105a, 121              |
| Foyn Coast         |                                |
| Cape Robinson      | B.A.S. Misc. 6                 |

ACKNOWLEDGEMENTS

I should like to express my thanks to Dr. I. M. Lamb, Farlow Herbarium, Harvard University, for confirming the identifications of representative specimens of each species; to Dr. S. W. Greene, Department of Botany, University of Birmingham, for assistance with the manuscript; and to Professor J. G. Hawkes, Mason Professor of Botany in the University of Birmingham, for facilities provided in his department.

*MS. received 31 August 1968*

REFERENCES

- BAKER, P. E., HOLDGATE, M. W., LONGTON, R. E., TILBROOK, P. J., TOMBLIN, J. F., VAUGHAN, R. W. and C. J. C. WYNNE-EDWARDS. 1964. A survey of the South Sandwich Islands. *Nature, Lond.*, **203**, No. 4946, 691-93.
- GREENE, S. W. 1964. Plants of the land. (*In* PRIESTLEY, R. E., ADIE, R. J. and G. DE Q. ROBIN, ed. *Antarctic research*. London, Butterworth and Co. (Publishers) Ltd., 240-53.)
- HOLDGATE, M. W. 1963. Observations in the South Sandwich Islands, 1962. *Polar Rec.*, **11**, No. 73, 394-405.
- LAMB, I. M. 1964. Antarctic lichens: I. The genera *Usnea*, *Ramalina*, *Himantormia*, *Alectoria*, *Cornicularia*. *British Antarctic Survey Scientific Reports*, No. 38, 34 pp.