

NEW RECORDS FOR ANTARCTIC UMBILICARIACEAE

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ABSTRACT. New localities are reported, together with some ecological data, for species of Antarctic Umbilicariaceae. These include the first record of a member of this family from South Georgia (*Omphalodiscus antarcticus* (Frey and Lamb) Llano), and the noteworthy occurrence of *Umbilicaria cristata* Dodge and Baker in two localities in the South Orkney Islands.

LLANO (1950), in his monograph of the Umbilicariaceae of the Western Hemisphere, listed seven species from three genera as occurring in Antarctica. This monograph, which not only provides full descriptions for these species and a summary of their known distribution, also includes a review of material from previous Antarctic expeditions which had been reported by Vainio (1903), Darbishire (1905, 1912, 1923a, b), Hue (1908, 1915), Dodge and Baker (1938), and Dodge (1948). Various erroneous or dubious identifications are also considered. Thus the monograph provides a satisfactory basis from which to evaluate the results of recent collections.

The purpose of the present paper is to report new distribution records and data on ecology obtained from a study of Antarctic lichen collections made by British Antarctic Survey personnel since 1956. Most of the material has come from the Scotia Ridge-Antarctic Peninsula region but collections from Coats Land and Dronning Maud Land, as well as farther north from South Georgia, have also yielded new records of interest.

Nomenclature follows that of Llano (1950) but for convenience, genera and species are arranged alphabetically. All specimens examined are cited and distribution data are briefly summarized for each species by island group or coasts, the latter including all offshore islands. However, full collection data are provided for those specimens which form the basis of new distribution records. An asterisk (*) after a specimen number indicates that its identification has been confirmed by Dr. G. A. Llano.

All specimens cited are part of the lichen collection of the British Antarctic Survey herbarium, at present housed in the Department of Botany, University of Birmingham.

SPECIES IN COLLECTIONS

Of the seven species from three genera recorded from the Antarctic by Llano (1950), data are presented here on the following five species: *Omphalodiscus antarcticus*, *O. decussatus*, *O. spongiosus*, *Umbilicaria cristata* and *U. propagulifera*. *Agropyron leiocarpa* (DC.) Gyeln. and its var. *nana* (Vain.) Llano were recorded by Llano (1950) from the Antarctic Peninsula and Marie Byrd Land, but no material of this species has been seen in the collections examined. *Umbilicaria solida* (Frey) Llano has been described from a single specimen collected in the South Orkney Islands. However, Llano (1950) expressed doubt as to the taxonomic status of this species, suggesting affinities with *Omphalodiscus antarcticus* or *Umbilicaria diffissa* Nyl. No material referable to this species has been seen in collections from the South Orkney Islands, although extensive lichen collections have been made there by the present author and other British Antarctic Survey personnel.

A key to Umbilicariaceae known with certainty to occur in the Antarctic Peninsula region is given below.

- | | | |
|---|----------------------------------|---|
| 1. Lower surface of thallus without rhizinae | <i>Omphalodiscus decussatus</i> | |
| Lower surface of thallus with rhizinae | | 2 |
| 2. Rhizinae coralloid, projecting through cracks or tears in the thallus to upper surface. Thallus polyphyllous | <i>Umbilicaria propagulifera</i> | |
| Rhizinae simple or sparingly branched, not projecting through cracks in the thallus. Thallus monophyllous | | 3 |

- | | | | |
|--|----|----------------------------------|---|
| 3. Thallus up to 3 cm. Upper surface light grey, with numerous apothecia of parasitic fungus (<i>Torula</i>) | .. | <i>Umbilicaria cristata</i> | |
| Thallus larger (except in immature specimens), usually 10–50 cm. rarely up to 200 cm. Upper surface brownish or purplish | .. | .. | 4 |
| 4. Upper surface brown-grey-purple; smooth, rarely slightly wrinkled. Frequently with apothecia of parasitic fungus (<i>Scutula</i>) | .. | <i>Omphalodiscus antarcticus</i> | |
| Upper surface light to dark brown, never with purple tinge; always wrinkled | .. | <i>Omphalodiscus spongiosus</i> | |

Omphalodiscus antarcticus (Frey and Lamb) Llano

This species has been collected from numerous localities along the west and east coasts of the Antarctic Peninsula and in the South Orkney and South Shetland Islands. It can now be reported from the sub-Antarctic island of South Georgia, a considerable northward extension of its range and also the first representative of the family Umbilicariaceae known from this island. The new records from Coats Land, considered with those noted by Llano (1950), suggest that this species is circumpolar in distribution in the Southern Hemisphere.

O. antarcticus occurs frequently on sheltered north-facing boulders or cliffs, dampened by a trickle of melt water during the summer. It does not appear to be nitrophilous since its commonest associates are *Usnea antarctica* Du Rietz and species of *Andreaea* and *Dicranoweisia*. It shows preference for a hard frost-resistant substratum and the present author noted its absence on the readily friable vesicular volcanic rocks occurring in the South Shetland Islands, although it was seen regularly growing in abundance on massive and other more frost-resistant rocks nearby. It has not been represented in the extensive collections made by K. Archibald in 1960–61, M. W. Holdgate in 1961–62 and 1963–64, and R. E. Longton in 1963–64 from the South Sandwich Islands, where the predominant rock types are basaltic volcanic ashes (Baker and others, 1964). Hence it is suggested that the single and dubious record of *O. antarcticus* for this island group, discussed by Llano (1950, p. 78), is more likely to refer to the South Shetland Islands.

The altitudinal range of *O. antarcticus* is from near sea-level in the South Orkney Islands to over 1,500 m. in Tottanfjella, Dronning Maud Land.

No fertile material was found in the collections. Many thalli from the South Orkney and South Shetland Islands were parasitized by a species of *Scutula*.

Specimens examined

South Georgia:	
Grytviken	Lindsay 1684b
South Orkney Islands:	
Coffer Island	Cameron and Kennett 13
Coronation Island	Lindsay 1026a, 1372
Lynch Island	Lindsay 959
Signy Island	Holdgate 235, 273; Lindsay 1151, 1190, 1277, 1282, 1311; R. Smith 428; Taylor 413
South Shetland Islands:	
Greenwich Island	Lindsay 642
Half Moon Island	Lindsay 575
King George Island	John and Sugden 49; Lindsay 844
Livingston Island	F.I.D.S. Misc. 23; Lindsay 58, 68, 392, 450, 499
Robert Island	Lindsay 609

Antarctic Peninsula (west coast):

Danco Coast Cameron and Kennett 25; F.I.D.S. Misc. 17; R. Smith 901

Graham Coast Archibald 32*; Corner 474, 518; Kennett 55, 60, 67; J. Smith 230a; Taylor 191

Fallières Coast Killingbeck 124, 164, 169, 184, 197, 242; Longton 927; R. Smith 105, 783

Antarctic Peninsula (east coast):

Trinity Peninsula Brading 61, 83b, 92a, 155, 209; Taylor 335, 344, 484

Coats Land:

Theron Mountains Brook and Johnston 2, 8a, 20a, 21a

Further data for those collections forming new distribution records are given in Table I.

TABLE I. COLLECTING DATA OF *Omphalodiscus antarcticus* (Frey and Lamb) Llano
FROM NEW LOCALITIES

Locality	Habitat	Collection number	Date of collection
<i>South Georgia:</i> Grytviken	On greywacke scree (30 m.)	Lindsay 1684b	10 November 1965
<i>South Orkney Islands:</i> Coffer Island	On west-facing rock face of coarse conglomerate (15–17 m.)	Cameron and Kennett 13	21 November 1961
Coronation Island, Olivine Point	Rocks (6 m.)	Lindsay 1026a	31 July 1966
above Shingle Cove	On boulders (440 m.)	Lindsay 1372	8 November 1966
Lynch Island	On boulders projecting through moss turf (12 m.)	Lindsay 959	16 March 1966
Signy Island, Borge Bay	On rocks (100 m.)	Holdgate 235	20 December 1961
Thule Islands	On sheltered north faces of cliff (20 m.)	Lindsay 1151	16 September 1966
<i>South Shetland Islands:</i> Greenwich Island, Discovery Bay	On maritime outcrop, facing north (15 m.)	Lindsay 642	6 January 1966
Half Moon Island	Basaltic rock facing west-north-west (50 m.)	Lindsay 575	5 January 1966
King George Island, Ardley Island	On south side of sea stack (6 m.)	John and Sugden 49	14 February 1966
Keller Peninsula	On maritime outcrop (15 m.)	Lindsay 844	29 January 1966
Livingston Island, south-east coast	On rocks (60 m.)	F.I.D.S. Misc. 23	29 December 1958
Barnard Point	On boulders on moraine (70 m.)	Lindsay 58	27 November 1965
Johnsons Dock	West face of outcrop near cliff line (35 m.)	Lindsay 68	28 November 1965

TABLE I—*contd.*

<i>Locality</i>	<i>Habitat</i>	<i>Collection number</i>	<i>Date of collection</i>
Byers Peninsula, South Beaches	On rocks on west-facing scree slope (10 m.)	Lindsay 392	16 December 1965
Robert Island, Edwards Point	North face of large boulder (30 m.)	Lindsay 609	5 January 1966
<i>Antarctic Peninsula (west coast):</i> Danco Coast, Brabant Island, Metchnikoff Point	East-facing rock crevices (3–10 m.)	Cameron and Kennett 25	1 December 1961
Anvers Island, Arthur Harbour	On dry rocks (altitude unknown)	F.I.D.S. Misc. 17	7 December 1957
Hermit Island	On rock faces and large boulders (75 m.)	R. Smith 901	9 March 1967
Lemaire Channel, Loubat Point	On rock (300 m.)	Kennett 55	19 March 1964
near Cape Tuxen	No data	Archibald 32	26 January 1961
Argentine Islands, Galindez Island	Vertical rock faces, sometimes dripping with water (10 m.)	Corner 474	20 March 1964
Fallières Coast, Adelaide Island, near station hut	Inclined rocks in sheltered gully (15 m.)	Longton 927	28 December 1964
Mothes Point	In north-facing cracks (15 m.)	Killingbeck 242	8 March 1963
Bennett Islands, Gränicher Island	Sheer rock (15 m.)	Killingbeck 184	19 November 1962
Megaw Island	In great profusion on all rocks (altitude unknown)	Killingbeck 164	17 November 1962
Pfaff Island	Rocks (15 m.)	Killingbeck 169	19 November 1962
Jenny Island north-east coast	On raised beach (11 m.)	Killingbeck 124	February 1962
<i>Antarctic Peninsula (east coast):</i> Trinity Peninsula, Hope Bay, Mount Flora	On scree slopes (altitude unknown)	Taylor 335	27 December 1960
Scar Hills	On flat upper surfaces of exposed rocks (100 m.)	Brading 61	15 January 1961
Andersson Nunatak	Dry upper surface of rock (altitude unknown)	Brading 92a	9 April 1960
ridge between Broad Valley and Russell East Glacier	On dry summit rocks (c. 350 m.)	Brading 209	27 April 1959
<i>Coats Land:</i> Theron Mountains, Lenton Bluff	South-facing cliffs	Brook and Johnston 2	November 1968

Omphalodiscus decussatus (Vill.) Schol.

This species seems to be widely distributed throughout the region of the Antarctic Peninsula as well as continental Antarctica. There appears to be little difference in thallus morphology in the collections from the peninsula region, but specimens from Coats Land and Dronning Maud Land are slightly smaller and have a thinner thallus with a less rugose upper surface. From the present author's observations in the South Orkney Islands, *O. decussatus* does not appear to be ornithocoprophilous, as some forms may be in the Arctic (Lyngby and Scholander, 1932). Some specimens from Dronning Maud Land were certainly growing near snow petrel nests, but no increase in thalline thickness or rugosity was noticed between these and other specimens.

Omphalodiscus decussatus forms a distinct community with *Usnea antarctica*, *Alectoria pubescens* (L.) Howe jr. and species of *Andreaea* in the South Orkney Islands. In the South Shetland Islands, the only material of *O. decussatus* seen by the present author was growing with *O. antarcticus*, *Usnea antarctica* and *Parmelia saxatilis* (L.) Ach. f. *acervata* (Hue) M. Lamb. *O. decussatus* is characteristic of north-facing boulders or cliffs which are dry throughout the summer, mainly at some distance from the rookeries of penguins and other birds. Its altitudinal range is from near sea-level in the South Orkney Islands to over 2,000 m. in Tottanfjella, Dronning Maud Land.

Fertile material was seen only in collections from the South Orkney Islands.

Specimens examined

South Orkney Islands:	
Coronation Island	Lindsay 1344, 1368, 1371
Signy Island	Lindsay 878, 1019*, 1138
South Shetland Islands:	
Livingston Island	Lindsay 69
Antarctic Peninsula (west coast):	
Danco Coast	R. Smith 902
Graham Coast	Corner 476*, 588; R. Smith 768a
Fallières Coast	Cousins 75; Hodson 82; Killingbeck 204; Longton 926; R. Smith 782*, 801*, 870; Taylor 444a, 445
Antarctic Peninsula (east coast):	
Trinity Peninsula	Brading 64, 66, 84a, 92b, 128, 136, 139b, 152, 182, 186; Taylor 340, 341, 343
Nordenskjöld Coast	Brading 104, 105b, 106, 174, 200, 208
Oscar II Coast	Kennett 32; Tindall 16
Foyn Coast	Tindall 38*, 59*
Wilkins Coast	Cousins 29
Dronning Maud Land:	
Tottanfjella	Bowra 51A, 73, 88B/a, 88B/b, 91b, 92B/d, 92B/g, 103a
Coats Land:	
Theron Mountains	Brook and Johnston 4a

Collection data for those specimens forming new distribution records are given in Table II.

Omphalodiscus spongiosus (Dodge and Baker) Llano

The localities of the few collections examined, when considered with existing distribution data, tend to confirm the view of Llano (1950) that this species should be regarded as circumpolar in its distribution in the Antarctic. From the sparse data available, it appears that the ecology of *O. spongiosus* is similar to that of *O. decussatus*, since it has been collected from dry scree slopes where it was growing in company with *Usnea sulphurea* (Koenig) Th. Fr. and *Alectoria minuscula* (Nyl. ex Arn.) Degel. at some distance from bird-nesting sites.

The material examined was sterile.

TABLE II. COLLECTING DATA OF *Omphalodiscus decussatus* (Vill.) Schol.
AND *O. spongiosus* (Dodge and Baker) Llano FROM NEW LOCALITIES

Species	Locality	Habitat	Collection number	Date of collection
<i>O. decussatus</i>	South Orkney Islands: Coronation Island above Shingle Cove	On boulders (440 m.)	Lindsay 1368	8 November 1965
	Signy Island, Rethval Point	On large boulders facing north (15 m.)	Lindsay 878	1 March 1966
	South Shetland Islands: Livingston Island, Johnsons Dock	On rock outcrop on raised beach (10 m.)	Lindsay 69	28 November 1965
	Antarctic Peninsula (west coast): Danco Coast, Anvers Island, Hermit Island	Rock faces (30–60 m.)	R. Smith 902	9 March 1967
	Graham Coast, near Mount Mill	Rock surfaces (330 m.)	Corner 588	25 September 1964
	Argentine Islands, Meek Channel	Rock surfaces (10 m.)	Corner 476	21 March 1964
	Galindez Island	Rock surfaces (altitude unknown)	R. Smith 768a	13 February 1967
	Fallières Coast, Red Rock Ridge, Safety Col	On small outcrop of Red Rock Ridge granite (3 m.)	Cousins 75	21 August 1963
	Adelaide Island, Cape Alexandra	Rocks (altitude unknown)	Killingbeck 204	9 December 1962
	near station hut	Inclined rocks in shel- tered gully (15 m.)	Longton 926	28 December 1964
	Jenny Island, east coast	On cobble-paved raised beach (15 m.)	Taylor 444a	30 January 1961
	Antarctic Peninsula (east coast): Trinity Peninsula, Hope Bay, Mount Flora	On scree slopes (altitude unknown)	Taylor 343	27 December 1960
	Scar Hills	Upper surface of ex- posed bedrock (100 m.)	Brading 64	15 January 1961
	Andersson Nunatak	Dry upper surface of rock (130 m.)	Brading 92b	9 April 1960
	Nobby Nunatak	Upper surfaces of flat summit rocks (270 m.)	Brading 128	15 January 1960
	near Striped Hill	On top of ridge (700 m.)	Brading 152	20 December 1959
	Prince Gustav Channel, Alectoria Island	On flat surfaces of dry rock (30 m.)	Brading 182	15 October 1960

TABLE II—*contd.*

Species	Locality	Habitat	Collection number	Date of collection
<i>O. spongiosus</i>	Nordenskjöld Coast, Larsen Inlet, near Tower Peak	On south side of dry summit rocks (c. 790 m.)	Brading 208	27 September 1960
	Oscar II Coast, Starbuck Glacier	Small bluff jutting out from cliffs (170 m.)	Kennett 32	25 November 1963
	Churchill Peninsula	On small ledge (300–400 m.)	Tindall 16	November 1963
	Foyt Coast, Cabinet Inlet, Cape Casey	On shelf on steep south-facing bluff (600 m.)	Tindall 59	December 1963
	Wilkins Coast, Unnamed locality at lat. 69°24'S., long. 63°40'W.	On rock near summit of nunatak (1,000 m.)	Cousins 29	1 November 1965
	Dronning Maud Land: Tottanfjella, station 88*	Scree and rock slope facing west (2,000 m.)	Bowra 88B/a	10 January 1964
	Coats Land: Theron Mountains, Marø Cliffs	South-facing cliffs	Brook and Johnston 4a	November 1968
	Antarctic Peninsula (east coast): Oscar II Coast, near Caution Point	South-facing scree slope above ice shelf (100 m.)	Kennett 23	4 November 1963
	Dronning Maud Land: Tottanfjella, station 92*	On rock (1,500 m.)	Bowra 92B/a	14 January 1964

* For precise locality see Bowra and others (1966, fig. 1).

Specimens examined

Antarctic Peninsula (east coast):

Oscar II Coast Kennett 23*, 26

Dronning Maud Land:

Tottanfjella Bowra 92B/a

Further details of these collections are given in Table II.

Umbilicaria cristata Dodge and Baker

This species was known previously from only two widely separated regions in the Antarctic, one in Queen Mary Land and the other in Marie Byrd Land. It is therefore of considerable interest to record it from two new localities in the South Orkney Islands, about 4,800 km. from the nearer of the two previously known sites. These new records support Llano's (1950) view that this species may be circumpolar in its distribution.

The South Orkney Islands' collections were growing with *Usnea fasciata* Torr., *Himantormia lugubris* (Hue) M. Lamb and species of *Rhizocarpon* and *Andreaea* on dry cliff faces.

Antarctic Peninsula (east coast):

Wilkins Coast

Cousins 71

Collection data for these specimens will be found in Table III.

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