

Bryophytes of Schirmacher Oasis in Antarctica

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Abstract

During the 19th expedition, 256 numbers of field samples were collected from different localities of Schumacher Oasis which included mosses, lichens and algae. Some culture work on mosses was also attempted.

Introduction

The flora of Schirmacher Oasis is Schumacher Oasis is wholly cryptogamic i.e. of non flowering plants namely algae, fungi, lichens and mosses. The other groups of Bryophytes namely Liverworts and Hornworts are completely absent in Schirmacher Oasis. Mosses are the dominating form of vegetation and also act as 'host' for the growth of not only other plant groups namely algae, fungi, and lichens but also for micro invertebrate fauna. There are some muscicolous lichens which grow on mosses, damage the moss tissue and inhibit its growth.

Sample Collection

Almost all the possible sites in Schirmacher Oasis were visited on foot to collect the mosses, lichens and algae. 15 Lakes were also visited. In total 45 traverses were made.

Apart from this following Nunataks were covered :

1. Pevikhornet - alt. 1021 m ; Lat. 70°57'S ; Long 11°52'E
2. Starheimtind - alt. 1278 m; Lat. 71°00'S ; Long. 12°00'E
3. Baalsrudfjellet - alt. 835 m ; Lat. 70°54'S ; Long. 12°4'E
4. Veteheia - alt. 200 m ; Lat. 70°45'S; Long. 11°38'E

A total of 256 field numbers (mosses + lichens + algae) were collected from the various localities of Schirmacher Oasis. Mountain Gjeruldsenhogda was visited for the first time by an Indian botanist. Its location is Lat. 71°57'08" S ; Long. 10°50' E at an altitude of 2000 m.

In Antarctic Botanical Zone about 85 species of mosses distributed over 43 genera are known to occur. Out of these 27 species i.e. about 31% are common to India. Twenty species are Himalayan, while the remaining 7 species are widely distributed in other biogeographic zones of India.

Schirmacher Oasis, the site of the present study, yielded 7 species of mosses. Of these 6 species are terrestrial and are quite widespread, while the seventh species is aquatic and confined to Priyadarshini Lake only. Moss rich sites include Priyadarshini Lake area, stream behind Maitri station, Russian station Area, Parvati Lake area, base of Trishul Hill and D.G. Snout area.

Nunataks Starheimtind and Veteheia harbour good moss vegetation; while mountain Gjeruldsenhogda was found to be completely devoid of any vegetation. Occurrence of such a limited number of mosses in Schirmacher Oasis indicates that their ecological limit is reached here. The hostile environment there may be the cause of such a poor diversity.

Classification & Enumeration of mosses

(Nos. of species given in brackets)

Class	Bryopsida
Subclass	Bryidae
Order	Bryales
Suborder	Bryineae
Family	Bryaceae
Genus	<i>Bryum</i> (2 ± 1)
Suborder	Pottiineae
Family	Pottiaceae
Genus	<i>Bryoerythrophyllum</i> (1) <i>Sarconeurum</i> (1)
Suborder	Dicranineae
Family	Ditrichaceae
Genus	<i>Ceratodon</i> (1)
Suborder	Grimmiineae
Family	Grimmiaceae
Genus	<i>Grimmia</i> (1)
Family	Bryaceae Schwaegr, In Willd, Spec. Pl. ed. 4.5 (2): 47, 1830.
Genus	<i>Bryum</i> Hedw., Spec. Musc. 178. 1801 <i>Bryum argenteum</i> Hedw., Spec. Musc. 181. 1801.

Antarctic Distribution: Schirmacher Oasis and other Antarctic regions :
South Shetland Islands, Victoria Land, Black Island,
Ross Island.

Indian Distribution: Sikkim, Darjeeling, Arunachal, Khasi Hills,
Kashmir, South India, Central India. A
cosmopolitan species.

Bryum pseudotriquetrum (Hedw.) Schwaegr., Spec. Musc. Suppl.
1(2): 110.1816. *Minimum pseudotriquetrum* Heds.,
Spec. Musc. 190. 1801.

Antarctica Distribution : Schirmacher Oasis and other Antarctic regions.

Indian Distribution: Sikkim, Kashmir.

***Bryum* sp.** very rare, aquatic, floating in Priyadarshini Lake.

Family Pottiaceae Schimp., Controll. Bryol. Eur. 24 1855-1856.

Genus *Bryoerythrophyllum* Chen, Hedwigia 80 : 4. 1941

Bryoerythrophyllum recurvirostre (Hedw.) Chen, Hedwigia 80:5:255.
52 f. 1 2 1941. *Weissia recurvirostris* Hedw.,
Spec. Musc 71 1801.

Antarctic Distribution: Schirmacher Oasis, Bunge Hills in Wilkes Land.

Indian Distribution: Kashmir Central India.

Genus *Sarcocneurium* Bryhn, Nyt Mag. Naturvid, 40:205. 1- 2 1902.

Sarcocneurium glaciata (C. Muell.) Card. Et. Bryhn, Nat. Antarct. Exp.
Nat. Hist. 3. (Musci) : 3.1907.

Antarctic Distribution: Schirmacher Oasis and other Antarctic regions :
Cockburn Islands, Victoria Land, Roll Island.

American Distribution: Southern South America.

Family Districhaceae Limpr. In Rabenh., Kryptogamen Fl. Ed. 2.4:482.
1887.

Genus *Ceratodon* Brid., Bryol. Univ. 1 : 480. 1826.

Ceratodon purpureus (Hedw.) Brid., Bryol. Univ. 1 : 480. 1826.
Dicranum purpureum Hedw., Spec. Musc. 136.
1801.

Antarctic Distribution: Schirmacher Oasis, Victoria Land, Deception Island.

Indian Distribution: Darjeeling, Assam, Kashmir, South India, Gangetic Plains.

Family Grimmiaceae Arnott, Disp. Meth. Mousses 19. 1825.

Genus *Grimmia* Hedw., Spec. Muse. 75. 1801.

Grimmia lawiana Willis in Filson, Lichens & Mosses Mac. Robertson Land Antarctica : 1966.

Culture work

Special mention may be made about the culture work done at Maitri station. All the mosses collected from Schirmacher Oasis were vegetative but three of them showed asexual reproductive bodies in the form of "caducous heads" or "brood bodies", All the three were cultured on Half strength *Knop's agar medium in culture tubes kept the "Tirumala Hut" by the side of a window at 17-19°C temp.

*NaNO ₃	375 mg
CaCl ₂ . 6H ₂ O	125 mg
KH ₂ PO ₄	125 mg
MgSO ₄ . 7H ₂ O	125 mg
KCl	60 mg
FeCl ₃ (3%)	one drop
Distilled water	1,000 ml
PH	6-7 (before autoclaving)
agar	1.5%

All the three mosses responded positively after 7 days, and shoot formation was noticed. It is concluded that in the absence of sporophytes these mosses produce asexual reproductive bodies for their survival.

Conservation

With the development of biological research activities in Schirmacher Oasis, the mosses are under great pressure. Since mosses act as 'host' for number of plant taxa and also for micro-organisms, every biologist is collecting moss samples. Utmost care should be taken to collect 'minimum' material for research purposes so that the fragile ecosystem existing there is not disturbed.



Fig. 1: Bryum sp. with 'caducous heads'



Fig. 2: Moss cushions near Priyadarshini Lake

Mention of a statement by Rudolph (1971) on Ecology of Land Plants in Antarctica will not be out of way which reads "It is the duty of every

person visiting this unique continent to take it upon himself to do all he can to preserve its ecosystem. Our survival in future may depend upon the understanding of such a 'simple' ecosystem existing under hostile conditions."

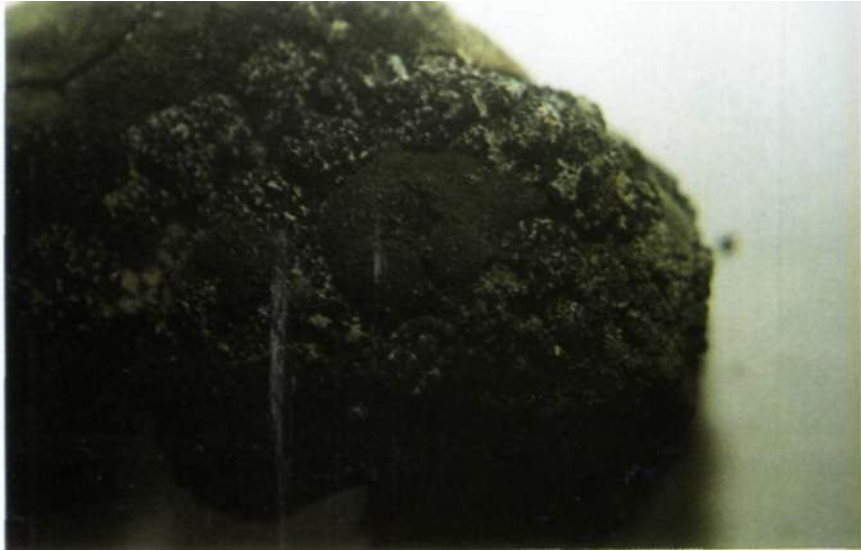


Fig. 3: Muscicolous Lichen on moss Grimmia sp.



Fig. 4: Muscicolous Lichen on Grimmia sp.

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Reference

Rudolf, E.D. 1971. Ecology of land plants in Antarctica. Research in Antarctic, ed. By L.O. Quam. Washington, Am. Ass. Adv. Sci., 191-211.