Algal Vegetation in the Ongul Islands, Antarctica

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東オングル島の陸氷と淡水藻の植生

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東オングル島には小さい池が 20 あまりと小さい川が2つと到る所に湿地がみられるがこれらには次のように淡水藻が豊富にみられた.

1. **池**　池底の砂の中には大抵の池には *Synechococcus* が普通にみられ, *Oscillatoria, Anabaena, Nodularia, Nostoc, Phormidum* などのラン藻類が多くみられた. 2, 3 の池では緑藻の *Chlamydomonas* がかなり沢山みられ, *Penium* も時々みうけた. ケイ藻では *Navicula* が比較的に広く分布しており, *Hantzschia* も普通にみられた. 2, 3 の池では池底の石がラン藻の *Dichothrix* のために暗青色を呈していた. また 2, 3 の池ではラン藻 *Nostoc* のコロニーが沢山集まっているのがみとめられた.

池の藻類は種, 量共にラン藻が大変多く, *Synechococcus, Dichothrix, Nostoc* が優占種であった. 2, 3 の池では緑藻 *Chlamydomonas* が優占種であった. ケイ藻の *Navicula*, 緑藻の *Penium* は亜優占種で比較的広くみられた.

2. **川**　1 つの川では藻類が豊富で, 底の石には緑藻の *Ulothrix* が附着し, ケイ藻の *Navicula, Hanlzschia*, ラン藻の *Nodularia, Oscillatoria, Phormidium* がかなり沢山附着していた. 他の川では藻類は大変少なかった. 川の藻類は緑藻が優占種でケイ藻, ラン藻は亜優占種であった.

3. **湿地**　残雪や池の周囲にみられるもので, ケイ藻の *Hantzschia* が優占種で, ケイ藻の *Navicula, Pinnularia*, ラン藻の *Anabaena, Aphanothece, Nodularia, Oscillatoria, Synechococcus* 緑藻の *Penium* がみられた. 湿地ではケイ藻が優占種であった.

The present writer took part in the Third Antarctic Research Expedition as a member in charge of biology and made biological investigations, staying at East Ongul Island from Feb. 1st to 4th in 1959.

The Ongul Islands are a group of islands located in the Lützow-Holm Bay in Antarctica, in Lat. 69° S, Long. 39°35′E.

East Ongul Island is 2.2 kilometers from east to west, 20 kilometers from north to south and in summer about 20% of the former and about 40% of the latter are covered with the remaining snow.

Habitat factor　It seems to be only in January and February that the monthly mean temperature is plus. There are about thirty days throughout the year when the daily mean temperature is plus. There are six hours from 12 to 18 in December, when the temperature is plus and twelve hours from 9 to 21 in January.

Besides, in the dry land wind sent salt as white as scattered flour, many strong wind days and long continuance of dark days in winter and so on make the growth

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of living things very unfavourable.

Aerial algae Mosses existed in the sands, their quantity being small. Green ones and black ones were found out and in black ones Gloeocapsa of cyanophyta coexisted. Mosses grew very thick and rhyzoid was highly developed. All were sterile and nothing with sporphyte was to be found. A little lichen was found on the moss co-existent with Gloeocapsa and in others veay scarce.

As stated above, Gloeocapsa of cyanophta co-existing with mosses and Aphanothece etc. were found under the stones in several places on East Ongul. There was nothing on the parts of the stones above soil, but only on the parts buried in the sands. This may be due to appropriate moisture and hard frozenness. They attached to the stones with little mica and the cause was unexplainable.

Table 1. Chemical composition of the pond water from East Ongul Island (SUGAWARA & TORII 1959)

	No. 1	No. 2	No. 3
Cl (*mg/l*)	134.7	136.3	204.2
SO_4 〃	36.2	16.4	25.2
Na 〃	70.0	74.4	85.0
K 〃	2.5	3.3	5.5
Ca 〃	7.7	14.0	11.0
Mg 〃	9.7	13.4	13.7
Sr 〃	0.13	0.30	0.21
I^- (*μg/l*)	1.9	1.9	0.5
IO^{-3} 〃	2.8	2.9	5.0
I(t) 〃	4.7	4.8	5.5

Table 2. Habitat factor of inland waters in the Ongul Islands.

		Air Temp.	Water Temp.	pH	Time
Pond	1		+ 4.5		21.30
	2	−2.5	+ 1.2	7.0	6.10
	3	−1.2	+ 4.6	7.2	20.50
	4	+1.2	+ 5.3	6.9	10.45
	5	0.0	+ 8.4	7.0	11.50
	6	−2.8	+ 1.4	7.0	7.00
	7	−1.9	+ 1.8	6.2	
	8	−0.7	+ 7.8	7.0	10.00
	9	+1.0	+ 8.6	6.9	
	10	+1.4	+10.9	7.0	
	11	+0.4	+ 8.3		16.10
	12	+0.4	+10.1	7.6	16.30
	13	−0.3	+10.1	7.1	
	14	−1.2	+ 8.3	7.1	
	15	−2.1	+ 7.2	7.1	19.00
	16	−2.1	+ 6.2	7.1	
River	1	−0.6	+ 4.7	7.0	15.30
	2	+1.2	+ 5.3	6.9	10.40

Fresh water algae 1. INLAND WATERS IN THE ONGUL ISLANDS. Even in East Ongul Island which is a small inland about 2km in diameter, there are over twenty ponds and marshes. They are filled with snow melted water and many of them are 20 to 30 meters in diameter and about 30cm deep. Most of them are likely not to dry up all the year round, though they are small ponds. They have pH from 6.9 to 7.1 and are mostly neutral (cf. Table 2) and there are little data for water quality and, according to SUGAWARA and TORII (1959), they are as the Table 1 shows, having much Cl inremarkable distinctiveness, their chemical composition being much different from that of sea water. Water temperature is from 1.2°C to 10.9°C and mostly appears to be 4.5°C (cf. Table 2).

This temperature is not so different from that of alpine lakes and marshes in Japan in summer. Species which can stand the cold in winter, reproduce during over 50 days in a year when it is supposed not to be frozen, and can repeat life cycle, can live satisfactorily.

There were two rivers in East Ongul,

one about 1 meter wide, the other 3 meters wide and there existed many marshes near the ground covered with the unmelted snow. Those marshes are not much suited to the life growth because they are frozen at night.

2. FRESH WATER ALGAE IN INLAND WATERS 1) Ponds Many Synechococcus were found in the sand on the bottom of the ponds, and many of Chlamydomonas of chlorophyta is some ponds. Dichothrix of cyanophyceae were found in dark-blue velvet manner on the stones of the bottoms of some ponds. And Nostoc colonies of cyanophyta were found in some ponds. Sometimes Navicula of bacillariophyta were found out in a good many number. Anabaena, Nodularia, Oscillatoria, Phormidium of cyanophyta, and Cosmarium and Penium of Chlorophyta came in sight comparatively much ofener.

2) Rivers. One is poor and the other considerably rich, with Ulothrix of chlorophyta being dominant, with Hantzschia and Navicula of bacillariophyta and Nodularia, Oscillatoria and Phormidium of cyanophyta seen. Concerning Algae in the rivers, chlorophyta were dominant, cyanophyta and bacillariophyta being subdominant.

3) Marshes. Hantzschia were dominant, and Pinnularia of bacillariophyta and other algae which are common in ponds were mostly found out though generally in a small quantity.

Snow algae Algae were not discovered on the snow, but they existed together with Oscillatoria of cyanophyta and Ulothrix of chrolophyta, in large quantity in the marsh into which the spring water back of Syowa Base flowed. As I reported in my study of snow algae in Japan, snow algae are not so specific and can grow in cold water. I foretold that in the future they would be discovered in cold water somewhere, and this time at the South Pole this was proved to be correct.

The reason why show algae were found out, not on the snow properly but in the water, is that the temperature falls below zero (C) for twelve hours, half a day, even in the middle of summer in the Ongul Islands and that it is hard for then to grow on the snow where they should grow properly, and so they grew in the almost unfrozen fresh water.

I made public also in my study of snow algae in Japan, that snow algae can be found in large quantities at about the time when the lowest temperature in a day begins not be minus (C) and even snow algae seem to reproduce unfavorably when the temperature on the surface of snow is minus (C). It was proved that this conclusion was not wrong.