

Observation of Algal Community Near Dongbaeksum, Haeundae

by

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INTRODUCTION

This survey was carried out on Dongbaeksum(— sum means island) from November, 1969 to October, 1970. It is the intent of this survey to study the present records of algal flora, species, and communities around this island, at which is located the marine laboratory of Busan Fisheries College. Because there are many problems concerning water pollution on coastal seas these days, it attempts to indicate the fate of as-yet-unpolluted algal flora and communities.

There have been several reports : on subtidal marine algal vegetation(Neushul, 1967) : on seaweed vegetation near the biological station (Jorde, 1966) : on studies of marine algae(Taniguti, 1961 : Sacto, 1970) : on the annual algal growth(Matsuura, 1968). In Korea, papers on geographical distribution(Kang, 1966) and on annual algal growth(Lee, 1972) have appeared. This author intends to report on algal flora and communities at Dongbaeksum, Haeundae, near Busan.

BRIEF NOTE ON ENVIRONMENTAL FACTORS

Observation Stations. The observed stations are located at the most southern part of the Korean peninsula, lying between $35^{\circ}9'45''$ and $35^{\circ}9'$ N lat., and extending from $129^{\circ}9'45''$ E long(about 20km west of City Hall).

Water Temperature and Salinity. August was the month of highest surface water temperature (26. 2°C): the month of lowest surface water temperature was March (8. 1°C). Salinity varied little from month to month, March being the season of highest, and August of lowest salinity through the year.

Tide. The tidal levels from the water mean level during the year starting July, 1969, are as follows: the greatest tidal fluctuation was 173cm from July, 1969, to June, 1970; the highest tide was 158cm in August, 1969: and the lowest tide was -15cm in March, 1970.

METHODS

This author selected three stations: a breakwater on the western side of Dongbaeksum (Station A); a rocky area facing the Daehan strait in front of the marine laboratory (Station B); and a rocky area near a sandy beach on the eastern side (Station C). Observations were carried out once a month at high tide with a quadrat (50cm×50cm), positioned by moving it up and down a standard line which had been marked by rope between the water level and a special starting point somewhere on shore. In case of very scanty algal flora, observations covering twice as much area as usual were made. The degree of coverage is indicated as follows:

- + : be counted individuals 1 or 2
- 1 : less than 1/5
- 2 : less than 2/5
- 3 : less than 3/5
- 4 : less than 4/5
- 5 : more than 4/5

RESULTS and DISCUSSION

Annual algal vertical distribution at Station B (Table 1) can be divided into seven associations, as follows:

- 1) *Capsosiphon fulvescens*—*Gloiopeltis furcata* Association.

This association grows at the highest zone of the station(110cm—160cm) and disappears in summer during the season of highest water temperature.

2) *Ulva pertusa*—*Myelophycus caespitosus* Association.

This association was observed at the next highest zone(100cm—0cm). *Gloiopeltis tenax* was observed at the upper part of the association, and a narrow belt of *Gymnogongrus flabelliformis* and *Calulacanthus okamurai* was observed slightly below it. *Ulva pertusa* is the species of widest distribution, but in summer it's vertical distribution range is reduced below 30cm.

3) *Enteromorpha linza*—*Collinsiella cava* Association.

This is the most abundant association to grow at low tidal zones during seasons of cold. *Porphyra surbobiculata*, *Pelvetia wrightii*, and *Ishige okamurai* were observed in this association.

4) *Monostroma grevillei*—*Scytosiphon lomentaria* Association.

This association appears at the next lowest tidal zone just below the *Enteromorpha linza* — *Collinsiella cava* Association. *Monostroma grevillei* only appears during cold seasons.

5) *Hizikia fusiforme* Association.

This association is distributed at the lowest tidal zone; it includes *Carpopeltis affinis*.

6) *Chondrus ocellatus* Association.

This association is distributed thru the area—120cm, and includes *Rhodoglossum japonica* and *Lomentaria catenata*.

7) *Ecklonia cava*—*Undaria pinnatifida* Association.

This association is distributed at a subtidal zone below —120cm, and includes *Pachymeniopsis eliptica*, *Pachymeniopsis lanceolata*, and *Sargassum spp.*

The total collected algal species were 181 species(Lee and Kang, 1970). The most scanty season of algal growth was September. Algal growth increased suddenly in January, and are even greater rate of increase continued from February to May(Lee, 1972). Measuring in terms of water temperature rather than date, these are the same results that Matsuura found in 1968.

Taniguti(1961) has classified the algal flora and communities of Japan. He has suggested that *Myelophycus caespitosus* Alliance be considered a typical alliance of

temperate coastal areas. Typical species of this alliance — *Myelophycus caespitosus*, *Carlopellis flabellata*, *Chondrus ocellatus*, *Sargassum micracanthum*, *Sargassum hemiphyllum*, *Gloiopeltis furcata* — were discovered at Dongbaeksum. According to Taniguti a typical community of open-sea algal — found on the Pacific coast of Japan — is *Hizikia fusiforme* — *Eisenia bicyclis*; he also said that there are typical subcommunities of *Sargassum hemiphyllum* or *Chondrus ocellatus* among the vegetation belt of *Gloiopeltis furcata* — *Myelophycus caespitosus* — *Hizikia fusiforme* — *Eisenia bicyclis*.

A few years ago, Kang(1966) suggested that, from the standpoint of plantgeographical distribution, algal flora on the southern coast of Korea is in the same category as that on the central Pacific coast of Japan. It was concluded that the algal associations of Dongbaeksum belong to Hizikietum Taniguti. There was, however, no *Eisenia bicyclis*, though *Ecklonia cava* appeared instead; this latter dominant species grows under the same ecological conditions in subtidal zones and belongs to the same genus as the former.

Taniguti(1961) suggested that certain varieties of the community of *Ishige okamurai* are less influenced by exposure to waves than are others. The distribution district of this varied community is the same as that of *Hizikia fusiforme*—*Eisenia bicyclis*, as stated above. In this study, it was concluded that the Hizikietum *Ishigeosum* Taniguti of the inner part of Station B was more influenced by waves than was that of the outer part. This author observed three vegetation belts in the upper zone of the littoral belt at Station B: *Gloiopeltis furcata*, *Ishige okamurai*, *Sargassum spp.*

ABSTRACT

This author carried out this study on Dongbaeksum during the period from November, 1969, through October, 1970. Seven typical algal associations were observed at the upper part of the observation stations during this year:

- 1) *Capsosiphon fulvescens* — *Gloiopeltis furcata* Association;
- 2) *Ulva pertusa* — *Myelophycus caespitosus* Association;
- 3) *Enteromorpha linza* — *Collinsiella cava* Association;
- 4) *Monostroma grevillei* — *Scytosiphon lomentaria* Association;

5) *Hizikia fusiforme* Association:) *Chondrus ocellatus* Association; and 7) *Ecklonia cava*—*Undaria pinnatifida* Association. Based on the observations, it was concluded that the algal associations of Dongbaeksum belonging to the *Hizikietum Taniguti* Alliance are typical algal associations, which can be found in exposed places on the central pacific coast of Japan. In places more exposed to waves are found algae similar to the algal association of *Gloiopeltis furcata* — *Myelophycus caespitosus* — *Hizikia fusiforme* — *Eisenia bicyclis*. Sheltered, inner places, less influenced by waves, support algae similar to the algal association of *Ishigeosum Taniguti*. While no *Eisenia bicyclis* occurred at Dongbaeksum, *Ecklonia cava* appeared in the subtidal zone, which could be considered a counterpart for *Eisenia bicyclis*.

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〈요 약〉

해운대 동백섬의 해조군락 조사

이 기 완

1969년 11월부터 1970년 10월까지 해운대 동백섬에서 조사한 해조군락은 다음과 같다 :

- 1) *Capsosiphon fulvescens* — *Gloiopeltis furcata* Association;
- 2) *Ulva pertusa* — *Myelophycus caespitosus* Association;
- 3) *Enteromorpha linza* — *Collinsiella cava* Association;
- 4) *Monostroma grevillei* — *Scytosiphon lomentaria* Association;
- 5) *Hizikia fusiforme* Association;
- 6) *Chondrus ocellatus* Association;
- 그리고 7) *Ecklonia cava*—*Undaria pinnatifida* Association으로 7군단이다.

동백섬의 해조류는 군락학적으로 *Myelophycion Taniguti* 중 일부 중부 태평양의 대표적인 외양성 군집인 *Hizikietum Taniguti*에 속한다고 할 수 있다.

파도의 영향을 받는 바깥쪽은 *Gloiopeltis furcata* — *Myelophycus caespitosus* — *Hizikia fusiforme* — *Eisenia bicyclis* 분군집과 일치하며 파도의 영향이 없는 곳은 *Hizikietum ishigeosum Taniguti*이다. 동백섬에서는 대황(*Eisenia bicyclis*)를 볼 수 없는 점이 다르나 그대신 점심대에서 우점종으로 나타나는 감태(*Ecklonia cava*)가 그 상대종이다.