

Summer Algal Flora of Gojeong-Ri, West Coast of Korea

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ABSTRACT

The marine benthic algae of Gojeong-Ri was investigated in a floristic aspect. As a result, 34 species, 7 blue-green, 14 red, 6 brown and 7 green algae were identified as a summer flora from the area. Among them, *Sirocoleum kurzii* (blue-green alga), *Ralfsia clavata* (brown alga), *Pseuduloella consociata* and *Cladophora speciosa* (green algae) were known as new records to Korea.

INTRODUCTION

As a part of preliminary marine environmental study for Electric Power Plant construction, the present investigation was carried out during August-October, 1978 in the vicinity of Gojeong-Ri, Chungcheongnam-Do (Province). Gojeong-Ri (126° 29' E, 36° 24' N) is located on the east side of the entrance of Cheonsu Bay in the mid-west coast of Korea. The algal flora near this area is not known except Daecheon, where Kang (1966) listed only 5 species in his study on the geographical distribution of Korean algae.

The coast of Gojeong-Ri is a flat plain composed of mud, sand, pebbles and stones, well protected from wind and waves by the scattered islands around the entrance of Cheonsu Bay. The benthic algal biomass in this area is so poor as a characteristic of the west coastal region (Kang, 1966; Lee, 1971), that any quantitative samplings can not be attempted. Therefore, the collections for checklist are made from three representative sites (Fig. 1).

OBSERVATION

As a result of present investigation, 34 species

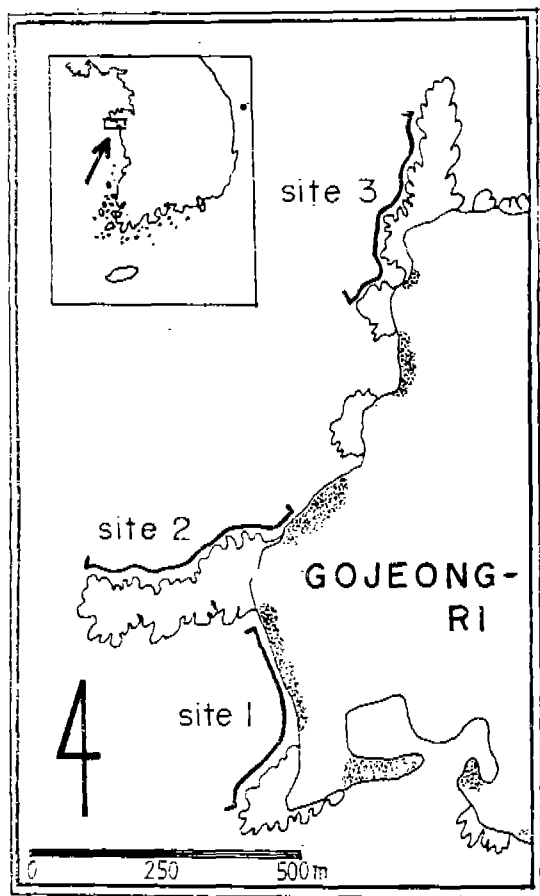


Fig. 1. Sampling sites at Gojeong-Ri.

of benthic algae, 7 species of Cyanophyta, 14 species of Rhodophyta, 6 species of Phaeophyta and 7 species of Chlorophyta, were identified. Among these, *Sirocoleum kurzii* (Cyanophyta), *Ralfsia clavata* (Phaeophyta), *Pseudovella consociata* and *Cladophora speciosa* (Chlorophyta) are recorded for the first time in Korea.

The characteristics of algal vegetations of three sampling sites (Fig. 1) are as follow. Site 1 is characterized by shallow water at ebb tide. *Gracilaria verrucosa* and *Gymnogongrus flabelliformis* grow sparsely on mud and stones. The small discoid green alga, *Pseudovella consociata* and blue-green alga, *Nostoc commune* are attached rather abundantly on pebbles. *Pelvetia siliquosa* are common at sublittoral fringe. Site 2 is characterized by flat rocks which are submerged to the sublittoral fringe. Many dwarf *Sargassum thunbergii* are observed on these rocks. *Gloiopeltis complanata*, *Cladophora conchopheria* are on hollow oyster shells and *Lyngbya gracilis* covers almost entire surface of *Sargassum thunbergii*. Site 3 is composed of steep rocks from the nearby hill. Several species of Melobesioideae, *Corallina* spp. and *Ralfsia* spp. grow sparsely on these rocks.

A List of Summer Algal Flora of Gojeong-Ri

(*new record to Korean algal flora)

CYANOPHYTA

Coccochloris stagnina Spreng 남두슬말

**Sirocoleum kurzii* (Zeller) Gomont

(Fig. 2)

Korean name: 갈래던지다발 (nom. nov.)

Habitat: Epiphytic on coralline algae mixed with mud.

Description: Plants caespitose, dirty blue-green; filaments irregularly or dichotomously branched, 35–70 μm in diam., with thick hyaline sheath; trichomes pale blue-green, 5–8.5 μm in diam., somewhat attenuate at apex, numerous (7–10) or sparse within a sheath, loosely or densely intertwined; cells 2–3.5 μm in length, 1/2–1/4 as short as diameter; apical cells obtuse conical, without calyptra.

The plant accords quite well with the description by Umezaki (1961). In a rough dirty gelatinous sheath, unbranched trichomes are intertwined each other. The trichomes are divided into two groups at branched portion, but the filaments maintain the number of trichomes by adding others or lose the number.

Lyngbya noragaardii Wille 가느랭비아

Epiphyte on *Corallina* spp.

Lyngbya gracilis (Menegh.) Rabenhorst

Covering *Sargassum thunbergii* densely. This is

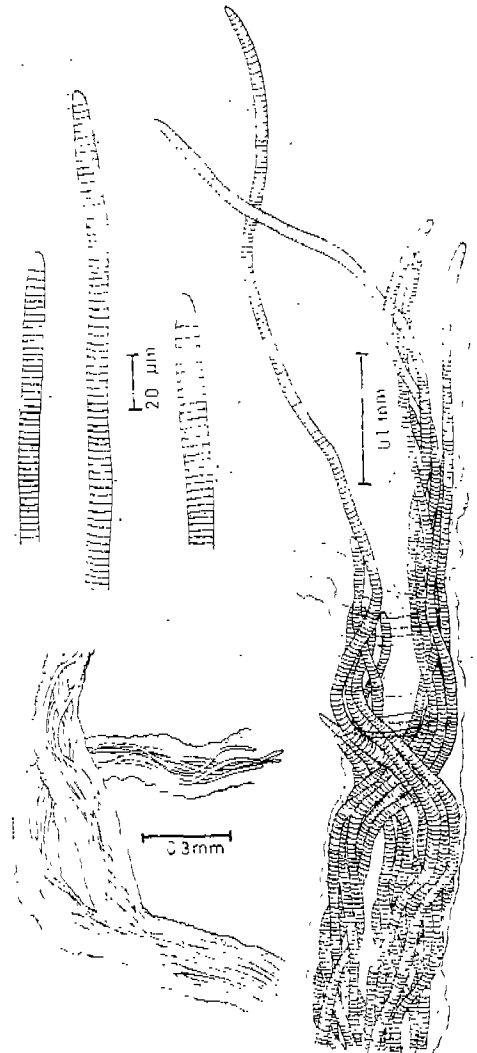


Fig. 2. *Sirocoleum kurzii* (Zeller) Gomont. Apices of trichomes (above left), detail of a filament (above right) and branched portion of a filament (below).

a dominant blue-green alga in this area. It was first recorded in Korea from Incheon Bay by Lee (1978).

Lyngbya confervoides C. Ag.-링비아

Nostoc commune Vauch. 구슬말

Calothrix pilosa Harvey 칼로트릭스

RHODOPHYTA

Goniotrichum alsidii (Zan.) Howe 마디털

Rhodochorton sp.

Immature plants.

Corallina officinalis Linné 산호말

Corallina pillulifera Post. et Rupr. 작은구슬산호말

Gloiopeltis complanata (Harv.) Yamada 애기풀가사리

Densely growing on oyster shells.

Carpopeltis affinis (Harv.) Okamura 까막살

Prionitis patens Okamura 작은톱니지누아리

Gracilaria verrucosa (Hudson) Pappenfuss 꼬시래기

Gymnogongrus flabelliformis Harvey 부켓살

Ceramium cimbricum Peterson

Chondria crassicaulis Harvey 서실

Polysiphonia codiicola Zanard.

Polysiphonia urceolata (Dillwyn) Greville 단지풀

폴리시포니아

PHAEOPHYTA

Ectocarpus sp.

Immature plants.

Ralfsia verrucosa (Aresch.) J. Ag. 바위딱지

**Ralfsia clavata* (Carm.) Crouan *sensu* Farlow

(Fig. 3)

Korean name: 흙바위딱지 (nom. nov.)

Habitat: Growing on rocks.

Description: Plants forming thin firm crust on substrata, 2-20 mm in diam., 130-150 μm thick at sterile part, 160-170 μm thick at reproductive part; vegetative cell rows 7-12 μm diam., arising straightly without clear concentric ridges, sometimes branched; cells 7-12 μm long, regular square or somewhat flattened on longitudinal plane; plurangia short, terminal, pluriseriate in 1-4 rows, 5-12 μm broad, 35-40 μm long; hairs absent.

This plant is characterized by small thin crust differing from *Ralfsia verrucosa*, the common species in Korean coast, which clearly develops

concentric ridges at the hypothallial layer. The pluriseriate plurangia accord well with the description of Setchell & Gardner (1925). The rhizoids and unangia are not observed. According to Taylor (1937), unangia are ovoid to pyriform borne on the base of the paraphyses, and 50-85 μm long and 20-32 μm in diameter.

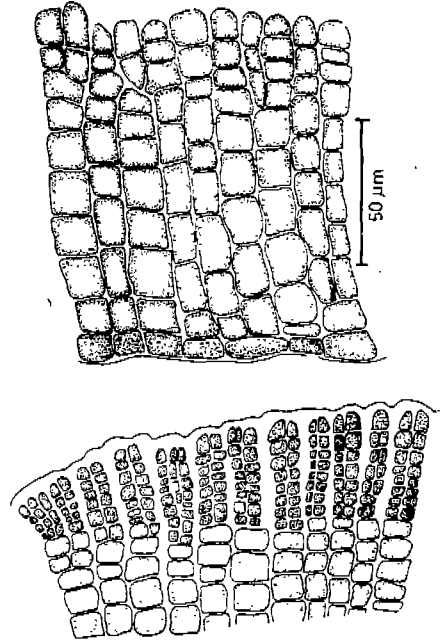


Fig. 3. *Ralfsia clavata* (Carm.) Crouan *sensu* Farlow.

Vegetative thallus (above) and plurangia (below).

Sphacelaria divaricata Mont. 갈레스파셀라리아

Pelvetia siliquosa Tseng et Chang 퉁부기

Since Okamura (1936), this plant identified to *Pelvetia wrightii* was noticed on its taxonomic character. Noda (1966) therefore gave a new name, *P. minor* for this. According to a careful observation by Yoo, Kang & Lee (unpublished data), the plants are rather small and their receptacles and vesicles are formed together at terminal 1-2 branches, and the vesicles comprise almost whole thallus in contrast to Japanese *P. wrightii*. These characters, however, accord quite well with *P. siliquosa* Tseng et Chang (1953).

Sargassum thunbergii (Mert.) Kuntze 지층이

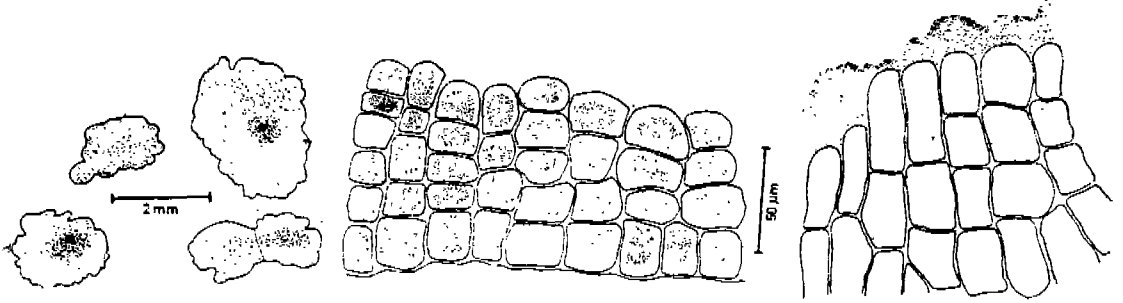


Fig. 4. *Pseudaulvella consociata* Setchell et Gardner.
Habit (left), central portion (middle) and marginal portion (right).

CHLOROPHYTA

**Pseudaulvella consociata* Setchell et Gardner
(Fig. 4)

Korean name: 녹색반점말 (nom. nov.)

Habitat: Growing on pebbles.

Description: Plants epiphytic on pebbles, irregular discoid crust, 2-5 mm diam., dark green; central portion 80-100 µm thick, with erect filaments composed of 4-6 cells, appearing parenchymatous; cells 13-27 µm diam., 20-35 µm long; marginal region with closely adjoined radiating prostrate filaments.

This plant grows on pebbles forming green dot-like crust. Compared with the description by Abbott & Hollenberg (1976), our plants are thinner with thicker erect filaments. Zoosporangia are not observed.

Chaetomorpha aerea (Dillw.) Kütz. 에기염주말
Growing on stones.

Cladophora albida Kütz. 슬클라도포라

Cladophora conchopheria Sakai

Covering shells densely.

Cladophora pusilla Sakai 에기클라도포라

**Cladophora speciosa* Sakai

(Fig. 5)

Korean name: 가늘클라도포라 (nom. nov.)

Habitat: Epiphytic on other algae, such as *Chondria crassicaulis* and *Polysiphonia* spp.

Description: Plants epiphytic on other algae, light green, soft, bushy, 1-2 cm high; rhizoid primary, descending from frond base, irregularly branched into firm, hapteron-like appearance, 6-12 µm thick, septate; main axis straight, 35-50

µm thick, composed of rather thick lateral membranes of 6-13 µm thickness; lateral branches irregularly dichotomously divided, 20-30 µm thick, 6-13 times as long as diameter; branchlets 15-20 µm thick, 130-210 µm long, dichotomously branched, with obtuse apex.

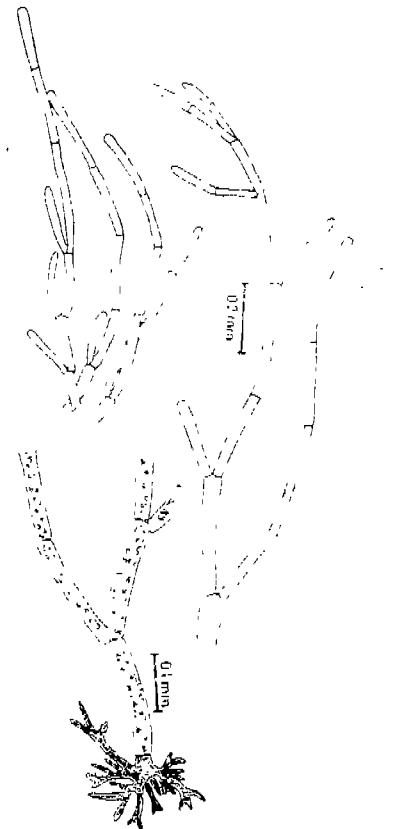


Fig. 5. *Cladophora speciosa* Sakai.
Branches (above right and left) and hapteron-like rhizoid.

This plant is very minute, characterized by the slender branches of rhizoid with dense chromatophores and slender dichotomous branches. Such characters accord well with *C. speciosa* Sakai. However, our plants are very small (1-2 cm) compared with Japanese plants (8-15 cm) mentioned in original description (Sakai, 1974). Moreover, slender branches of our plants show some similarity to those of *C. albida*. Even though such difficulties for identification, the straight branches without constriction at node and the middle insertion of branches as mentioned by Sakai lead the authors to identify this plant to *C. speciosa*. Some further observation on reproduction will be helpful for clarification of our plants more precisely.

Enteromorpha sp.

Immature plants.

DISCUSSION

Gojeong-Ri is characterized by the dominancy of tiny algae such as *Pseudullvela consociata*, *Chaetomorpha aerea*, *Cladophora* spp. and *Ralfsia* spp. The abundance of blue-green algae may be caused by their resistance to the long dry condition created by shallow water (Odum, 1967). The benthic algal vegetation of the west coast of Korea is generally considered poor compared with the other coasts (Kang, 1966; Lee, 1971). Kang points out that shallow water affected directly by the climates and large reclaimed beach are unfavorable for the algal habitat, and Lee explains the reason with muddy substrata common along the west coast caused by Yellow River from China. Lee & Yoo (1978), however, show some fertile algal flora in the outer islands far from the coastal region.

According to Lee & Yoo (1978), Gyeogryeolbi Islands, located on north to Gojeong-Ri, is the northern limit of the South Coast Section by Kang (1966), considering algal vegetation. But Gojeong-Ri shows some typical floristic characters of the West Coast Section by poor vegetation, sparse growth of *Gymnogongrus flabelliformis* and *Corallina* spp., and dwarf ecotype of habitants, as shown in

Gyeonggi Bay (Lee, H. B. & Lee, I. K. unpublished data). Thus, it can be considered that the northern limit of the South Coast Section will be somewhat below in coastal area than Gyeogryeolbi Islands, although the Section will extends up to the Islands in off-shore area.

As the present investigation is limited to the late summer flora, some long term survey will be necessary to clarify the whole flora and ecological characters as well as the distribution of the algae in this area.

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摘 要

火力發電所 예정지역의 海洋生態學的 기초조사의 일환으로서, 忠淸南道 高亭里의 海藻相을 1978년 8월~9월에 조사하였다. 高亭里의 海藻植生은 매우 빈약하며, 西海岸區域(姜, 1966)에 속하는 特徵을 나타내었다. 조사 결과, 藍藻 7種, 紅藻 14種, 褐藻 6種, 綠藻 7種, 총 34種의 生育海藻目錄이 밝혀졌으며, 이 중 *Sirocoleum kurzii*(藍藻), *Ralfsia clavata*(褐藻), *Pseudullvela consociata*와 *Cladophora speciosa*(綠藻) 등 4種은 우리나라에서 그 生育이 처음으로 알려졌다.

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