1972

A taxonomic study of the marine algae of Netarts Bay, Oregon

Charles Jerome Kunert
Portland State University

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AN ABSTRACT OF THE THESIS OF Charles Jerome Kunert for the
Master of Science in Biology presented July 1, 1972.

Title: A Taxonomic Study of the Marine Algae of Netarts
Bay, Oregon.

APPROVED BY MEMBERS OF THE THESIS COMMITTEE:

Dr. B. E. Lippert, Chairman

Dr. Robert Quinn

Dr. ~~Hester J.~~ Newman

Gathering taxonomic data is fundamental to any biological or ecological research. It was the intent of this paper to increase the storehouse of taxonomic information by studying the marine algae of one section of the Oregon coastline. Netarts Bay was chosen because of its accessibility and generally primitive nature. It is in an area of Oregon largely untouched by phycologists and so offered an opportunity for original research.

Techniques of collecting and preserving specimens were kept as simple as possible, thus allowing a proportionately greater amount of the available time to be spent in the classification of the organisms. The body

of this paper is, therefore, an annotated list of the algae collected and identified. A total of 78 species were identified, the majority belonging to the division Rhodophyta (45 of the 78). An effort was made in collecting to be as thorough as possible. Algae ranging in habitat all the way from the spray zone to the depths of Netarts Bay were included. However, while the collection is comprehensive, because of the great size of the Bay it is undoubtedly incomplete. Only further research can identify which algae have been overlooked or omitted.

Photographs are in evidence throughout much of the text. It is hoped that they will illustrate some of the forms which might be found only in this region and also, as accurately as possible, to aid in the identification of species elsewhere.

A TAXONOMIC STUDY OF THE MARINE ALGAE
OF NETARTS BAY, OREGON

by
CHARLES JEROME KUNERT

A thesis submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE
in
BIOLOGY

Portland State University
1972

TO THE OFFICE OF GRADUATE STUDIES:

The members of the Committee approve the thesis of
Charles Jerome Kunert presented July 1, 1972.

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PREFACE

In the realm of taxonomic literature dealing with marine algae, there is a virtual dearth of literature concerning the northern Oregon coast. Although the Pacific coastline is fairly well represented in the literature for most of its length from Alaska to Mexico, the northern Oregon coast has been relatively untouched by phycologists to date. Setchell and Gardner (1903, 1919-1920, 1933, 1937), in their pioneering work, did cover the entire Pacific Coast of North America, but made few references to the northern Oregon beaches in specific. Alaska, British Columbia, and Washington have been covered by Kylin (1925) and Scagel (1957, 1966, 1967) who is currently working primarily with the Phaeophyta and Rhodophyta of this region. Doty (1947a, 1947b) and his colleagues from the University of Oregon Marine Biological Station at Charleston, Oregon have covered the southern Oregon coast. Smith (1944) thoroughly covered the Monterey Peninsula region of California, and was followed by Hollenberg and Abbott (1965, 1968) in this area. Abbott (1961, 1965, 1967, 1968, 1969) has concentrated her efforts around the Hopkins Marine Station, Pacific Grove, California, while Hollenberg (1943, 1944, 1945, 1961) worked largely in California and Mexico. Mexico also was extensively covered

ACKNOWLEDGMENTS

The author takes this opportunity to acknowledge with much gratefulness the help of Dr. B. E. Lippert in directing my first feeble efforts in this work, the help of Dr. Isabella Abbott in identifying certain very troublesome specimens, Mr. Roy Derickson in photographic assistance, and my wife, Pat, for enduring my many trips to the coast and long hours away from home while completing my research and paper.

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CHAPTER I

GEOGRAPHIC FEATURES AND TOPOGRAPHY OF THE NETARTS BAY, OREGON REGION

Netarts Bay is located on the northern Oregon coast, some seven miles west of the town of Tillamook. The Bay is bounded to the north by the projection of Cape Meares into the Pacific Ocean, and to the south by Cape Lookout. The western shore of the Bay is a long, narrow wedge of sand spit which runs along a north-south path and forms the mouth of the Bay where it approaches the land in the area just north of the town of Netarts. The eastern shoreline is largely the last vestiges of the Coast Range undulating down to the ocean.

Netarts Bay is a very shallow bay, and much of it is exposed at low tide. The southern half of Netarts Bay is composed of silt deposition and is very muddy. Travel by foot in this area of the Bay is very difficult due to the soft nature of the mud. The western region, as well as that of the northern half of the Bay is largely sand, with the eastern shore sand and natural rocks. Only a narrow channel is open to navigation at low tide.

The area around Netarts Bay is largely undeveloped, and pollution characteristic of other estuarine areas

along the coast is, for the most part, absent. The only inroads into the ecological balance of the Bay have come as a result of the retaining wall built along the eastern shore, and the boat jetties constructed south of the town of Netarts. Both of these features are constructed of large basaltic rocks which have been hauled into the area. These rocks are not native to this region, although the Bay is couched between two lava flows which form Cape Meares and Cape Lookout.

Twelve separate streams bring fresh water into the Bay, thus creating special habitat problems for organisms living in the immediate vicinity of the flow of these streams into the salt water of the Bay. These areas were found to have their own peculiar types of marine flora.

Collecting stations were chosen by the author to cover all of the various topographical factors which might influence the type of algae found in the area. Six large collecting stations were set up as follows: Zone 1: The extreme northern shore of the Bay, immediately in front of the town of Netarts, and stretching from the area just north of the boat jetties to Fall Creek. This area is characterized by native rocks approximately 5 to 30 cm. in diameter buried in sand. Many clam-diggers frequent this region, and hence there is much turnover of the rock and sand. Zone 2: The rocks that form the boat jetties. These rocks were evidently placed here some eight years

ago, and since that time have been repopulated by a large variety of algal types. This area and Zone 1 possess the greatest variety of algal species. Zone 3: The rocks which form the retaining wall running from the boat jetties to Whiskey Creek. During the winter months, the rocks in this area were found to be largely barren.

Zone 4: The extreme southeastern shore of the Bay. This is an area of much mud, fallen logs, and grass running into the Bay proper. Zone 5: The southwestern shore of the Bay, running from Cape Lookout State Park to two miles out on the spit. It is similar in edaphic factors to Zone 4, but has a different exposure to the sun.

Zone 6: The northern tip of the sand spit. This area is almost entirely exposed at low tide, and is formed of sand brought out of the Pacific by wave action and wind. Very few natural rocks occur in this region.

Because of the sand spit, wave action is quite limited in Netarts Bay itself. Only in the most ferocious winter storms do waves reach a size which would affect the flora on the rocks along the eastern shore. The western shore is protected from wave action because the prevailing winds are westerly, and the sand spit blocks them effectively.

If one were to characterize the Bay in terms of its variety of algal life, one would have to conclude that for the most part Netarts Bay is fairly desolate.

The muddy south end of the Bay is largely covered by mats of Rhizoclonium, while Fucus predominates along the shoreline. The sandy areas of the Bay are usually heavily populated with Porphyra, Ulva, Enteromorpha, and Blidingia which may float into the region. The rocky areas of the Bay, especially in Zones 1 and 2, are the most heavily populated areas in terms of variety of species, with Laminaria, Sargassum, and Ulva along with several species of Gigartina being the dominants.

Figure 1. Topographical map of the Netarts Bay area showing collecting sites as Zone 1, Zone 2, etc. (Photograph of U.S. Geological Survey Map).

CHAPTER II

MATERIALS AND METHODS

I. COLLECTING

An attempt was made to reach each of the different collecting stations once during each of the seasons from winter to summer. Hence three complete circuits of the Bay were made during the collecting trips.

The collection procedure followed in pursuit of these algae involved a fairly simple and unsophisticated approach. The collector and any assistants started at one end of a collecting station and systematically combed the station, both in the water and on the beach area for any new specimens. All collections were performed from one hour before to one hour after low tide. Specimens were placed in collection jars numbered with an identifying number for future reference. Notations were made in a collection booklet for each number entered including location, physical surroundings, edaphic factors, biotic surroundings, frequency, color, size, and other pertinent information.

II. PRESERVATION

Two basic types of preservation methods were

attempted in this research: wet and dry. The wet preservation involved the use of 10% formalin in sea water. FAA was utilized as a preservative, but was found to be much too caustic, especially on the Rhodophyta. With FAA all color was gone from specimens within one day, while 10% formalin was found to preserve texture and color indefinitely if the specimen was not placed in the sun or any source of heat or light other than the sun. The dry preservation method involved placing specimens on regular grade student herbarium mounting paper (obtained from the Carolina Biological Supply Co.). The initial mounting was done under water, where fragile specimens could be manipulated with a camel hair brush and arranged properly on the herbarium paper. These were then placed under a layer of single thickness cheesecloth, put between two blotters and two pieces of corrugated cardboard, and pressed in an herbarium press. The blotters were replaced with fresh ones once every 24 hours for three days. Usually the algae will stick well to the herbarium paper due to the glue-like mucilage which permeates most algal tissues, but in cases where they did not or where the specimen was particularly fragile, Archer's Adhesive was used to permanently mount them to the sheet.

Of the two methods, the latter is better for display purposes and shows the general shape of the alga,

whereas the former method is better in cases where microscopic studies are necessary to reveal the true identity of the species.

III. IDENTIFICATION

Identification was carried out through various keys, but principally through several very helpful references. These included Setchell and Gardner (1920) for the Chlorophyta and Phaeophyta, Smith (1944) for all the Rhodophyta in particular, and Scagel (1966). Nomenclature utilized is that of Hollenberg and Abbett in their revision of Smith's work on the Monterey Peninsula.

IV. ILLUSTRATIONS

Microphotographs found in this manuscript were taken on a Carl Zeiss phase-plane objective microscope. Kodak Panatomic-X and Verichrome Pan films were utilized in a Rada microscope camera attachment. All specimens were compared to a Bausch and Lomb optical micrometer for size checks.

Full size illustrations were photographed with a Praktica Nova B and Tri-X Pan film.

TABLE I
DISTRIBUTION OF SPECIES AT
COLLECTING STATIONS IN
NETARTS BAY
1971

Algal Species	Zones					
	1	2	3	4	5	6
CHLOROPHYTA						
Rhizoclonium implexum			x			
Rhizoclonium tortuosum	x	x		x	x	
Cladophora ovoidea			x			
Cladophora flexuosa		x				
Cladophora gracilis				x		
Cladophora bertolonii						
v. hamosa				x	x	
Cladophora glaucescens		x	x			
Spongomorpha spinescens		x				
Monostroma zostericola			x			
Monostroma oxyspermum				x		
Blidingia minima v. minima	x		x	x	x	
Blidingia minima v. subsalsa				x	x	
Enteromorpha linza	x	x			x	
Enteromorpha intestinalis						
v. clavata			x			
Enteromorpha prolifera		x				x
Enteromorpha tubulosa			x			
Enteromorpha flexuosa			x	x		
Ulva angusta			x	x		
Ulva fenestrata	x	x	x	x	x	
Ulva expansa				x		x
Ulva rigida		x				
Ulva stenophylla	x	x				
Ulva vexata		x				
Ulva dactylifera		x				
Ulothrix implexa			x			
PHAEOPHYTA						
Ectocarpus variabilis			x			
Ectocarpus confervoides						
v. confervoides	x		x		x	
Phaeostrophion irregulare	x		x			
Desmerestia munda	x	x				
Desmerestia herbacea	x	x				
Laminaria saccharina						
v. saccharina	x	x				
Sargassum muticum	x	x			x	
Fucus gardneri v. abbreviatus				x	x	

TABLE I Continued

Algal Species	Zones					
	1	2	3	4	5	6
RHODOPHYTA						
<i>Bangia vermicularis</i>		x				
<i>Smithora naiadum</i>	x		x			
<i>Porphyra perforata</i>		x			x	x
<i>Porphyra lanceolata</i>	x					
<i>Cryptosiphonia woodii</i>	x	x	x	x		
<i>Lithothamnion californicum</i>		x				
<i>Dermatolithon dispar</i>	x					
<i>Corallina officinalis</i>						
<i>v. chilensis</i>	x					
<i>Prionitis lanceolata</i>						x
<i>Prionitis andersonii</i>	x	x				
<i>Callophyllis oregona</i>	x					
<i>Gracilariopsis sjoestedtii</i>	x	x			x	
<i>Ahnfeltia plicata</i>	x	x				
<i>Ahnfeltia concinna</i>	x					
<i>Gymnogongrus leptophyllus</i>				x	x	
<i>Gigartina cristata</i>		x				
<i>Gigartina exasperata</i>	x		x	x	x	
<i>Gigartina californica</i>	x		x			
<i>Gigartina papillata</i>		x				
<i>Gigartina volans</i>		x	x			
<i>Gigartina harveyana</i>		x				
<i>Rhodoglossum affine</i>			x			
<i>Iridaea heterocarpa</i>		x				
<i>Iridaea lineare</i>		x				
<i>Iridaea cordata</i>	x	x	x			
<i>Iridaea whidbeyana</i>		x				
<i>Plocamium coccineum</i>						
<i>v. pacificum</i>	x					x
<i>Antithamnion kylinii</i>	x					
<i>Platythamnion villosum</i>				x		
<i>Microcladia coulteri</i>	x	x				x
<i>Microcladia borealis</i>						x
<i>Ptilota hypnoides</i>	x					
<i>Ptilota filicina</i>	x	x				
<i>Polyneura latissima</i>		x				
<i>Hymenena setchellii</i>	x					
<i>Hymenena flabelligera</i>	x	x				
<i>Hymenena kylinii</i>	x					
<i>Polysiphonia pacifica</i>	x					
<i>Polysiphonia dictyurus</i>			x			
<i>Polysiphonia paniculata</i>	x		x		x	
<i>Polysiphonia collinsii</i>	x	x	x		x	
<i>Pterosiphonia dendroidea</i>	x	x				

TABLE I Continued

Algal Species	Zones					
	1	2	3	4	5	6
<i>Odonthallia floccosa</i>	x	x	x			
<i>Odonthallia oregona</i>		x				
<i>Laurencia spectabilis</i>	x					

CHAPTER III

AN ANNOTATED LIST OF THE MARINE ALGAE OF NETARTS BAY, OREGON

I. DIVISION: CHLOROPHYTA

Class: Chlorophyceae

Order: Cladophorales

Rhizoclonium Kuetz.

Key to the Species

- Filaments soft, forming fleecy masses on mud, 20-30 μ in diameter, segments about 2 times as long as broad Rhizoclonium implexum(1)
Filaments rigid, contorted, dark green, forming rope-like entangled masses on mud or sand, 50-80 μ in diameter, segments 1-2 times as long as broad, occasionally longer Rhizoclonium tortuosum(2)

(1) Rhizoclonium implexum (Dillw.) Kuetz.

On mud in zone 3. Collected only June 29.
Setchell and Gardner (1920), p. 183.
Collection number: 173

(2) Rhizoclonium tortuosum (Dillw.) Kuetz.

Fig. 2.

Very common throughout the range, sometimes covering most of the mudflats at the south end of Netarts Bay.
Setchell and Gardner (1920), p. 185.
Collection numbers: 13, 42, 50, 60, 74, 87.

Cladophora Kuetz.

Key to the Species

1. Filaments containing both cylindrical and barrel shaped segments in the same filament . . . Cladophora ovoidea(1)
1. Filaments with similar shaped segments throughout . 2.
2. Main filaments distinctly flexuous Cladophora flexuosa(2)
2. Main filaments essentially straight 3.

Figure 2. Rhizoclonium tortuosum. (10x)

3. Main filaments coarse, up to 150μ Cladophora gracilis(3)
 3. Main filaments slender, not over 80μ 4.
 4. Ramuli curved Cladophora bertolonii v. hamosa(4)
 4. Ramuli straight Cladophora glaucescens(5)

(1) Cladophora ovoidea Kuetz.

In slightly erect tufts attached to rocks in mud.
 Collected only on July 12.
 Setchell and Gardner (1920), p. 214.
 Collection number: 211.

(2) Cladophora flexuosa (Griff.) Harv.

In association with Polysiphonia collinsii on rocks
 in the upper littoral zone around the boat jetty. Col-
 lected only March 13. Collection number: 46.
 Setchell and Gardner (1920), p. 217.

(3) Cladophora gracilis (Griff.) Kuetz.

In tufts on rocks in the mudflats of zone 4. Ident-
 ified by Dr. Isabella Abbott.
 Setchell and Gardner (1920), p. 216.
 Collection number: 171.

(4) Cladophora bertolonii v. hamosa (Kuetz.) Ardiss

Fig. 3.

Forming a reddish-brown mat (when dry) on the upper surface of the banks of the south end of the Bay in zone 4 and 5. At about + 3.0'. Very abundant.
 Setchell and Gardner (1920), p. 218.
 Collection numbers: 48, 80.

Figure 3. Cladophora bertelonii v. hamosa. (10x)

- (5) Cladophora glaucescens (Griff.) Harv. Fig. 4.
 Epiphytic on Zostera, forming loosely tufted yellow-green masses. Collected June 29 and July 12.
 Setchell and Gardner (1920), p. 219.
 Collection numbers: 169, 203.

Spongomorpha spinescens Kuetz.
 In erect tufts at -1.0'. Green and entangled.
 Collected only June 12 near the boat jetty.
 Setchell and Gardner (1920), p. 229.
 Collection number: 144.

Order: Ulvales

Monostroma Thur.

Key to the Species

Epiphytic on Zostera Monostroma zostericola(1)

Figure 4. Cladophora glaucescens. (10x)

Growing on rocks or free-floating
 Monostroma oxyspermum(2)

- (1) Monostroma zostericola Tilden Fig. 5.
 Growing on Zostera along with Smithora naiadum and
 two species of Ectocarpus. To a height of 4 cm. Col-
 lected only June 29.
 Setchell and Gardner (1920), p. 238.
 Collection number: 163.

- (2) Monostroma oxyspermum (Kuetz.) Doty Fig. 6.
 Growing on rocks or free-floating in a fresh-water
 stream that would be covered at high tide with salt water.
 Collected in zone 4 on March 21.
 Setchell and Gardner (1920), p. 240-241.
 Scagel (1966), p. 39.
 Collection numbers: 61, 62, 67.

Blidingia Kylin

Key to the Varieties

- Frond tubular, unbranching. Blidingia minima v. minima(1)
 Frond branching Blidingia minima v. subsalsa (2)

- Blidingia minima (Nägeli) Kylin v. minima Fig. 7.
 Common throughout the Bay at upper littoral to lower

Figure 5. Monostroma zostericola, showing a surface view of the thallus. (40x)

Figure 6. Monostroma oxyspermum, showing a surface view of the thallus. (40x)

inter-tidal zone, attached to rocks or logs in sand or mud.
Setchell and Gardner (1920), p. 249-250.

Scagel (1966), p. 42-43.

Collection numbers: 9, 11, 59, 64, 65, 66, 92, 93, 165.

Figure 7. Blidingia minima v. minima, showing a surface view of the thallus. (97x)

- (2) Blidingia minima v. subsalsa (Kjellman) Scagel
Common in the muddy regions of zones 4 and 5, exposed at low tide.
Setchell and Gardner, (1920), p. 249.
Scagel (1966), p. 43.
Collection numbers: 63, 84.

Enteromorpha Link

Key to the Species

1. Frond distinctly compressed into a lanceolate blade Enteromorpha linza(1)
1. Frond remaining tubular throughout, even though it may be compressed to some degree 2.
2. Cells arranged in longitudinal rows in much of the frond 3.
2. Cells not arranged in longitudinal rows except at times in the very youngest parts of the frond Enteromorpha intestinalis v. clavata(2)
3. Fronds proliferous Enteromorpha prolifera(3)
3. Fronds not proliferous 4.

4. Fronds coarse, plainly tubular, of evident numerous longitudinal rows . Enteromorpha tubulosa(4)
 4. Fronds simple, inflated, and flexuous
 Enteromorpha flexuosa(5)

- (1) Enteromorpha linza (Linnaeus) J. Agardh
 Common throughout the Bay attached to rocks in the intertidal zone.
 Setchell and Gardner (1920), p. 262.
 Seagel (1966), p. 52.
 Collection numbers: 5, 78, 107, 108, 146.
- (2) Enteromorpha intestinalis v. clavata J. Agardh
 Attached to rocks at -1.0' in zone 3. Collected only June 29.
 Setchell and Gardner (1920), p. 253.
 Seagel (1966), p. 50.
 Collection number: 154.
- (3) Enteromorpha prolifera (Müller) J. Agardh Fig. 8 + 9.
 Attached to rocks or sand at +1.0 to +3.0', forming green mats over large areas of exposed sand, especially in the protected cove formed by the boat jetty. Present during the summer months only.
 Setchell and Gardner (1920), p. 254.
 Collection numbers: 121, 147, 174.

Figure 8. Enteromorpha prolifera, showing a surface view of the thallus. (40x)

Herbarium of No. 121

Technical Name ENTEROMORPHA PROLIFERA (MUELL.) J. AG.

Common Name GREEN CONFETTI

Family ULVACEAE

Locality NETARTS BAY, OREGON

Date JUNE 12, 1971

Altitude + 3.0 FOOT

Habitat ATTACHED TO

Collected by C. J. KUNERT

A ROCK.

Identified by C. J. KUNERT

KUNERT Lab., Bradport, Pa.

Figure 9. *Enteromorpha prolifera*. (1/2x)

(4) Enteromorpha tubulosa Kuetz.

Attached to rocks at -1.0' in zone 3. Collected only June 29.

Setchell and Gardner (1920), p. 256.

Scagel, (1966), p. 56.

Collection number: 155.

(5) Enteromorpha flexuosa (Wulf.) J. Agardh

On rocks and logs of the intertidal zone.

Setchell and Gardner (1920), p. 255.

Collection number: 58, 160.

Ulva Thuret

Key to the Species

1. Cells square in cross section, frond narrowly lanceolate Ulva angusta(1)
1. Cells rectangular in cross section 2.
 2. Frond broad in proportion to height 3.
 2. Frond narrow in proportion to height 5.
3. Frond with regular, abundant perforations Ulva fenestrata(2)
3. Frond with a few irregular holes or none at all . . 4.
 4. Frond short, lanceolate to ovate, usually split deeply Ulva rigida(3)
 4. Frond large and expanded with ruffled edges Ulva expansa(4)
5. Frond long, simple, and much ruffled Ulva stenophylla(5)
5. Frond very short, simple, plane Ulva vexata(6)
5. Frond divided into long strips borne on a short, broad basal portion Ulva dactylifera(7)

(1) Ulva angusta Setchell and Gardner Fig. 10.

Attached to rocks by a very short, solid stipe and a minute disc-shaped holdfast at -1.0' in zones 3 and 4. Very common in places.

Setchell and Gardner (1920), p. 264.

Collection numbers: 53, 158.

(2) Ulva fenestrata Postels and Ruprecht Fig. 11.

Common throughout the Bay attached to rocks or free-floating. Reaches lengths of more than 1 meter, and is very variable in shape.

At times this species is difficult to distinguish from Ulva expansa because of the arbitrary nature of the classification scheme. It may at times be difficult to decide whether holes are "regular" or not.

Setchell and Gardner (1920), p. 267.

Scagel (1966), p. 59.

Collection numbers: 26, 54, 88, 123, 153, 189.

Herbarium of

No. 124

Technical Name ULVA ANGUSTA SETINELL AND GARDNER

Common Name SEA LETTUCE

Family ULVACEAE

Locality NETARTS BAY, OREGON

Date JUNE 12, 1971

Altitude -2.0 FOOT

Habitat ATTACHED TO
ROCKS.

Collected by C.J. KUNSBAT

Identified by C.J. KUNSBAT

McCormick Lab. Bradford, Pa.

Figure 10. Ulva angusta. (1/2x)

Herbarium of	No. 88
Technical Name	<u>ULVA FENESTRATA</u> P. and R.
Common Name	SEA LETTUCE
Family	ULVACEAE
Locality	NESTARS BAY, OREGON
Altitude	ABOVE HIGH TIDE IN POOL
Collected by	C.J.K.
Identified by	C.J.K.
Date	5/1/71
Habitat	FREE FLOATING

Figure 11. Ulva fenestrata. (1/2x)

(3) Ulva rigida C. Agardh

Attached to rocks from the sublittoral. Collected by Paul Bethke while skin-diving near the boat jetties. Collected March 13.

Setchell and Gardner (1920), p. 269.

Scagel (1966), p. 61.

Collection number: 45.

(4) Ulva expansa (Setchell) Setchell and Gardner

Attached to exposed mud or sand at low tide or free-floating. Not common.

Setchell and Gardner (1920), p. 268.

Scagel (1966), p. 58.

Collection numbers: 36, 69.

(5) Ulva stenophylla Setchell and Gardner Fig. 12.

Very common attached to rocks in the high subtidal to low intertidal zone in zones 1 and 2. Some reaching a length of 1.5 meters.

Setchell and Gardner (1920), p. 271.

Collection numbers: 100, 129.

(6) Ulva vexata Setchell and Gardner

Isolated example found January 22 near the boat jetties on high intertidal rocks.

Setchell and Gardner (1920), p. 271.

Collection number: 1.

(7) Ulva dactylifera Setchell and Gardner

At times abundant attached to rocks in the high intertidal zone near the boat jetties. Collected March 13.

Setchell and Gardner (1920), p. 272.

Collection numbers: 39, 40.

Order: Ulotrichales

Ulothrix implexa Kützinger

On bridge pilings, forming a bright green layer. Collected February 20.

Setchell and Gardner (1920), p. 283.

Scagel (1966), p. 28.

Collection number: 30.

Herbarium of No. 100

Technical Name ULVA STENOPHYLLA S. AND G.

Common Name SEA LETTUCE

Family ULVACEAE

Locality NETARTS BAY, OREGON

Altitude -1.6'

Collected by C.J. KUNERT

Identified by C.J. KUNERT

Date MAY 25, 1971

Habitat FREE FLOATING
OR ATTACHED TO
EXPOSED SAND.

McGraw-Hill, Bradford, Pa.

Figure 12. *Ulva stenophylla*. (1/2x)

II. DIVISION: PHAEOPHYTA

Class: Isogeneratae

Order: Ectocarpales

Ectocarpus Lyngbye

Key to the Species

Gametangia regularly over 100 μ in length
 Ectocarpus variabilis(1)
 Gametangia less than 100 μ in length
 Ectocarpus confervoides v. confervoides(2)

(1) Ectocarpus variabilis (Saunders) G. M. Smith

Figs. 13 + 14.

Epiphytic on Zostera. Collected June 29.

Setchell and Gardner, (1920), p. 413.

Smith, (1944), p. 85.

Collection number: 163.

Figure 13. Ectocarpus variabilis, showing branching of filaments and plurilocular gametangia. (10x)

(2) Ectocarpus confervoides v. confervoides (Roth) LeJolis

Fig. 15.

Epiphytic on Zostera and Desmerestia.

Figure 14. Ectocarpus variabilis, showing an enlargement of a plurilocular gametangium and a portion of the filament. (40x)

Setchell and Gardner (1920), p. 414.

Scagel (1957), p. 68.

Collection numbers: 109, 179.

Class: Heterogeneratae

Order: Punctariales

Phaeostrophion irregulare Setchell and Gardner

Common in zones 1 and 3 on rocks at -0.5'. Usually in bunches, and rarely exceeding 4 cm. in height.

Setchell and Gardner (1920), p. 586.

Hollenberg and Abbott (1966), p. 23.

Collection number: 172.

Order: Desmerestiales

Desmerestia Lamouroux

Key to the Species

Fronds more than 3.0 meters long and 4-10 cm. wide Desmerestia munda(1)

 Fronds less than 1.0 meter long and 1-2 cm. wide
 Desmerestia herbacea(2)

Figure 15. Ectocarpus confervoides v. confervoides, showing the branching of the filaments. (10x)

- (1) Desmerestia munda Setchell and Gardner Fig. 16.
 Common throughout the Bay, attached to rocks and shells, but especially frequent in zones at the northeast edge of the Bay.
 Setchell and Gardner (1920), p. 567.
 Smith, (1944), p. 121
 Collection numbers: 110, 122.
- (2) Desmerestia herbacea (Turner) Lamoureux Fig. 17.
 Rare attached to rocks at -3.0'.
 Setchell and Gardner (1920), p. 566.
 Smith (1944), p. 121.
 Collection numbers: 104, 204.

Order: Laminariales

Laminaria saccharina v. saccharina (Linnaeus) Lamoureux
 Common attached to rocks at -1.0 to -4.0'. Some fronds have evident bullations, while others lack them entirely. To a length of 3.0 meters.
 Setchell and Gardner (1920), p. 595.
 Scagel (1957), p. 97.
 Collection numbers: 95, 101, 116, 125.

Figure 16. *Desmarestia munda*. ($\frac{1}{2}x$)

Herbarium of No 204

Technical Name DESMERESTIA HERBACEA (TURNER) LANDOUR
 Common Name WIDE-BRANCHED COLOR CHANGER
 Family DESMERESTIACEAE
 Locality NETARTS BAY, OREGON Date JULY 12, 1971
 Altitude -3.0' Habitat ATTACHED
 Collected by C.J. KUNERT TO ROCKS.
 Identified by C.J. KUNERT

McCurt Labell, Bradford, Pa.

Figure 17. Desmerestia herbacea. ($\frac{1}{2}x$)

Class: Cyclosporeae

Order: Fuciales

Sargassum muticum (Yendo) Fensholt Fig. 18.
Extremely common along the east shore of the Bay
from -1.0 to -20'. To a length of 3 meters.
Scagel (1967), p. 164.
Collection numbers: 41, 44, 76, 106.

Fucus gardneri v. abbreviatus (Gardner) Scagel
Very common at +1.0 to +3.0' in mudflats of zones
4 and 5.
Setchell and Gardner (1920), p. 672.
Scagel (1957), p. 116.
Collection numbers: 56, 81.

III. DIVISION: RHODOPHYTA

Class: Rhodophyceae

Order: Bangiales

Bangia vermicularis Harvey Figs. 19 + 20.
Forming a thin green to rusty brown scum on high
intertidal rocks. Thalli increasing in size as the year
progresses. To 1 cm. during February and up to 5 cm.
during June.
Smith (1944), p. 167.
Collection numbers: 23, 149, 150.

Smithora naiadum (Anderson) Hollenberg Fig. 21.
Frequently occurring and epiphytic on Zostera and
Phyllospadix. Collected June 29 and July 9.
Smith (1944), p. 169.
Hollenberg and Abbett (1966), p. 37.
Scagel (1957), p. 129.
Collection numbers: 163, 188.

Porphyra C. A. Agardh

Key to the Species

Frond much expanded, of irregular shape
. Porphyra perforata(1)
Frond linear-lanceolate in shape . Porphyra lanceolata(2)

(1) Porphyra perforata J. G. Agardh

Common throughout the range attached to rocks, sand,
or free-floating, but especially common in zones 5 and 6.

Figure 18. Sargassum muticum. ($\frac{1}{2}x$)

Figure 19. Bangia vermicularis, showing uniseriate upper portion of the thallus. (10x)

Figure 20. Bangia vermicularis, showing corticated lower portion of the thallus. (40x)

Smith (1944), p. 172.
Collection numbers: 38, 70, 77.

Figure 21. Smithora naiadum. Surface view of the thallus. (40x)

(2) Porphyra lanceolata (Setchell and Hus) Smith Fig. 22.

Very common during July, found washed ashore in zone 1. Otherwise not collected. Some take on a very bright red to red-orange coloration.

Smith (1944), p. 170.

Collection number: 186.

Order: Cryptonemiales

Cryptosiphonia woodii J. G. Agardh

Fig. 23.

Common throughout the Bay on rocks and logs in the low intertidal to high littoral zones.

Smith (1944), p. 200.

Collection numbers: 6, 29, 35, 131, 140, 168.

Lithothamnion californicum Foslie

Common during summer months on rocks at -2.0 to -4.0', forming a thick whitish-pink calcareous layer.

Smith (1944), p. 221.

Collection number: 199.

Dermatolithon dispar (Foslie) Foslie

Common epiphytic on Ahnfeltia, forming a calcareous tube which surrounds many of the branches.

Smith (1944), p. 225.

Hollenberg and Abbott (1966), p. 61.

Collection number: 187.

Herbarium of	No. 186
Technical Name	<i>PORPHYRA LANCEOLATA</i> (SETCHELL AND
Common Name	RED TADPOLE LAYER HUS) SMITH.
Family	BANGIACEAE
Locality	NETHATS BAY, DAEGUN
Altitude	HIGH TIDE MARK
Collected by	C. J. KUNERT
Identified by	C. J. KUNERT
Date	JULY 9, 1971
Habitat	RESTING ON
	ROCKS ALONG THE
	HIGH TIDE MARK.

Figure 22. *Porphyra lanceolata*. (1/2x)

Herbarium of No. 35

Technical Name CRYPTOSIPHONIA WOODII J.G. AGARDH

Common Name

Family DHAMNIDIACEAE

Locality NETARTS BAY, OREGON

Date FEB. 20, 1971

Altitude + 1.0 FEET

Habitat ON LOGS IN

Collected by C.J. KUNERT

TIDE FLATS

Identified by C.J. KUNERT

McGraw-Hill, Bradford, Pa.

Figure 23. Cryptosiphonia woodii. ($\frac{1}{x}$)

Corallina officinalis v. chilensis (Harvey) Kützinger
 Only one specimen collected. Very few coralline
 algae are to be found in the quiet waters of Netarts
 Bay. Collected July 9.
 Smith (1944), p. 230.
 Scagel (1957), p. 156.
 Collection number: 191.

Prionitis J. G. Agardh

Key to the Species

Branches 2.5-5 mm. broad, linear. Prionitis lanceolata(1)
 Branches to 20 mm. broad, lanceolate
 Prionitis andersonii(2)

(1) Prionitis lanceolata Harvey
 An isolated specimen cast ashore. Collected June
 30.
 Smith (1944), p. 246.
 Collection number: 176.

(2) Prionitis andersonii Eaton Fig. 24.
 Common in zones 1 and 2 attached to rocks at -1.0
 to -3.0'.
 Smith (1944), p. 246.
 Collection number: 111, 135, 200.

Callophyllis oregana Doty
 Infrequent on rocks in the intertidal to littoral
 zones. All specimens sterile.
 Doty (1947), p. 175.
 Collection numbers: 117, 196.

Order: Gigartinales

Plecanium coccineum v. pacificum (Kylin) Dawson
 Collected from algae cast ashore in zones 1 and 6.
 Collected only June 30 and July 9.
 Smith (1944), p. 264.
 Dawson (1961a), p. 264.
 Hollenberg and Abbott (1966), p. 85.
 Collection numbers: 175, 185.

Gracilariopsis sjeestedtii (Kylin) Dawson Fig. 25.
 Common throughout the Bay attached to rocks at
 -1.0 to -3.0', or, at times, growing much higher up on
 mud.
 Smith (1944), p. 267.
 Scagel (1957), p. 181.
 Collection numbers: 8, 82, 113, 114, 115, 128.

Herbarium of No. 135

Technical Name PRIONITIS ANDERSONII EATON

Common Name

Family GRATELOUPIACEAE

Locality NETARTS BAY, OREGON

Altitude - 2.0 FOOT

Collected by C.J. KUNERT

Identified by C.J. KUNERT

Date JUNE 12, 1971

Habitat ATTACHED TO
SHELLS OF ROTACEA.

McGraw-Hill, Bristol, Pa.

Figure 24. Prionitis andersonii. (1/2x)

Herbarium of No 115

Technical Name GRACILARIA SJOESTEDTII KYLIN
 Common Name SEWING THREAD
 Family GRACILARIACEAE
 Locality NETARTS BAY, OREGON Date MAY 25, 1971
 Altitude - 1.0 FOOT Habitat ON ROCK
 Collected by C. J. KUWERT IN THE INTERTIDAL
 Identified by C. J. KUWERT ZONE.

Figure 25. Gracilariaopsis sjoestedtii. (1/2x)

Ahnfeltia Fries

Key to the Species

- Branches less than 0.5 mm. in diameter Ahnfeltia plicata(1)
 Branches 0.5 to 1.0 mm. in diameter Ahnfeltia concinna(2)

(1) Ahnfeltia plicata (Hudson) Fries

Very common on rocks at -2.0 to -4.0' in zones 1 and 2. Forming very dense tufts of wiry branches.

Smith (1944), p. 271.

Collection numbers: 133, 187.

(2) Ahnfeltia concinna (J. G. Agardh) Setchell and Gardner

Rare on rocks and shells in the intertidal zone.

Smith (1944), p. 272.

Scagel (1957), p. 182.

Collection numbers: 119, 198.

Gymnogongrus leptophyllus J. G. Agardh

Very common on the surface of the shoreline in zones 4 and 5 where only very high tide would reach.

Smith (1944), p. 273.

Collection number: 79.

Gigartina Stackhouse

Key to the Species

1. Blade with an evident thickened ridge along the margin Gigartina cristata(1)
 1. Blade without a thickened ridge 2.
 2. Papillae distinctly flattened Gigartina volans(2)
 2. Papillae acutely pointed or rounded 3.
 3. Blade relatively broad, subdichotomously divided Gigartina papillata(3)
 3. Blade usually longer than broad, not subdichotomously divided 4.
 4. Blades linear-lanceolate and once or twice dichotomously divided from a stipitate lower portion Gigartina harveyana(4)
 4. Blades usually simple, obovate-lanceolate 5.
 5. Apex of blade tapering to an acute point Gigartina californica(5)
 5. Apex of blade generally rounded Gigartina exasperata (6)

- (1) Gigartina cristata (Setchell) Setchell and Gardner
Rare attached to rocks at the -1.0' mark. In tufts from a common discoid holdfast. Dark brown to red in color when fresh.
Smith (1944), p. 283.
Collection numbers: 22, 137.
- (2) Gigartina volans (C. A. Agardh) J. G. Agardh Fig. 26.
Rare in the low intertidal zone on rocks. Dark red-brown in color. Blades smooth compared to other Gigartina. (Identified by Dr. Isabella Abbott.)
Smith (1944), p. 282.
Collection numbers: 27, 33, 145.
- (3) Gigartina papillata (C. A. Agardh) J. G. Agardh Fig. 27.
Common attached to the vertical faces of rocks at +1.0'. Edges of the blades are thickened. Dark brown in color.
Smith (1944), p. 283.
Collection number: 208.
- (4) Gigartina harveyana (Kützinger) Setchell and Gardner Fig. 28.
Common attached to rocks between -1.0 and -3.0'. Dull brownish-red color. To a length of 1 meter.
Smith (1944), p. 282.
Collection number: 134.
- (5) Gigartina californica J. G. Agardh Fig. 29.
Infrequent on rocks at -1.0'. Yellowish-brown in color. To a height of 25 cm.
Smith (1944), p. 280.
Collection numbers: 162, 182.
- (6) Gigartina exasperata Harvey and Bailey Fig. 30.
Throughout the Bay attached to rocks or more frequently attached to sand at -1.0'. Iridescent reddish-green in color.
Scagel (1957), p. 185.
Collection numbers: 4, 34, 37, 90, 97.
- Rhodoglossum affine (Harvey) Kylin
Rare on rocks in the low intertidal zone. Collected February 20.
Smith (1944), p. 287.
Collection number: 28.

Herbarium of	No. 145
Technical Name	<u>GIGARTINA VOLANS</u> (C. Ag.) J. Ag.
Common Name	TURNISH TOWEL
Family	GIGARTINACEAE
Locality	NETARTS BAY, OREGON
Altitude	UPPER LITTORAL TO F.T.O.
Collected by	C. J. KUMERT
Identified by	C. J. KUMERT
Date	JUNE 12, 1971
Habitat	ATTACHED TO ROCKS

Figure 26. Gigartina volans. ($\frac{1}{2}x$)

Herbarium of

No. 208

Technical Name *GIGARTINA PAPILLATA* (C. Ag.) J. Ag.

Common Name TURKISH TUNEL

Family GIGARTINACEAE

Locality NETARTS BAY, OREGON

Altitude +1.0'

Collected by C.J. KUNERT

Identified by C.J. KUNERT

Date JULY 12, 1971

Habitat ATTACHED TO
THE VERTICAL
FACE OF ROCKS.

McGraw-Hill, Bradford, Pa.

Figure 27. *Gigartina papillata*. (1/2x)

Figure 28. Gigartina harveyana. ($\frac{1}{2}x$)

Herbarium of	No. 182
Technical Name	<u>GIGARTINA CALIFORNICA</u> J.G. AGARDH
Common Name	TURKISH TONGUE
Family	GIGARTINACEAE
Locality	NEVADIS BAY, OREGON
Altitude	WASHED ASHORE
Collected by	C.J. KUNERT
Identified by	C.J. KUNERT
Date	JULY 9, 1971
Habitat	ATTACHED
	TO ROCKS

Figure 29. Gigartina californica. (1/2x)

Herbarium of		No. 37
Technical Name <u>GIGARTINA EXASPERATA</u> HARVEY + BAILEY		
Common Name <u>TURKISH TOWEL</u>		
Family <u>GIGARTINACEAE</u>		
Locality <u>NETARTS BAY, DREDDON</u>		Date <u>FEB. 20, 1971</u>
Altitude <u>+0.2 FOOT</u>		Habitat <u>ATTACHED TO</u>
Collected by <u>C. J. KUNERT</u>		<u>MUCK IN TIDE</u>
Identified by <u>C. J. KUNERT</u>		<u>FLATS</u>

Figure 30. Gigartina exasperata. ($\frac{1}{2}x$)

Iridaea Bory

Key to the Species

1. Blade deeply and regularly divided Iridaea heterocarpa(1)
1. Blade not deeply and regularly divided 2.
 2. Blade usually linear, more than 8 times as long as broad Iridaea lineare(2)
 2. Blade relatively broad 3.
3. Blade with a cordate base, more than twice as long as it is broad Iridaea cordata(3)
3. Blade usually broader than long . Iridaea whidbeyana(4)

(1) Iridaea heterocarpa Postels and Ruprecht Fig. 31.
 Rare attached to rocks at -1.5'. Thick and leathery in texture. Collected July 12 in zone 2.
 Smith (1944), p. 291.
 Scagel (1957), p. 191.
 Collection number: 201.

(2) Iridaea lineare (Setchell and Gardner) Kylin
 Rare attached to rocks at -1.0'. Blade is usually spirally twisted. Collected June 12 in zone 2.
 Smith (1944), p. 290.
 Scagel (1967), p. 256.
 Collection number: 138.

(3) Iridaea cordata (Turner) Bory Fig. 32.
 Infrequent attached by a short holdfast to rocks at -1.0 to -3.0'. Brightly iridescent in the water, but a dull brownish-green out of the water. Usually in groups of four or five. Collected in zones 1, 2, and 3.
 Smith (1944), p. 288.
 Scagel (1957), p. 190.
 Collection numbers: 136, 167, 183.

(4) Iridaea whidbeyana (Setchell and Gardner) Scagel Fig. 33.
 Infrequent on rocks at -3.0', usually in bunches. Blades reaching very large proportions, some upwards of 1.5 meters in length and width. Collected in zone 2.
 Setchell and Gardner (1937), p. 174.
 Scagel (1957), p. 191.
 Collection numbers: 141, 206.

Order: Ceramiales

Antithamnion kylinii Gardner

Collected from a tidepool in zone 1 where it had been evidently washed from greater depths. Collected July 9.

Smith (1944), p. 307.

Herbarium of	No. 201.
Technical Name	<u>IRIDAEA HETEROCARPA</u> P. AND R.
Common Name	IRIDESCENT SEANEED
Family	GYMNOGASTRIACEAE
Locality	NEEMETS BAY, OREGON
Altitude	-15'
Collected by	C. J. KIMBERT
Identified by	B. E. LIPPERT
Date	JULY 12, 1971
Habitat	ATTACHED TO ROCKS.

Figure 31. Iridaea heterocarpa. ($\frac{1}{2}x$)

Herbarium of No. 136

Technical Name IRIDOPHYCUS CORDATUS (TURNER) S. + G.
 Common Name IRIDESCENT SEA WEED
 Family GIGARTINACEAE
 Locality NETARTS BAY, OREGON Date JUNE 12, 1971
 Altitude -1.0' Habitat ATTACHED
 Collected by C.J. KUNERT TO ROCKS.
 Identified by C.J. KUNERT

Figure 32. Iridaea cordata. (1/2x)

Figure 33. Iridaea whidbeyana. (1/2x)

Collection number: 193.

Platythamnion villosum Kylin

Found in association with Polysiphonia collinsii.
Collected in zone 4 on March 13.
Smith (1944), p. 315.
Collection number: 49.

Microcladia Greville

Key to the Species

Branching distichous and alternateMicrocladia coulteri(1)
Branching unilateral and pectinateMicrocladia borealis(2)

(1) Microcladia coulteri Harvey

Common throughout the Bay on rocks or shells at the low tide line.
Smith (1944), p. 329.
Collection numbers: 15, 18, 19, 72, 130, 151, 192.

(2) Microcladia borealis Ruprecht

One specimen washed ashore in zone 6, collected on April 17.
Smith (1944), p. 330.
Collection number: 73.

Ptilota C. A. Agardh

Key to the Species

Margins of the ultimate branchlets smoothPtilota hypnoides(1)
Margins of the ultimate branchlets serrately dividedPtilota filicina(2)

(1) Ptilota hypnoides Harvey

A single specimen found epiphytic on Corallina officinalis v. chilensis. Collected July 9 in zone 1.
Smith (1944), p. 332

(2) Ptilota filicina (Farlow) J. Agardh

Fig. 34.
Collected twice, both times washed ashore near the boat jetties. Collected February 5 and July 9.
Smith (1944), p. 333.
Collection numbers: 20, 195.

Polyneura latissima (Harvey) Kylin

Fig. 35.
Rare. Washed ashore high in the intertidal zone near the boat jetties. Collected only June 12.

Herbarium of	No. 195
Technical Name	<i>PTILOTA FILICINA</i> (FABR.) J. L. A.
Common Name	RED WING
Family	CERAMIACEAE
Locality	NETARTS BAY, OREGON
Altitude	WASCO ASHORE
Collected by	C. J. KUNERT
Identified by	C. J. KUNERT
Date	JULY 9, 1971
Habitat	?

Figure 34. *Ptilota filicina*. ($\frac{1}{2}x$)

Herbarium of No. 126

Technical Name *POLYNEURA LATISSIMA* (HARVEY) KYLIN
 Common Name CRIBSCROSS NETWORK
 Family DELESSEERIACEAE
 Locality NETARTS BAY, OREGON Date JUNE 12, 1971
 Altitude CAST ASHORE Habitat
 Collected by C. J. KUNERT
 Identified by C. J. KUNERT

McGraw-Hill, Inc., New York, N.Y.

Figure 35. Polyneura latissima. (1/2x)

Smith (1944), p. 341.
Collection number: 126.

Hymenena Greville

Key to the Species

1. Tetrasporophytes with oval sori Hymenena setchellii(1)
1. Tetrasporophytes linear-elliptical 2.
 2. Thalli usually more than 15 cm. Hymenena flabelligera(2)
 2. Thalli usually less than 10 cm. Hymenena kylinii(3)

- (1) Hymenena setchellii Gardner Fig. 36.
On rocks buried in sand at -2.5' in zone 1. Col-
lected May 25.
Smith (1944), p. 350.
Collection numbers: 103, 120.

- (2) Hymenena flabelligera (J. Agardh) Kylin Fig. 37.
Found washed ashore and epiphytic on Prionitis
andersonii. Collected in the vicinity of the boat jetty.
Smith (1944), p. 348.
Collection numbers: 112, 127, 181.

- (3) Hymenena kylinii Gardner Fig. 38.
Collected in the same locale and habitats as H.
flabelligera, but distinctly smaller in size.
Smith (1944), p. 349.
Collection numbers: 99, 180.

Polysiphonia Greville

Key to the Species

1. Segments with four pericentral cells Polysiphonia pacifica(1)
1. Segments with more than four pericentral cells 2.
 2. Trichoblasts and scar cells absent Polysiphonia dictyurus(2)
 2. Trichoblasts and scar cells present 3.
3. Trichoblasts and scar cells regularly occurring on
every segment, the thalli to 20 cm. or more Polysiphonia paniculata(3)
3. Trichoblasts and scar cells less frequent, the thalli
under 4 cm. Polysiphonia collinsii(4)

- (1) Polysiphonia pacifica Hollenberg Fig. 39.
Uncommon on rocks near the mouth of the Bay.
Smith (1944), p. 359.
Collection numbers: 7, 10.

Herbarium of	No. 103
Technical Name	<u>HYMENENA</u> ^{SETCHELLII} FERRELLTOERA (J. G. Gardner) Kytod
Common Name	VEINED SEA FAN
Family	DELESSERIACEAE
Locality	NETARTS BAY, OREGON
Altitude	-1.6 feet
Collected by	C.J. KUNERT
Identified by	C.J. KUNERT
Date	MAY 25, 1971
Habitat	ON SAND AND ROCKS

Figure 36. Hymenena setchellii. (1/2x)

Herbarium of	No. 181
Technical Name	<u>HYMENENA FLABELLIGERA</u> (J. Ag.) KYLIN
Common Name	VEINED SEA FAN
Family	DELESERIACEAE
Locality	NETARTS BAY, OREGON
Altitude	WASHED ASHORE
Collected by	C. J. KUNERT
Identified by	C. J. KUNERT
Date	JULY 9, 1971
Habitat	?

Figure 37. Hymenena flabelligera. (1/2x)

Herbarium of	No. 180
Technical Name	<u>HYMENENA KYLINII GARDNER</u>
Common Name	VEINED SEA FAN
Family	DELESSERIACEAE
Locality	NETARTS BAY OREGON Date JULY 9, 1971
Altitude	WASHED ASHORE Habitat ?
Collected by	C.J. KUNERT
Identified by	C.J. KUNERT

Figure 38. Hymenena kylinii. ($\frac{1}{2}x$)

Figure 39. Polysiphonia pacifica, showing two of the four pericentral cells that form the major portion of the thallus. (40x)

(2) Polysiphonia dictyurus J. Agardh

Rare on rocks in the mudflats of zone 4. Rough in texture. Collected on June 29.

Hollenberg (1944), p. 474.

Collection number: 170.

(3) Polysiphonia paniculata Montagne Figs. 40, 41, + 42.

Very common throughout the Bay on rocks in the low intertidal to high littoral zones. The most common species of Polysiphonia in Netarts Bay.

Hollenberg (1944), p. 474.

Collection numbers: 85, 86, 152, 156, 161, 166, 194.

(4) Polysiphonia collinsii Hollenberg

Common throughout the Bay on rocks in the intertidal to subtidal zone.

Hollenberg (1944), p. 474.

Collection numbers: 24, 32, 43, 75, 83, 91, 96, 132.

Pterosiphonia dendroidea (Montagne) Falkenberg Fig. 43.

Uncommon attached to rocks from -1.0 to -3.0'. Collected on rocks from the boat jetties.

Smith (1944), p. 366.

Collection numbers: 14, 139, 190.

Figure 40. *Polysiphonia paniculata*, showing the scar cell (point "A"). (40x)

Figure 41. *Polysiphonia paniculata*, showing the characteristic configuration of tetraspores. (10x)

Herbarium of No. 152

Technical Name POLYSIPHONIA PANICULATA MONT.

Common Name

Family RHODOMELACEAE

Locality NETARTS BAY, OREGON

Date JUNE 29, 1971

Altitude -1.0'

Habitat ATTACHED

Collected by E.J. KUNERT

TO ROCKS

Identified by C.J. KUNERT

McGraw-Hill, Bradford, Pa.

Figure 42. Polysiphonia paniculata. ($\frac{1}{2}x$)

Figure 43. Pterosiphonia dendroidea. (2.5x)

Odonthallia Lyngbye

Key to the Species

- Cystocarps over 0.5 mm. in diameter, branching profuse .
 Odonthallia floccosa(1)
 Cystocarps over 0.5 mm. in diameter rarely if ever, the
 branching more slender and less profuse
 Odonthallia oregona(2)

(1) Odonthallia floccosa (Esper) Falkenberg Fig. 44.

Very common in the high littoral zones of the east side of the Bay. Collected from May through July.

Smith (1944), p. 375.

Collection numbers: 98, 105, 142, 143, 159.

(2) Odonthallia oregona Doty Fig. 45.

Collected July 12 from rocks along the boat jetty. At the low tide mark. These differ from O. floccosa in overall size, being much smaller.

Doty (1947), p. 196.

Collection number: 209.

Laurencia spectabilis Postels and Ruprecht

Rare in the intertidal zone on rocks. Collected only May 25.

Smith (1944), p. 377.

Collection number: 118.

Herbarium of

No. 142

Technical Name ODONTHALLIA FLOCCOSA (ESPER) FALKENBERGCommon Name SHARP-TOOTH BRUSHFamily RHODOMELACEAELocality NETARTS BAY, OREGONAltitude - 1.0 FOOTCollected by C.J. KUNERTIdentified by C.J. KUNERTDate JUNE 12, 1971Habitat ATTACHED TO
ROCKS.

Figure 44. Odonthallia floccosa. (1/2x)

Herbarium of

No. 209

Technical Name ODONTHALLIA OREGONA DOTYCommon Name SHARP TOOTH BRUSHFamily RHODOMELACEAELocality NETARTS BAY, OREGONDate JULY 12, 1971Altitude -0.2'Collected by C. J. KUNERTHabitat ATTACHED TO
ROCKS.Identified by C. J. KUNERT

Figure 45. Odonthallia oregana. (1/2x)

The collection numbers referred to in the preceding annotated list of marine algae are the author's. This collection is presently being housed at Concordia College, 2811 N. E. Holman, Portland, Oregon, 97211.

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APPENDIX

KEY TO THE GENERA

Division: Chlorophyta

1. Thallus a simple or branched filament 2.
1. Thallus not filamentous 5.
 2. Filaments branching 4.
 2. Filaments unbranched 3.
3. Filaments entangled in mats that are prostrate
. Rhizoclonium, p. 12
3. Filaments attached, not bent and entangled with one
another Ulothrix, p. 23
 4. Filaments in rope-like strands held together by
recurved branches Spongomorpha, p. 14
 4. Filaments repeatedly branched, but not in rope-
like strands Cladophora, p. 12
5. Thallus 1 cell in thickness Monostroma, p. 14
5. Thallus 2 cells in thickness 6.
 6. No open space between the two cell layers
. Ulva, p. 20
 6. An open space between the two cell layers 7.
7. Thallus markedly flattened Enteromorpha, p. 17
7. Thallus cylindrical, arising from a discoid base
. Blidingia, p. 15

Division: Phaeophyta

1. Thallus filamentous Ectocarpus, p. 25
1. Thallus not filamentous 2.
 2. Thallus blade-like, usually simple 3.
 2. Thallus branched 5.
3. Holdfast with evident haptera Laminaria, p. 27
3. Holdfast without haptera 4.
 4. Blades with marginal teeth or veins
. Desmarestia, p. 26
 4. Blades without marginal teeth or veins
. Phaeostrophion, p. 26
5. Thallus flattened with dichotomous branching throughout
. Fucus, p. 30
5. Thallus not flattened, blades borne radially about axis
. Sargassum, p. 30

Division: Rhodophyta

1. Thallus stony, impregnated with lime 2.
1. Thallus not stony, not impregnated with lime 4.
 2. Thallus wholly crutose and prostrate 3.
 2. Thallus with erect, jointed shoots
 - Corallina, p. 36
3. Thallus thick and stony, commonly covering rocks and shells Lithothamnion, p. 33
3. Thallus forming a thin crust of small diameter, usually epiphytic Dermatolithon, p. 33
 4. Thallus a simple or branched filament 7.
 4. Thallus not filamentous 5.
5. Thallus a blade one or two cells in thickness 6.
5. Thallus more than two cells in thickness 9.
 6. Thallus epiphytic on eelgrass, blade usually less than 1 cm. long Smithora, p. 30
 6. Thallus not epiphytic, blade over 8 cm. tall Porphyra, p. 30
7. Thallus a simple filament Bangia, p. 30
7. Thallus a branched filament 8.
 8. Each verticel with all branchlets the same length Antithamnion, p. 46
 8. Each verticel with two long and two short length branchlets Platythamnion, p. 50
9. Thallus cells in regular transverse series 10.
9. Thallus cells not in a regular transverse series . 11.
 10. Branches cylindrical and radially disposed Polysiphonia, p. 53
 10. Branches more or less flattened Pterosiphonia, p. 57
11. Thallus cylindrical or a slightly flattened cylinder, usually more or less branched 12.
11. Thallus neither cylindrical nor a slightly flattened cylinder 19.
 12. Branching dichotomous, branches stiff and wiry Ahnfeltia, p. 39
 12. Branching not dichotomous 13.
13. Thallus with a few long branches, rarely short branching Gracilariopsis, p. 36
13. Thallus with many branches 14.
 14. Major branches with many short lateral braches, all approximately the same length 15.
 14. Major branches with progressively shorter branches 16.
15. Short branches flattened and resembling minute leaves Ptilota, p. 50
15. Short branches sharply pointed, more or less distichous and compressed Odonthallia, p. 60

- 16. Branching of smaller branches pectinate . . . 17.
- 16. Branching of smaller branches not pectinate 18.
- 17. Pectinate branches incurved toward apex of branch bearing them Plocanium, p. 36
- 17. Pectinate branches curving away from apex of branch bearing them Microcladia, p. 50
- 18. Apices of branches acutely pointed
- Cryptosiphonia, p. 33
- 18. Apices of branches rounded . . . Laurencia, p. 60
- 19. Thallus with a single, undivided blade but at times with proliferous blades from the margin, the blade being sessile or with a distinct stipe 26.
- 19. Thallus more or less divided 20.
- 20. Divisions of thallus dichotomous 21.
- 20. Divisions of thallus not dichotomous 23.
- 21. Surface of dichotomies with many papillate outgrowths Gigartina, p. 39
- 21. Surface of dichotomies without papillate outgrowths 22.
- 22. Dichotomies thickened, elliptical in transverse section Gymnogongrus, p. 39
- 22. Dichotomies flattened, fan-shaped
- Callophyllis, p. 36
- 23. Flattened portion of thallus with a midrib, veins, or both 24.
- 23. Flattened portion of thallus without a midrib or veins 25.
- 24. Blade almost entire, with conspicuous anastomosing veins Polyneura, p. 50
- 24. Blade mostly not entire, with inconspicuous veins Hymenena, p. 53
- 25. Flattened surfaces of thallus covered with papillate outgrowths Gigartina, p. 39
- 25. Flattened surfaces smooth, blade segments all about the same length Prionitis, p. 36
- 26. The surface of the blade covered with papillate outgrowths Gigartina, p. 39
- 26. Flattened surfaces smooth 27.
- 27. Leaf-like lobes of the thallus somewhat pointed
- Iridaea, p. 46
- 27. Leaf-like lobes of the thallus broadly rounded, the stipe of erect shoots flattened . . . Rhodoglossum, p. 40

Note: The above keys are an adaptation of the key to the genera found in Smith (1944), pp. 400-412.