

THE MARINE ALGAE OF  
VIRGINIA AND MARYLAND  
INCLUDING THE CHESAPEAKE BAY AREA<sup>1 2</sup>

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INTRODUCTION

Until 1965 there existed no publication treating any aspect of the benthic or attached marine algae of the coast of Virginia and Maryland including the Chesapeake Bay area. Prior to this date only minor references to particular species for this area can be found in the literature. This paucity of research can be attributed, in the main, to the lack of solid substrata permitting prolonged and extensive development of algal populations. Time spent on more favorable habitats such as the rocky shores of the New England coast offer, to the phycologist, far more rewarding results for his endeavors.

The areas of the Virginia and Maryland coast facing directly upon the Atlantic are unstable, constantly moving, wave washed, sandy beaches. Behind the so-called Barrier Islands lie thousands of acres of *Spartina* salt marshes. In the shallow bays, between the Barrier Islands and the mainland, are abundant oyster reefs which offer a more stable substratum for algal growth. Since, however, the waters of these bays may reach temperatures in excess of 30°C during the summer only a limited number of algal taxa are to be found. The muddy bottoms of these bays, among the oyster reefs, offer a continuous supply of sediments which are constantly kept in suspension by the tidal currents. Consequently, light penetration is not great. Even in shallow waters it is virtually impossible to visually locate the algal populations.

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In contrast to the higher salinities of the Atlantic coast, the Chesapeake Bay is a considerably more brackish area with salinities dropping significantly as one proceeds northward. Some stretches of sandy beaches do exist but they are subjected to less wave action than those of the Atlantic. Again *Spartina* salt marshes border extensive areas of the bay. The lower salinities, especially in the upper bay, exclude a great number of marine algal taxa. Some areas of the bay locally support a typical freshwater algal flora because of the steady and constant influx of fresh water. The upper reaches of all the estuaries are continually pouring into the water system a freshwater algal population. While such freshwater algal populations are not actively growing and will not long survive at the higher salinities, they often will be encountered on the microscopical examination of water samples. Their contribution to the overall ecology of the area can only be speculative at the present state of our knowledge.

Into this inhospitable habitat for marine algae man has constructed wood and rock jetties, breakwaters, piers, retaining walls, groins, and other structures. These offer a satisfactory, however unnatural, substrate for algal growth which are almost immediately colonized by algae. These types of man-made structures offer to the investigator an opportunity, with a reasonable expenditure of energy, to secure some insight into the composition of the algal population.

In 1965 the first significant publication on algae in this area appeared. Zaneveld and Barnes (1965) reported on the annual periodicity of the marine algae in the lower Chesapeake Bay. In the six following years, several papers have appeared reporting the algal flora of a particular rock jetty, geographical area, or habitat. In no case, however, does any of these published papers give an accurate picture of the wide variety of marine algae to be encountered in the states of Virginia and Maryland. In fact, many papers because of their limited scope leave the reader under the

false impression that the algal flora is far less diverse than it actually is.

This paper presents the results of a survey I initiated in September 1970, to establish the composition, abundance, location and periodicity of marine algae in Virginia and Maryland. These types of information were particularly desirable for us to accrue in view of: 1) the economic importance of the area's fishing industries which ultimately depend upon, and are affected by, the photosynthetic entities of the marine environment; 2) the ever-increasing pollution of the Chesapeake Bay and its estuaries; pollution which may affect the absolute and relative composition of the photosynthetic entities; and 3) the need to have at hand a ready store of pertinent information to investigate and to consider more intelligently the various ecological factors affecting the local marine environment. This paper represents a small step in the realization of these goals.

The following treatment presents a synoptic survey of the marine algae species reported for the states of Virginia and Maryland. No attempt has been made to describe morphologically or taxonomically the various species in the area under study. However, an attempt has been made to bring together, in a single work for the investigator, a summation of our current knowledge concerning the composition of the marine algal populations and to give their geographical distribution.

In the following the names for the plant divisions have been taken from Bold (1967). The names of families have been drawn, with a single minor exception, from Papenfuss (1955).

In the Division Cyanophycophyta no attempt has been made to relegate to synonymy the algal names as determined by the classical, standard works with those new names recently proposed by Drouet and Daily (1965) and Drouet (1968), nor does it seem desirable to do so in view of the fact that the authors have not given detailed opinions for their reduction of literally thousands of taxa to less than 20 genera. This has resulted in several cyanophy-

cean algae being entered under two different names. This situation is, however, compatible with the basic aim of this paper, namely a summation of the algal taxa reported for the area.

All specimens cited, without reference to a publication, are deposited in the herbarium of the Virginia Institute of Marine Science. Specimen citations taken from a publication follow the reference.

#### DIVISION CHLOROPHYCOPHYTA

Family ZYGNEMATACEAE (Meneghini) Kützing orth. mut.  
Engler (essentially freshwater species)

*Spirogyra* sp.: GENERAL: Griffith (1961), Chesapeake Bay, R. C. Whaley.

Family DESMIDIACEAE Kützing ex Ralfs orth. mut.  
Stizenberger

*Closterium gracile* Brébisson: GENERAL: Griffith (1961), Chesapeake Bay, R. C. Whaley.

*Staurastrum* sp.: GENERAL: Griffith (1961), Chesapeake Bay, R. C. Whaley.

Family ULOTRICHAECEAE Kützing orth. mut. Rabenhorst

*Ulothrix endosporangia* Humm nom. prov.: VIRGINIA: H. J. Humm, York River at Gloucester Point and throughout the immediate general area.

*Ulothrix flacca* (Dillwyn) Thuret: VIRGINIA: F. D. Ott, York River at Gloucester Point. Wulff (1967), York River at Gloucester Point. Wulff and Webb (1969), York River at Gloucester Point. MARYLAND: F. D. Ott, on piling at Ocean City. Mathieson and Fuller (1969), pilings at Chesapeake Biological Laboratory boathouse, mouth of Patuxent River at Drum Point, abandoned Cedar Point Light House.

*Ulothrix subflaccida* Wille: VIRGINIA: S. Ramsey, York River at Gloucester Point.

*Ulothrix* sp.: GENERAL: Griffith (1961), Chesapeake Bay, R. C. Whaley.

Family CHAETOPHORACEAE Harvey orth. mut.  
Stizenberger

*Entocladia viridis* Reinke: VIRGINIA: H. J. Humm, on

*Grinnellia americana* from the northern end of Willoughby Spit near Hampton Roads; *F. D. Ott*, on *Grinnellia americana* from the York River at Gloucester Point.

*Entocladia wittrockii* Wille: VIRGINIA: *J. Vogel et H. J. Humm*, on *Fucus vesiculosus* from salt marshes along Hummock Channel, Wachapreague.

*Protoderma marinum* Reinke: VIRGINIA: *Leg. H. J. Humm*, York River in Guinea Marshes.

*Pseudodendroclonium marinum* (Reinke) Aleem et Schulz: MARYLAND: Mathieson and Fuller (1969), abandoned Cedar Point Light House, beach between Cedar Point and Point No Point south of Patuxent River mouth.

Family MONOSTROMACEAE Kunieda ex Suneson

*Monostroma leptodermum* Kjellman: VIRGINIA: Wulff (1967), York River at Gloucester Point. Wulff and Webb (1969), York River at Gloucester Point.

*Monostroma oxyspermum* (Kützing) Doty: VIRGINIA: *H. J. Humm*, York River at Gloucester Point; *F. D. Ott*, Chincoteague Inlet at Chincoteague. MARYLAND: Mathieson and Fuller (1969), shore of Patuxent River on rocks of retaining wall of Naval Base Property.

*Monostroma* sp.: VIRGINIA: Rhodes (1970), Burton's Bay near Wachapreague.

Family ULVACEAE Lamouroux orth. mut. Dumortier

*Enteromorpha clathrata* (Roth) J. Agardh: VIRGINIA: *H. J. Humm*, York River near Gloucester Point; *F. D. Ott*, Burton's Bay near Wachapreague. Mangum, Santos and Rhodes (1968), York River at Sandy Point. MARYLAND: *F. D. Ott*, on *Spartina* stems in marsh area south of jetty. Mathieson and Fuller (1969), beach on south shore of Patuxent River west of entrance to Naval Seaplane Harbor.

*Enteromorpha compressa* (Linnaeus) Greville: VIRGINIA: *M. Lynch*, York River at Gloucester Point; *Leg. B. L. Wulff*, York River at Yorktown; *Leg. F. D. Ott*, Chesapeake Bay at Cape Charles. Wulff (1967), York River at Gloucester Point; Mangum, Santos and Rhodes (1968), York River at Sandy Point; Wulff and Webb (1969), York River at Gloucester Point. MARYLAND: *J. K. Lowry*, *B. H. Robi-*

son, and *B. L. Wulff*, north jetty at Ocean City; *Leg. F. D. Ott*, on shells in marsh area just south of jetty. *Wulff et al* (1968), jetty at Ocean City.

*Enteromorpha erecta* (Lyngbye) J. Agardh: VIRGINIA: *Wulff* (1967), York River at Gloucester Point; *Mangum, Santos and Rhodes* (1968), York River at Sandy Point; *Wulff and Webb* (1969), York River at Gloucester Point.

*Enteromorpha intestinalis* (Linnaeus) Link: VIRGINIA: *Zaneveld and Barnes* (1965), lower Chesapeake Bay; *Zaneveld* (1966-67); *Wulff* (1967), York River at Gloucester Point; *Wulff and Webb* (1969), York River at Gloucester Point; *Marsh* (1970), York River; *Rhodes* (1970), *Burton's Bay* near Wachapreague. MARYLAND: *B. H. Robison, J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City. *Zaneveld* (1966-67), *sine locus*; *Wulff et al* (1968), jetty at Ocean City; *Mathieson and Fuller* (1969), beach on south shore of Patuxent River just west of entrance to Naval Station seaplane harbor, Drum Point at mouth of Patuxent River, #5 beacon at mouth of Patuxent River, rock retaining wall on Naval Base property on south shore of Patuxent River, abandoned Cedar Point Light House, Cover Point just north of Patuxent River mouth, beach north of Cove Point, 1.5 miles east of Bloodsworth Island, channel between James Island and Red Nun #2, Kent Narrows and Piney Narrows Marina, Chester River off Cedar Point, Patuxent River off Half Pone Point, Patuxent River west of Broomes Island.

*Enteromorpha lingulata* J. G. Agardh: VIRGINIA: *M. Wass*, York River at Gloucester Point.

*Enteromorpha linza* (Linnaeus) J. Agardh: VIRGINIA: *M. Wass*, York River at Gloucester Point; *Leg. M. Wass*, York River at Gloucester Point; *Leg. H. J. Humm*, York River at Gloucester Point. *Zaneveld and Barnes* (1965), lower Chesapeake Bay; *Zaneveld* (1966-67); *Wulff* (1967), York River at Gloucester Point; *Wulff and Webb* (1969), York River at Gloucester Point; *Marsh* (1970), York River; *Rhodes* (1970), *Burton's Bay* near Wachapreague. MARYLAND: *J. K. Lowry, B. H. Robison* and *B. L. Wulff*, north

jetty at Ocean City; *Leg. J. K. Lowry, B. L. Wulff and B. H. Robison*, north jetty at Ocean City; Zaneveld (1966-67); *Wulff et al* (1968), jetty at Ocean City.

*Enteromorpha marginata* J. Agardh: VIRGINIA: Zaneveld (1966-67).

*Enteromorpha micrococca* Kützing: MARYLAND: *J. K. Lowry, B. L. Wulff, and B. H. Robison*, north jetty at Ocean City. *Wulff et al* (1968), jetty at Ocean City.

*Enteromorpha minima* Nägeli: VIRGINIA: *M. Wass*, York River at Gloucester Point; *Leg. H. J. Humm*, York River at Gloucester Point. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); *Wulff* (1967), York River at Gloucester Point; *Wulff and Webb* (1969), York River at Gloucester Point. MARYLAND: *Wulff et al* (1968), jetty at Ocean City, *Mathieson and Fuller* (1969), mouth of Patuxent River at Drum Point, shore of Patuxent River at Naval Base property.

*Enteromorpha plumosa* Kützing: VIRGINIA: Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague.

*Enteromorpha prolifera* (Müller) J. Agardh: VIRGINIA: *M. Wass*, York River at Gloucester Point; *W. Dillon*, York River at Gloucester Point; *H. J. Humm*, Hummock Channel near Wachapreague; *F. D. Ott*, Chincoteague Inlet at Chincoteague. Zaneveld (1966-67); *Wulff* (1967), York River at Gloucester Point; *Wulff and Webb* (1969), York River at Gloucester Point. MARYLAND: *J. K. Lowry, B. H. Robison, and B. L. Wulff*, north jetty at Ocean City; *F. D. Ott*, on oyster shells in marsh area just south of jetty. Zaneveld (1966-67); *Wulff et al* (1968), jetty at Ocean City; *Mathieson and Fuller* (1969), Kent Narrows and Piney Narrows Marina.

*Percursaria percursa* (C. Agardh) J. Agardh: MARYLAND: Zaneveld (1966-67).

*Ulva lactuca* Linnaeus; VIRGINIA: *F. D. Ott*, Chincoteague Inlet at Chincoteague. Zaneveld and Barnes (1965), lower Chesapeake Bay; *Wulff* (1967), York River at Gloucester Point; *Mangum, Santos and Rhodes* (1968), York River

at Sandy Point; Wulff and Webb (1969), York River at Gloucester Point; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *B. L. Wulff, J. K. Lowry and B. H. Robison*, north jetty at Ocean City; *F. D. Ott*, on shells in shallow water at Ocean City. *Wulff et al* (1968), jetty at Ocean City; Mathieson and Fuller (1969), Patuxent River west of entrance to seaplane harbor, mouth of Patuxent River at Drum Point, Patuxent River on retaining wall of Naval Base property, beach midway between Cedar Point and Point No Point, south of Patuxent River mouth, beach north of Cove Point, Holland Strait off South Marsh Island, mid-channel in Broad Creek connecting Little Annemessex River and Pocomoke Sound, 1.5 miles east of Bloodsworth Island, 1.25 miles southwest of Red Nun #2, between Poplar Island Narrows Light and Can #1, 900 yards east of Coaches Island, mouth of Crab Alley Bay off Parson and Bodkin Island, channel between James Island and Red Nun #2, east and west of Knapps Narrows, Kent Narrows and Piney Narrows Marina.

*Ulva lactuca* Linnaeus var. *latissima* (Linnaeus) de Candolle: VIRGINIA: *K. M. S. Aziz*, York River at Gloucester Point; *F. D. Ott*, Chincoteague Inlet at Chincoteague. Zaneveld (1966-67). MARYLAND: *F. D. Ott*, adrift at Assateague Beach. Zaneveld (1966-67).

*Ulva lactuca* Linnaeus var. *rigida* (C. Agardh) Le Jolis: VIRGINIA: *F. D. Ott*, Chesapeake Bay at Cape Charles. Zaneveld (1966-67). MARYLAND: *F. D. Ott*, on rock at jetty in Ocean City.

Family CHLORELLACEAE (Wille) Brunnthaler

*Chlorella* sp.: MARYLAND: Morse (1947), mouth of Patuxent River. GENERAL: Griffith (1961), Chesapeake Bay, *D. C. Morse*.

Family GOMONTIACEAE Bornet et Flahault ex De Toni

*Gomontia polyrhiza* (Lagerheim) Bornet et Flahault: VIRGINIA: *H. J. Humm*, York River at Gloucester Point; *K. M. S. Aziz*, York River at Yorktown; *F. D. Ott*, Chesapeake Bay at Cape Charles. MARYLAND: *B. H. Robison*,



*J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City;  
*F. D. Ott*, Ocean City growing on *Spartina* stems.

Family HYDRODICTYACEAE (S. F. Gray) Dumortier orth.  
mut Cohn (essentially freshwater species)

*Pediastrum boryanum* (Turpin) Meneghini: GENERAL:  
Griffith (1961), Chesapeake Bay, *R. C. Whaley*.

*Pediastrum duplex* Meyen: GENERAL: Griffith (1961),  
Chesapeake Bay, *R. C. Whaley*.

*Pediastrum simplex* Meyen: GENERAL: Griffith (1961),  
Chesapeake Bay, *R. C. Whaley*.

Family SCENEDESMACEAE Oltmanns  
(essentially freshwater species)

*Actinastrum* sp.: GENERAL: Griffith (1961), Chesapeake  
Bay, *R. C. Whaley*.

*Scenedesmus acuminatus* (Lagerheim) Chodat: GEN-  
ERAL: Griffith (1961), Chesapeake Bay, *R. C. Whaley*.

*Scenedesmus opaliensis* P. Richter: GENERAL: Griffith  
(1961), Chesapeake Bay, *R. C. Whaley*.

*Scenedesmus quadricauda* (Turpin) in de Brébisson et  
Godey: VIRGINIA: Marshall (1967), Elizabeth River.

*Scenedesmus* sp.: VIRGINIA: Marshall (1967), Elizabeth  
River.

Family CLADOPHORACEAE (Hassell) Cohn

*Chaetomorpha aerea* (Dillwyn) Kützing: MARYLAND:  
Zaneveld (1966-67); *Wulff et al* (1968), jetty at Ocean  
City.

*Chaetomorpha linum* (Müller) Kützing: VIRGINIA: *H. J.*  
*Humm*, York River in the Guinea Marshes; *B. L. Wulff*,  
York River off Wormley Creek. Marsh (1970), York River.

*Cladophora albida* (Hudson) Kützing: VIRGINIA: *F. D.*  
*Ott*, Chesapeake Bay at Cape Charles. Zaneveld (1966-67).

*Cladophora crystallina* (Roth) Kützing: VIRGINIA: Zane-  
veld (1966-67).

*Cladophora expansa* (Mertens) Kützing: VIRGINIA: Zane-  
veld (1966-67).

*Cladophora fascicularis* (Mertens) Kützing: VIRGINIA:  
*H. J. Humm*, Hampton Roads at Norfolk; *M. Wass*, York  
River at Gloucester Point.

*Cladophora flexuosa* (Dillwyn) Harvey: VIRGINIA: *F. D. Ott*, Chincoteague Inlet at Chincoteague. Zaneveld and Barnes (1965), lower Chesapeake Bay. MARYLAND: Mathieson and Fuller (1969), Patuxent River at Broomes Island.

*Cladophora flexuosa* (Dillwyn) Harvey forma *densa* Collins: VIRGINIA: Zaneveld (1966-67). MARYLAND: Mathieson and Fuller (1969), Abandon Cedar Point Light House.

*Cladophora gracilis* (Griffith ex Harvey) Kützing: VIRGINIA: Zaneveld and Barnes (1965), lower Chesapeake Bay; Marsh (1970), York River. MARYLAND: *F. D. Ott*, in quiet water in marshes south of Ocean City. Mathieson and Fuller (1969), Cove Point just north of Patuxent River mouth, beach north of Cove Point, mid-channel in Broad Creek connecting Little Annemessex River and Pocomoke Sound.

*Cladophora magdalenae* Harvey: VIRGINIA: *H. J. Humm*, York River in the Guinea Marshes.

*Cladophora rupestris* (Linnaeus) Kützing: VIRGINIA: *M. Wass*, York River at Gloucester Point; *F. D. Ott*, Burton's Bay near Wachapreague.

*Rhizoclonium kockianum* Kützing: VIRGINIA: *H. J. Humm*, York River at Gloucester Point.

*Rhizoclonium riparium* (Roth) Harvey: VIRGINIA: *H. J. Humm*, York River at Gloucester Point. Zaneveld (1966-67). MARYLAND: Mathieson and Fuller (1969), pilings at Chesapeake Biological Laboratory boathouse.

*Rhizoclonium tortuosum* Kützing: VIRGINIA: *H. J. Humm*, Hummock Channel at Wachapreague.

Family BRYOPSIDACEAE Bory de Saint-Vincent orth. mut.

De Toni

*Bryopsis hypnoides* Lamouroux: VIRGINIA: *F. D. Ott*, James River at north end of James River Bridge. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); Mangum, Santos and Rhodes (1968), York River at Sandy Point. MARYLAND: *F. D. Ott*, on pilings at Ocean City. Zaneveld (1966-67).

*Bryopsis plumosa* (Hudson) C. Agardh: VIRGINIA: *W.*

*Dillon*, York River at Gloucester Point; P. E. Hargraves, York River at Gloucester Point; *F. D. Ott*, Hampton Roads at Fort Monroe. Zaneveld and Barnes (1965), lower Chesapeake Bay; Wulff (1967), York River at Gloucester Point; Zaneveld (1966-67); Wulff and Webb (1969), York River at Gloucester Point; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, on pilings at Ocean City. Zaneveld (1966-67).

DIVISION PHAEOPHYCOPHYTA

Family ECTOCARPACEAE (C. Agardh) Kützing orth. mut.  
Harvey

*Ectocarpus confervoides* (Roth) Le Jolis: VIRGINIA: *M. Wass*, Sarah's Creek below Gloucester Point; *F. D. Ott*, York River at Sandy Point. Zaneveld (1966-67); Wulff and Webb (1969), York River at Gloucester Point. MARYLAND: *F. D. Ott*, Ocean City, in marsh area just south of jetty. Zaneveld (1966-67).

*Ectocarpus elachistaeformis* Heydrich: VIRGINIA: *H. J. Humm*, York River at Gloucester Point.

*Ectocarpus penicillatus* (C. Agardh) Kjellman: VIRGINIA: Mangum, Santos and Rhodes (1968), York River at Sandy Point.

*Ectocarpus siliculosus* (Dillwyn) Lyngbye: VIRGINIA: *M. Wass*, York River at Sandy Point; *M. Wass*, York River at Gloucester Point; *F. D. Ott*, Hampton Roads at Lynnhaven Inlet. Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, Ocean City, in marsh area just south of jetty.

*Giffordia duchassaingiana* (Grunow) Taylor: MARYLAND: *B. H. Robison*, *J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City. Wulff *et al* (1968), jetty at Ocean City.

*Pylaiella littoralis* (Linnaeus) Kjellman: VIRGINIA: Zaneveld (1966-67); Mangum, Santos and Rhodes (1968), York River at Sandy Point. MARYLAND: Zaneveld (1966-67).

Family SPHACELARIACEAE J. Agardh orth. mut. Cohn

*Sphacelaria fusca* (Hudson) C. Agardh: VIRGINIA: *F. D.*

Ott, York River at Gloucester Point. MARYLAND: Mathieson and Fuller (1969), Patuxent River 200 yards west of Broomes Island.

Family DICTYOTACEAE Lamouroux orth. mut. Dumortier

*Dictyota dichotoma* (Hudson) Lamouroux: VIRGINIA: H. J. Humm, Hummock Channel near Wachapreague. Humm (1963), Hummock Channel near Wachapreague; Rhodes (1970), Burton's Bay near Wachapreague.

Family MYRIONEMATACEAE (Nägeli) Foslie orth. mut.  
Skottsberg

*Ascocyclus orbicularis* Magnus: VIRGINIA: H. J. Humm, York River at Gloucester Point. Mangum, Santos and Rhodes (1968), York River at Sandy Point.

*Myrionema stragulans* Greville: VIRGINIA: Mangum, Santos and Rhodes (1968), York River at Sandy Point.

Family ELACHISTACEAE Kjellman

*Elachistea facicola* (Velle) Areschoug: VIRGINIA: J. L. Wood, adrift and epiphytic on *Fucus vesiculosus*, collected ca. 60 miles offshore from the mouth of the Chesapeake Bay.

*Elachistea* sp.: VIRGINIA: Marsh (1970), York River.

Family CORYNOPHLAEACEAE Oltmanns

*Leathesia difformis* (Linnaeus) Areschoug: VIRGINIA: F. D. Ott, Chincoteague Inlet at Chincoteague. Zaneveld (1966-67); Rhodes (1970), Burton's Bay near Wachapreague.

Family SPERMATOCHNACEAE Kjellman

*Stilophora rhizodes* (Ehrhart) J. Agardh: VIRGINIA: B. H. Wulff, York River at Gloucester Point.

Family STRIARIACEAE Kjellman

*Striaria attenuata* (C. Agardh) Greville: VIRGINIA: F. D. Ott, Chincoteague Inlet at Chincoteague. Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: F. D. Ott, Ocean City, in marsh area just south of jetty.

Family MYRIOTRICHACEAE Kjellman

*Myriotrichia subcorymbosa* (Farlow emend. Holden) Blomquist: VIRGINIA: H. J. Humm, York River at Gloucester Point; H. J. Humm, York River at Gloucester Point.

## Family PUNCTARIACEAE (Thuret) Kjellman

*Desmotrichum undulatum* (J. Agardh) Reinke: VIRGINIA: *F. D. Ott*, on *Zostera* at Cape Charles. Mangum, Santos and Rhodes (1968), York River at Sandy Point; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, on bent stems of *Spartina* in marsh area just south of jetty.

*Petalonia fascia* (O. F. Müller) Kuntze: VIRGINIA: *F. D. Ott*, on rocks at Chincoteague Inlet at Chincoteague. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67). MARYLAND: *J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City; *F. D. Ott*, Ocean City, on stones of jetty. Zaneveld (1966-67); *Wulff et al* (1968), jetty at Ocean City.

*Punctaria latifolia* Greville: VIRGINIA: *F. D. Ott*, James River just north of James River Bridge. Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, Ocean City, in marsh area just south of jetty.

*Punctaria plantaginea* (Roth) Greville: VIRGINIA: Zaneveld and Barnes (1965), lower Chesapeake Bay. MARYLAND: Zaneveld (1966-67).

## Family SCYTOSIPHONACEAE (Thuret) Hauck

*Asperococcus echinatus* (Mertens) Greville: VIRGINIA: *F. D. Ott*, York River at Yorktown Beach. MARYLAND: *F. D. Ott*, Ocean City, in marsh area just south of jetty.

*Scytosiphon lomenataria* (Lyngbye) C. Agardh: VIRGINIA: *F. D. Ott*, Burton's Bay near Wachapreague. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *B. H. Robison*, *J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City; *F. D. Ott*, Ocean City on stones of jetty. Zaneveld (1966-67); *Wulff et al* (1968), jetty at Ocean City.

## Family DICTYOSIPHONACEAE Kützing orth. mut. Kjellman

*Dictyosiphon foeniculaceus* (Hudson) Greville: VIRGINIA: Rhodes (1970), Burton's Bay near Wachapreague.

## Family FUCACEAE Lamouroux orth. mut. Dumortier

*Fucus vesiculosus* Linnaeus: VIRGINIA: *J. Vogel*, Haven

Beach, just south of Milford Haven facing Chesapeake Bay; *H. J. Humm*, adrift in Little Creek, Norfolk; *K. de Witt*, washed ashore at Virginia Beach; *H. J. Humm*, Hummock Channel near Wachapreague; *F. D. Ott*, on rocks at Chincoteague Inlet at Chincoteague. Zaneveld (1966-67). Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, Ocean City on rocks and at edge of salt marshes. Zaneveld (1966-67); *Wulff et al* (1968), jetty at Ocean City.

*Fucus vesiculosus* Linnaeus var. *sphaerocarpus* J. Agardh: MARYLAND: Zaneveld (1966-67).

*Ascophyllum nodosum* (Linnaeus) Le Jolis: VIRGINIA: *F. D. Ott*, adrift in Chincoteague Inlet at Chincoteague. Zaneveld (1966-67), *sine locus*. MARYLAND: *F. D. Ott*, Ocean City, abundant in the wash in October 1971. Zaneveld (1966-67).

*Ascophyllum nodosum* (Linnaeus) Le Jolis forma *scorpioides* (Hornemann) Reinke: MARYLAND: *J. K. Lowry* and *B. H. Robison*, found attached to the north jetty at Ocean City.

Family SARGASSACEAE (Decaisne) Kützing orth. mut.  
De Toni

*Sargassum natans* (Linnaeus) J. Meyen: VIRGINIA: *F. D. Ott*, Burton's Bay near Wachapreague. Zaneveld (1966-67). MARYLAND: *F. D. Ott*, Ocean City, abundant in the wash during November-December 1971. Zaneveld (1966-67).

*Sargassum hystrix* J. Agardh var. *buxifolium* (Chauvin) J. Agardh: VIRGINIA: *F. D. Ott*, adrift at Hampton Roads at Lynnhaven Inlet. Zaneveld (1966-67). MARYLAND: *F. D. Ott*, Assateague Beach, abundant in the wash during November-December 1971.

#### DIVISION RHODOPHYCOPHYTA

##### Family GONIOTRICHACEAE Skuja

*Goniotrichum alsidii* (Zanardini) Howe: VIRGINIA: Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *Wulff et al* (1968), jetty at Ocean City.

## Family ERYTHROPELTIDACEAE Skuja

*Erythrocladia subintegra* Rosenvinge: VIRGINIA: *H. J. Humm*, York River at Gloucester Point.

*Erythrotrichia rhizoides* Cleland: VIRGINIA: Rhodes (1970), Burton's Bay near Wachapreague.

## Family BANGIACEAE (S. F. Gray) Nägeli

*Bangia ciliaris* Carmichael: MARYLAND: *B. L. Wulff*, *J. K. Lowry* and *B. H. Robison*, north jetty at Ocean City; mixed in with herbarium sample of *Acrochaetium trifilum*.

*Bangia fuscopurpurea* (Dillwyn) Lyngbye: VIRGINIA: *F. D. Ott*, Virginia Beach on stones of jetty south of resort area. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); *Wulff* (1967), York River at Gloucester Point; *Wulff* and *Webb* (1969), York River at Gloucester Point. MARYLAND: *B. L. Wulff*, *B. H. Robison* and *J. K. Lowry*, north jetty at Ocean City; *F. D. Ott*, Ocean City on rocks in marsh area just south of jetty. Zaneveld (1966-67); *Wulff et al* (1968), jetty at Ocean City.

*Porphyra leucosticta* Thuret: VIRGINIA: *K. de Witt*, Lynnhaven Inlet; *P. E. Hargraves*, York River at Gloucester Point. Zaneveld and Barnes (1965), lower Chesapeake Bay; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *B. L. Wulff*, *B. H. Robison* and *J. K. Lowry*, north jetty at Ocean City; *F. D. Ott*, Ocean City on stones of jetty. *Wulff et al* (1968), jetty at Ocean City.

*Porphyra miniata* (Lyngbye) C. Agardh: VIRGINIA: *H. J. Humm*, Hummock Channel near Wachapreague. Rhodes (1970), Burton's Bay near Wachapreague.

*Porphyra umbilicalis* (Linnaeus) J. Agardh: VIRGINIA: *F. D. Ott*, Chincoteague Inlet at Chincoteague. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); *Wulff* (1967), York River at Gloucester Point; *Wulff* and *Webb* (1969), York River at Gloucester Point. MARYLAND: Zaneveld (1966-67); *Wulff et al* (1968), jetty at Ocean City.

## Family ACROCHAETIACEAE Fritsch

*Acrochaetium alcyonidii* Jao: VIRGINIA: K. M. S. Aziz, York River at Gloucester Point.

*Acrochaetium dasyae* Collins: VIRGINIA: D. Dilliman, James River above Gum Rock.

*Acrochaetium flexuosum* Vickers: MARYLAND: Mathieson and Fuller (1969), Patuxent River west of Broomes Island.

*Acrochaetium radiatum* Jao: MARYLAND: B. L. Wulff, J. K. Lowry and B. H. Robison, jetty at Ocean City.

*Acrochaetium trifilum* (Buffham) Batters emend. Aziz: MARYLAND: B. L. Wulff, J. K. Lowry and B. H. Robison, north jetty at Ocean City; B. L. Wulff, J. K. Lowry and B. H. Robison, north jetty at Ocean City; B. H. Robison, J. K. Lowry and B. L. Wulff, north jetty at Ocean City. Wulff *et al* (1968), jetty at Ocean City.

*Acrochaetium virgatulum* (Harvey) J. Agardh: MARYLAND: Wulff *et al* (1968), jetty at Ocean City.

*Acrochaetium virgatulum* (Harvey) J. Agardh forma *luxurians* (J. Agardh) Collins: VIRGINIA: M. Wass, York River at Gloucester Point.

*Acrochaetium* spp.: MARYLAND: Wulff *et al* (1968), jetty at Ocean City.

Family HELMINTHOCLADIACEAE (J. Agardh) Harvey  
orth. mut. Hauck

*Nemalion multifidum* (Weber et Mohr) J. Agardh: MARYLAND: J. K. Lowry and B. H. Robison, north jetty at Ocean City; E. M. and B. H. Wulff, north jetty at Ocean City. Wulff *et al* (1968), jetty at Ocean City.

Family BONNEMAISONIACEAE Schmitz *in* Engler

*Asparagopsis hamifera* (Harriot) Okamura: It has been established that the two independently described algae, *Asparagopsis hamifera* and *Trailiella intricata*, are respectively the gametophytic and tetrasporophytic plants of an alga having a heteromorphic alternation of generations. While the gametophytic *Asparagopsis hamifera* has not been recorded for the geographical area under study, the tetrasporophytic *Trailiella intricata* has been found. This plant has been entered in this compilation under the



Ceramiaceae where it was assigned prior to the establishment of its relationship with *Asparagopsis hamifera*.

Family GELIDIACEAE Kützing orth. mut. Harvey

*Gelidium crinale* (Turner) Lamouroux: VIRGINIA: *M. Lynch*, jetty at Little Creek in Norfolk; *H. J. Humm*, York River at Yorktown; *F. D. Ott*, Chesapeake Bay at Cape Charles on stones of jetty. Zaneveld and Barnes (1965), lower Chesapeake Bay; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, Ocean City on rocks of jetty.

Family CORALLINACEAE (Lamouroux) Harvey

*Fosliella farniosa* (Lamouroux) Howe: VIRGINIA: *H. J. Humm*, York River at Gloucester Point.

*Fosliella lejolisii* (Rosanoff) Howe: VIRGINIA: Marsh (1970), York River.

Family SOLIERIACEAE (Harvey) Hauck

*Agardhiella tenera* (J. Agardh) Schmitz: VIRGINIA: *H. J. Humm*, York River at Gloucester Point; *K. M. S. Aziz*, York River at Gloucester Point; *P. E. Hargraves*, York River at Gloucester Point; *F. D. Ott*, Hampton Roads at Lynnhaven. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); Mangum, Santos and Rhodes (1968), York River at Sandy Point; Mathieson and Fuller (1969), Gwynn Island 300 yards inshore of #1 beacon; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, Assateague Beach, abundant in wash. Zaneveld (1966-67).

Family HYPNEACEAE J. Agardh

*Hypnea musciformis* (Wulfen) Lamouroux: VIRGINIA: *H. J. Humm*, York River at Yorktown; *F. D. Ott*, Chesapeake Bay at Cape Charles on stones of jetty. Zaneveld (1966-67). Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, Ocean City in marsh area just south of jetty. Zaneveld (1966-67).

Family GRACILARIACEAE (Nägeli) Kylin

*Gracilaria foliifera* (Forsskål) Børgesen: VIRGINIA: *F. D. Ott*, Burton's Bay near Wachapreague. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-

67); Mangum, Santos and Rhodes (1968), York River at Sandy Point; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *B. H. Robison* and *J. K. Lowry*, jetty at Ocean City; *F. D. Ott*, Ocean City on shells in marsh area just south of jetty. Zaneveld (1966-67); *Wulff et al* (1968), jetty at Ocean City.

*Gracilaria verrucosa* (Hudson) Papenfuss: VIRGINIA: *F. D. Ott*, Chincoteague Inlet at Chincoteague. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); Mathieson and Fuller (1969), Mobjack Bay off Guinea Marsh, Gwynn Island 300 yards inshore of #1 beacon; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, on stones in marsh area just south of jetty. Zaneveld (1966-67); Mathieson and Fuller (1969) beach midway between Cedar Point and Point No Point south of Patuxent River mouth, beach north of Cove Point, Holland Strait off South Marsh Island near #2 beacon, midway between #9 beacon and James Island Light off Crisfield, Great Rock Oyster Bar off James Island Light, Little Annemessex River at mouth of Battle Creek, Pocomoke Sound off Broad Creek, Shark Fin Shoal east of Bloodsworth Island, mouth of Patuxent River near Obstruction Buoy west of Drum Point, between Poplar Island Narrows Light and Can #1, Crab Alley Bay between Can #1 and Bodkin Island, channel between James Island and Red Nun #2, east and west of Knapps Narrows, Kent Narrows and pilings at Piney Narrows Marina.

Family GIGARTINACEAE Bory de Saint-Vincent orth. mut.

Cohn

*Chondrus crispus* Stackhouse: VIRGINIA: Zaneveld (1966-67).

Family CHAMPIACEAE Kützing orth. mut. Bliding

*Champia parvula* (C. Agardh) Harvey: VIRGINIA: *K. M. S. Aziz*, York River at Gloucester Point; *M. Wass*, York River at Gloucester Point; *F. D. Ott*, Chesapeake Bay at Cape Charles. Zaneveld and Barnes (1965), lower Chesapeake Bay; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*,

Ocean City on shells in marsh area just south of jetty. Mathieson and Fuller (1969), Great Rock Oyster Bar south of James Island Light, Little Annemessex River and Pocomoke Sound, Pocomoke Sound off Broad Creek, Shark Fin Shoal east of Bloodsworth Island.

*Lomentaria baileyana* (Harvey) Farlow: VIRGINIA: *F. D. Ott*, Burton's Bay near Wachapreague. Rhodes (1970), Burton's Bay near Wachapreague.

Family CERAMIACEAE (S. F. Gray) Harvey orth. mut.

Rabenhorst

*Antithamnion cruciatum* (C. Agardh) Nägeli: VIRGINIA: Rhodes (1970), Burton's Bay near Wachapreague.

*Callithamnion baileyi* Arnott: VIRGINIA: *B. L. Wulff*, York River at Gloucester Point. Zaneveld (1966-67). MARYLAND: *B. H. Robison*, *J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City. *Wulff et al* (1968), jetty at Ocean City.

*Callithamnion byssoides* Arnott: VIRGINIA: *M. Lynch*, jetty in Little Creek in Norfolk; *H. J. Humm*, Hummock Channel near Wachapreague; *F. D. Ott*, Burton's Bay near Wachapreague. Zaneveld and Barnes (1965), lower Chesapeake Bay; *Wulff* (1967), York River at Gloucester Point; *Wulff and Webb* (1969), York River at Gloucester Point; *Marsh* (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, Assateague Beach adrift in wash.

*Callithamnion corymbosum* (Smith) C. Agardh: VIRGINIA: *F. D. Ott*, Chincoteague Inlet at Chincoteague. Rhodes (1970), Burton's Bay near Wachapreague.

*Ceramium diaphanum* (Lightfoot) Roth: VIRGINIA: Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); *Marsh* (1970), York River. MARYLAND: Zaneveld (1966-67), *sine locus*.

*Ceramium fastigiatum* (Roth) Harvey: VIRGINIA: *M. Wass*, mouth of Chesapeake Bay; *F. D. Ott*, Chesapeake Bay at Cape Charles, on stones of jetty. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); *Marsh* (1970), York River; Rhodes (1970), Burton's

Bay near Wachapreague. MARYLAND: *B. H. Robison, J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City; *F. D. Ott*, Assateague Beach abundant in wash. *Wulff et al* (1968), jetty at Ocean City.

*Ceramium rubriforme* Kylin: VIRGINIA: Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague.

*Ceramium rubrum* (Hudson) C. Agardh: VIRGINIA: *B. L. Wulff*, York River at Yorktown; *P. E. Hargraves*, adrift in the York River at Gloucester Point; *F. D. Ott*, Chesapeake Bay at Cape Charles. Woodson (1959), mouth of James River; Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); *Wulff* (1967), York River at Gloucester Point; Mangum, Santos and Rhodes (1968), York River at Sandy Point; Mathieson and Fuller (1969); Mobjack Bay off Guinea Marsh; *Wulff* and Webb (1969), York River at Gloucester Point; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *J. K. Lowry, B. L. Wulff* and *B. H. Robison*, north jetty at Ocean City; *F. D. Ott*, Assateague Beach, abundant in the wash. Zaneveld (1966-67); *Wulff et al* (1968), jetty at Ocean City; Mathieson and Fuller (1969), beach on south shore of Patuxent River just west of entrance to Naval Station seaplane harbor, rock retaining wall on Naval Base property south shore of Patuxent River, beach north of Cove Point, Holland Strait off South Marsh Island, midway between #9 beacon and James Island Light off Crisfield, Great Oyster Bar south of James Island Light, Little Annemessex River at mouth of Battle Creek, mid-channel in Broad Creek connecting Little Annemessex River and Pocomoke Sound, Shark Fin Shoal east of Bloodsworth Island, 1.5 miles east of Bloodsworth Island, mouth of Patuxent River near Obstruction Buoy west of Drum Point, between Poplar Island Narrows Light and Can #1, Crab Alley Bay between Can #1 and Bodkin Island, channel between James Island and Red Nun #2, Kent Narrows and pilings at Piney Narrows Marina, Chester River off Cedar Point, Patuxent River 200 yards west of Broomes Island.

*Ceramium strictum* (Kützing) Harvey: VIRGINIA: *M. Wass*, York River at Gloucester Point; *P. E. Hargraves*, adrift in the York River at Gloucester Point; *J. Vogel*, eastern side of Gwynn Island near mouth of the Rappahannock River. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); Wulff (1967), York River at Gloucester Point; Mangum, Santos and Rhodes (1968), York River at Sandy Point; Mathieson and Fuller (1969), Mobjack Bay off Guinea Marsh; Wulff and Webb (1969), York River at Gloucester Point; Marsh (1970), York River. MARYLAND: *B. L. Wulff*, *J. K. Lowry* and *B. H. Robison*, north jetty at Ocean City. Zaneveld (1966-67); Wulff *et al* (1968), jetty at Ocean City; Mathieson and Fuller (1969), beach on shore of Patuxent River west of entrance to Naval Station seaplane harbor, rock retaining wall on Naval Base property south shore of Patuxent River, abandoned Cedar Point Light House, beach north of Cove Point, Holland Strait off South Marsh Island, midway between #9 beacon and James Island Light off Crisfield, Great Rock Oyster Bar south of James Island Light, Little Annemessex River at mouth of Battle Creek, mid-channel in Broad Creek connecting Little Annemessex River and Pocomoke Sound, Pocomoke Sound off Broad Creek. Shark Fin Shoal east of Bloodsworth Island, 1.5 miles east of Bloodsworth Island, mouth of Patuxent River near Obstruction Buoy west of Drum Point, mouth of Crab Alley Bay off Parson Island and Bodkin Island, channel between James Island and Red Nun #2, off Half Pone Point, 200 yards west of Broomes Island.

*Griffithsia tenuis* C. Agardh: VIRGINIA: *H. J. Humm*, York River at Gloucester Point.

*Spyridia filamentosa* (Wulfen) Harvey: VIRGINIA: *F. D. Ott*, Chesapeake Bay at Cape Charles. Mangum, Santos and Rhodes (1968), York River at Sandy Point; Mathieson and Fuller (1969), Mobjack Bay off Guinea Marsh; Pocomoke Sound near Red Nun #6; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, Ocean City on shells in marsh area just

south of jetty. Mathieson and Fuller (1969), Holland Strait off South Marsh Island, midway between #9 beacon and James Island Light off Crisfield, Great Rock Oyster Bar south of James Island Light, Little Annemessex River at mouth of Battle Creek, mid-channel in Broad Creek connecting Little Annemessex River and Pocomoke Sound, Pocomoke Sound off Broad Creek, between Red Nun #4 and Hooper Strait Light, mouth of Patuxent River near Obstruction Buoy west of Drum Point.

*Trilliella intricata* (J. Agardh) Batters: MARYLAND: Mathieson and Fuller (1969), Holland Strait off South Marsh Island, between #9 beacon and James Island Light off Crisfield, Great Rock Oyster Bar south of James Island Light, mid-channel in Broad Creek connecting Little Annemessex River and Pocomoke Sound, Pocomoke Sound off Broad Creek, between Red Nun #4 and Hooper Strait Light.

Family DASYACEAE Kützing orth. mut. Rosenberg

*Dasya pedicellata* (C. Agardh) C. Agardh: VIRGINIA: K. M. S. Aziz and J. Vogel, Haven Beach, Mathews County; F. D. Ott, Burton's Bay near Wachapreague. Zaneveld and Barnes (1965), lower Chesapeake Bay; Wulff (1967), York River at Gloucester Point; Wulff and Webb (1969), York River at Gloucester Point; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: Mathieson and Fuller (1969), beach north of Cove Point, 1300 yards east of Red Nun #6 off Sharps Island Light, between Poplar Island Narrows Light and Can #1, 900 yards east of Coaches Island, mouth of Crab Alley Bay off Parson Island and Bodkin Island, east of Knapps Narrows, off Half Pone Point.

Family DELESSERICAE Bory de Saint-Vincent orth. mut.

Nageli

*Caloglossa leprieurii* (Montagne) J. Agardh: VIRGINIA: F. D. Ott, York River at Sandy Point on *Spartina* stems. Post (1968), James River on shore of Mulberry Island above Nells Creek, R. Patrick; James River at Cobham's Wharf, J. C. Strickland. MARYLAND: Post (1968), at east-

ern shore of mouth of St. Leonard Creek near Solomon's Island, *G. Papenfuss*.

*Grinnellia americana* (C. Agardh) Harvey: VIRGINIA: *H. J. Humm*, adrift at Norfolk end of bridge in Hampton Roads; *H. J. Humm*, York River at Gloucester Point; *J. Vogel* and *K. M. S. Aziz*, Haven Beach in Mathews County; *F. D. Ott*, Burton's Bay near Wachapreague. Zaneveld and Barnes (1965), lower Chesapeake Bay; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, Ocean City in marsh area just south of jetty.

Family RHODOMELACEAE (J. Agardh) Harvey

*Bostrychia radicans* Montagne: VIRGINIA: *F. D. Ott*, James River at College Creek on old wooden retaining wall. Post (1968), James River on shore of Mulberry Island above Nells Creek, *R. Patrick* (as *Bostrychia rivularis*); on the sea wall ca.  $\frac{1}{4}$  mile above the York River Bridge at Yorktown, *H. J. Humm*; James River at Cobham's Wharf, *J. C. Strickland*; Old Plantation Creek ca. two miles south of Cape Charles, *H. G. Richards*. MARYLAND: Post (1968), at eastern shore of mouth of St. Leonard Creek, near Solomon's Island, *G. Papenfuss* (as *Bostrychia radicans* forma *moniliforme*); at Patuxent River opposite Solomon's Island Bridge, *G. Papenfuss*.

*Bostrychia rivularis* Harvey: VIRGINIA: *H. J. Humm*, York River in the Guinea Marshes. Rhodes (1970), Burton's Bay near Wachapreague.

*Chondria baileyana* (Montagne) Harvey: VIRGINIA: *H. J. Humm*, York River in the Guinea Marshes; *F. D. Ott*, Burton's Bay near Wachapreague.

*Chondria sedifolia* Harvey: VIRGINIA: Rhodes (1970), Burton's Bay near Wachapreague.

*Chondria tenuissima* (Goodenough et Woodward) C. Agardh: VIRGINIA: *H. J. Humm*, jetty at Cape Charles. Zaneveld (1966-67); Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: Zaneveld (1966-67), *sine locus*.

*Polysiphonia denudata* (Dillwyn) Kützing: VIRGINIA: *P. E. Hargraves*, adrift in the York River at Gloucester

Point; *H. J. Humm*, York River at Gloucester Point; *D. Kapram*, York River at Gloucester Point; *F. D. Ott*, Chesapeake Bay at Cape Charles. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); Wulff (1967), York River at Gloucester Point; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *B. L. Wulff*, *B. H. Robison* and *J. K. Lowry*, intertidal region at Ocean City; *J. K. Lowry*, *B. H. Robison* and *B. L. Wulff*, north jetty at Ocean City; *F. D. Ott*, Assateague Beach, abundant in the wash. Zaneveld (1966-67); Wulff *et al* (1968), jetty at Ocean City.

*Polysiphonia harveyi* Bailey: VIRGINIA: *H. J. Humm*, Hummock Channel near Wachapreague; *M. Wass*, York River near Gloucester Point; *J. Vogel*, east side of Gwynn Island near mouth of Rappahannock River; *F. D. Ott*, Hampton Roads at Lynnhaven Inlet. Zaneveld and Barnes (1965), lower Chesapeake Bay; Zaneveld (1966-67); Mangum, Santos and Rhodes (1968), York River at Sandy Point; Mathieson and Fuller (1969), Mobjack Bay off Guinea Marsh; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *B. H. Robison*, *J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City; Zaneveld (1966-67); Wulff *et al* (1968), jetty at Ocean City; Mathieson and Fuller (1969), rock retaining wall on Naval Base property on south shore of Patuxent River, abandoned Cedar Point Light House, beach north of Cove Point, Holland Strait off South Marsh Island, mid-channel in Broad Creek connecting Little Annemessex River and Pocomoke Sound, Shark Fin Shoal east of Bloodsworth Island, 1.5 miles east of Bloodsworth Island, between Poplar Island Narrows Light and Can #1, 900 yards east of Coaches Island, mouth of Crab Alley Bay off Parson Island and Bodkin Island, channel between James Island and Red Nun #2, east and west of Knapps Narrows, Kent Narrows and pilings at Piney Narrows Marina.

*Polysiphonia nigrescens* (Hudson) Greville: VIRGINIA: *B. L. Wulff*, York River at Gloucester Point; *F. D. Ott*, Burton's Bay near Wachapreague. Zaneveld and Barnes



(1965), lower Chesapeake Bay; Zaneveld (1966-67); Wulff (1967), York River at Gloucester Point; Wulff and Webb (1969), York River at Gloucester Point; Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: *F. D. Ott*, Ocean City on stones of jetty. Zaneveld (1966-67).

*Polysiphonia novae-angliae* Taylor: MARYLAND: *B. H. Robison, J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City; *J. K. Lowry, B. L. Wulff* and *B. H. Robison*, north jetty at Ocean City. *Wulff et al* (1968), jetty at Ocean City.

*Polysiphonia subtilissima* Montagne: VIRGINIA: *J. Vogel*, west side of Gwynn Island near mouth of the Rappahannock River; *F. D. Ott*, Chesapeake Bay at Cape Charles. Zaneveld (1966-67); Marsh (1970), York River; Rhodes (1970), Burton's Bay near Wachapreague. MARYLAND: Zaneveld (1966-67).

*Polysiphonia urceolata* (Lightfoot) Greville: MARYLAND: *J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City. *Wulff et al* (1968), jetty at Ocean City.

#### DIVISION CYANOPHYCOPHYTA

##### Family CHROOCOCCACEAE Nägeli

*Agmenellum quadruplicatum* (Meneghini) de Brébisson: GENERAL: Griffith (1961), Chesapeake Bay, *R. E. Griffith*; *D. C. Morris*.

*Agmenellum thermale* (Kützing) Drouet et Daily: MARYLAND: Drouet and Daily (1956), Potomac River at Plummers Island west of Cabin John, *F. Drouet, E. P. Killip* and *D. Richards*.

*Anacystis cyanea* Drouet et Daily: VIRGINIA: *B. L. Wulff* bloom in the Rappahannock between Tappahannock and Port Royal. Drouet and Daily (1956), Queens Creek at Haw Tree Landing, *A. F. Chestnut*.

*Anacystis dimidiata* (Kützing) Drouet et Daily: VIRGINIA: Zaneveld (1966), Chincoteague Island in a ditch, *L. C. Goldstein, E. S. Luttrell* and *J. C. Strickland*. MARY-

LAND: Zaneveld (1966), Smith Island at Tylerton, *P. W. Wolle*. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Anacystis marina* Drouet et Daily: VIRGINIA: *E. T.* and *B. L. Wulff*, York River at Gloucester Point; *H. J. Humm*, York River at Gloucester Point. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Anacystis montana* (Lightfoot) Drouet et Daily forma *montana* (Lightfoot) Drouet et Daily: GENERAL: Griffith (1961), Chesapeake Bay.

*Anacystis montana* (Lightfoot) Drouet et Daily forma *minor* (Wille) Drouet et Daily: GENERAL: Griffith (1961), Chesapeake Bay.

*Anacystis thermalis* (Meneghini) Drouet et Daily forma *thermalis* (Meneghini) Drouet et Daily: GENERAL: Griffith (1961), Chesapeake Bay.

*Chroococcus turgidus* (Kützing) Nägeli: MARYLAND: Drouet (1939), in brackish waters: marsh pool at Chance, marsh pool west of Ewell on Smiths Island, marsh pool at Tylerton on Smiths Island, *P. W. Wolle*.

*Chroococcus* sp.: MARYLAND: Morse (1947), mouth of Patuxent River.

*Coccochloris elabens* (de Brébisson) Drouet et Daily: GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Coccochloris peniocystis* (Kützing) Drouet et Daily: GENERAL: Griffith (1961), Chesapeake Bay.

*Coccochloris stagnina* Sprengel: VIRGINIA: Drouet and Daily (1956), Virginia Beach in pool and on wet soil in the Back Bay National Wildlife Refuge, *H. A. Bailey*, *E. S. Luttrell* and *J. C. Strickland*; Zaneveld (1966), Virginia Beach in the Back Bay National Wildlife Refuge in pool and on wet soil under slightly brackish conditions, *H. A. Bailey*, *E. S. Luttrell* and *J. C. Strickland*. MARYLAND: Zaneveld (1966). GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Gomphosphaeria aponina* Kützing: MARYLAND: Drouet (1939), in brackish water: marsh pool between Chance

and Dames Quarter. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Gomphosphaeria lacustris* Chodat: GENERAL: Griffith (1961), Chesapeake Bay.

*Johannesbaptistia pellucida* (Dickie) Taylor et Drouet: MARYLAND: Drouet (1939), brackish waters: marsh pool west of Ewell on Smiths Island, marsh pool between Chance and Dames Quarter, *P. W. Wolle*. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Merismopedia glauca* (Ehrenburg) Nägeli: MARYLAND: Morse (1947), mouth of Patuxent River.

#### Family ENTOPHYSALIDACEAE Geitler

*Entophysalis conferta* Drouet et Daily: VIRGINIA: *M. Wass*, York River at Gloucester Point; Mangum, Santos and Rhodes (1968), York River at Sandy Point. MARYLAND: Wulff *et al* (1968), jetty at Ocean City.

*Entophysalis deusta* (Meneghini) Drouet et Daily: VIRGINIA: Drouet and Daily (1956), York River at Yorktown, *J. C. Strickland*, York River at Yorktown, *H. J. Humm*; Zaneveld (1966), York River at Yorktown, *J. C. Strickland*, Zaneveld (1966); Wulff (1967), York River at Gloucester Point; Mangum, Santos and Rhodes (1968), York River at Sandy Point; Wulff and Webb (1969), York River at Gloucester Point. MARYLAND: *B. H. Robison*, *J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City. Drouet and Daily (1956), salt marsh flat at Chesapeake Beach, *E. C. Leonard*, in Patuxent River at Solomons Island, *F. Drouet*, *E. P. Killip* and *F. R. Forsberg*, on mud at Wenona, *P. W. Wolle* and *F. Drouet*, on hardened soil on the shore of Tangier Sound near Prickly Point, *F. Drouet* and *P. W. Wolle*; Zaneveld (1966). Wulff *et al* (1968), jetty at Ocean City. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

#### Family OSCILLATORIACEAE (S. F. Gray)

##### Dumortier ex Kirchner

*Arthrospira brevis* (Kützing) Drouet: VIRGINIA: Drouet (1968), culture from York River at Yorktown, *J. C. Strickland*. MARYLAND: Drouet (1968), on mud and pilings at

Wenona, *P. W. Wolle* and *F. Drouet*; bank of Potomac River above Point of Rocks, *M. H. Hohn*.

*Hydrocoleum holdenii* Tilden: MARYLAND: *Drouet* (1939), in a salt marsh one mile south of Public Landing in Assateague Bay, *P. W. Wolle*; marsh ditch at Tylerton on Smiths Island, *P. W. Wolle*. GENERAL: *Griffith* (1961), Chesapeake Bay, *F. Drouet* and *F. K. Daily*.

*Lyngbya aerugineo-coerulea* (Kützing) Gomont: GENERAL: *Griffith* (1961), Chesapeake Bay.

*Lyngbya aestuarii* (Mertens) Lyngbye in Liebman ex Gomont: VIRGINIA: *Strickland* (1940), from a marine aquarium at West Point, *J. W. Bailey* and *J. C. Strickland*; *Zaneveld* (1966), Chincoteague Island, *L. C. Goldstein*, *E. S. Luttrell* and *J. C. Strickland*; coating on dead tree five miles upstream from the York River Bridge, at the old ferry landing at Gloucester Point, on border of York River near Gloucester Point, *C. F. Rhyne*; *Zaneveld* (1966-67). MARYLAND: *Drouet* (1939), subaerial in brackish and marine waters: salt marsh at Public Landing in Assateague Bay, *P. W. Wolle*, brackish ditch at Ewell; *Zaneveld* (1966), Rattlesnake Landing at Chincoteague Bay, *J. Zaneveld*, *W. D. Barnes* and *H. W. West*; *Zaneveld* (1966-67). GENERAL: *Griffith* (1961), Chesapeake Bay, *F. Drouet*.

*Lyngbya confervoides* C. Agardh ex Gomont: VIRGINIA: *Zaneveld* (1966). MARYLAND: *Drouet* (1939), on rocks and wood in marine waters: on pilings of old wharf at Public Landing in Assateague Bay, *P. W. Wolle*, jetty on Upper Thoroughfare on Deal Island, on rocks at Wenona; *Zaneveld* (1966), Ocean City in harbor on wooden pilings, *J. Zaneveld*, *W. D. Barnes* and *H. W. West*; *Zaneveld* (1966). GENERAL: *Griffith* (1961), Chesapeake Bay, *F. Drouet*.

*Lyngbya gracilis* (Meneghini) Rabenhorst: VIRGINIA: *H. J. Humm*, York River in the Guinea Marshes.

*Lyngbya lutea* (C. Agardh) Gomont ex Gomont: VIRGINIA: *Strickland* (1940), in brackish and salt water habitats: from pilings of West Norfolk Bridge in Portsmouth, on stump in James River at Cobham's Wharf; *Zaneveld*

(1966), on pilings of West Norfolk Bridge in Portsmouth, *J. C. Strickland*, on stump in James River at Cobham's Wharf, *J. C. Strickland*; York River at Seaford, *R. W. Menzel* and *J. C. Strickland*. MARYLAND: Drouet (1939), on rocks and wet soil on shores: on banks of Nanticoke River opposite Sand Hill Beach at Tyaskin. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Lynngbya semiplena* (C. Agardh) J. Agardh ex Gomont: VIRGINIA: Zaneveld (1966), Chincoteague Island, *L. C. Goldstein*, *E. S. Luttrell* and *J. C. Strickland*, Wachapreague in harbor on wooden pilings, *J. Zaneveld*, *W. D. Barnes* and *H. W. West*, Cape Charles city harbor on rocks of breakwater, *C. F. Rhyne*, Virginia Beach at Lynnhaven Inlet, *W. D. Barnes*, Virginia Beach at Lynnhaven Inlet forming a slimy coating on a bulkhead, *W. D. Barnes*, western side of Lynnhaven Bay on oyster shells, *W. D. Barnes*, Little Creek Inlet on the western breakwater, *C. F. Rhyne*, *B. Phillips* and *J. Zaneveld*, Back Bay, *H. A. Bailey*, *E. S. Luttrell* and *J. C. Strickland*, Chesapeake at west side of Great Bridge, *C. M. Wilson*, Norfolk on rocks, *W. D. Barnes* and *H. W. West*, in York River at Queens Creek, *A. F. Chestnut* and *J. C. Strickland*, York River five miles upstream from York River Bridge, along border of York River, *C. F. Rhyne*. MARYLAND: *J. K. Lowry*, *B. H. Robison* and *B. L. Wulff*, north jetty at Ocean City. Drouet (1939), in marine and brackish waters: in Chesapeake Bay, *H. C. Bold*; Zaneveld (1966); Wulff *et al* (1968), jetty at Ocean City. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Microcoleus chthonoplastes* (Mertens) Zanardini ex Gomont: VIRGINIA: *K. M. S. Aziz*, Mobjack Bay; Zaneveld (1966), at the old ferry landing at Gloucester Point, on border of York River near Gloucester Point, *C. F. Rhyne*; Zaneveld (1966-67); Wulff (1967), York River at Gloucester Point; Wulff and Webb (1969), York River at Gloucester Point. MARYLAND: Drouet (1939), on mud flat between Ewell and Rhodes Point on Smiths Island, brackish ditch between Wenona and Deal Island, wet sand along Upper

Thoroughfare on Deal Island, on wet soil at White Haven Ferry at Mt. Vernon; Zaneveld (1966), Rattlesnake Landing in Chincoteague Bay, *J. Zaneveld, W. D. Barnes, and H. W. West*; Zaneveld (1966-67). GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Microcoleus lyngbyaceus* (Kützing) Crouan: VIRGINIA: Wulff (1967), York River at Gloucester Point; Drouet (1968), Mulberry Island in James River, *R. Patrick*; Wulff and Webb (1969), York River at Gloucester Point. MARYLAND: Drouet (1968), Crisfield, *F. Drouet and P. W. Wolle*; Cabin John, *F. Drouet and E. P. Killip*, Chesapeake Bay, *H. C. Bold*, Chincoteague Bay, *J. Zaneveld, W. D. Barnes and H. W. West*.

*Microcoleus tenerrimus* Gomont: VIRGINIA: *K. M. S. Aziz*, York River between York River Bridge and Naval Weapons Station; Zaneveld (1966), western side of Lynnhaven Inlet on oyster shells, *W. D. Barnes and H. W. West*. MARYLAND: Drouet (1939), in brackish and marine waters: on pilings at Wenona. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Microcoleus vaginatus* (Vaucher) Gomont: VIRGINIA: Drouet (1968), James River downstream from Jamestown, *R. Patrick*. MARYLAND: Drouet (1968), Patuxent River at Benedict, *F. Drouet and C. W. Reimer*, Plummers Island in Potomac River west of Cabin John, *Drouet et al.*

*Oscillatoria amphibia* C. Agardh ex Gomont: VIRGINIA: Zaneveld (1966), west of Queen Sound, *L. C. Goldstein, E. S. Luttrell, and J. C. Strickland*. MARYLAND: Drouet (1939), in brackish and almost fresh water: marsh pool between Chance and Dames Quarter; Zaneveld (1966). GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Oscillatoria brevis* Kützing ex Gomont var. *neapolitana* (Kützing) Gomont: MARYLAND: Drouet (1939), in brackish and semi-marine waters, on pilings at Wenona, puddle at old wharf at Shelltown, *P. W. Wolle*. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Oscillatoria laetevirens* Crouan ex Gomont: VIRGINIA:

Zaneveld (1966), York River at Seaford, *J. C. Strickland*; Zaneveld (1966-67).

*Oscillatoria lutea* C. Agardh: VIRGINIA: Drouet (1968), on pilings at Seaford, *J. C. Strickland*, on shells in James River 4.5 miles downstream from Jamestown Island, *R. Patrick*, pilings of bridge at Portsmouth, *J. C. Strickland et al.* MARYLAND: Drouet (1968), bank of Nanticoke River opposite Sandy Hill Beach at Tyaskin, *P. W. Wolle* and *F. Drouet*.

*Oscillatoria margaritifera* Kützing ex Gomont: VIRGINIA: Zaneveld (1966), west of Queens Sound, *L. C. Goldstein, E. S. Luttrell* and *J. C. Strickland*, York River at Seaford, *L. C. Goldstein, E. S. Luttrell* and *J. C. Strickland*. MARYLAND: Drouet (1939), in brackish and semimarine waters: marsh ditch at Weona, *P. W. Wolle*, marsh pool at Chance, marsh ditch at Tylerton on Smiths Island, *P. W. Wolle*; Zaneveld (1966).

*Oscillatoria nigro-viridis* Thwaites in Harvey ex Gomont: VIRGINIA: *B. L. Wulff*, York River at Gloucester Point. *Strickland* (1940), on pilings of the West Norfolk Bridge at Portsmouth; Zaneveld (1966), west of Queen Sound, *L. C. Goldstein, E. S. Luttrell* and *J. C. Strickland*, on pilings of West Norfolk bridge, *J. C. Strickland*. MARYLAND: Drouet (1939), in marine and semimarine waters: on pilings at Wenona.

*Oscillatoria princeps* Vaucher ex Gomont: VIRGINIA: Zaneveld (1966), northwest of Wachapreague, *L. C. Goldstein, E. S. Luttrell* and *J. C. Strickland*, Portsmouth west of Hickory, *C. M. Wilson*. MARYLAND: Zaneveld (1966).

*Oscillatoria retzii* C. Agardh: VIRGINIA: Drouet (1968), on logs in James River north of the Fort Eustis Dock, *R. Patrick*.

*Oscillatoria salinarum* Collins, Holden and Setchell: VIRGINIA: Zaneveld (1966), west of Queen Sound, *L. C. Goldstein, E. S. Luttrell* and *J. C. Strickland*. MARYLAND: Drouet (1939), brackish ditch at Ewell on Smiths Island, marsh ditch near Wenona, *P. W. Wolle*, Tylerton, *P. W. Wolle*.

*Oscillatoria splendida* Greville ex Gomont: VIRGINIA: Zaneveld (1966), Portsmouth west of Great Bridge, C. M. Wilson; Zaneveld (1966-67). MARYLAND: Zaneveld (1966).

*Oscillatoria submembranaceae* Ardissonne et Strafforello: VIRGINIA: Drouet (1968), on barnacles on a pier at Seaford, J. C. Strickland. MARYLAND: Drouet (1968), on mud at Ewell on Smiths Island, P. W. Wolle and F. Drouet, on an alluvial flat on Plummers Island in the Potomac River west of Cabin John.

*Oscillatoria subuliformis* Thwaites in Kützing ex Gomont: VIRGINIA: M. Wass, on barnacles on a buoy in Sarah's Creek. Strickland (1940), from experimental jars in which oysters were active at West Point, J. W. Bailey, in Richmond from a marine aquarium at the University of Virginia, J. W. Bailey and J. C. Strickland. Zaneveld (1966), Yorktown, R. M. Moore and J. C. Strickland, south border of York River.

*Oscillatoria* sp.: VIRGINIA: Marshall (1967), Elizabeth River. MARYLAND: Morse (1947), mouth of Patuxent River.

*Phormidium persicinum* (Reinke) Gomont: VIRGINIA: Strickland (1940), from marine aquaria at West Point, J. W. Bailey and J. C. Strickland.

*Phormidium retzii* (C. Agardh) Kützing ex Gomont: VIRGINIA: Strickland (1940), James River at Cobham's Wharf.

*Phormidium submembranaceum* (Ardissonne et Strafforello) Gomont: VIRGINIA: H. J. Humm, York River at Gloucester Point.

*Phormidium uncinatum* (J. Agardh) Gomont: VIRGINIA: M. Wass, York River at Gloucester Point.

*Phormidium weissii* Drouet: MARYLAND: Drouet (1939), in a brackish pool at Wenona, on *Ruppia* in a marsh pool between Ewell and Rhodes Point on Smiths Island, road puddle at old wharf at Shelltown, P. W. Wolle. GENERAL: Griffith (1961), Chesapeake Bay, F. Drouet.

*Porphyrosiphon notarisii* (Meneghini) Kützing: VIRGINIA: Wulff (1967), York River at Gloucester Point;



Drouet (1968), Mulberry Island in the James River; Wulff and Webb (1969), York River at Gloucester Point. MARYLAND: Drouet (1968), in a saltmarsh near Jenkins Creek at Crisfield, *F. Drouet* and *P. W. Wolle*.

*Porphyrosiphon splendidus* (Greville) Drouet: VIRGINIA: Drouet (1968), Portsmouth west of Great Bridge, *C. M. Wilson*. MARYLAND: Drouet (1968), Potomac River three miles below mouth of Monocacy River, *M. H. Hohn*, Waterloo Marsh at Monie Creek, *P. W. Wolle*.

*Schizothrix arenaria* (Berkeley) Gomont: VIRGINIA: Drouet (1968), James River north of Fort Eustis Dock, *R. Patrick*. MARYLAND: Drouet (1968), Plummers Island in Potomac River west of Cabin John, *F. Drouet* and *E. P. Killip*, marsh on shore of Patuxent River, *F. Drouet* and *C. W. Reimer*, salt marsh near Rattlesnake Landing at Chincoteague Bay, *Moul.*

*Schizothrix calcicola* (C. Agardh) Gomont: VIRGINIA: *E. T.* and *B. L. Wulff*, York River at Gloucester Point; *H. J. Humm*, York River at Gloucester Point. Zaneveld (1966), Strickland in MS 1943; Zaneveld (1966-67); Wulff (1967), York River at Gloucester Point; Drouet (1968), James River at Mulberry Island, *R. Patrick*, York River at West Point, *J. W. Bailey*, in James River downstream from Jamestown Island; Mangum, Santos and Rhodes (1968), York River at Sandy Point; Wulff and Webb (1968), York River at Gloucester Point. MARYLAND: Drouet (1968), in Potomac River west of Cabin John, *F. Drouet* and *E. P. Killip*, salt marsh at Crisfield, *F. Drouet* and *P. W. Wolle*, in Patuxent River at Solomons Island, *E. P. Killip*, *F. Drouet* and *F. R. Fosberg*; Wulff *et al* (1968), jetty at Ocean City.

*Schizothrix tenerrima* (Gomont) Drouet: VIRGINIA: Drouet (1968), James River at Mulberry Island, *R. Patrick*, James River at Cobham's Wharf, *J. C. Strickland*. MARYLAND: Drouet (1968), Patuxent River at Solomons Island, *F. Drouet*, *E. P. Killip* and *F. R. Fosberg*, at Wenona, *P. W. Wolle* and *F. Drouet*.

*Spirulina major* Kützing ex Gomont: MARYLAND: Drouet

(1939), brackish pool at Wenona, Cove Point, *H. C. Bold*.  
GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Spirulina subsalsa* Oersted ex Gomont: VIRGINIA: Strickland (1940), York River near West Point, *J. W. Bailey*, at West Point from jars in which oysters were active, *J. W. Bailey*, in Richmond at the University of Richmond in a marine aquarium; Zaneveld (1966), York River near Yorktown, *J. C. Strickland*; Zaneveld (1966-67); Wulff (1967), York River at Gloucester Point; Wulff and Webb (1969), York River at Gloucester Point. MARYLAND: Drouet (1939), in marine and brackish waters: in a marsh pool between Chance and Dames Quarter; Zaneveld (1966); Drouet (1968), Cove Point, *H. C. Bold*, Jerico Marshes west of Fairmount, *F. Drouet* and *P. W. Wolle*, between Ewell and Rhodes Point on Smiths Island, *P. W. Wolle* and *F. Drouet*, marsh south of Jenkins Creek near Crisfield, *F. Drouet* and *P. W. Wolle*. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Spirulina subsalsa* Oersted forma *oceanica* (Crouan) Gomont: VIRGINIA: *H. J. Humm*, on barnacles from a buoy in Sarah's Creek.

*Spirulina tenerrima* Kützing ex Gomont: MARYLAND: Drouet (1939), in brackish and marine waters: marsh pool between Ewell and Rhodes Point on Smiths Island. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Spirulina* sp.: MARYLAND: Morse (1947), mouth of Patuxent River.

*Symploca atlantica* Gomont: VIRGINIA: Strickland (1940), James River at Cobham's Wharf; Zaneveld (1966), York River near Gloucester Point, *C. F. Rhyne*, James River at Cobham's Wharf, *J. C. Strickland*. MARYLAND: Zaneveld (1966), on wooden harbor pilings at Snow Hill Public Landing, *J. Zaneveld*, *W. D. Barnes*, and *H. W. West*.

*Trichodesmium thiebautii* Gomont: VIRGINIA: *F. D. Ott*, very abundant in the phytoplankton during August and September in the lower Chesapeake Bay, 1970.

## Family NOSTOCACEAE Dumortier ex Engler

*Anabaena inaequalis* (Kützing) Bornet et Flahault: VIRGINIA: *H. J. Humm*, York River at Yorktown.

*Anabaena sphaerica* Bornet et Flahault: MARYLAND: Drouet (1939), in a brackish ditch between Wenona and Deal Island. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

*Anabaena torulosa* (Carmichael) Lagerheim ex Bornet et Flahault: VIRGINIA: Zaneveld (1966), south border of York River near the York River Bridge.

## Family MICROCHAETACEAE Lemmermann

*Nodularia harveyana* (Thwaites) Thuret: VIRGINIA: *K. M. S. Aziz*, York River at Yorktown. MARYLAND: Drouet (1939), floating in a brackish pond at Rhodes Point on Smiths Island. GENERAL: Griffith (1961), Chesapeake Bay, *F. Drouet*.

## Family RIVULARIACEAE Kützing ex Bornet et Flahault

*Dichothrix penicillata* Zanardini ex Bornet et Flahault: VIRGINIA: Zaneveld (1966), York River 15 miles downstream from the York River Bridge.

*Calothrix confervicola* (Roth) C. Agardh: VIRGINIA: *K. M. S. Aziz*, York River between the York River Bridge and the Naval Weapons Station. MARYLAND: *B. L. Wulff*, *B. H. Robison* and *J. K. Lowry*, north jetty at Ocean City, *J. K. Lowry*, *B. H. Robison* and *B. L. Wulff*, north jetty at Ocean City. *Wulff et al* (1968), jetty at Ocean City.

*Calothrix crustaceae* Schousboe et Thuret ex Bornet et Thuret: VIRGINIA: *H. J. Humm*, York River at Gloucester Point. Zaneveld (1966), on oyster shells on the west side of Lynnhaven Inlet, *W. D. Barnes* and *H. W. West*, on wooden pole of the old ferry landing at Gloucester Point, *J. Zaneveld*; Zaneveld (1966-67); *Wulff* (1967), York River at Gloucester Point; *Wulff* and *Webb* (1969), York River at Gloucester Point. MARYLAND: *B. H. Robison*, *J. K. Lowry* and *B. L. Wulff*, north jetty at Ocean City; *J. K. Lowry*, *B. H. Robison* and *B. L. Wulff*, north jetty at Ocean City. Zaneveld (1966), Snow Hill Public Landing on concrete blocks in Chincoteague Bay, *J. Zaneveld*, *W. D.*

*Barnes* and *H. W. West*; *Zaneveld* (1966-67); *Wulff et al* (1968), jetty at Ocean City.

*Calothrix pulvinata* (Mertens) C. Agardh: MARYLAND: *Drouet* (1939), in marine and brackish waters: on pilings in Nanticoke River at Sandy Hill Beach in Tyaskin, on pilings of old wharf at Shelltown, *P. W. Wolle*. GENERAL: *Griffith* (1961), Chesapeake Bay, *F. Drouet*.

*Rivularia nitida* C. Agardh: MARYLAND: *Drouet* (1939), in wet brackish places: on cedar stumps at head of Pocomoke Sound below Shelltown, *P. W. Wolle*. GENERAL: *Griffith* (1961), Chesapeake Bay, *F. Drouet*.

Family SCYTONEMATACEAE Kützing ex Bornet et Flahault

*Fremyella grisea* (Bornet et Flahault) J. de Toni: MARYLAND: *Drouet* (1939), in marine and brackish waters: on pilings of old wharf at Shelltown, *P. W. Wolle*. GENERAL: *Griffith* (1961), Chesapeake Bay, *F. Drouet*.

*Plectonema calothrichoides* Gomont: VIRGINIA: *K. M. S. Aziz*, York River above the York River Bridge.

*Plectonema golenkinianum* Gomont: MARYLAND: *Drouet* (1939), in marine and brackish waters: on pilings of old wharf at Shelltown, *P. W. Wolle*. GENERAL: *Griffith* (1961), Chesapeake Bay, *F. Drouet*.

*Plectonema terebrans* Bornet et Flahault: VIRGINIA: *K. M. S. Aziz*, York River near Yorktown.

Family STIGONEMATACEAE Kirchner

*Mastigocoleus testarum* Bornet et Flahault: VIRGINIA: *H. J. Humm*, York River at Gloucester Point.

#### SUMMARY

In the preceding treatment 213 taxa have been recorded for the area under study. A number of these taxa, especially in the Chlorophycophyta, are strictly freshwater algae and are included herein only because they have been reported as being present. A few other taxa of the Cyanophycophyta may be entered in this treatment under two different names for the reasons discussed in the introduction to this paper.

These 213 taxa are distributed in the four algal divisions as follows:

<i>Division</i>	<i>Number</i>	<i>Percent</i>
Chlorophycophyta	55	25.8
Phaeophycophyta	29	13.6
Rhodophycophyta	54	25.4
Cyanophycophyta	75	35.2

It is interesting to note that the majority of the collecting sites within the area under study center about either 1) the marine laboratories located at Solomons Island, Gloucester Point, Norfolk, and Wachapreague, or, 2) the stone jetties at Ocean City and in Norfolk. Little attention has been given to the algal flora elsewhere including the thousands of acres of *Spartina* salt marshes, the oyster reefs, and the possible algal flora of the deeper waters off the Atlantic coast and in the Chesapeake Bay. As these particular areas are more thoroughly and more systematically surveyed, it should be anticipated that additional taxa will be added to the marine algal flora of Maryland and Virginia. For each algal species reported, its known geographical distribution in the area is given.

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#### LITERATURE CITED

- BOLD, H. C. 1967. *Morphology of Plants*, 2nd ed. Harper & Row, Publishers, New York. XXIX + 541 pp.
- DROUET, F. 1939. The Myxophyceae of Maryland. *Field Mus. Nat. Hist., Bot. Ser.* (Chicago) 20(1): 1-14.

- . 1968. *Revision of the Classification of the Oscillatoriaceae*. Monograph No. 15, The Academy of Natural Sciences of Philadelphia. Philadelphia. 370 pp., including 131 figs.
- DROUET, F. and W. A. DAILY. 1956. Revision of the Cocoid Myxophyceae. *Butler Univ. Bot. Studies* (Indianapolis) XII: 1-218.
- GRIFFITH, R. E. 1961. *Phytoplankton of Chesapeake Bay, an Illustrated Guide to the Genera*. Contribution No. 172, Chesapeake Biological Laboratory, Maryland Department of Research and Education, Solomons, Maryland. IV + 79 pp., including 123 figs.
- HUMM, H. J. 1963. *Dictyota dichotoma* in Virginia. *Virginia Jour. Sci.* (Richmond) (N.S.) 14(3): 109-111.
- MANGUM, C. P., S. L. SANTOS, and W. R. RHODES, JR. 1968. Distribution and feeding in the onuphid polychaete, *Diopatra cuprea* (Bosc.) *Mar. Biol.* (Berlin) 2: 33-40.
- MARSH, G. A. 1970. *A Seasonal Study of Zostera Epibiota in the York River, Virginia*. Doctor of Philosophy Dissertation, College of William and Mary, Faculty of the School of Marine Science, Gloucester Point, Virginia. XI + 156 pp.
- MARSHALL, H. G. 1967. Plankton in James River Estuary, Virginia II. Phytoplankton in the Elizabeth River. *Virginia Jour. Sci.* (Richmond) (N.S.) 18(3): 105-109.
- MATHIESON, A. and S. W. FULLER. 1969. A preliminary investigation of the benthonic marine algae of Chesapeake Bay region. *Rhodora* (Boston) 71: 524-534.
- MORSE, D. C. 1947. Some observations on seasonal variations in plankton population, Patuxent River, Maryland, 1943-1945. *Chesapeake Biol. Lab. Publ.* (Solomons, Maryland) 65: 1-31.
- PAPENFUSS, G. F. 1955. Classification of the Algae, pp. 115-224 in R. C. Miller, E. L. Kessel and G. F. Papenfuss. *A Century of Progress in the Natural Sciences, 1853-1953*. California Academy of Science, San Francisco. XII + 807 pp.
- PATTEN, B. C., R. A. MULFORD and J. E. WARINNER. 1963. An annual phytoplankton cycle in the lower Chesapeake Bay. *Chesapeake Sci.* (Solomons, Maryland) 4(1): 1-20.
- POST, E. 1968. Zur Verbreitungs-Ökologie des Bostrychietum. *Hydrobiologia* (Den Haag) 31(2): 241-316.
- RHODES, R. G. 1970. Seasonal occurrence of marine algae on an oyster reef in Burton's Bay, Virginia. *Chesapeake Sci.* (Solomons, Maryland) 11(1): 61-63.
- STRICKLAND, J. C. 1940. The Oscillatoriaceae of Virginia. *Amer. Jour. Bot.* (Lancaster) 27: 628-633.
- WOODSON, B. E. 1959. A study of the Chlorophyta of the James River basin, Virginia. I. Collection points and species list. *Virginia Jour. Sci.* (Richmond) (N.S.) 10(2): 70-82.

- WULFF, B. L. 1967. *Intertidal Zonation of Marine Algae at Gloucester Point, Virginia*. Master of Arts Thesis, The College of William and Mary, Department of Marine Science, The Virginia Institute of Marine Science, Gloucester Point, Virginia. VII + 49 pp.
- WULFF, B. L., E. M. T. WULFF, B. H. ROBISON, J. K. LOWRY, and H. J. HUMM. 1968. Summer marine algae of the jetty at Ocean City, Maryland. *Chesapeake Sci.* (Solomons, Maryland) 9(1): 56-60.
- WULFF, B. L. and K. L. WEBB. 1969. Intertidal zonation of marine algae at Gloucester Point, Virginia. *Chesapeake Sci.* (Solomons, Maryland) 10(1): 29-35.
- ZANEVELD, J. 1966. The marine algae of the American coast between Cape May, N. J. and Cape Hatteras, N. C. I. The Cyanophyta. *Bot. Mar. (Hamburg)* IX (¾): 101-128, including figs. 1-7.
- ZANEVELD, J. S. and W. D. BARNES. 1965. Reproductive periodicities of some benthic algae in lower Chesapeake Bay. *Chesapeake Sci.* (Solomons, Maryland) 6(1): 17-32.
- ZANEVELD, J. S. 1966-67. *The Benthic Marine Algae of Delaware: A Preliminary Checklist, Revised from 1966*. Scientific Series, Publication No. 2, Old Dominion College, Norfolk, Virginia. 36 pp. mimeographed.

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