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A SURVEY OF THE SEAWEEDS OF THE AEGEAN SEA WITH TAXONOMIC STUDIES ON SPECIES OF THE TRIBE ANTITHAMNIEAE (RHODOPHYTA)

BY

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II. "-. 1983. The life history of *Antithamnion heterocladum* (Rhodophyta, Ceramiales) in culture.- Botanica mar., 26:153-157.
III. "-. 1985a. North Aegean marine algae. I. New records and observations from the Sithonia Peninsula, Greece.- Botanica mar., 28: 453-468.
IV. "- 1985b. The taxonomic recognition of *Pterothamnion crispum* (Rhodophyta, Ceramiales), with a survey of the carposporophyte position in genera of the Antithamnieae.- Br. phycol. J., 20:381-389.
V. "- 1986. A comparative study of *Antithamnion tenuissimum* and three varieties of *Antithamnion cruciatum*, including var. *scandinavicum* var. nov. (Rhodophyceae).- Nord. J. Bot. 6:703-709.

Abstract

Athanasiadis, A. 1987. A survey of the seaweeds of the Aegean Sea with taxonomic studies on species of the tribe Antithamnieae (Rhodophyta).

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The seaweed vegetation of the Sithonia Peninsula (N. Aegean Sea) was investigated during the years 1980-86 and data on the morphology, taxonomy, nomenclature, ecology and distribution of 265 identified taxa of Rhodophyta, Phaeophyta, and Chlorophyta are presented. More than 80 species are new to the Aegean Sea, and among them the Atlantic rhodophytes *Peyssonnelia immersa* Maggs & Irvine, *Antithamnion ogdeniae* Abbott, *Chondria collinsiana* Howe, *Chondria polyrhiza* Coll. & Herv., and phaeophytes *Mesogloia lanosa* P. & H. Crouan, *Microspongium gelatinosum* Reinke, and *Ralfsia clavata* (Harv.) P. & H. Crouan, are new to the Mediterranean flora.

Ten species, belonging to the genera *Mesophyllum* Lemoine, *Phymatolithon* Foslie, *Haematocelis* J. Ag., *Peyssonnelia* Decne, *Laurencia* Lamour., *Chondria* C. Ag., *Seirospora* Harv., *Myrionema* Grev., *Myriactula* O. Kuntze, and *Bryopsis* Lamour., are provisionally described under their generic names as identification to species level requires critical revision of the genera.

A survey of the seaweeds of the Aegean Sea is given for the first time and in this connection many previously recorded taxa are excluded or reduced to synonyms, and two new combinations are made: *Spongites notarisii* (Dufour) Athanasiadis and *Balliella cladoderma* (Zanardini) Athanasiadis. It shows that at least 440 recognized species and taxa of lower rank occur , of which about 20% are Mediterranean endemics. Most of the taxa (ca 78 %) have a Mediterranean-Atlantic origin.

Within the area investigated, the distribution of the species identified appears to be similar to that described elsewhere in the Mediterranean, although differences occur in abundance and size of particular species as well as in the representative seaweed populations. A large number of taxa falls within the group of rare species, which are usually characterised by a depauperate thallus too. *Cystoseira corniculata* (Wulfen) Zanard. is the dominant macroalga on the Makedonian coast and is here considered to be the most characteristic element of the local marine vegetation.

Special emphasis is given to representatives of the tribe Antithamnieae (Ceramiales, Rhodophyta) and a revision of the group in the Aegean Sea is reported. In addition to the traditional taxonomic criteria, biosystematic methods are used including sexual compatibility, chromosome number, and controlled laboratory culture to test the range form of morphological features. Three genera are recognized, namely *Antithamnion* Nägeli, *Pterothamnion* Nägeli, and *Balliella* Itono & Tanaka. They are characterized by apical, lateral, and intercalary carposporophyte position respectively. A study of the type species of the genus *Antithamnion*, *A. cruciatum* (C. Ag.) Näg., reveals the occurrence of a distinct entity in southern Scandinavian and the establishment of the variety *Antithamnion cruciatum* var. *scandinavicum* Athanasiadis is proposed.

Preface

Study of the marine algae of the Aegean Sea is a particularly attractive field of research, not only because knowledge of the local marine vegetation is very limited, but also to establish the relationship of the Aegean flora to those of the adjoining seas. The absence of critical systematic studies in the past, and the existence of unexplored sublittoral areas in the N. Aegean Sea justified the present investigation, which started in spring 1980 and continued until summer 1986. It was soon realized that the systematic analysis of the taxa concerned was a very complex process involving many desciplines and necessitating an international cooperation. Thus, as a first step and within the frame of a doctoral thesis, the study was limited to the identification and description of the taxa occurring on the southeastern coast of the Sithonia peninsula (N. Greece), with special attention given to the rhodophytes and in particular members of the tribe Antithamnieae. The latter group was selected especially in order to continue the biosystematic investigations of the European Antithamnieae, a study commenced by O. Sundene and later continued by J. Rueness and M. Rueness. A survey of the seaweeds of the Aegean Sea was also considered necessary as soon as the number of new records for this region increased considerably, and also because such an account was never previously given.

It is hoped that the present study will stimulate further investigations, especially in southern areas of the Archipelagus, in order to provide a more detailed account of the marine flora of the whole Aegean Sea.

This thesis is based on the following papers:

I. Athanasiadis, A. 1987. A survey of the seaweeds of the Aegean Sea. Manuscript.

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CONTENTS

Introduction

The natural history of the marine plants of the Aegean Sea has been a field of systematic research exercised since the Linnean period, although as the etymology of the word *Fucus*[1] indicates seaweeds were in use in Ancient Greece (see Gmelin 1768).

Forsskål (1775), who was a pupil of Linnaeus, published the first Aegean records from material collected at the of islands of Imbros and Tenedos. He listed three species, *Ulva intestinalis* [L.], *Fucus pavonicus* [L.], and *Conferva viridis*, but provided no descriptions or references.

Over the past 200 years several botanists who visited the coasts of Greece and islands of the Archipelagus collected seaweeds (for a historical account see Politis 1953), but unfortunately, most of them published their observations merely as lists of taxa, and very few provided morphological descriptions or other notes (e. g. Nizamuddin & Lehnberg 1970). This is to be regretted, since lists of names, in the absence of critical investigations, do not give reliable information on the flora of a region; on the contrary they sometimes contribute to the taxonomic confusion that apparently characterizes a large number of species in the Mediterranean.

The present thesis gives the results of a systematic investigation carried out at the Sithonia Peninsula and adjacent localities on the Makedonian coast (see paper I, fig. 1) (p. 17) during the years 1980-86. It also presents a survey of all previously published records of seaweeds from the Aegean Sea. Since the critical study of each taxon was obviously not feasible within the time schedule of this work, members of the tribe Antithamnieae were selected for a detailed study.

Geographic and hydrographic characteristics of the Aegean Sea

The Aegean Sea is an enclosed area, the north, east and west limits of which are naturally determined by the peninsulas of Balkan and Asia Minor. In the south it is bounded by an imaginary line commencing at 28° 16' E (Cape Aspros) on Asia Minor, and connecting Cape Ammou (N. Rhodes), Cape Prassonisi (S. Rhodes), Cape Vrodou (Karpathos, 35° 33' N), Cape Kastellon (Karpathos), Cape Plaka (E. Crete), Cape Agria Gramvousa (W. Crete), Cape Apolitari (Antikithira), Rock Psira, Cape Trachilion (N. Kithira), Cape Spathi (NW. Kithira), and Cape Agia Maria (Elafonnisos, 26° 28' N, 22° 57' E) to Peloponnesus (see paper I, fig. 2).

In its northern part, the Aegean Sea is connected with the Sea of Marmara by a narrow strait (Dardanelles) with a sill depth of about 40 m, while in the south it is isolated from the eastern Mediterranean basin by a chain of islands and sills with depths varying between 180 m (between Kithira and Elafonnisos) and 1,100 m (between Rhodes and Karpathos) (Maley & Johnson 1971).

Through the straits of Dardanelles, brackish water enter the northern Aegean Sea, particularly during summer (Lacombe *et al.* 1958), and reduces the salinity (see paper I, fig. 2) (p. 18, 19), which generally remains above 36 ‰ below 20 m depth (Table I). A maximum value of 39.2 ‰ is noted in the surface water in the southern Aegean Sea.

Annual temperature fluctuations of the surface water in the N. Aegean Sea show ranges between 10.5° and 25.5° C in the Strimonikos Gulf (Koukouras *et al.* 1984), 6.6° and 27° C in the Thessaloniki Gulf (Haritonidis 1978), and 12° and 26° C on the Sithonian coast (paper III), whereas in the S. Aegean Sea (Rhodes) a range between 14.7° and 27.1° C has been reported (Diannelidis *et al.* 1977). These fluctuations are, however, reduced with depth,

1. seaweed; red colour ("κοκκινα'δι", "φκιασι'δι"), extracted from seaweeds, used by the Greek women

becoming 12.3° to 20.2° C at 20 m depth in the Strimonikos Gulf (Koukouras *et al.* 1984), and generally 10° to 15 ° C below 500 m depth (Lacombe *et al.* 1958) (see Table I).

Late Pleistocene history

Studies of deep-sea cores from the eastern Mediterranean basin have shown that a series of stagnant phases occurred, the last of which prevailed at Post-glacial time (about 9,000 to 6,000 - 5,000 BC) (see Olausson 1971). During this time large volumes of brackish (melt) water entered the Aegean Sea from the Black Sea, and while the anoxic bottom conditions presumably presented the deep water organisms with considerable survival problems, the drastic decrease in salinity in the upper water masses could equally have been fatal to the marine plants.

General characteristics of the seaweed flora

Several investigators have characterized the local marine vegetation of the Aegean Sea as comparatively poor in species (e. g. Nizamuddin & Lehnberg 1970, Coppejans 1974, Haritonidis 1978); a statement which is in agreement with the general opinion that species diversity and biomass of the Mediterranean biota decline from west to east, with the Levant Sea as the most impoverished area (see Ben-Tuvia 1983, Ketchum 1983).

Moreover, marine biologists who are familiar with the Mediterranean fauna and flora recognize that the biota in the eastern basin are usually distinguished by smaller habit, and it has been suggested that this might reflect adaptations to the lower nutrient concentration and higher average water temperature that forces the organisms to maintain a higher metabolic rate (see Pérès & Picard 1958: 290).

As regards the marine algae, the culture experiments of this study (papers II and IV) showed that nutrients apparently affect to the size of the thallus, since filamentous algae grown in the laboratory in enriched media developed larger thalli than in the field. A simple comparison between specimens collected on the coast of Sithonia and the eutrophic area of N. Michaniona in the vicinity of the Thessaloniki Gulf confirms this hypothesis, as one realizes that species (e. g. *Chylocladia verticillata*) are conspicuously more luxuriant in the vicinity of the Gulf. The depauperate thallus of many seaweeds seems therefore to be a local phenomenon related to the oligotrophic conditions that apparently characterize large areas of the Aegean Sea.

Moreover, areas distinguished by eutrophic waters may show remarkable changes in their vegetation. Checking the long list of species occurring at Sithonia (Table II) and trying to identify the most common macroalgae occurring at N. Michaniona (Table III), it is evident that several species, including *Gracilaria* cf. *verrucosa*, *Hypnea musciformis*, and *Ceramium rubrum*, seem to be restricted to the eutrophic area.

Although several taxa were described from the Aegean Sea (see Giaccone 1968), later studies have shown that these merely belong to entities with wider distribution in the adjoining seas, or that their status is obscure and in need of re-examination. The occurrence of endemic species in the Aegean marine flora is therefore rather unlikely, as the main results of the present survey show and the Late Pleistocene history suggests. The drastic and apparently disadvantageous, environmental fluctuations of the last 10,000 years and the permanent contact between the Aegean Sea and the eastern Mediterranean basin, might be reasons why the Aegean marine algae have not significantly diverged from their Mediterranean counterparts.

On the other hand, the Aegean flora includes species that appear to be endemic to the eastern Mediterranean basin. Within this group, those which are well known are *Cystoseira corniculata*, *Tenarea tortuosa*, and *Beckerella mediterranea*, while others such as *Cladophora feredayi*, *Herponema graniferum*, *Cystoseira adriatica*, and *Antithamnion*

fragilissimum are little known and their status and geographic distribution require re-investigation. This, together with the apparent absence of significant contributions of temperate species from the Black Sea, suggests that the Aegean seaweed flora represents a rather homogeneous part of the adjoining eastern Mediterranean basin.

The new records from the Makedonian coast

Eightythree species are recorded for the first time in the Aegean Sea and among them the rhodophytes *Peyssonnelia immersa*, *Antithamnion ogdeniae*, *Chondria collinsiana*, *Chondria polyrhiza*, and the phaeophytes *Microspongium gelatinosum*, *Ralfsia clavata* and *Mesogloia lanosa* are new to the Mediterranean flora. As appears from Table II, several of these species were collected only at one locality, and in several instances the material identified was limited sometimes to a single specimen only. Other species were found to be widespread on the coast, as for example *Codium vermilara* and *Dudresnaya verticillata*, which suggests that previous collections of these plants were confused with related taxa.

A number of species such as *Gulsonia annulata* and *Rhodochaete parvula* were met with in abundance only in a particular (favored) year. Their "sudden" occurrence on the coast can not presently be explained and requires further investigations.

At least ten species belonging to the genera *Mesophyllum*, *Phymatolithon*, *Haematocelis*, *Peyssonnelia*, *Laurencia*, *Chondria*, *Seirospora*, *Myrionema*, *Myriactula*, and *Bryopsis*, are described under their generic names, since their identification at the species level requires critical taxonomic and nomenclatural studies. As appears from the discussion given in each case, some of these species have apparently been described in the past under erroneous names, as for example *Peyssonnelia codana* Rosenv. sensu Verlaque and *Myriactula arabica* (Kütz.) J. Feldm. sensu Zinova. Others seem to represent entities not previously discovered, as for example the species of *Laurencia* belonging to the section Planae. In both cases, however, taxonomic establishment of the new entities necessitates critical revision of the Mediterranean representatives of the respective genus, which is a study beyond the scope of this thesis.

The survey of the literature dealing with records of seaweeds from the Aegean Sea revealed a considerable number of species not previously known in the Mediterranean. In most such cases, the lack of evidence was deemed sufficient to consider the identifications as doubtful and these records are briefly discussed under the excluded species. Records of species occurring in the Black Sea remain, however, a puzzle, as they could represent specimens found in the drift or even rare members of the Aegean flora.

The present investigations show that the distribution of the Aegean species in adjoining seas is as follows:

Mediterranean species (endemic)	20 %
Aegean-Mediterranean-Atlantic species	78 %
Aegean-Black Sea species	46 %
Aegean-Red Sea species	32 %

The seaweed vegetation on the coast of the Sithonia Peninsula

The seasonal variations of the macroalgal populations in the littoral and upper sublittoral zone at Sithonia are a more prominent phenomenon than algal zonation, as tides of high amplitude do not occur on the coast. Haritonidis (1978) mentions a tidal amplitude of 25 cm in the Thessaloniki Gulf, which is negligible in comparison to the sea level changes caused by the winds and the atmospheric pressure.

Seaweed populations occurring close to the water surface, usually among barnacles, and ca 50 cm above water level (or more in exposed sites) were those of *Porphyra linearis, Nemalion helminthoides*, small crustose corallines (including *Goniolithon papillosum* and *Spongites notarisii*), *Corallina elongata, Ceramium ciliatum, Lophosiphonia spp., Alsidium helminthochorton, Polysiphonia sertularioides, Gastroclonium clavatum, Griffithsia opuntioides, Bryopsis muscosa, Enteromorpha compressa, Chaetomorpha aerea, Cladophora* spp., *Cladophora coelothrix, Scytosiphon lomentaria*, and *Ralfsia verrucosa.*

These species are considered as representatives of the littoral zone in the Mediterranean (Feldmann 1937), although it should be noted that their seasonal development is more limited on the coast of Sithonia than in the western basin. With the exception of the sciaphilous species, such as *Corallina elongata, Gastroclonium clavatum, Griffithsia opuntioides* and the crustose corallines, very few of these littoral populations persist in summer, as the high temperature and light intensity soon result in their decomposition. They are replaced in summer by a belt of Cyanophyta (usually *Calothrix crustacea* Born. & Flah.).

The upper limits of the sublittoral zone are clearly marked by various species of *Cystoseira*, which are widespread on the coast, as elsewhere in the Mediterranean. With the exception of *C. compressa*, the species are perennial and reach maximum growth in spring (Sauvageau 1912, Feldmann 1937).

Cystoseira corniculata is the dominant species on the Makedonian coast and forms homogeneous populations on exposed and sheltered sites to depths of at least 35 m. In order to define the associated epiphytic and understory macroalgae, four samples, each covering an area of 400 cm^2, were collected in summer 1984 and all plants including most of the crustose algae were identified. This analysis showed that the number of associated species considerably increased with depth, being 26 to 30 close to the water surface and ca 55 below the summer thermocline (at 15 to 18 m depth) (Table IV; the diferrences between localities are insignificant). Salinity tests in the area gave values of 32 to 33 ‰ at the surface and ca 37 ‰ at 18 m depth. Moreover, summer collections from the sublittoral zone (to ca 30 m depth) showed that a significant number of macroalgae were restricted below the summer thermocline (e. g. *Bonnemaisonia asparagoides, B. clavata, Kallymenia lacerata, Gracilaria corallicola, Halymenia latifolia, Platoma cyclocolpa, Nemastoma dichotomum, Sphaerococcus coronopifolius, Balliella cladoderma, Asperococcus turneri, Gontrania lubrica, Cutleria multifida, Mesogloia lanosa, Myriotrichia protasperococcus, Arthrocladia villosa, Sporochnus pedunculatus*). These observations indicate that the development of the thermocline in summer results in the zonation of the sublittoral vegetation, as stenothermic species are forced to limit their distribution to deeper habitats.

Among the species that appear to compete with *C. corniculata* in abundance is *Stypocaulon scoparium*, populations of which are usually found on vertical rock surfaces. *Padina pavonica, Dictyopteris membranacea, Dictyota* spp., and *Dilophus fasciola* also occur prominently during early spring and summer and, with the exception of *D. membranacea* that is a strictly sciaphilous species, the rest grow in sites exposed to the sunlight.

Belts of ulvaceous algae are conspicuous by their absence, although the group is well represented in the vicinity of the Thessaloniki Gulf (eutrophic waters). Among the other chlorophytes, *Acetabularia acetabulum* and *Dasycladus vermicularis* may locally dominate in the upper sublittoral zone, and populations of the latter species persist throughout the year. *Codium bursa, Halimeda tuna* and *Udotea petiolata*, which are perennial species, are usually restricted to deeper waters, although they may occasionally populate shaded habitats close to the water surface.

Annual photophilous rhodophytes that occur in populations in the upper sublittoral zone in spring and summer are *Laurencia obtusa* var. *obtusa* and var. *crucifera, Laurencia*

microcladia, *Wrangelia penicillata* and *Spyridia filamentosa*. Shaded habitats with good water circulation are more rich in species such as *Lithophyllum expansum* sensu Lemoine, *Grateloupia filicina*, *Halymenia floresia* (annual), *Cryptonemia lomation*, *Rytiphloea tinctoria*, *Halopitys incurvus* and *Peyssonnelia* spp.

Autumn and early winter on the coast of Sithonia are seasons without marked changes in the algal vegetation, although it becomes impoverished by the gradual elimination of the annuals. However, the violent winds and the decreasing temperature that prevail in winter result in a vertical circulation of the water and numerous stenothermic species appear in the upper sublittoral zone (e. g. *Ptilothamnion pluma*, *Ceramium ciliatum*, *Pleonosporium borreri*, *Callithamnion* spp., and species of *Antithamnion* and Delesseriaceae). The vertical circulation apparently also results in an increased nutrient supply of benefit to the algal vegetation, as indicated by its luxuriant growth in late winter and spring.

The tribe Antithamnieae

Within the red algal order Ceramiales, species with *Batrachospermum*-organization and orthostichous arrangement of whorl-branches were considered as a monophyletic group by Hommersand (1963:330), and placed in a separate tribe, the Antithamnieae. Apart from the orthographic correctness of the name [Dixon (pers. comm.) advocated correcting it to Antithamnioneae], the taxonomic status of the group was universally accepted, although apparent problems were recognized as soon as attempts to draw generic lines within the group on a worldwide basis were made. Moe & Silva (1980) argued that this is stemmed from the "open" thallus organization of the ceramiaceous algae, which results in a large number of prominent features, the diagnostic value of which might not always be of particular taxonomic significance. They also suggested that the group was undergoing, or had recently undergone, explosive evolution, resulting in numerous entities, the rank of which would be difficult to determine in distinct phylogenetic lines.

My only criticism of this argumentation is that we must neither rely on present knowledge, nor wait until more taxa from unexplored regions have been described. In my opinion, the key to the specific and generic situation in the Antithamnieae must first be clarified within the representatives of the group on a regional basis. The information we need to clarify these tasks can become available if biosystematic methods are used, as shown by the work of O. Sundene, J. Rueness and M. Rueness, and also adopted in my investigations.

The species concept in Antithamnieae

Considering this classical biological problem in a comparatively primitive group of plants as the Antithamnieae, one has to study in detail two main subjects. The life history in members of the group and the range form of the taxa considered in both sympatric and allopatric populations. Since occurrence of polyploid series in nature (see Dixon 1966) and artificial construction of autopolyploids (see van der Meer 1986) has been demonstrated in other groups of red algae, one may hypothesize that similar phenomena also operate, or have operated, resulting in the numerous entities currently included in the Antithamnieae. The high number of chromosomes obtained in some species of the group (papers II and IV) support this hypothesis, although evidence of polyploid series or complexes are lacking. In fact, reliable data of relevance to the species concept in Antithamnieae are very limited.

Some results from my studies will now be discussed. Of particular importance is the case of *Antithamnion heterocladum* (papers II and V). This species was originally studied in culture by Sundene (1964) from material collected at Banyuls-sur-Mer and referred to as *Antithamnion tenuissimum*. According to Sundene (1964: 10) the identification was made by

J. Feldmann, but as appears both from Sundene's illustrations and the examination of isolates of the original strain (kindly provided by J. Rueness), the alga represents *A. heterocladum*. Rueness & Rueness (1973) who later studied the same strain reported a *Polysiphonia*-type of life history with irregularities (mixed phases) and chromosome numbers n ≈ 32 in gametophytes and 2n ≈ 64 in tetrasporophytes. *A. heterocladum* was later studied again in culture from material originating from the N. Aegean Sea (paper II) and a regular type of *Polysiphonia*-life history was described this time with different chromosome numbers, n = 46 ± 4 in the gametophytes and 2n = 86 ± 8 in the tetrasporophytes.

Since Sundene's strain was obtained in culture and after the misidentification was realized, several cross-fertilization experiments between male and female gametophytes of each strain were attempted. However, all were unsuccessful which suggests that the different ploidy level could be the reason for their sexual isolation. The present chromosome numbers also suggest that the base-number in the species must be, or have been lower (n = 16 ?). It could be argued here that since reproductive isolation is evident between the two strains, each one of which successfully demonstrates a *Polysiphonia*-type of life history, a specific status for each of them should be recognized. However, the lack of both population studies and morphological features distinguishing them from each other suggest that such a conclusion would be highly premature. It is worth noting here that a similar case has previously been reported in representatives of two populations of *Gracilaria verrucosa* with haploid numbers n = 24 and n = 32 respectively (Bird *et al.* 1982). In that case, the authors concluded that application of the same binomial to the two entities is erroneous. They did not, however, taxonomically separate the two strains.

My comparative studies on *Antithamnion cruciatum* and *Antithamnion tenuissimum* from material originating from various localities along the European coast resulted in the discovery of a new entity, *A. cruciatum* var. *scandinavicum* (paper V). Whatever the phylogenetic background of these three taxa is, it is significant to stress that each of them is characterized by distinctive morphological features, which are, however, usually modified by the ecological conditions. As a result, many intermediate forms exist, some of which overlap, so that individuals of the separate taxa can easily be confused if not critically studied. Their distribution on the European coast shows distinct patterns, as var. *cruciatum* is widespread in the Mediterranean and along the European Atlantic coast (but rare in Scandinavia), while *A. tenuissimum* and var. *scandinavicum* seem to be restricted to the Mediterranean and southern Scandinavia respectively. However, the isolates of var. *scandinavicum* showed wider temperature and salinity tolerance than the distribution of the collections indicated, and it was gratifying to identify later the variety in the laboratory of Prof. F. Magne among his cultures of *Antithamnion* from Brittany. According to him, the French strain demonstrated a regular *Polysiphonia*-type of life history, which was not observed in the Swedish isolates.

In order to determine the rank of the new entity hybridization attempts were desirable, but the Swedish isolates remained mostly sterile and the few tetrasporangia observed were abortive. Thus, the close relationship of var. *scandinavicum* to var. *cruciatum* was deemed sufficient to support its varietal status, although it should be mentioned that hybridization and population studies might later show that it merits specific rank.

My biosystematic studies in *Pterothamnion plumula* and *Pterothamnion crispum* (paper IV) largely confirmed the results of Sundene (1975), and furthermore demonstrated the geographical distribution of *P. crispum* between the British Isles and the N. Aegean Sea. With regard to the identical chromosome numbers (n = 24 ± 2, 2n = 48 ± 4) in the two species, the failure to obtain hybrids demonstrates that sexual isolation is complete in the two entities, despite their relatively close morphological relationship.

This contrasts with the situation in *Pterothamnion plumula,* where N. Atlantic strains with widely diverging morphology may successfully interbreed (see Rueness 1978). The

taxonomic situation in this species becomes further obscure, with regard to the sexually isolated Mediterranean entity reported by Sundene (1975). My personal observations in herbaria and collections from localities elsewhere in the Mediterranean have also indicated that at least two other forms related to *P. plumula* or *P. crispum* exist, and until their identity is clarified it seems premature to deduce any conclusions about the specific situation in the genus *Pterothamnion* .

The position of procarps and carposporophytes in the Antithamnieae

The sexual reproduction in Antithamnieae is of the *Polysiphonia*-type and this has successfully been demonstrated in culture experiments, confirmed by cytological studies, in at least four species in two genera (Rueness & Rueness 1973; papers II and IV).

While the structure of the individual sexual organs (i. e. procarps and spermatangia) and the post-fertilization stages are uniform in most members of the group, the position and number of the procarps and carposporophytes show distinctive types. Within the genera considered, three types are found (Fig. 1) (paper IV).

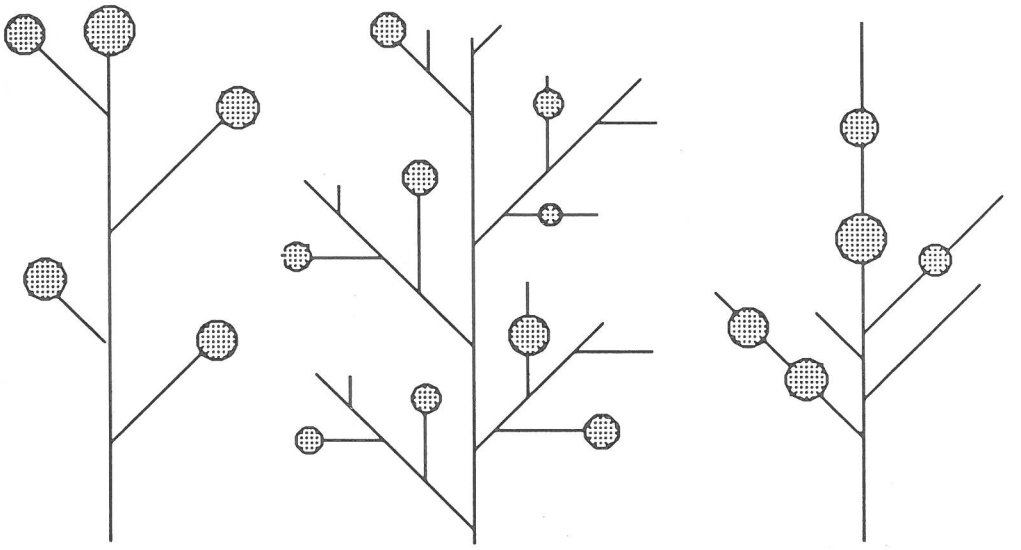

Fig. 1. The position of carposporophytes in the Antithamnieae

In one type (apical) the procarps are numerous (up to 20) and develop along the apices of main and lateral axes; following fertilization a single carposporophyte is formed close to the apex of each axis, suppressing its further vegetative growth. This occurs in several species of *Antithamnion* sensu stricto and possibly also in *Antithamnionella*.

In a second type (lateral) the procarps are reduced in number,1 to 6 (rarely more), and usually develop on the lateral axes, while the main axes continue their growth cutting off new laterals. Following fertilization, a single carposporophyte is formed close to or below the apex of each lateral axis which may continue or suppress its growth. This is observed in members

of the genera *Pterothamnion* and *Platythamnion* .

A third type (intercalary) is evident in the genera *Balliella* and *Scagelia*, where procarps (1 to 4 in number) and carposporophytes are developed in series intercalary on main and lateral axes.

In the case of *Antithamnion cladodermum*(=*Balliella cladoderma*) (paper I, p. 68), the absence of information about the sexual reproduction makes the generic position of the species doubtful, although its thallus organization is well accommodated within *Balliella*.

Concluding the observations on the sexual apparatus of the Antithamnieae, it is important to stress that while the position of procarps has long been regarded as a diagnostic feature at and above the level of the tribe in the Ceramiaceae (see Hommersand 1963), the present studies show that:

a) it is even a diagnostic feature of genera.

b) at least three distinctive types (apical, lateral and intercalary) occur in Antithamnieae, where carposporophytes exhibit a similar type of arrangement on the thallus, although procarps do not always result in carposporophytes.

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Table I. Salinity (‰) and Temperature (°C) fluctuations in the Aegean Sea.

N. Aegean Sea, off Olibias Island (23° 48' E, 40° 35' N) (after Koukouras *et al.* 1984)

	04.02.77		16.05.77		24.07.77		01.11.77	
Depth	S	T	S	T	S	T	S	T
0 m	29.8	10.5	32.1	19.5	33.9	25.5	29.8	17.1
20 m	36.9	12.3	36.8	16.5	38.3	20.2	36.8	18.5
27 m	37.2	12.0	37.2	14.2	40.1	18.0	37.1	18.2
34 m	39.7	12.5	39.7	14.5	40.0	18.4	39.7	18.6
40 m	40.1	12.9	39.9	15.5	40.3	16.5	40.4	18.0

Salinity values (‰) in the summer of 1955 (after Lacombe *et al.* 1958)

	N. Aegean Sea, SE. off Athos (24° 30' E, 40' N)	S. Aegean Sea, NW. off Crete (23° 40' E, 35° 50' N)
Depth		
0 m	33.77	39.25
10 m		34.0
20 m	38.0	
25 m	38.11	39.0
50 m		38.89
75 m	38.70	
100 m		38.96
200 m	38.86	38.95
500 m		38.93

Table II. The distribution of the seaweeds identified on the coast of Sithonia in the years 1980-86. Taxa collected at one locality (A), and at two or more localities (B). Total number of localities 17. Taxa in bold are new records in the Aegean Sea.

RHODOPHYTA	A	B
Chroodactylon ornatum		+
Erythrocladia irregularis		+
Porphyra linearis	+	
Audouinella daviesii	+	
Gelidium latifolium		+
Gelidium pusillum		+
Gelidiella lubrica		+
Nemalion helminthoides		+
Falkenbergia sp.		+
Bonnemaisonia clavata		+
Amphiroa rubra		+
Corallina elongata		+
Fosliella farinosa		+
Jania corniculata	+	
Lithophyllum sp. ("*expansum* ")		+
Mesophyllum sp.	+	
Pneophyllum confervicola		+
Pneophyllum zonale		+
Spongites ramulosa	+	
Titanoderma verrucatum	+	
Dudresnaya verticillata		+
Acrodiscus vidovichii		+
Halymenia floresia		+
Halymenia trigona	+	
Kallymenia lacerata	+	
Contarinia peyssonneliaeformis	+	
Rhizophyllis squamariae		+
Peyssonnelia crispata		+
Peyssonnelia harveyana	+	
Peyssonnelia polymorpha		+
Peyssonnelia rubra	+	
Peyssonnelia sp.	+	
Cruoriella armorica	+	
Hildenbrandia prototypus		+
Schmitzia neapolitana	+	
Platoma cyclocolpa		+
Halarachnion ligulatum	+	
Rhodophyllis divaricata		+
Sphaerococcus coronopifolius		+
Gigartina acicularis	+	
Phyllophora crispa	+	
Hypnea cervicornis	+	
Champia parvula		+
Gastroclonium clavatum		+
Lomentaria clavellosa		+
Botryocladia botryoides		+
Stylonema alsidii		+
Erythrotrichia carnea		+
Rhodochaete parvula		+
Audouinella humile	+	
Gelidium melanoideum	+	
Gelidiella antipai		+
Liagora viscida		+
Galaxaura oblongata		+
Bonnemaisonia asparagoides	+	
Amphiroa rigida		+
Choreonema thuretii		+
Corallina granifera		+
Goniolithon papillosum	+	
Jania rubens		+
Lithophyllum sp. ("dentatum")	+	
Melobesia membranacea		+
Phymatolithon sp.	+	
Pneophyllum rosanoffii	+	
Spongites notarisii	+	
Titanoderma cystoseirae		+
Helminthopsis purpurifera		+
Thuretella schousboei	+	
Cryptonemia lomation		+
Halymenia latifolia	+	
Grateloupia filicina	+	
Kallymenia microphylla		+
Peyssonnelia bornetii		+
Peyssonnelia dubyi	+	
Peyssonnelia immersa	+	
Peyssonnelia rosa-marina		+
Peyssonnelia squamaria		+
Polystrata compacta	+	
Haematocelis sp.	+	
Calosiphonia vermicularis	+	
Nemastoma dichotomum		+
Predaea ollivieri		+
Sebdenia rodrigueziana		+
Plocamium cartilagineum		+
Gracilaria corallicola		+
Gymnogongrus griffithsiae	+	
Schottera nicaeensis	+	
Caulacanthus ustulatus	+	
Chylocladia verticillata		+
Lomentaria chylocladiella		+
Botryocladia boergesenii		+
Chrysymenia ventricosa		+

Table II. Continued.

RHODOPHYTA	A	B		A	B
Rhodymenia sp.	+		*Antithamnion cruciatum*		+
Antithamnion heterocladum		+	***Antithamnion ogdeniae***		+
Antithamnion tenuissimum	+		***Balliella cladoderma***	+	
Gymnothamnion elegans		+	***Pterothamnion crispum***	+	
Callithamniella tingitana	+		***Callithamnion byssoides***	+	
Callithamnion cordatum		+	*Callithamnion corymbosum*		+
Callithamnion decompositum	+		***Seirospora*** sp.		+
Ceramium bertholdii		+	*Ceramium ciliatum*		+
Ceramium cinnabarinum		+	*Ceramium circinatum*		+
Ceramium codii		+	*Ceramium diaphanum*		+
Ceramium flaccidum		+	*Ceramium strictum*		+
Ceramium tenuissimum		+	*Compsothamnion thuyoides*	+	
Pleonosporium borreri	+		*Crouania attenuata*		+
Crouania francisci	+		***Gulsonia nodulosa***		+
Anotrichium barbatum	+				
Griffithsia phyllamphora		+	*Griffithsia opuntioides*		+
Monosporus pedicillatus		+	***Lejolisia mediterranea***		+
Ptilothamnion pluma		+	***Spermothamnion flabellatum***		+
Spermothamnion repens	+		*Sphondylothamnion multifidum*	+	
Spyridia filamentosa		+	*Wrangelia penicillata*		+
Dasya baillouviana	+		*Dasya corymbifera*		+
Dasya hutchinsiae		+	*Dasya ocellata*	+	
Dasya punicea	+		*Dasyopsis plana*	+	
Dasyopsis spinella		+	*Heterosiphonia crispella*		+
Acrosorium uncinatum		+	*Apoglossum ruscifolium*		+
Erythroglossum sandrianum		+	***Hypoglossum hypoglossoides***		+
Myriogramme distromatica		+	*Myriogramme minuta*		+
Nitophyllum punctatum		+	*Alsidium corallinum*	+	
Alsidium helminthochorton	+		***Brongniartella byssoides***	+	
Chondria coerulescens	+		*Chondria dasyphylla*	+	
Chondria polyrhiza	+		*Chondria tenuissima*		+
Chondria sp.	+		*Digenia simplex*		+
Dipterosiphonia rigens		+	*Erythrocystis montagnei*		+
Halopitys incurvus		+	*Halydictyon mirabile*	+	
Herposiphonia secunda		+	*Herposiphonia tenella*	+	
Laurencia microcladia		+	*Laurencia obtusa*		+
Laurencia obtusa var. *crucifera*		+	*Laurencia paniculata*	+	
Laurencia sp.		+	*Lophosiphonia cristata*	+	
Lophosiphonia reptabunda		+	*Lophosiphonia scopulorum*		+
Lophosiphonia subadunca		+	*Polysiphonia elongata*		+
Polysiphonia fruticulosa	+		*Polysiphonia furcellata*		+
Polysiphonia opaca	+		*Polysiphonia ornata*		+
Polysiphonia sertularioides	+		*Polysiphonia subulifera*		+
Polysiphonia tenerrima	+		***Polysiphonia tripinnata***	+	
Rytiphloea tinctoria		+			

Table II. Continued.

PHAEOPHYTA	A	B
Acinetospora crinita	+	
Feldmannia irregularis		+
Lithoderma adriaticum		+
Ralfsia clavata	+	
Myrionema liechtensternii		+
Elachista intermedia	+	
Myriactula rigida		+
Myriactula sp.		+
Gontrania lubrica	+	
Mesogloia lanosa	+	
Stilophora rhizodes		+
Myriotrichia repens		+
Giraudia sphacelarioides		+
Colpomenia sinuosa		+
Scytosiphon lomentaria	+	
Zanardinia prototypus		+
Nereia filiformis		+
Choristocarpus tenellus		+
Sphacelaria plumula	+	
Halopteris filicina	+	
Cladostephus spongiosus f.*verticillatus*	+	
Dictyota dichotoma		+
Dictyota dichotoma var. *intricata*	+	
Dilophus fasciola		+
Padina pavonica		+
Cystoseira barbata	+	
Cystoseira corniculata		+
Cystoseira dubia	+	
Cystoseira spinosa		+
Sargassum trichocarpum		+

CHLOROPHYTA	A	B
Palmophyllum crassum	+	
Phaeophila dendroides		+
Enteromorpha compressa		+
Enteromorpha multiramosa		+
Anadyomene stellata		+
Cladophora coelothrix		+
Cladophora echinus		+
Cladophora pellucida		+
Cladophora vagabunda	+	
Bryopsis hypnoides	+	
Bryopsis sp.	+	
Pedobesia lamourouxii		+
Codium coralloides		+
Codium vermilara		+
Penicillus capitatus	+	
Udotea petiolata		+
Dasycladus vermicularis		+

	A	B
Ectocarpus arctus		+
Streblonema sphaericum		+
Microspongium gelatinosum	+	
Ralfsia verrucosa		+
Myrionema sp.	+	
Myriactula rivulariae		+
Cladosiphon mediterraneus		+
Liebmannia leveillei		+
Nemacystus flexuosus		+
Myriotrichia adriatica	+	
Myriotrichia protasperococcus	+	
Asperococcus turneri		+
Hydroclathrus clathratus	+	
Cutleria multifida		+
Arthrocladia villosa	+	
Sporochnus pedunculatus	+	
Sphacelaria cirrosa		+
Sphacelaria tribuloides	+	
Stypocaulon scoparium		+
Dictyopteris membranacea		+
Dictyota linearis	+	
Dilophus mediterraneus	+	
Taonia atomaria		+
Cystoseira compressa		+
Cystoseira crinotophylla		+
Cystoseira ercegovicii		+
Sargassum acinarium	+	
Sargassum vulgare		+

	A	B
Epicladia sp.	+	
Pringsheimiella sp.		+
Enteromorpha intestinalis	+	
Ulva rigida	+	
Chaetomorpha aerea	+	
Cladophora dalmatica		+
Cladophora laetevirens		+
Cladophora prolifera		+
Valonia utricularis		+
Bryopsis muscosa		+
Halicystis sp.		+
Codium bursa		+
Codium effusum		+
Halimeda tuna		+
Pseudochlorodesmis furcellata		+
Acetabularia acetabulum		+

Table III. Species not encountered on the coast of Sithonia, although commonly collected in the vicinity of the Thessaloniki Gulf (N. Michaniona).

Bangia atropurpurea
Porphyra leucosticta
Hypnea musciformis
Gracilaria verrucosa
Ceramium rubrum
Enteromorpha linza
Punctaria latifolia

Table IV. Epiphytic and understory species identified in samples (400 cm^2) of *Cystoseira corniculata* from different depths. A150784, 0.35 m depth (**A**), SI180784, 0.5 m (**B**), SI160784, 8.5 m (**C**), KI210784, 18.0 m (**D**) (The geographic situation of the localities is given in paper I) (p. 17).

RHODOPHYTA	A	B	C	D		A	B	C	D
Amphiroa rigida	+				*Peyssonnelia rosa-marina*			+	
Gelidiella antipai	+				*Nitophyllum* sp.			+	
Erythrocystis montagnei	+				*Acrosorium uncinatum*			+	+
Corallina granifera	+	+			*Apoglossum ruscifolium*			+	+
Audouinella sp.	+	+			*Hypoglossum hypoglossoides*			+	+
Crustose corallines	+	+	+	+	*Dipterosiphonia rigens*			+	+
Jania rubens	+	+	+	+	*Polysiphonia elongata*			+	+
Fosliella farinosa	+	+	+	+	*Peyssonnelia squamaria*			+	+
Ceramium flaccidum	+	+	+	+	*Botryocladia botryoides*			+	+
Dasya hutchinsiae	+	+	+	+	*Lithophyllum* sp. (" *expansum* ")			+	+
Herposiphonia secunda	+	+	+	+	*Rhodymenia* sp.			+	+
Polysiphonia fruticulosa	+	+	+	+	*Antithamnion cruciatum*			+	+
Laurencia obtusa	+	+	+	+	*Pterothamnion crispum*			+	+
Ceramium cinnabarinum	+		+	+	*Ptilothamnion pluma*			+	+
Erythrotrichia carnea	+		+		*Spermothamnion flabellatum*			+	+
Chroodactylon ornatum		+			*Spermothamnionrepens*			+	+
Wrangelia penicillata		+			*Gelidium latifolium*				+
L. obtusa v. *crucifera*		+	+		*Amphiroa rubra*				+
Lomentaria sp.		+	+		*Pleonosporium borreri*				+
Ceramium tenuissimum		+	+	+	*Sphondylothamnion multifidum*				+
Crouania attenuata		+	+	+	*Halydictyon mirabile*				+
Rhodophyllis divaricata		+	+	+	*Cryptonemia lomation*				+
Chondria coerulescens			+		*Caulacanthus ustulatus*				+
Chrysymenia ventricosa			+		*Plocamium cartilagineum*				+
Chylocladia verticillata			+		*Ceramium strictum*				+
Antithamnion heterocladum			+		*Gulsonia nodulosa*				+
Hymenoclonium sp.			+		*Dasyopsis plana*				+
Audouinella daviesii			+		*Dasyopsis spinella*				+
Heterosiphonia crispella			+		*Nitophyllum distromaticum*				+

Table IV. Continued.

PHAEOPHYTA	A	B	C	D
Cladosiphon mediterraneus	+			
Cystoseira corniculata	+	+	+	+
Stilophora rhizodes	+	+	+	+
Sphacelaria cirrosa	+	+	+	+
Dilophus fasciola	+		+	+
Stypocaulon scoparium	+		+	+
Cystoseira compressa	+	+		
Colpomenia sinuosa		+		
Padina pavonica		+	+	
Dictyota dichotoma		+	+	+
Myriactula rivulariae		+	+	+
Cystoseira spinosa			+	
Feldmannia irregularis			+	
Myriotrichia repens			+	
Aglaozonia sp.			+	
Halopteris filicina				+
Zanardinia prototypus				+
Sphacelaria plumula				+
Dictyopteris membranacea				+
Myrionema sp.				+

CHLOROPHYTA	A	B	C	D
Chaetomorpha aerea	+			
Phaeophila dendroides	+	+		
Cladophora sp.	+	+		
Valonia utricularis	+	+	+	+
Pringsheimiella sp.		+		
Dasycladus vermicularis		+		
Cladophora echinus			+	+
Halimeda tuna			+	+
Pseudochlorodesmis furcellata			+	+
Udotea petiolata			+	+

A Survey of the Seaweeds of the Aegean Sea

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Introduction

This paper gives a survey of the marine species of Rhodophyta, Phaeophyta and Chlorophyta of the Aegean Sea on the basis of material collected on the northern coast of Greece in the years 1980-86, and a critical assessment of previously published records. Most of the material studied originates from the following localities situated on the southeastern coast of the Sithonia peninsula and adjacent areas: Olibias island (OI), Vourvourou (V), Armenistis (AR), Platanitsi (P), Rigas (R), Achlada (A), Sarti (S), Sart islet (SI), Sarti reef (SR), Sarti caves (SC), Linaraki (L), Kriaritsi islets (KI), Kriaritsi (K), Kalamitsi caves (KC), Pseudocopanos islet (PI), Drepanon (D), Porto-Coufo (PC), Tristinika (T), Kriopigi (KR), Palini (PA), Nea Iraclia (NI), and Nea Michaniona (NM) (Fig. 1). Collection and preservation techniques as well as methods employed for the examination of the material follow Athanasiadis (1985a).

Localities of records compiled from previous studies, and values of surface salinity (after Lacombe *et al.* 1958) appear in the general map of the Aegean Sea (Fig. 2), which also shows the geographic limits of this area as determined by the International Hydrographic Congress of 1919 (London) and the Circular of Monaco of February 15th, 1923. In the south, the limits are determined by 28° 16' E on the peninsula of Asia Minor, Cape Ammou (N. Rhodes), Cape

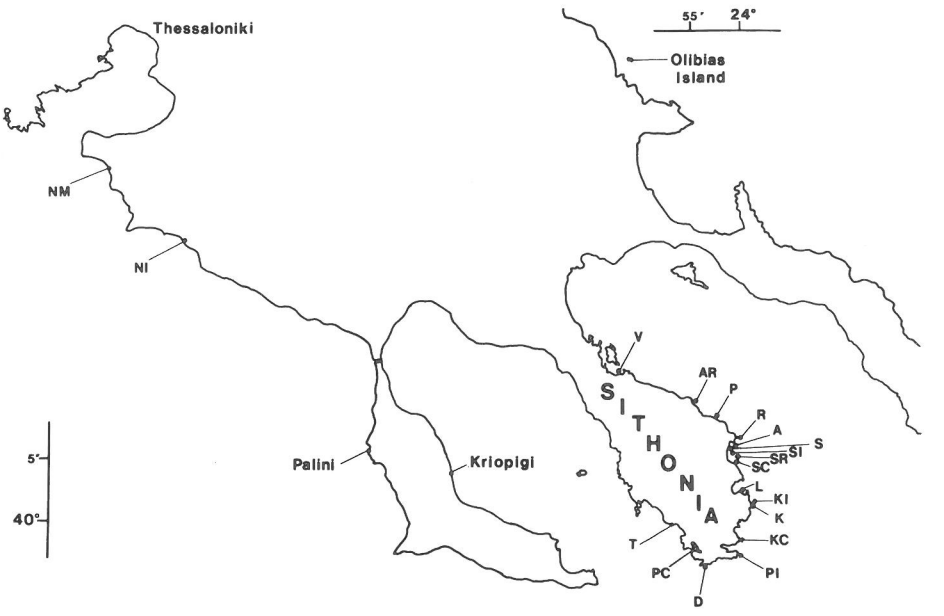
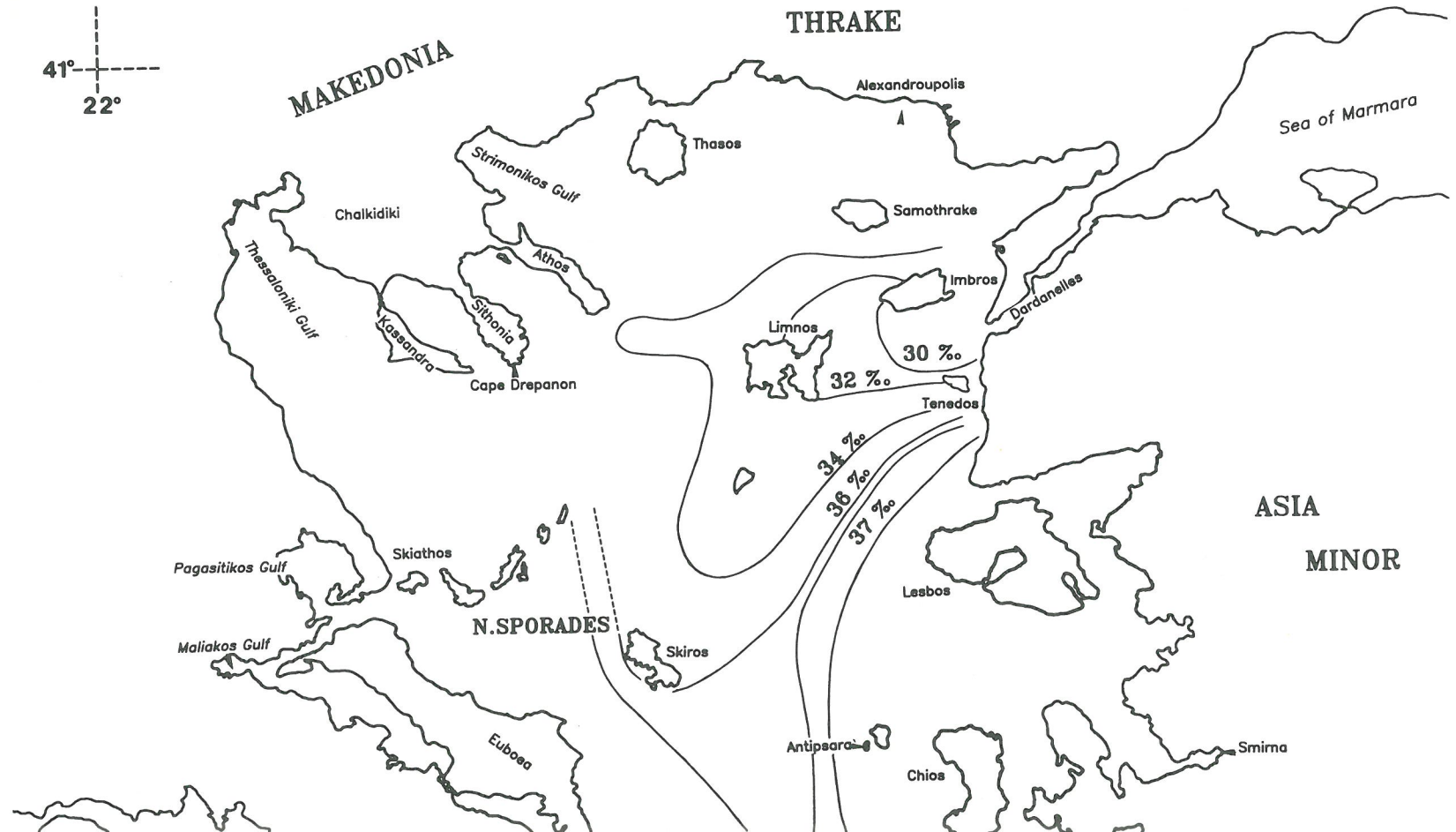


Fig. 1. Geographic position of the Sithonia peninsula and adjacent areas showing the localities where collections of seaweeds were made.


41°
22°
MAKEDONIA
THRAKE
Alexandroupolis
Thasos
Strimonikos Gulf
Chalkidiki
Samothrake
Sea of Marmara
Athos
Thessaloniki Gulf
Imbros
Dardanelles
Sithonia
Kassandra
Limnos
30 ‰
Cape Drepanon
32 ‰
Tenedos
34 ‰
36 ‰
37 ‰
ASIA
MINOR
Skiathos
Pagasitikos Gulf
Lesbos
N.SPORADES
Maliakos Gulf
Skiros
Euboea
Antipsara
Smirna
Chios

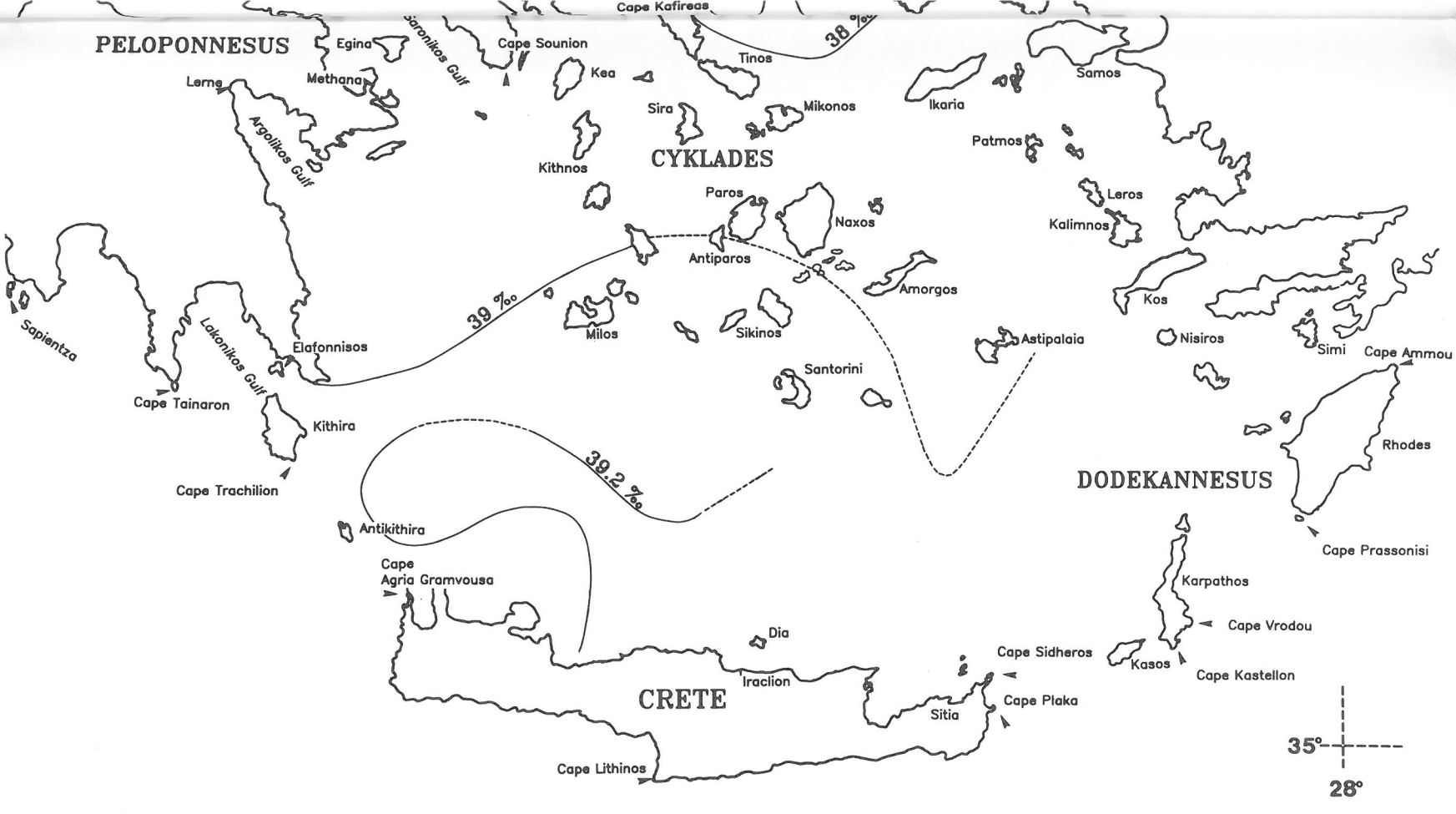


Fig. 2. Map of the Aegean Sea showing the main islands and the coastline of the peninsulas of Balkan and Asia Minor. Values of surface salinity after Lacombe *et al.* (1958).

Prassonisi (S. Rhodes), Cape Vrodou (Karpathos, 35° 33' N), Cape Kastellon (Karpathos), Cape Plaka (E. Crete), Cape Agria Gramvousa (W. Crete), Cape Apolitari (Antikithira), Rock Psira, Cape Trachilion (N. Kithira), Cape Spathi (NW. Kithira), and Cape Agia Maria (Elafonnisos, 26° 28' N, 22° 57' E) to Peloponnesus

The systematic classification of the taxa follows Parke & Dixon (1976), with a few exceptions restricted to ordinal and family names that follow Silva (1980b, 1981) and Silva & Johansen (1986). Species, genera and tribes (used in the Ceramiaceae) appear in alphabetical order, with genera listed under the respective tribe and species under the respective genus.

Synonyms are given only to previous records from the Aegean Sea. They are cited below each currently accepted combination, usually with a reference to the author(s) who made the revision. A question mark indicates that clear evidence supporting the synonymy is lacking, while an asterisk in front of a combination indicates that Aegean material has been seen by myself. Records of taxa with doubtful occurrence or uncertain taxonomic status are treated at the end of the respective family (or tribe) under the title "Excluded species".

Morphological and anatomical descriptions are given as far as possible to provide knowledge of little known species, but also to warrant the correct identification of the material.

Abbreviations of Herbaria and terms used in the text are the following: British Museum (Natural History) London (**BM**); Botanical Museum and Herbarium Copenhagen (C); Botanical Museum Gothenburg (**GB**); Rijksherbarium Leiden (**L**); Botanical Museum Lund (**LD**); Laboratoire de Cryptogamie, Muséum National d'Histoire Naturelle Paris (**PC**); longitudinal sections (l. s.), radial sections (r. s.), transverse sections (t. s.), surface view (s. v.), scanning electron microscopy (S. E. M.).

The species distributions outside the Aegean Sea are based on data from literature (unless otherwise stated), and are given only for species that I have personally collected on the northern coast of Greece. Basionyms of species and species synonyms of previously published records from the Aegean Sea are cited with their generic names, when the rank and the epithet is maintained. Authorities of species records are given only when incorrectly attributed.

Collections are listed according to locality (usually abbreviated), day (not always given), month, and year. They refer to herbarium material (or slides), a part of which is deposited at the Botanical Museum of Gothenburg (**GB**).

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Taxa

RHODOPHYTA Wettstein
PORPHYRIDIALES Kylin
GONIOTRICHACEAE G. M. Smith

CHROODACTYLON Hansgirg

* ***Chroodactylon ornatum*** (C. Agardh) Basson
= *Asterocytis ornata* (C. Agardh) Hamel

Epiphyte on the fronds of *Giraudia sphacelarioides* and *Laurencia obtusa.*
Collections: A140782, K010882.
Cosmopolitan.
Aegean Sea: Sithonia (present study), Cyclades (Nizamuddin & Lehnberg 1970), and S. Archipelagus (Giaccone 1968a, as *A. ornata* Hamel).

STYLONEMA Reinsch

* ***Stylonema alsidii*** (Zanardini) Drew
= *Goniotrichum alsidii* (Zanardini) Howe
= *Goniotrichum elegans* (Chauvin) Le Jolis (Wynne 1985a)

Usually observed in crude cultures of material from the upper sublittoral zone. Monospores were developed by fragmentation (or degeneration) of entire individuals. In the field plants sporadically occurred as epiphytes on *Gelidium pusillum.*
Collections: A100581, A030183, T280685.
Cosmopolitan.
Aegean Sea: Sithonia (present study), Limnos (Schiffner & Schussnig 1943, as *G. elegans*), Pagasitikos Gulf, Attica, Crete and N. Sporades, (Diannelidis 1950, 1953, as *G. elegans* var. *alsidii* and *G. alsidii*), and S. Archipelagus (Giaccone 1968a, as *G. elegans* Zan.).

Stylonema cornu-cervi Reinsch
= *Goniotrichum cornu-cervi* (Reinsch) Hauck (Wynne 1985a)

Reported from the Saronikos Gulf (Diapoulis & Verlaque 1981, as *Goniotrichum*).

BANGIALES Schmitz
ERYTHROPELTIDACEAE Skuja

ERYTHROCLADIA Rosenvinge

* ***Erythrocladia irregularis*** Rosenvinge
= *Erythrocladia subintegra* Rosenvinge (Heerebut 1968)

Observed on sponges, diverse macroalgae, and in crude cultures of material from the upper sublittoral zone.
Collections: A100581, K290783.
Cosmopolitan.
Aegean Sea: Sithonia (present study), Saronikos Gulf (Diapoulis & Verlaque 1981; as *E. subintegra* observed on *Cladophora* and *Chaetomorpha*).

ERYTHROTRICHIA Areschoug

* ***Erythrotrichia carnea*** (Dillwyn) J. Agardh
= *Erythrotrichia ceramicola* (Lyngbye) Areschoug
= *Erythrotrichia investians* (Zanardini) Bornet (Heerebut 1968)

Common in crude cultures or as an epiphyte on diverse macroalgae in the field. Reproduction in culture occurred by gonidia.
Collections: A100581, A030183; also observed on algae from adjacent localities.
Cosmopolitan.
Aegean Sea: Sithonia (present study), Cyclades (Nizamuddin & Lehnberg 1970, Coppejans 1974), and Attica (Politis 1936, as *E. ceramicola*).

BANGIACEAE Engler

BANGIA Lyngbye

* ***Bangia atropurpurea*** (Roth) C. Agardh
= *Bangia fuscopurpurea* (Dillwyn) Lyngbye

Found at a few localities in early spring and summer as a distinct belt in the supralittoral zone, occasionally growing over a belt of *Enteromorpha* spp. (e. g. *E. compressa*).
Collections: NI050480, 0I150680.
Cosmopolitan.
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975, as *B. fuscopurpurea*), Crete (Politis 1932, as *B. fuscopurpurea*), Rhodes (Diannelidis *et al.* 1977, as *B. fuscopurpurea*), and Asia Minor (Güven & Öztig 1971, as *B. fuscopurpurea*).

PORPHYRA C. Agardh

* ***Porphyra leucosticta*** Thuret in Le Jolis
= *Porphyra atropurpurea* De Toni (cf. De Toni 1897:17)

Drift specimens were collected in the vicinity of the Thessaloniki Gulf in early spring.
Collections: NM220386.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the N. Atlantic (type locality: Mediterranean France; Le Jolis 1863:100), to Scandinavia.
Aegean Sea: Thrake (Katsikopoulos 1939), Makedonian coast and Lesbos (Haritonidis & Tsekos 1974, 1975), Crete (Diannelidis 1950), and Asia Minor (Güven & Öztig 1971).

* ***Porphyra linearis*** Greville

Dense populations were met with on exposed granite rocks in the supralittoral zone in March. Thalli were 10 to 15 (25) cm long and 1 to 2 (3) cm broad, occasionally with proliferations towards their apices.
Collections: K170386.
Distributed in the Mediterranean and the NE. Atlantic.
Aegean Sea: Sithonia (present study).
Note: This is the first record of *P. linearis* in the Aegean Sea, which suggests that either it is rare or has a limited seasonal occurrence in the area.

Porphyra umbilicalis (Linnaeus) J. Agardh
= *Ulva umbilicalis* Linnaeus

Reported from the Makedonian coast (Haritonidis & Tsekos 1975), the N. Sporades and Crete

(Diannelidis 1950, as *Ulva umbilicalis* Roth), Sira and Lerne (Fauché *et al.* 1832-33, as *U. umbilicalis* Roth).

Excluded species

Bangia thaerasiae Bory

Originally described from material collected at Santorini (Fauché *et al.* 1832-33:334), this taxon was later considered by De Toni (1897:12) to belong to a diatom.

Porphyra purpurea (Roth) C. Agardh

The single record from the Makedonian coast (Haritonidis & Tsekos 1975) should be regarded as doubtful, since this species is considered to be distributed in the N. Atlantic and the N. Pacific (see Conway 1964, Wynne 1972).

RHODOCHAETALES Skuja
RHODOCHAETACEAE Schmitz

RHODOCHAETE Thuret

* ***Rhodochaete parvula*** Thuret

Observed as a common epiphyte on *Helminthopsis purpurifera* and once on *Peyssonnelia squamaria* in the sublittoral zone in the summer of 1984. Thalli were up to 1 mm long, composed of subdichotomously branched acrochaetioid filaments with characteristic elliptical reproductive structures developed laterally from vegetative cells.
Collections: S100684, SR180784, SR200784.
The species is only known from a few localities in the Mediterranean (type locality: Antibes; Bornet 1892:261; see Magne 1960:407) and the West Indies (Taylor 1971).
Aegean Sea: Sithonia (present study).

NEMALIALES Schmitz
ACROCHAETIACEAE Taylor

AUDOUINELLA Bory

* ***Audouinella crassipes*** (Børgesen) Garbary
= *Acrochaetium crassipes* Børgesen

Specimens grew on *Ptilothamnion pluma* in the sublittoral zone. Thalli were up to 25 µm long, composed of one or two simple or unilaterally branched, 2- to 6-celled filaments with isodiametric cells, to 5 µm broad, and arising from a single basal cell up to 6.5 µm broad. Terminal hair cells occurred occasionaly.
Collections: A040183.
Distributed in the Mediterranean (Coppejans & Boudouresque 1976), the West Indies (type locality: Virgin islands; Børgesen 1909:1, as *Chantransia*) (Taylor 1960, Stegenga & Kemperman 1983), the Canaries (Børgesen 1927), the Mauritius (Børgesen 1942), and the Pacific (Dawson 1957).
Aegean Sea: Sithonia (present study) and the Saronikos Gulf (Diapoulis & Verlaque 1981).
Note: According to Stegenga & Mulder (1979), this species belongs to the genus *Chromastrum* Papenfuss, which encompasses acrochaetioid algae with a single basal cell in the gametophytes and a multicellular basal system in the sporophytes. Consequently, *A. crassipes* might represent the gametophytic generation of a species whose tetrasporophytic

stage is still unknown (Stegenga & Kemperman 1983).

* ***Audouinella daviesii*** (Dillwyn) Woelkerling
= *Acrochaetium daviesii* (Dillwyn) Nägeli

Monosporangial plants, to 2 mm long, were encountered in the sublittoral zone as epiphytes on *Galaxaura oblongata*. Isolates in culture formed tufts, to 10 mm long, composed of unilaterally branched erect axes arising from a prostrate basal system of prostrate axes. Axial cells were 20 to 40 µm long and 10 to 12 µm broad, each provided with one parietal chloroplast. Isolates propagated by monosporangia, to 16 µm long and 8 µm broad, borne in groups on short laterals.
Collections: A100581.
Cosmopolitan; widely distributed in warm-temperate and boreal regions including the Mediterranean (Feldmann 1939), the N. Atlantic to Scandinavia (Jaasund 1965; Woelkerling 1973; Dixon & Irvine 1977a), and the Pacific (Woelkerling 1971).
Aegean Sea: Sithonia (present study), N. Sporades (Schiffner & Schussnig 1943, as *Achrochaetium*).

* ***Audouinella humile*** (Rosenvinge) Garbary

A few monosporangial plants were encountered as epiphytes on *Jania rubens*. Thalli were up to 70 µm long, composed of one to three unilaterally branched erect filaments with isodiametric cells 6 to 8 µm broad, and arising from a basal prostrate system of 4-celled filaments. The monosporangia were ca 13 µm long and 9 µm broad, singly and terminally borne on short laterals. Terminal hair cells were occasionally present.
Collections: A290680.
Distributed in the Mediterrannean (Levring 1942), the Black Sea (Zinova 1967), and the N. Atlantic (type locality: Denmark; Rosenvinge 1909:117, as *Chantransia*).
Aegean Sea: Sithonia (present study).
Note: The relationship of *A. humile* to several Mediterranean species characterized by a multicellular base, such as *Acrochaetium boergesenii* Schiffner (1931), *Acrochaetium molinieri* Coppejans & Boudouresque (1976, fig. 24) and *Acrochaetium mahumetanum*Hamel (1927), is in need of re-investigation. On the other hand, Stegenga & Mulder (1979) reported that the tetrasporophytic stage of *Chromastrum moniliforme* (Rosenvinge) Papenfuss is closely similar to this species.

Audouinella mediterranea (Levring) Ballesteros

Reported from the Saronikos Gulf [Diapoulis & Verlaque 1981, as *Acrochaetium mediterraneum* (Levring) Boudouresque].
Note: Examination of the type material of this species (*Chantransia mediterranea* Levring, Herb. Levring, "on *Clad. dalmatica* Sicilien, Modello 1939"; **GB**), showed that it is in good agreement with the original description (Levring 1942:30, fig. 1 A to G). Type specimens are distinguished from *A. crassipes* by larger thallus and cell size, and several (2 or 3) erect axes (cf. Woelkerling 1972).

Audouinella molinieri (Coppejans & Boudouresque) Garbary
= *Acrochaetium molinieri* Coppejans & Boudouresque

Reported from the Saronikos Gulf (Diapoulis & Verlaque 1981, as *Acrochaetium*).
Note: As interpreted by Stegenga & Mulder (1979, fig. 41), *A. molinieri* might be included within *Chromastrum*, where the monosporangial plants with septate basal cells (see Coppejans & Boudouresque 1976, figs 19 to 23) might represent the tetrasporophytic stage of this species.

Audouinella purpurea (Lightfoot) Woelkerling (1973)
= *Rhodochorton purpureum* (Lightfoot) Rosenvinge
= *Rhodochorton rothii* (Turton) Nägeli

Reported from the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978, as *R. purpureum*), and the S. Archipelagus (Giaccone 1968a, as *R. rothii* Naeg.).
Note: Re-establishment of the genus *Rhodochorton* is recognized by some authors, since gametophytes (unknown in European waters) have been described from Pacific isolates as diminutive plants lacking the carposporophytic stage (West 1969).

Audouinella secundata (Lyngbye) Dixon
= *Acrochaetium secundatum* (Lyngbye) Nägeli

Reported from the N. Sporades (Diannelidis 1950, 1953, as *Acrochaetium* on *Dictyota*).

Audouinella virgatula (Harvey) Dixon
= *Acrochaetium virgatulum* (Harvey) Bornet

Reported from the N. Sporades [Diannelidis 1950, 1953, as *A. virgatulum* (Harvey) J. Agardh].

GELIDIACEAE Kützing

GELIDIUM Lamouroux

* ***Gelidium latifolium*** (Greville) Bornet & Thuret

Plants grew on rocks or crustose corallines at shaded habitats (crevices or vertical rock surfaces) in the upper sublittoral zone (1 to ca 5 m depth). Thalli were dark red, to 10 cm long, composed of terete or compressed fronds with distichous or radial ramification. Female gametophytes with carposporophytes and tetrasporophytes were collected in November. Tetrahedrally divided sporangia, 35 to 40 µm in diameter, were borne on swollen apical parts of young branches.
Older plants were usually overgrown by *Corallina granifera* and *Jania rubens*.
Collections: NI040580, A290680, A201180, S100782, K290783, SC010784.
Distributed in the Mediterranean, the Black Sea, and the NE. Atlantic (type locality: British Isles; see Dixon & Irvine 1977a) to southern Norway (see Rueness 1977).
Aegean Sea: Makedonian coast [Politis 1925, 1953, as *G. latifolium* var. *hystrix* (J. Ag.); Katsikopoulos 1939; Haritonidis & Tsekos 1974, 1975], Attica [Politis 1936, as *G. latifolium* Born. var. *hystrix* (J. Ag.) Hauck], Cyclades (Coppejans 1974), S. Archipelagus (Giaccone 1968a, as *G. latifolium* Thur. & Born. v. *hystrix* Feldm. & Hamel), and Asia Minor [Güven & Öztig 1971, as *G. latifolium* (Born.)].

* ***Gelidium melanoideum*** Schousboe ex Bornet

A single, epilithic tetrasporophyte, to 1 cm long, was encountered in the upper sublittoral zone. The thallus was composed of prostrate cylindrical axes giving rise to slightly compressed or flattened branches. Tetrahedrally divided tetrasporangia, 25 to 32 µm in diameter, were borne in transverse series forming V-shaped bands along the apices. Rhizines were not observed.
Collections: K010882.
Distributed in the Mediterranean and along the Atlantic coast of Morocco (type locality: Tanger; Bornet 1892:269) and Iberia (Gallardo *et al.* 1985).
Aegean Sea: Sithonia (present study).

* ***Gelidium pusillum*** (Stackhouse) Le Jolis
= *Gelidium crinale* (Turner) Lamouroux (Dixon & Irvine 1977a, b)

A common sand-binding alga in the littoral and upper sublittoral zone, usually found entangled to *Corallina elongata*. Thalli were yellow-brown to red, to 3 cm long, composed of prostrate and erect, terete or compressed, axes, to 0.4 mm thick, subdichotomously to irregularly ramified with more or less acute branch apices. Female gametophytes with cystocarps, to 320 µm broad, were collected in January and June, and tetrasporophytes with tetrahedrally divided sporangia, 40 to 50 µm in diameter, in August. Fronds were usually encircled by minute crustose corallines, e. g. *Titanoderma verrucatum*, or grazed by animals.
Collections: NI020480, NI130480, A201180, V100782, K010882, A040183, K210685.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), the C. and NE. Atlantic (type locality: British Isles; see Dixon & Irvine 1977a) to S. Norway, and the Pacific.
Aegean Sea: Makedonian coast (Politis 1925, 1953; as *G. crinale*; Haritonidis & Tsekos 1974, 1975; also as *G. crinale*), N. Sporades (Schiffner & Schussnig 1943; Diannelidis 1953, as *G. crinale*), Pagasitikos Gulf (Diannelidis 1948; as *G. crinale*), Attica (Politis 1936; as *G. crinale*), Rhodes (Diannelidis *et al.* 1977, as *G. crinale*), S. Archipelagus (Giaccone 1968a, as *G. crinale* Lamx), and Asia Minor (Güven & Öztig 1971; as *G. crinale*).
Note: As interpreted by Dixon & Irvine (1977a, b), *G. pusillum* is a perennial alga with considerable variation in external morphology. Compared to the Atlantic counterparts, the plants from Sithonia were merely corresponding to the slender form of the species that is found under unfavorable ecological conditions.

PTEROCLADIA J. Agardh

* ***Pterocladia capillacea*** (Gmelin) Bornet & Thuret

This species does not occur on the southern coast of Sithonia, although it has been reported from other localities in the N. Aegean Sea, such as Alexandroupolis (Thrake) (Katsikopoulos 1939) and Thasos Island (Haritonidis and Tsekos 1974, 1975). It has commonly been recorded from southern areas in the Aegean Sea such as, the N. Sporades (Diannelidis 1950), Pagasitikos Gulf (Diannelidis 1948), Cyclades (Politis 1938, Coppejans 1974), Crete (Politis 1932), and Asia Minor (Güven & Öztig 1971).
Dense populations were met with at Crete (Iraclion 290983), growing on the sheltered side of the jetty in the upper sublittoral zone.

BECKERELLA Kylin

* ***Beckerella mediterranea*** Huvé
= *Phyllophora aegei* Giaccone (1968b; 1968d:541)

Originally described by Huvé (1962a) from material collected at Kea, Santorini, Dia, Cape Tainaron (Peloponnesus) and Cape Lithinos (S. Crete), this species was later reported at the same area by Giaccone (1968b, as *Phyllophora aegei*).
Note: *B. mediterranea* is apparently endemic to the islands of the S. Archipelagus, Peloponnesus, and Crete, and grows in shaded habitats between 2 and at least 120 m depth. It represents the only member of the genus in the Mediterranean, while its congenerics are mainly known from the Indo-Pacific. Isotype material was examined at the British Museum (BM).

Excluded species

Gelidium corneum (Hudson) Lamouroux

This binomial has been proposed for rejection on the basis of taxonomic confusion (Feldmann & Hamel 1936, Dixon 1967), while it has commonly been applied in the past to a species of

Gelidium, currently known as *G. sesquipedale* (Clemente) Thuret. This species is, however, not known to occur elsewhere in the Mediterranean, and therefore the records of *G. corneum* from the Makedonian coast (Haritonidis & Tsekos 1975) and Rhodes (Reinbold 1898) are doubtful and probably based on misidentifications.

Gelidium pectinatum Schousboe ex Montagne

Reported from the Thasos Island (Haritonidis & Tsekos 1974, as *G. pectinatum* Kütz.) and the S. Archipelagus [Huvé 1962a, as *G. pectinatum*.(Schousb.) Mont.]. The status of this species requires re-examination. Judging from Montagne's (1846:108, pl. 10, fig. 1) original description and illustration, it appears to be closely related to *G. latifolium*.

GELIDIELACEAE Fan

GELIDIELLA Feldmann & Hamel

* ***Gelidiella antipai*** Celan

This species was recently included in the marine flora of the Aegean Sea on the basis of material collected at Sithonia (see Athanasiadis 1985a).

* ***Gelidiella lubrica*** (Kützing) Feldmann & Hamel

Plants grew in the upper sublittoral zone, attached to pebbles by means of short rhizoidal pads. Thalli were up to 4 mm long, composed of prostrate and erect terete axes, to 180 µm in diameter. Erect axes were provided with terminal, conical stichidia, with several longitudinal rows (at least 6 to 7) of tetrahedrally divided tetrasporangia, 25 to 32 µm in diameter.
Collections: K010882, KI290783.
Endemic in the Mediterranean (Feldmann & Hamel 1934, 1936; Schnetter & Schnetter 1981).
Aegean Sea: Sithonia (present study).

Gelidiella pannosa (Feldmann) Feldmann & Hamel

Reported from the Saronikos Gulf (Diapoulis & Verlaque 1981).

WURDEMANNIACEAE Taylor

WURDEMANNIA Harvey

Wurdemannia miniata (Draparnaud) Feldmann & Hamel

Reported from the S. Archipelagus (Giaccone 1968a, as *W. miniata* Feldm. & Hamel).

HELMINTHOCLADIACEAE J. Agardh

LIAGORA Lamouroux

* ***Liagora viscida*** (Forsskål) C. Agardh
=? *Liagora cladoniaeformis* Bory

Commonly met with on pebbles and rocks in the upper sublittoral zone (to ca 5 m depth) in summer. Thalli were whitish to greenish, slightly calcified and soft, to 7 cm long, composed of a subdichotomously divided frond with terete to compressed branches, 1 to 2 mm broad. The growth was multiaxial with a compact filamentous medulla of rhizoidal cells and a cortex of

subdichotomously to trichotomously branched filaments, divided up to the fifth-order. Monoecious gametophytes bore terminal spermatangia. Carpogonial branches were 4-celled and laterally borne on cortical filaments. Carposporophytes were surrounded by involucral filaments. Tetrasporophytes are unknown in this species.
Collections: OI090680, A000681, K010883, SI100684, SC010784.
Distributed in the Mediterranean, the Bosporus (type locality: Constantinople; Forsskål 1775:193, as *Fucus*), and the NE. Atlantic to Brittany (Crouan & Crouan 1867).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975), Cyclades (Nizamuddin & Lehnberg 1970; Coppejans 1974), Crete (Schussnig 1943), Rhodes (Diannelidis *et al.* 1977).
Note: *Liagora cladoniaeformis* was erected by Bory (Fauché *et al.* 1832-33:328) to accommodate plants collected on the coast of Lakonia (Peloponnesus). Judging from the original description, this species appears to be a synonym of *L. viscida* (De Toni 1897:90).

Liagora distenta (Roth) C. Agardh

Reported from Methana (Peloponnesus; Fauché *et al.* 1832-33:329, as *L. distenta* Lamx), and the S. Archipelagus (Giaccone 1968a, as *L. distenta* Ag.).

NEMALION Duby

* ***Nemalion helminthoides*** (Velley) Batters
= *Nemalion multifidum* (Weber & Mohr) J. Agardh (Dixon & Irvine 1977a:142)

Commonly met with among barnacles on exposed granite rocks in the supralittoral zone. Young individuals, a few cm long, were recorded as early as in January, whereas overgrown specimens, to 60 cm long, persisted until late August. Thalli were red-yellow to red-brown (greenish when inhabited by Cyanophyta), mucilaginous, with terete and sparsely branched fronds, to 5 mm broad. The growth was multiaxial with a compact medulla of rhizoidal cells, ca 13 µm broad, giving rise to a cortex of subdichotomously and trichotomously branched filaments. Carpogonial plants with carposporophytes, to 100 µm in diameter, were collected in June. *Polysiphonia tenerrima* was commonly found as an epiphyte in late summer.
Collections: A290680, A100581, A040183, SI100684, PI030884.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the N. Atlantic from Morocco to Norway and N. Carolina to Canada.
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), and Asia Minor (Güven & Öztig 1971, as *N. multifidum*).

Excluded species

Liagora ceranoides Lamouroux

This taxon was reported from the Argolikos Gulf and Peloponnesus by Bory (Fauché *et al.* 1832-33:329; with *L. viscida* Ag. cited as a synonym), and Rhodes (Reinbold 1898). These records are, however, in need of confirmation, while it is worth noting that this tropical species has only recently been reported elsewhere in the Mediterranean from the Iberian coast (Gallardo *et al.* 1985).

GALAXAURACEAE Parkinson

GALAXAURA Lamouroux

* ***Galaxaura oblongata*** (Ellis & Solander) Lamouroux
= *Galaxaura adriatica* Zanardini (Papenfuss *et al.* 1982)

Saxicolous and epiphytic plants, the latter growing on crustose corallines, were collected in the

sublittoral zone (5 to 20 m depth). Thalli were pinkish to whitish, to 80 mm long, usually composed of several terete and subdichotomously branched fronds, 1 to 1.2 mm broad, arising from a basal holdfast. Thallus organization was multiaxial with a compact medulla of subdichotomously divided rhizoidal cells, 190 to 390 µm long and 5 to 12 µm broad, giving rise to a cortex of subdichotomously branched, to the fourth-order, filaments composed of subspherical to cylindrical cells, 32 to 45 µm long and up to 25 µm wide. Ultimate cells, 8 to 16 µm wide, were calcified, firmly bounded together, and occasionally converted into hair cells. Plants with spherical spermatangial sori, to 200 µm wide, borne in embedded conceptacles with an apical ostiole, were collected in July, August, and November. Subspherical spermatangia, 4 to 6.5 µm broad, were terminally borne on uni- or bilaterally branched filaments, composed of cells up to 10 µm long and 3 µm broad. Individuals with carpogonia or carposporophytes were not observed. Species of *Audouinella*, *Myrionema*, *Feldmannia*, *Antithamnion*, *Ceramium*, and *Giraudia sphacelarioides* occurred as epiphytes.
Collections: A181180, A201180, A110581, A250881, A140782.
Widely distributed in tropical and warm-temperate regions including the Mediterranean, the Atlantic, the Red Sea, and the Indo-Pacific (see Papenfuss *et al.* 1982).
Aegean Sea: Sithonia (present study), Cyclades (Coppejans 1974), and the S. Archipelagus (Giaccone 1968a; as *G. adriatica*).
Note: Tetrasporophytes, unknown in European plants, have been described from Hawaii as diminutive acrochaetioid filaments with cruciately divided sporangia (Magruder 1984).

SCINAIA Bivona

Scinaia forcellata Bivona

Reported from the Makedonian coast [Haritonidis & Tsekos 1975, as *S. furcellata* (Turn.) Biv.], the N. Sporades [Coppejans 1974, as *S. furcellata* (Turn.) Biv.], and Asia Minor [Güven & Öztig 1971, as *S. furcellata*(Turn.) Biv.].

BONNEMAISONIACEAE Schmitz

ASPARAGOPSIS Montagne

* ***Asparagopsis*** cf. ***armata*** Harvey
= *Falkenbergia* cf. *rufolanosa* (Harvey) Schmitz

Infertile plants of *Falkenbergia* were collected in the sublittoral zone as epiphytes on *Gelidium latifolium*. Thalli were up to 2 cm long, composed of subdichotomously branched filaments and attached to their host by means of rhizoidal holdfasts.
Collections: A081081, K300786.
Note: The material was tentatively referred to as the tetrasporophytic phase of *A. armata* pending investigations on the relationship of this species with its close relative *Asparagopsis taxiformis* (Delile) Trevisan (Dixon & Irvine 1977a). *Falkenbergia* has previously been reported in the Aegean Sea from the Saronikos Gulf (Diapoulis & Verlaque 1981) and Asia Minor (Güven & Öztig 1971, as *F. rufolanosa*), whereas *A. armata* has been reported only once from Rhodes (see Diapoulis & Verlaque 1981).

BONNEMAISONIA C. Agardh

* ***Bonnemaisonia asparagoides*** (Woodward) C. Agardh

A few gametophytes, to 15 cm long, were collected in the sublittoral zone (ca 30 m depth) in association with *Arthrocladia villosa*. Thalli were radially to distichously branched, with a terete main axis less than 1 mm broad, and ultimate branches up to 3 mm long and 85 µm

broad. Spermatangial structures were clavate, to 70 µm long and 50 µm broad. Cystocarps were subovate and up to 500 µm in diameter.
Collections: KC310784.
Distributed in the Mediterranean and the Atlantic coast of Europe between Norway and Morocco (see Dixon & Irvine 1977a).
Aegean Sea: Sithonia (present study).

* ***Bonnemaisonia clavata*** Hamel

Saxicolous and epiphytic plants, the latter growing on crustose algae and *Posidonia* rhizomes, were collected in the sublittoral zone (12 to 15 m depth). Thalli were pinkish, to 15 cm long, composed of irregularly branched and slightly compressed fronds, arising from a basal holdfast. Individuals bore carposporophytes and species of *Audouinella*, *Epicladia* and *Myrionema* as epiphytes.
Collections: SR150784, SR180784, SR200784, KI010784.
Distributed in the Mediterranean (type locality: Marseille; Hamel 1930:44) and the NE. Atlantic to the British Isles (see Dixon & Irvine 1977a).
Aegean Sea: Sithonia (present study).

CORALLINALES Silva & Johansen
CORALLINACEAE Lamouroux

AMPHIROA Lamouroux

Amphiroa beauvoisii Lamouroux

Reported from the S. Archipelagus (Giaccone 1968a).

* ***Amphiroa rigida*** Lamouroux

Plants grew on hard substrata, usually on crustose corallines, in the upper sublittoral zone down to ca 10 m depth. Thalli were violet-pinkish to whitish, to 4 cm long, composed of subdichotomously to irregularly ramified fronds with cylindrical to slightly compressed intergeniculae, to 3.5 mm long and 0.8 mm broad. Longitudinal sections of intergeniculae studied in S. E. M. showed medullary (hypothallial) cells arranged in prominent tiers, where two series of long cells, each up to 100 µm long and ca 10 µm broad, alternated with a series of isodiametric cells, 10 to 15 µm in diameter (S. E. M.). Medullary cells of the external periphery gave rise to a polystromatic cortex (perithallium), to 300 µm thick, composed of more or less isodiametric cells. Secondary pit-connections occurred commonly between contiguous medullary or cortical cells. Unipore tetrasporangial conceptacles were 220 to 260 µm in internal diameter, with 2 to 4 cell layers in the conceptacle roof. Tetrasporangia were zonately divided, 30 to 50 µm long and 12 to 20 µm broad.
Collections: A210480, A041280, A290880, A091081, K010882, SI160784, K000685, also observed at T and Olibias island.
Distributed in the Mediterranean (type locality), the Caribbean (Børgesen 1915-20), and the Pacific (see Norris & Johansen 1981).
Aegean Sea: Makedonian coast (present study), Pagasitikos Gulf (Diannelidis 1935), Cyclades (Politis 1938, Coppejans 1974), Crete (Diannelidis 1950), the S. Archipelagus (Giaccone 1968a), and Asia Minor (Güven & Öztig 1971).

* ***Amphiroa rubra*** (Philippi) Woelkerling
=? *Amphiroa cryptarthrodia* Zanardini

Plants were collected in the sublittoral zone as endo-epiphytes on crustose corallines, especially on *Lithophyllum expansum* Philippi sensu Lemoine. Thalli were reddish to pinkish, to 4 cm

long, composed of subdichotomously to irregularly ramified fronds with their basal part penetrating into the host. Intergeniculae were cylindrical to slightly compressed at the ends, to 4.4 mm long and 460 µm broad. Medullary (hypothallial) cells were arranged in prominent tiers with one series of long cells, 120 to 145 µm long and ca 10 µm broad, alternating with one series of short cells, 50 to 60 µm long and ca 10 µm broad. Medullary cells in the external periphery gave rise to a cortex (perithallium) of isodiametric cells, up to 3 layers thick. Secondary pit-connections were commonly developed between contiguous medullary or perithallial cells. Individuals collected between August and January bore unipore tetrasporangial conceptacles. These formed elliptical cavities, 220 to 230 µm long and 100 µm high, and bore zonately divided tetrasporangia, to 25 µm long and 9.5 to 12 µm broad.
Collections: A200881, A081081, A091081, A100782, A040183.
Distributed in the Mediterranean (type locality: Sicily; see Woelkerling 1983a:172).
Aegean Sea: Sithonia (present study).
Note: The Aegean plants were in agreement with the lectotype specimen of *A. rubra*, as described by Woelkerling (1983a), from which were distinguished only by slightly shorter tiers of medullary cells (50 to 60 instead of 65 to 84 µm in the lectotype). As appears from the literature, this species is closely related to *Amphiroa cryptarthrodia*, which exhibits a similar morphology and wide distribution in the Mediterranean and the NE. Atlantic to France (see Hamel & Lemoine 1953). In the Aegean Sea, *A. cryptarthrodia* has been reported from Attica (Politis 1936; on stones), Crete (Politis 1932), and the S. Archipelagus (Giaccone 1968a).

CHOREONEMA Schmitz

* ***Choreonema thuretii*** (Bornet) Schmitz

Tetrasporophytes with subspherical conceptacles, to 100 µm in diameter, grew on *Corallina granifera* and *Jania rubens* in the upper sublittoral zone. Zonately divided tetrasporangia, 35 to 40 µm long and 15 to 25 µm broad, were observed in specimens collected throughout the year.
Collections: A210480, A171180, A041280, K100782.
Cosmopolitan; distributed in the Mediterranean, the Black Sea (Zinova 1967), the NE. Atlantic to southern Scandinavia (Suneson 1937, 1943), and the Indo-Pacific (see Dawson 1960).
Aegean Sea: Sithonia (present study), N. Sporades, Cyclades and Limnos (Schiffner & Schussnig 1943, as *C. thureti* Schmitz; Diannelidis 1953, tetrasporophytes and carposporophytes).

CORALLINA Linnaeus

* ***Corallina elongata*** Ellis & Solander
= *Corallina mediterranea* Areschoug

Dense populations grew in shaded semi-exposed habitats in the littoral and sublittoral zone, to at least 6 m depth. Thalli were pinnately branched with intergeniculae, to 985 µm long and 865 µm broad, usually compressed and provided with lateral corniculate projections. Medullary intergenicular cells were ca 45 µm long. Tetrasporophytes collected in November and December bore zonately divided tetrasporangia, 100 to 165 µm long and 30 to 56 µm broad, in conceptacle cavities 210 to 385 µm long and up to 355 µm high.
Collections: A041280, A171180, P000881, A101081, KC000784, K200686, Iraclion 270983.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic to the British Isles (see Parke & Dixon 1976).
Aegean Sea: Recorded as *C. mediterranea* from the Makedonian coast (Haritonidis & Tsekos 1974, 1975), the Cyclades (Nizamuddin & Lehnberg 1970, Coppejans 1974), the S. Archipelagus (Giaccone 1968a), and Asia Minor (Güven & Öztig 1971).

* ***Corallina granifera*** Ellis & Solander
=? *Corallina virgata* Zanardini
=? *Corallina attenuata* Kützing

Plants formed subspherical tufts, to 3 cm long, growing on diverse macroalgae and seagrasses in the littoral and sublittoral zone, to at least 8 m depth. Thalli were pinkish to whitish, composed of subdichotomous, pinnate, or radially ramified axes, with intergeniculae 165 to 745 µm long and 50 to 400 µm broad. Individuals collected in July bore elliptical, spermatangial conceptacles with cavities up to 310 µm long and 145 µm broad. Urnshaped to subovate, empty conceptacles, occasionally provided with lateral branches, were observed on plants collected in May.
Collections: A020480, NI130480, A061180, A100581, K100782, K000683, also observed at Olibias island, AR, P, and Iraclion 270983.
Distributed in the Mediterranean (type locality: Mediterranean Africa; see Agardh 1852:569) and the C. and NE. Atlantic between the tropical coast of Africa (see Price *et al.* 1986) and the British Isles (see Parke & Dixon 1976).
Aegean Sea: Makedonian coast (present study), N. Sporades, Limnos and Cyclades [Schiffner & Schussnig 1943, as *C. virgata* var. *attenuata* (Kütz.) Hauck and var. *penicillata* Schiffner], Rhodes (Agardh 1852), and Asia Minor (Güven & Öztig 1971).
Note: This species is considered as polymorphous and several taxa are cited as synonyms by De Toni (1905:1845) and later authors (e. g. Hamel & Lemoine 1953). The wide form range in intergenicular size and branching pattern in the Aegean plants also suggests that several entities might be involved (cf. Bressan 1974).

Corallina officinalis Linnaeus

Reported from the Makedonian coast (Politis 1925, 1953; Katsikopoulos 1939; Haritonidis 1974, 1975), the Pagasitikos Gulf and the N. Sporades (Diannelidis 1935, 1950, 1953), Crete, Attica and the Cyclades (Politis 1932, 1936, 1938), the S. Archipelagus (Giaccone 1968a), and Asia Minor (Güven & Öztig 1971).
Note: The distinction between *C. officinalis* and *C. elongata* is rather delicate, and has long been the subject of controversies (e. g. Bressan & Benes 1977, Schnetter & Richter 1979). Although typical plants of the species were not found at Sithonia, previous authors claim their occurrence in adjacent localities as also in other areas of the Aegean Sea. The taxon is also included in check-lists of Mediterranean marine algae from the coast of France (Boudouresque *et al.* 1984), Spain (Gallardo *et al.* 1985), and Lybia (Nizamuddin *et al.* 1979).

FOSLIELLA Howe

* ***Fosliella farinosa*** (Lamouroux) Howe
= *Melobesia farinosa* Lamouroux

A common epiphyte on diverse macroalgae and *Posidonia* leaves in the sublittoral zone. The crustose thallus was up to 2 mm in extent, and bore hemispherical sporangial conceptacles, 90 to 140 µm in diameter, usually surrounded by a ring of trichocytes.
Collections: A001081, A140782, S100882.
Distributed in the Mediterranean (type locality), the NE. Atlantic to the British Isles (see Chamberlain 1983), the Red Sea (see Papenfuss 1968), the Black Sea (Zinova 1967), and the Indo-Pacific (Balakrishnan 1947, Dawson 1960).
Aegean Sea: Commonly reported as *Melobesia* from the Makedonian coast (Politis 1925, 1953; Katsikopoulos 1939; Haritonidis & Tsekos 1974, 1975), the Cyclades (Politis 1938, Schiffner & Schussnig 1943, Coppejans 1974), the N. Sporades (Schiffner & Schussnig 1943, Diannelidis 1950), Rhodes (Reinbold 1898), and the S. Archipelagus (Giaccone 1968a).

Fosliella farinosa f. ***callithamnioides*** (Foslie) Chamberlain (1983:351)
= *Melobesia farinosa* f. *callithamnioides* Foslie
= *Melobesia solmsiana* Falkenberg

Reported under synonymous or superfluous names from the Makedonian coast [Haritonidis & Tsekos 1974, 1975, as var. *solmsiana* (Falkbg.) Fosl.], the N. Sporades (Diannelidis 1953, as *Melobesia callithamnioides* Falkenberg), Rhodes (Reinbold 1898, as *Melobesia callithamnioides* Falkbg.), and the S. Archipelagus (Giaccone 1968a, as *M. solmsiana*).

GONIOLITHON Foslie

* ***Goniolithon byssoides*** (Lamarck) Foslie
= *Lithothamnium byssoides* (Lamarck) Philippi
= *Lithophyllum byssoides* (Lamarck) Foslie

Reported from the Makedonian coast [Haritonidis & Tsekos 1975, as *Lithothamnion byssoides* (Lamour.)], the Cyclades (Coppejans 1974), and the S. Archipelagus (Giaccone 1968a, as *Lithophyllum byssoides* Fosl.). Specimens from Cape Sidheros (E. Crete) were available for examination through a generous loan from the personal herbarium of Dr. Y. Chamberlain (Portsmouth Polytechnic).

* ***Goniolithon papillosum*** (Zanardini ex Hauck) Foslie

This species is known to occur in characteristic patches on rocks in the exposed littoral zone in association with *Rivularia* sp., *Nemalion helminthoides*, and other corallines. It has been reported from widespread localities in the Mediterranean, while Aegean plants have been included in a study of the species by Huvé (1962b). Plants collected at PI (close to Cape Drepanon) were up to 4 cm in extent, with prominent excrescences occasionally formed by abutted margins. The crustose fronds were up to 0.5 mm thick, and grew by means of a coaxial and usually prostrate perithallial tissue of rectangular cells, to 50 µm long and ca 10 µm broad. Unipore conceptacles bore cavities to 200 µm in diameter, protruding ca 100 µm above the thallus surface.
Collections: PI020884
Endemic in the Mediterranean (type locality: Adriatic; Hauck 1883:272).
Aegean Sea: Sithonia (Cape Drepanon), Samothrake (Cape Malathrea), Limnos (Siderites), and Antipsara (Huvé 1962b).

HALIPTILON Johansen

Haliptilon squamatum (Linnaeus) Johansen *et al.* (1973:212)
= *Corallina squamata* Linnaeus

Reported from the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978; as *C. squamata* Ell. & Sol.), and Rhodes (Diannelidis *et al.* 1977, as *C. squamata* Ellis).

JANIA Lamouroux

Jania adhaerens Lamouroux

Reported from the Cyclades (Nizamuddin & Lehnberg 1970).

* ***Jania corniculata*** (Linnaeus) Lamouroux
= *Corallina corniculata* Linnaeus

A few plants with empty conceptacles were collected in the upper sublittoral zone as epiphytes

on *Stypocaulon scoparium*. Thalli were up to 2 cm long, composed of dichotomously branched fronds with slightly compressed intergeniculae, 250 to 680 µm long and 60 to 260 µm broad, bearing pinnate short laterals.
Collections: A020480, A100581, A201180
Distributed in the Mediterranean and the NE. Atlantic to the British Isles (see Parke & Dixon 1976).
Aegean Sea: Sithonia (present study), and Asia Minor (Güven & Öztig 1971, as *Corallina*).

Jania longifurca Zanardini

Reported from the Makedonian coast (Haritonidis & Tsekos 1974, 1975; Haritonidis 1978), the Pagasitikos Gulf, the N. Sporades and Crete (Diannelidis 1935, 1950, 1953).

* ***Jania rubens*** (Linnaeus) Lamouroux
= *Corallina rubens* Linnaeus

A common epiphyte on diverse macroalgae and seagrasses in the upper sublittoral zone, to a depth of ca 10 m. Plants formed subspherical tufts, 2 to 5 cm in diameter, composed of dichotomously ramified fronds with intergeniculae 0.5 to 1.35 mm long and 90 to 200 µm broad. Specimens with conceptacles were observed throughout the year, usually inhabited by the endoparasite *Choreonema thuretii*.
Collections: A020480, N130480, A201180, K010882, K000683, also observed at Olibias island, V, AR, S, SR, SC, PI, D and T;
Distributed in the Mediterranean, the Black Sea (Zinova 1967) and the NE. Atlantic to Scandinavia (see Kylin 1944, Rueness 1977).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975), the N. Sporades (Diannelidis 1950, 1953), Attica (Politis 1936), Cyclades (Politis 1938, Schiffner & Schussnig 1943, Coppejans 1974), S. Archipelagus (Huvé 1962a, Giaccone 1968a), Rhodes (Reinbold 1898, as *Corallina*), and Asia Minor (Güven & Öztig 1971, as *Corallina*).

LITHOPHYLLUM Philippi

* ***Lithophyllum dentatum*** (Kützing) Foslie sensu Hamel & Lemoine

Saxicolous plants, forming conglomerate masses on vertical rock surfaces and occasionally growing as understory species covered by plants of *Cystoseira compressa*, were collected in semi-exposed habitats in the upper sublittoral zone (1 to 2 m depth). Detached masses were pinkish-violet to whitish, to 10 cm long, 6 cm broad and 7 cm thick, composed of numerous tuberculate-lamellate, in older plants irregularly anastomosed, excrescences, 1 to 3 mm thick, and horizontally expanded basal margins curving inwards. Transverse sections of excrescences showed a polystromatic coaxial core giving rise to ascending filaments composed of rectangular cells, 30 to 36 µm long and up to 15 µm broad, commonly provided with secondary pit-connections (S. E. M.). Specimens collected in July were infertile, although embedded unipore conceptacles, to 320 µm in diameter, with distinct columella-like structures, were observed.
Collections: L000778, L010784.
Note: The Aegean plants were in agreement with the concept of *L. dentatum* (Kützing) Foslie as recognized by Hamel & Lemoine (1953), although apparently different from the type specimen of the basionym of this species, *Spongites dentata* Kützing (Woelkerling 1985) which is closely related to *Neogoniolithon* Setchell & Mason sensu Hamel & Lemoine (see under *Spongites*). As a result the distribuition and the correct name of this species is obscure and necessitates critical re-examination of all records and previously applied synonyms. *Lithophyllum dentatum* was reported in the Aegean Sea from the S. Archipelagus (Giaccone 1968a, as *L. dentatum* Fosl.), although in the absence of morphological description the record should be regarded as doubtful.

Lithophyllum duckeri Woelkerling (1983a:173)
= *Lithothamnium crassum* Philippi

Reported from the Cyclades (Politis 1938, as *L. crassum*).
Note: See note under *Lithophyllum racemus*.

* ***Lithophyllum expansum*** Philippi sensu Lemoine
= *Pseudolithophyllum expansum* (Philippi) Lemoine pro parte

Epiphytic plants, growing on diverse macroalgae and especially on *Cystoseira corniculata*, were commonly found in the sublittoral zone, to depths of at least 15 m. Specimens were variously coloured, reddish to pinkish or even grey, to 15 cm in extent, composed of horizontally expanded, undulate, and usually superimposed fronds with lobate margins. Individual fronds were less than 1 mm thick, usually exhibiting a monostromatic hypothallium composed of isodiametric cells, to 16 µm in diameter, and giving rise to a perithallium of rectangular cells, 10 to 20 µm long and 5 to 10 µm broad, arranged in longitudinal series. Perithallial filaments were vertically ascending or curving to the hypothallium, occasionally even tending to form a prostrate noncoaxial tissue. Secondary pit-connections occurred commonly between contiguous perithallial and hypothallial cells. Tetrasporophytes with unipore conceptacles and zonately divided tetraspores, 50 to 80 µm long and 25 to 50 µm broad, were collected in January. Empty sporangial conceptacle cavities, with a central columella-like structure, were elliptical, 200 to 350 µm long and 100 µm high.
Collections: A041280, S100881, A250881, A091081, A140782, A040183, SI160784.
Distributed in the Mediterranean and localities on the Atlantic coast of Europe (Hamel & Lemoine 1953, as *Pseudolithophyllum*)
Aegean Sea: *P. expansum*, presumably sensu Hamel & Lemoine (1953), has been reported from the Makedonian coast (Haritonidis & Tsekos 1974, 1975), the Cyclades (Politis 1938, Coppejans 1974), the S. Archipelagus (Huvé 1962a, Giaccone 1968a,d; as a dominating species at 60 m depth at Kithira channel), and Asia Minor (Güven & Öztig 1971).
Note: Philippi's original material of *L. expansum* originates from Sicily and appears to be conspecific with the commonly known alga *Mesophyllum lichenoides* (Woelkerling 1983 b) (cf. Hamel & Lemoine 1953). As a result, the correct name for this common species is obscure and requires critical re-examination of the earliest applied synonyms (e. g. *Melobesia stictaeformis* Areschoug in J. Agardh). Woelkerling (1983 b) considered *L. incrustans* Philippi to be conspecific with this species, basing his conclusion on a study of Philippi's type material. However, it should be mentioned that many features related to the habit and habitat of *L. incrustans* are not evident in the authentic collection. As currently interpreted, *L. incrustans* is a mainly intertidal species, closely adhering to the substratum, and exhibits thicker fronds that may develop a prostrate, coaxial perithallial tissue (see Cabioch 1972).

Lithophyllum incrustans Philippi

Recorded from the Makedonian coast (Haritonidis & Tsekos 1975), and the S. Archipelagus (Giaccone 1968a).

Lithophyllum lichenoides Philippi
= *Lithophyllum tortuosum* (Esper) Foslie sensu Lemoine (Woelkerling *et al.* 1985:327)

Zimmermann (1982) reported for the first time this species in the eastern Mediterranean from the Gulf of Smirna and localities on the west coast of Crete (outside the Aegean Sea).

Lithophyllum subtenellum (Foslie) Foslie
= *Lithothamnion subtenellum* (Foslie) Lemoine

Reported from the S. Archipelagus (Giaccone 1968a, as *Lithothamnion subtenellum*

Lemoine).
Note: According to Adey (1970:6), the type specimen exhibits unipore sporangial conceptacles, secondary pit-connections and a monostromatic hypothallium.

LITHOTHAMNION Heydrich

Lithothamnion sonderi Hauck

Reported from the S. Archipelagus (Giaccone 1968a).

MELOBESIA Lamouroux

* ***Melobesia membranacea*** (Esper) Lamouroux
= *Lithothamnion membranaceum* (Esper) Foslie

Plants were found around the fronds of diverse macroalgae (e. g. *Laurencia paniculata, Stypocaulon scoparium, Cladophora* spp.), in the sublittoral zone. They formed patches, a few mm in extent, with multipore tetrasporangial and unipore cystocarpic conceptacles, both with inner cavities 60 to 100 μm in diameter. Zonately divided sporangia were cylindrical, to 50 μm long and 30 μm broad.
Collections: K010882, K290783, SI100684.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic to Scandinavia (see Hamel & Lemoine 1953, Rueness 1977).
Aegean Sea: Sithonia (present study), and Cyclades (Schiffner & Schussnig 1943, as *Lithothamnion*).

MESOPHYLLUM Lemoine

Mesophyllum lichenoides (Ellis) Lemoine

Reported from the Makedonian coast (Haritonidis & Tsekos 1974, 1975), and S. Archipelagus (Huvé 1962a, Giaccone 1968a, d; as *M. lichenoides* Lemoine, found at 60 m depth at the Kithira channel).

* ***Mesophyllum sp.***

Saxicolous plants, growing with large parts of their thallus unattached, were collected in a sublittoral cave at ca 0.5 m depth. Thalli were purple-red and formed horizontally expanded crusts, to 7 cm in extent, composed of several superimposed and fragile frond with lobate margins, each up to 100 μm thick. Transverse sections of individual fronds showed a polystromatic, noncoaxial, central tissue (hypothallium), of horizontally running filaments with dorsiventral organization. Cell fusions were numerous between contiguous cells. Multipore conceptacles, to 600 μm in diameter, were protruding above the thallus surface.
Collections: SC010784.
Note: The Aegean plants were distinguished from *M. lichenoides* (see Woelkerling & Irvine 1986b) chiefly by the habit and the plumose (noncoaxial) hypothallium.

PHYMATOLITHON Foslie

Phymatolithon calcareum (Pallas) Adey & McKibbin
= *Lithothamnion calcareum* (Pallas) Areschoug

Reported from the Egina island (Lemoine 1915:10, as *Lithothamnion*), Crete (Diannelidis 1950, as *Nullipora informis* Lamx) (see Woelkerling & Irvine 1986a), and the S. Archipelagus

(Huvé 1962a, as *Lithothamnion*).

Phymatolithon lenormandii (Areschoug) Adey
=*Lithothamnion lenormandii* (Areschoug) Foslie

Reported from the Makedonian coast (Haritonidis & Tsekos 1974, 1975; as *Lithothamnion*), the S. Archipelagus (Giaccone 1968a, as *L. lenormandii* Fosl.), and Asia Minor (Güven & Öztig 1971; as *Lithothamnion*).

* ***Phymatolithon*** sp.

Saxicolous plants adhering to the substratum were collected in a sublittoral cave at ca 0.5 m depth. Thalli were bluish violet to light grey, smooth and glossy, to 7 cm in extent and to 3 mm thick, composed of a coaxial, polystromatic hypothallium of rectangular cells that gave rise to ascending perithallial filaments with rectangular to isodiametric cells. Subepithallial meristematic zones, characteristically composed of progressively elongate cells, were observed. Specimens bore unipore conceptacles of two sizes, presumably corresponding to male and female ones. Minor conceptacle cavities were 165 to 200 µm in diameter, and large ones up to 330 µm in diameter. Empty sporangial conceptacles, with up to 25 pores and a distinct ridge in the roof, were sunken below the thallus surface. Embedded, multipore, conceptacle cavities were 240 to 380 µm long and 195 to 220 µm high.
Collections: SC010784.
Note: The genus *Phymatolithon* is poorly known in the Mediterranean. Compared to Atlantic congenerics, the Aegean plants were most closely related to *P. purpureum* (P. & H. Crouan) Woelkerling & Irvine which, however, exhibits smaller asexual conceptacales (see Adey & Adey 1973, as *P. polymorphum*) lacking a ridge.

PNEOPHYLLUM Kützing

* ***Pneophyllum confervicola*** (Kützing) Chamberlain

Plants were found as epiphytes on *Posidonia* leaves and macroalgae in the sublittoral zone. Thalli were pinkish to whitish, to 1 mm in extent, composed of a monostromatic hypothallium of isodiametric hypothallial cells, 8 to 10 µm long and 6 to 16 µm broad, more or less arranged in longitudinal rows and provided with subspherical epithallial cells occasionally bearing trichocytes. Gametophytes were monoecious with male and female conceptacles borne close to each other, the former up to 40 µm and the latter 70 to 80 µm in diameter. Tetrasporangial conceptacles, similar in size to the female ones, bore tetrasporangia to 32 µm long and 20 µm broad. Sexual and asexual conceptacles were characteristically projected and domed-shaped.
Filamentous specimens, corresponding to f. *minutula* (Foslie) Chamberlain, were sporadically observed on algae.
Collections: A001081, KI010784, SI180784.
Widely distributed in most temperate and tropical regions including the Mediterranean (type locality: Adriatic; Kützing 1843:295, as *Phyllactidium*, on *Chaetomorpha*), the Black Sea (Zinova 1967), the NE. Atlantic to Scandinavia (Suneson 1943), and the Indo-Pacific (see Chamberlain 1983).
Aegean Sea: Sithonia (present study).

Pneophyllum lejolisii (Rosanoff) Chamberlain (1983:359)
=*Melobesia lejolisii* Rosanoff

Reported from the S. Archipelagus (Giaccone 1968a, as *Melobesia*).

* ***Pneophyllum rosanoffii*** Chamberlain

This recently described species (Chamberlain 1983) was recognized as a common epiphyte on *Zostera* L. and *Halopitys incurvus*. The Aegean plants grew on *Posidonia* leaves in the sublittoral zone, and were ca 2 mm in extent with slightly larger female conceptacles, 210 to 290 in diameter (with cavities 130 to 200 μm in diameter), than those described in the type material. The plants were distinguished from other species of *Pneophyllum* and *Fosliella* chiefly by the prominent ostiolar filaments.
Collections: A001081.
Distributed in the Mediterranean and along the Atlantic coast of Europe to Denmark (Chamberlain 1983).
Aegean Sea: Sithonia (present study).

* ***Pneophyllum zonale*** (P. & H. Crouan) Chamberlain (1983:435)
= *Melobesia zonalis* (P. & H. Crouan) Foslie

Plants grew on diverse macroalgae in the upper sublittoral zone. Thalli were polystromatic, more or less circular, to 1.5 mm in diameter, with perithallial cells, 8 to 16 μm long, arranged in radial rows and provided with prominently subspherical, epithallial cells.
Collections: SI180784, K020786.
Distributed in the Mediterranean, the NE. Atlantic to Scandinavia, and in the southern hemisphere (see Chamberlain 1983).
Aegean Sea: Sithonia (present study), and S. Archipelagus (Giaccone 1968a, as *M. zonalis* Foslie).

SPONGITES Kützing

Based on a study of Kützing's original collections from the Mediterranean, Woelkerling (1985) resurrected the genus *Spongites*, as typified by *S. fruticulosa* Kützing (designated by Woelkerling). As currently circumscribed, *Spongites* encompasses mastophoroid species with plumose hypothallium and ascending perithallial filaments occasionally terminating in trichocytes. The generitype *S. fruticulosa* appears to be conspecific with two other Mediterranean taxa separately described by Kützing (see Woelkerling 1985), while the definition of *Spongites* apparently accommodates at least two other Mediterranean species, currently referred to the genus *Neogoniolithon* Setchell & Mason sensu Hamel & Lemoine (1953); *N. mamillosum* and *N. notarisii*.

* ***Spongites notarisii*** (Dufour) Athanasiadis comb. nov.
= *Melobesia notarisii* Dufour (1861:59)
= *Neogoniolithon notarisii* (Dufour) Hamel & Lemoine

Saxicolous and epizoic plants, the latter growing on barnacles and *Patella* sp., were collected in the littoral zone. Thalli formed small patches, to 2 cm in extent, with lobate margins, ca 5 mm in diameter and 200 μm thick, adhering to the substratum. The hypothallium was multiaxial and polystromatic, up to 7 layers thick, composed of filaments with rectangular cells, 26.5 to 44.5 μm long and 8 to 13 μm broad, giving rise to ascending perithallial filaments with rectangular to subspherical cells, 8 to 20 μm long and 8 to 13 μm broad. The epithallium was composed of elliptical cells, 5 to 10 μm long and 10 to 15 μm broad, usually replaced at irregular intervals by subspherical to rectangular trichocytes, 30 to 50 μm long and 20 to 26.5 μm broad. Fusions between contiguous cells were commonly present. Tetrasporophytes bore hemispherical or conical conceptacles 450 to 590 μm in diameter, protruding, 230 to 425 μm, above the thallus surface. Conceptacle cavities were elliptical, 190 to 390 μm long and 100 to 150 μm high, with a central opening, ca 50 μm in diameter and 100 to 180 μm high. Zonately divided tetrasporangia were elliptical, 52 to to 122 μm long and

20 to 57 µm long. Columella-like structures were absent in the cavities.
Collections: SI180784.
Endemic in the Mediterranean (type locality: Genoa, Dufour 1861:39, as *Melobesia*).
Aegean Sea: Sithonia (present study), Cyclades [Coppejans 1974, as *N. notarisii* (Dufour) Setchell & Mason], and the S. Archipelagus (Giaccone 1968a, as *N. notarisii* Setchell & Mason).
Note: The Aegean plants were in good agreement with the concept of *N. notarisii*, as recognized by Hamel & Lemoine (1953) and later authors (i. e. Bressan 1974), although re-examination of Dufour's original collections is necessary to confirm the status of the basionym of this species.

* ***Spongites ramulosa*** (Philippi) Kützing
= *Lithothamnion fruticulosum* (Kützing) Foslie f. *ramulosa* (Phillipi) Foslie
=? *Neogoniolithon mamillosum* (Hauck) Setchell & Mason

Coralline structures occurring in the sublittoral zone (5 to ca 10 m depth) along the margins of rocks and close to the level of the accumulated sand, were usually formed by this alga and some unidentified species of *Lithothamnion*. Plants were light violet, becoming whitish when died. Detached masses were up to 5 cm in diameter, composed of irregularly expanded, superimposed and variously branched fronds. Sections of the thallus showed a plumose hypothallium with ascending perithallial filaments lacking terminal trichocytes. Fusions between contiguous cells were commonly present. Superficial or embedded unipore, hemispherical conceptacles without columella were observed in specimens collected in August.
Collections: K010883, A140886.
Endemic in the Mediterranean (type locality: Sicily, see Woelkerling 1983a:184) (cf. Hamel & Lemoine 1953).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978, as *N. mamillosum*), Pagasitikos Gulf, N. Sporades and the Cyclades (Diannelidis 1950, 1953, as *L. fruticulosum* f. *ramulosa*), and the S. Archipelagus (Giaccone 1968a; as *N. mamillosum* Setchell & Mason).
Note: The Aegean plants were in good agreement with the description of the type specimen of the basionym of this species, *Lithothamnion ramulosum* Philippi, as provided by Woelkerling (1983a). *Spongites ramulosa* appears to be conspecific with *Neogoniolithon mamillosum* as interpreted by Hamel & Lemoine (1953:73).

TENAREA Bory

* ***Tenarea tortuosa*** (Esper) Lemoine
=*Tenarea undulosa* Bory

Reported from Crete (Diannelidis 1950, as *T. undulosa*), Euboea (Cape Kafireas), the Antipsara island and the Cyclades (Huvé 1957; Coppejans 1974; as *T. undulosa*), and the S. Archipelagus (Giaccone 1968a; as *T. undulosa*). Specimens collected at Cape Sidheros (E. Crete) were available for an examination through a generous loan from the herbarium of Dr. Y. Chamberlain (Portsmouth Polytechnic).
Note: Material originating from the Cyclades was included in a recent taxonomic reassessment of the species by Woelkerling *et al.* (1985).

TITANODERMA Nägeli

Titanoderma corallinae (P. & H. Crouan) Woelkerling *et al.* (1985:333)
= *Melobesia corallinae* P. & H. Crouan

Reported from the N. Sporades as an epiphyte on *Jania rubens* (Diannelidis 1950, 1953, as *Melobesia*).

* ***Titanoderma cystoseirae*** (Hauck) Woelkerling *et al.* (1985:333)
= *Melobesia cystoseirae* Hauck
= *Dermatolithon papillosum* (Zanardini) Foslie var. *cystoseirae* (Hauck) Lemoine

Bisporangial plants were collected in the sublittoral zone as epiphytes on diverse macroalgae (e. g. *Cystoseira* spp., *Galaxaura oblongata* and *Acrodiscus vidovichii*). Thalli were up to 1 cm in extent and 450 µm thick, composed of a monostromatic hypothallium of sinuous cells, to 15 µm long and 110 µm high, giving rise to a polystromatic perithallium of smaller rectangular cells, 4 to 10 layers thick. Unipore conceptacles, to 500 µm in diameter, were provided with a single ostiole, to 50 µm in diameter, and bore bisporangia 45 to 82 µm long and 26 to 52 µm broad. Surface cells of the conceptacle roof were characteristically cup-shaped.
Collections: A140783, K020883.
Distributed in the Mediterranean (type locality: Adriatic; Hauck 1883:266) and NE. Atlantic to the British Isles (see Parke & Dixon 1976).
Aegean Sea: Sithonia (present study), Attica and Cyclades (Politis 1936, 1938; Schiffner & Schussnig 1943; as *Melobesia*), and S. Archipelagus (Giaccone 1968a, as *D. papillosum* var. *cystoseirae* Lem.).

Titanoderma hapalidioides (P. & H. Crouan) J. Price, D. John & G. W. Lawson
= *Dermatolithon hapalidioides* (P. & H. Crouan) Foslie

Reported from the island of Tenedos (Lemoine 1915:18, as *Dermatolithon*) and the S. Archipelagus (Giaccone 1968a, as *D. hapalidioides* Foslie). Material from Lesbos is deposited in Herb. Foslie (Adey & Lebednik 1967:40).

Titanoderma pustulatum (Lamouroux) Nägeli
= *Melobesia pustulata* Lamouroux
= *Dermatolithon pustulatum* (Lamouroux) Foslie (Woelkerling *et al.* 1985:333)

Reported from Rhodes (Reinbold 1898, as *Melobesia*, on *Laurencia* and *Cystoseira* spp.), and Attica (Gerloff & Geissler 1974, as *Dermatolithon*).

* ***Titanoderma verrucatum*** (Lamouroux) Chamberlain

Bisporangial plants growing around the fronds of *Gelidium pusillum* in the littoral zone and previously tentatively referred to as *Dermatolithon* cf. *litorale* (Athanasiadis 1985a) were found to be in agreement with *T. verrucatum* as defined by Chamberlain (1986).

Excluded species

Lithophyllum fasciculatum (Lamarck) Foslie
= *Lithothamnion fasciculatum* (Lamarck) Areschoug

According to the latest version of the check-list of British marine algae (Parke & Dixon 1976), the taxonomic status of this species is in need of re-investigation. The taxon is not treated in taxonomic accounts of the genus in the Mediterranean (Hamel & Lemoine 1953, Bressan 1974), hence the sporadic records from the Pagasitikos Gulf (Diannelidis 1935, as *Lithothamnion*) and the Cyclades (Politis 1938, as *Lithothamnion*), are doubtful and probably based on misidentifications.

Lithophyllum racemus (Lamarck) Foslie

The identity of this taxon is obscure since its basionym *Millepora racemus* Lamarck was never re-examined. The species has been reported in the Aegean Sea from the Egina and Tenedos

islands (Lemoine 1915:15, tab. I, fig. 10), and the S. Archipelagus (Huvé 1962a; Giaccone 1968a, as *L. racemus* Foslie). Material referred to this species from the Nisiros island is also deposited in Herb. Foslie (Adey & Lebednik 1967:43). According to Hamel & Lemoine (1953:57), *L. racemus* is conspecific with Philippi's *Lithothamnium crassum* (= *Lithophyllum duckeri* Woelkerling, 1983a).

Lithothamnion crispatum Hauck (Hamel & Lemoine 1953:84)
= *Lithophyllum crispatum* (Hauck) Hauck

This species has been reported from the islands of Thasos (Haritonidis & Tsekos 1974, as *Lithophyllum crispatum* Hauck), Tenedos (Lemoine 1915:6), and Crete (Politis 1932 and Schussnig 1943, as *Lithophyllum crispatum* Hauck). In view of the taxonomic confusion, examination of the type material, which originates from the Adriatic (Hauck 1878), is necessary.

Lithothamnion fruticulosum (Kützing) Foslie sensu Hamel & Lemoine

The basionym of this species, *Spongites fruticulosa* Kützing, is the generitype of the mastophoroid genus *Spongites*, recently re-established by Woelkerling (1985), and in view of the taxonomic confusion all records of *L. fruticulosum* must be treated with caution. *Lithothamnion fruticulosum* sensu Hamel & Lemoine (1953) and Bressan (1974), is presumably a species of *Lithothamnion*, the correct name of which remains unknown. The taxon has been reported in the Aegean Sea from the islands of Nisiros (Foslie 1905a, tab. I, fig.15), Egina (Lemoine 1915:11), and the S. Archipelagus (Huvé 1962a; Giaccone 1968a, as *L. fruticulosum* f. *clavulata* Fosl., f. *crassiuscula* Fosl., and f. *kuetzingiana* Fosl.).

Lithothamnion solutum (Foslie) Foslie
= *Lithophyllum solutum* (Foslie) Lemoine

Originally described by Foslie (1905a:7, figs 18 to 33) as *Lithothamnion fruticulosum* f. *soluta* from material collected in the N. Adriatic, this alga was later also erected to the level of species by Foslie (1906:14) too. Its type material was not included in the revision of Foslie's Herbarium by Adey, presumably because it was considered as "synonymous with an older type, or created on grounds generally accepted as insufficient" (Adey 1970:2). As appears from Foslie's description, *L. solutum* seems to be related to *L. coralloides* P. & H. Crouan. The species has been reported from the islands of Egina and Tenedos (Lemoine 1915, pl. I, fig. 9, as *Lithophyllum*), Nisiros (Printz 1919, tab. XVII, fig. 16), and the S. Archipelagus (Huvé 1962a, as *L. solutum* Foslie; Giaccone 1968a, as *Lithophyllum solutum* Lemoine).

Mesophyllum philippii (Foslie) Adey (1970:25)
= *Lithothamnion philippii* Foslie

Reported from the islands of Egina and Tenedos (Lemoine 1915:6, tab. I, fig. 14, as *Lithothamnion*), and the S. Archipelagus (Huvé 1962a, Giaccone 1968a, as *Lithothamnion*). Material from the island of Nisiros is also deposited in Herb. Foslie (Adey & Lebednik 1967:67). Although Adey examined the type material and also designated a lectotype, he gave no information about the vegetative or reproductive features of this species, but his concept of *Mesophyllum.*

Nullipora trochanter Bory

Bory (1832:206, pl. LIV, fig. 2a, b) erected *Nullipora trochanter* to accommodate a marine plant collected at Sapiéntza island and Methana on the coast of Peloponnesus. The species was described as globose and polymorphous, violet-bluish to whitish, with excrescences resembling "...l' extremité supérieure d' un fémour humain.", and this peculiar character together with a

general aspect of the thallus were illustrated. Bory also regarded his material as related to Esper's *Millepora polymorpha* var. *globosa*, although he explicitly separated the two taxa on the basis of characters relating to the size and the colour of the plants. Except for the superficial similarity between *Nullipora trochanter* and the alga currently known as *G. byssoides*, Bory's concept does not provide any essential characters to allow identification of his material in modern context and therefore the status of *Nullipora trochanter* is in need of re-investigation. The species was later reported from various localities in the S. Archipelagus (Euboea, Cyclades, Crete, Dodecannesus, and Asia Minor) by Huvé (1963), as *Lithophyllum trochanter* (Bory) Huvé, although she failed to cite the basionym of the species and validate the new combination.

CRYPTONEMIALES Schmitz
DUDRESNAYACEAE J. Agardh

DUDRESNAYA P. & H. Crouan

* ***Dudresnaya verticillata*** (Withering) Le Jolis

Saxicolous and epiphytic plants, the latter growing on crustose algae, were commonly encountered in summer in the sublittoral zone, to a depth of ca 25 m. Thalli were pinkish to reddish, mucilaginous and soft, composed of a terete and radially-irregularly ramified frond, up to 25 cm high with a main axis up to to 2 mm broad. Thallus organization was of *Batrachospermum*-type with four whorl-branches per axial cell, usually subdichotomously and trichotomously branched up to the tenth-order, composed of cells gradually demeanishing, with ultimate cells ca 25 µm long and 3 µm broad. Rhizoidal outgrowths up to 3 µm thick, were borne from inner (basal or contiguous) cells of the whorl-branches. Isomorphic tetrasporangial and gametangial plants, the latter dioecious, were included in most collections. Spermatangia, ca 2 µm in diameter, were borne in pairs, on ultimate cells of the whorl-branches. Carpogonia, with a straight trichogyne, were terminally formed on 9- or 10-celled carpogonial branches, whereas auxiliary cells, 10 to 14 µm in diameter, were intercalary borne on 12- to 20-celled, separate filaments of the whorl-branches. Gonimoblasts were developed from the fusion cell produced by the contact of the connecting filament to the auxiliary cell. Mature carposporophytes were subspherical, to 170 µm in diameter. Tetrasporophytes developed zonately divided tetrasporangia, to 45 µm long and 18 µm broad, terminally or laterally borne on filaments of the whorl-branches.
Collections: A000680, SI240684, R270684, SR200784, KC260784.
Distributed in the Mediterranean (Funk 1927, 1955; Hauck 1885) and the NE. Atlantic (type locality: British Isles; see Irvine 1983:12) between Madeira (Levring 1974) and southern Scandinavia (Kylin 1944, Sundene 1953).
Aegean Sea: Sithonia (present study).
Note: According to Littler (1974) and Irvine (1983) *D. verticillata* is a monoecious species but the Aegean plants were dioecious like those from Roscoff examined by Kylin (1928:35). The apparent absence of previous records of this species in the Aegean Sea is probably due to misidentifications of this taxon with *Helminthopsis purpurifera*.

HELMINTHOPSIS J. Agardh

* ***Helminthopsis purpurifera*** (J. Agardh) Papenfuss (1958:105)
= *Acrosypmhyton purpuriferum* (J. Agardh) Sjöstedt
= *Dudresnaya purpurifera* J. Agardh

Saxicolous and epiphytic gametophytes, the latter growing on macroalgae and *Posidonia* rhizomes, were commonly found in the sublittoral zone, to at least 20 m depth, in spring and summer. Thalli were pinkish, mucilaginous and soft, to 20 cm long, composed of a terete and radially ramified frond with lateral branches, to 5 mm broad, gradually attenuating towards the apex and the base. Thallus organization was of *Batrachospermum*-type with four whorl-

branches per axial cell. These were subdichotomously or trichotomously divided, usually to the seventh-order, with descending rhizoids, to 5 µm thick, developed from their basal cells, and moniliform ultimate cells, 8 to 12 µm long, occasionally provided with terminal hair cells. The plants were monoecious. Carpogonia and auxiliary cells, the latter more numerous, were terminally borne on lateral filaments of the whorl-branches. Carpogonial branches were usually 10-celled, provided with characteristic bilateral short filaments and a twisted trichogyne, whereas auxiliary cell branches were 5- to 11-celled. Spermatangia were terminally borne around the ultimate cells of the whorl-branches.
Rhodochaete parvula was a common epiphyte on specimens collected in the summer of 1984.
Collections: A000480, AR000680, SI100684, A140684, SR270684,
Distributed in the Mediterranean (type locality: Pozzuoli and Amalfi; Agardh 1842:85) and Madeira (Levring 1974; re-examined material from Funchal 19.06.73; **GB**).
Aegean Sea: Sithonia (present study), Pagasitikos Gulf and N. Sporades (Diannelidis 1935, 1953), Attica (Politis 1936, as *Dudresnaya*), and Asia Minor (Güven & Öztig 1971).
Note: Cortel-Breeman & van den Hoek (1970) showed that the sporophytic phase of this species is a crustose plant resembling *Hymenoclonium* Batters, and subsequently Cortel-Breeman (1975) reported that this crust could even be distinguished from the tetrasporophytic stage of *Bonnemaisonia asparagoides* by its more compact structure. Infertile plants of *Hymenoclonium*, closely resembling those illustrated by Cortel-Breeman (1975, figs 1 to 3) and Funk (1955, tab. IX, figs 5, 6), were provisionally identified as the tetrasporophytic phase of *H. purpurifera* pending further investigations. Thalli were a few mm in extent, and grew on *Myriogramme distromatica* and sponges. They were composed of several uniseriate axes, irregularly branched in one plane, with rectangular cells, to 55 µm long and 5 µm broad. Secondarily developed filaments were cut off from periaxial cells and formed a compact tissue with nearly isodiametric cells, 8 to 16 µm in diameter.
Collections: A100782, KI290783.

GLOIOSIPHONIACEAE Schmitz

THURETELLA Schmitz

*** *Thuretella schousboei*** (Thuret) Schmitz

A saxicolous, carpogonial plant with carposporophytes was encountered in the sublittoral zone (ca 4 m depth). Its thallus was mucilaginous and soft, ca 6 cm long, composed of a terete and irregularly branched frond with a main axis up to 1 mm thick. Thallus organization was of *Batrachospermum* -type, with four whorl-branches cut off from the uppermost part of each axial cell. Basal cells of the whorl-branches were trichotomously divided giving rise to subdichotomously branched, to the eighth-order, filaments composed of cells gradually diminishing in size. Ultimate cells were 10 to 20 µm long and 6.5 to 8 µm broad. Rhizoidal descending outgrowths, were borne from the basal and contiguous cells of the whorl-branches, and covered the central axis. Individual whorl-branch developed up to 3 procarps, and one or two carposporophytes. Mature carposporophytes were subspherical, ca 300 µm in diameter, and were covered by contiguous vegetative filaments of the whorl-branches.
Collections: A140684.
Distributed in the Mediterranean, and the Atlantic coast of Morocco (type locality: Tanger; Bornet & Thuret 1876:185, tab. XLIX, as *Crouania*) and Madeira (Levring 1974; re-examined material from Canical 26.04.69, collected at 2 to 4 m depth; **GB**).
Aegean Sea: Sithonia (present study).
Note: Judging from the present collections and data from the literature (Bornet & Thuret 1876, Kylin 1930, Funk 1955, and others), *T. schousboei* appears to be an annual species, the gametophytes of which occur between April and August. Spermatangial plants have been described by Bornet and Thuret, whereas tetrasporophytes are unknown.

HALYMENIACEAE Bory

ACRODISCUS Zanardini

* ***Acrodiscus vidovichii*** (Meneghini) Zanardini

Saxicolous plants, usually growing in populations of 5 to 10 individuals, were found in shaded habitats in the sublittoral zone (1 to 8 m depth). Thalli were reddish, foliose and fleshy, to 5 cm high, composed of one to several stipitate fronds, subdichotomously branched, and arising from a discoid holdfast. Branches were ligulate, to 1 cm broad and 200 µm thick, with more or less undulate margins and blunt apices. Thallus organization was multiaxial with a filamentous medulla composed of a network of rhizoidal cells, to 5 µm thick, giving rise to a cortex of 5 or 6 layers of isodiametric cells with epidermic cells 2 or 3 µm in diameter. Tetrasporophytes with elliptical, cruciately divided sporangia, to 35 long and 12 to 15 µm broad, were collected in October. Tetrasporangia were developed in superficial sori, which were slightly protruding (ca 20 µm) above the thallus surface and situated close to the apices on one side of the frond.
Sphacelaria sp. and *Titanoderma cystoseirae* grew as epiphytes.
Collections: A250881, A081081, K010882.
Endemic in the Mediterranean (type locality: Dalmatia; see Ardissone 1883:162).
Aegean Sea: Sithonia (present study), and S. Archipelagus (Huvé 1962a).

CRYPTONEMIA J. Agardh

* ***Cryptonemia lomation*** (Bertoloni) J. Agardh

Saxicolous plants were commonly met with in shaded habitats, usually as understory species (e. g. below *Dictyopteris membranacea*) or in crevices in the sublittoral zone (1 to at least 10 m depth). Thalli were dark red, to 10 cm high, composed of several foliose and stipitate fronds arising from a crustose discoid holdfast, to 5 mm in extent. Stipes were solid and terete, to 5 cm long, and usually branched, expanding into leaf-like blades, roundish to fan-shaped, to 3 cm in diameter and 65 to 110 µm thick, with a few marginal proliferations. The structure of the blades was multiaxial with a network of medullary cells composed of stellate and rhizoidal cells with thick, refractive cell walls (visible in surface view of the blades under the microscope), giving rise to a firm cortex with epidermic cells, 4 to 10 µm in diameter, cut off from inner cortical cells, to 20 µm in diameter. Cruciatelly or irregularly divided, subspherical tetrasporangia, 10 to 15 µm in diameter, borne on young blades were found in plants collected in June, November and December. Perennial plants were overgrown by hydrozoans, bryozoans, and crustose corallines.
Collections: A171180, A201180, A041280, K010882, A150782, A140783, T280685.
Distributed in the Mediterranean (type locality: Italy; see Codomier 1972:79), the Canaries (Børgesen 1929) and Madeira (Levring 1974); also reported from India (Børgesen 1937).
Aegean Sea: Sithonia (present study), S. Archipelagus (Giaccone 1968a,d, as *C. lomation* J. Ag., found at 60 m depth at the channel of Kithira), and Rhodes (Reinbold 1898).
Note: *C. lomation* appears to be closely related to the Atlantic *C. seminervis* (C. Ag.) J. Ag., and judging from the treatment of this species in the British flora (Irvine & Farnham 1983:20) as well as previous floristic accounts (Ardré 1970) the two algae should be regarded as conspecific.

Cryptonemia tunaeformis (Bertoloni) Zanardini

Reported from the S. Archipelagus (Huvé 1962a).

HALYMENIA C. Agardh

* ***Halymenia floresia*** (Clemente) C. Agardh

Saxicolous plants were commonly met with in shaded habitats (usually in crevices) in the sublittoral zone, to at least 20 m depth, in summer and autumn. Thalli were reddish to pinkish, soft and mucilaginous, to 15 cm high, composed of one to three flattened fronds (blades), arising from a minute discoid holdfast. Fronds were subdichotomously to irregularly ramified, with branches up to 3 cm broad bearing abundant proliferations from the margins. Thallus organization was multiaxial, composed of a network of rhizoidal and stellate medullary cells, anticlinally linking to cortical cells. Epidermic cells were 5 to 15 µm in diameter. Gametangial plants with carposporophytes, to 150 µm in diameter, and isomorphic tetrasporophytes with cruciately divided, subspherical tetrasporangia, 15 to 26 µm in diameter, were collected between June and October.
Collections: K160881, A081081, PL210881, A150782, SR230684, T280685.
Distributed in the Mediterranean (type locality: coast of Andalousia; see Codomier 1972:88), the West Indies (Børgesen 1915-20), the Red Sea (Turner 1809) and India (Balakrishnan 1961).
Aegean Sea: Sithonia (present study), N. Sporades (Diannelidis 1950), and the S. Archipelagus (Huvé 1962a).

* ***Halymenia latifolia*** Kützing

A few minute plants, to 2 cm long, with ovate fronds and anatomy similar to the preceding species, were collected in the sublittoral zone (ca 20 m depth).
Collections: SR200784.
Distributed in the Mediterranean and the NE. Atlantic to the British Isles (Maggs & Guiry 1982b).
Aegean Sea: Sithonia (present study).

* ***Halymenia trigona*** (Clemente) C. Agardh
=? *Halymenia cavernicola* Giaccone (Codomier 1972:83)

A single, infertile plant was identified in collections from the sublittoral zone. The thallus was reddish to pinkish, soft and mucilaginous, to 3 cm long, composed of a terete to slightly compressed and subdichotomously ramified frond with more ore less acute apices. Inner thallus organization was similar to the preceding species of the genus. Epidermic cells were 5 to 10 µm in diameter, cut off from inner cortical cells, to 25 µm in diameter.
Collections: T280685.
Distributed in the Mediterranean and the Atlantic coast of Morocco and Spain (type locality: Cadiz; see De Toni 1905:1544).
Aegean Sea : Sithonia (present study).
Note: *Halymenia cavernicola* was described by Giaccone (1968b:400, figs 1 to 4) to accommodate some plants originally collected at Cape Lithinos (S. Crete) and in the Tyrrhenian Sea, and later at the channel of Kithira and the island of Dia. Giaccone's study is the only knowledge we have about this species, which according to Codomier (1972) might represent a young plant of *H. trigona.*

GRATELOUPIA C. Agardh

* ***Grateloupia filicina*** (Lamouroux) C. Agardh
=? *Gelidium neglectum* Bory

Saxicolous plants grew at shaded, sheltered habitats in the upper sublittoral zone (ca 0.5 m depth). Thalli were dark red-brown, cartilaginous, to 2.5 cm high, composed of a compressed

and pinnately branched frond, with a main axis up to 3 mm broad, arising from a discoid holdfast. Thallus organization was multiaxial composed of a filamentous medulla of rhizoidal and stellate cells, giving rise to a compact cortex with epidermic cells 4 to 11 µm in diameter. Young branches were usually hollow with a loose medulla and a thin cortex, gradually becoming firm and rigid. Isomorphic tetrasporophytes and gametophytes, the latter with carposporophytes, were collected in June and August. Carposporophytes were subspherical, to 195 µm in diameter, and scattered on the branches. Cruciately or irregularly divided sporangia, 35 to 40 µm long and 18 to 25 µm broad, were borne in the outer cortex of young branches.
Collections: K000882, K210684, K000786.
Distributed in most temperate, tropical and subtropical regions including the Mediterranean (type locality: Adriatic; see Dixon 1959), the C. and N. Atlantic (Børgesen 1915-20) to the British Isles, and the Indo-Pacific (see Irvine & Farnham 1983).
Aegean Sea: Sithonia (present study) and Lesbos [Candargy 1899, as *Grateloupia filicina* (Wulf.) Ag.].
Note: *Gelidium neglectum* was originally described by Bory (Fauché *et al.* 1832-33:324) from material collected at Lerne (Peloponnesus). It was later considered as a synonym of *G. filicina* by Harvey (1846-51) and De Toni (1905:1564), although information based on an examination of Bory's original material is lacking.

KALLYMENIA J. Agardh

* ***Kallymenia lacerata*** J. Feldmann

A few saxicolous, infertile plants were collected in crevices in the sublittoral zone (ca 20 m depth). Thalli were red to pinkish, fleshy and mucilaginous, to 12 cm in diameter, composed of several foliose and lacerate fronds (blades), anastomosed, with individual lobes up to 5 cm long and 2 cm broad. Fronds were attached to the substratum by means of several discoid holdfasts. Thallus organization was multiaxial with a network of rhizoidal and stellate medullary cells, the latter up to 220 µm long and 60 µm broad (exclusive the projections), giving rise to a loose cortex of isodiametric epidermic cells, 5 to 11 µm in diameter, developed from inner cortical cells, to 30 µm in diameter.
Collections: SR200784.
Endemic in the Mediterranean (type locality: Algeria; Feldmann 1942a:10, fig. 2).
Aegean Sea: Sithonia (present study).

* ***Kallymenia microphylla*** J. Agardh

Saxicolous and epiphytic plants, the latter growing on *Posidonia* rhizomes, were collected in the sublittoral zone (6 to 10 m depth). Thalli were dark red-brown to pinkish, composed of a foliose frond up to 12 cm in diameter, with several roundish blades (lobes), each provided with a more or less peltate stipe, a few mm long. Lobes were fleshy, to 5 cm in diameter and 300 µm thick, usually anastomosed and with undulate margins. New lobes were developed from the margins or the basal stipe. Thallus organization was multiaxial with a network of rhizoidal and stellate medullary cells, the latter up to 40 µm in diameter (exclusive the projections), giving rise to a firm cortex with epidermic cells, 5 to 10 µm in diameter, developed from inner cortical cells, to 30 µm in diameter. Gametophytes with carposporophytes were collected in August. Plants collected in January were inhabited with endophytic unicellular green algae.
Collections: A290680, S100782, K010882, A040183, SI160784, SR200784, KI010784.
Distributed in the Mediterranean and the NE. Atlantic between the Canaries (Børgesen 1929) and the British Isles (type locality) (see Irvine & Farnham 1983:42, cf. Agardh 1851:288).
Aegean Sea: Sithonia (present study), and the S. Archipelagus (Giaccone 1968a, d; reported from the channel of Kithira at 60 m depth).
Note: Recognition of the genus *Meredithia* J. Agardh, as typified by this species, might be justified on the basis of the heteromorphic life history observed in Irish isolates (Guiry & Maggs 1982).

Kallymenia reniformis (Turner) J. Agardh

Reported from the S. Archipelagus (Giaccone 1968a, as *Callymenia reniformis* J. Ag.).

RHIZOPHYLLIDACEAE Schmitz

CONTARINIA Zanardini

* ***Contarinia peyssonneliaeformis*** Zanardini

A few infertile plants were found on the basal holdfast of a specimen of *Cystoseira spinosa* from the upper sublittoral zone. They formed bright, red crusts, to 2 cm in extent and 1.2 mm thick, composed of horizontally expanded superimposed fronds, each up to 370 µm thick. Radial sections of the thallus showed a dorsiventral organization with principal axial filaments composed of cylindrical cells, to 40 µm long and 20 µm broad. They gave rise to short descending and long ascending filaments, the former usually 2- or 3-celled and up to 30 µm long and the latter up to 260 µm long, subdichotomously branched at the base, and composed of cells gradually diminishing with epithallial cells ca 6.5 µm in diameter. Multicellular rhizoids, usually branched and up to 15 µm thick, were borne from basal cells.
Collections: A091080.
Endemic in the Mediterranean (type locality: Dalmatia; Zanardini 1843: 45; 1860-76:47).
Aegean Sea: Sithonia (present study).

RHIZOPHYLLIS Kützing

* ***Rhizophyllis squamariae*** (Meneghini) Kützing

Commonly met with as an epiphyte on *Peyssonnelia squamaria* and species of *Codium* in the sublittoral zone. Thalli were dark-red, to 1 cm in extent, composed of a horizontally expanded and usually subdichotomously branched, crustose frond, to 160 µm thick, with monostromatic margins of rectangular cells, 4 to 8 µm in diameter, occasionally arranged in radial rows. Thallus organization was uniaxial with cylindrical axial cells, 50 to 90 µm long and 10 to 50 µm broad, occasionally visible in surface view of the thallus, giving rise to descending, ascending and presumably horizontally growing bilateral filaments. Ascending filaments, to 100 µm long, were subdichotomously divided with epithallial cells 8 to 10 µm in diameter. Large cells, presumably trichocytes or gland cells, to 40 µm long and 20 µm broad, occurred among epithallial cells. Multicellular rhizoids, to 15 µm thick, occasionally divided, were borne from basal layer cells. Tetrasporophytes with zonately divided tetrasporangia, 45 to 50 µm long and 13 µm broad, were collected in August. The sporangia were superficially borne in sori, to 850 µm broad and 70 µm thick, covered by a mucilaginous layer.
Collections: A250881, A100782, A140782, K010882.
Endemic in the Mediterranean.
Aegean Sea: Makedonian coast (Politis 1925, 1953), Crete, Attica and Cyclades (Politis 1932, 1936, 1938).

PEYSSONNELIACEAE Denizot

CRUORIELLA P. & H. Crouan

* ***Cruoriella armorica*** P. & H. Crouan

This species represents the generitype and the only member of the genus in European waters, and It is reported from widely separated regions in the Atlantic, the Mediterranean, and the Pacific. It was included in the Aegean marine flora on the basis of infertile material collected at

Sithonia (see Athanasiadis 1985a).

HAEMATOCELIS J. Agardh

* ***Haematocelis*** sp.

Plants resembling *H. fissurata* P. & H. Crouan, but apparently lacking "oil droplets" (visible as white spots in surface view of the thallus) and provided with gland cells (so far unknown in the genus *Haematocelis*), were found in collections from the sublittoral zone. They grew in association with *P. immersa*, and their thalli were dark red, uncalcified, a few mm in extent and up to 200 µm thick. The hypothallium was polyflabellate provided with distinct principal filaments composed of slightly larger cells. Ascending perithallial filaments were composed of cells, 9 to 45 µm long and 4 to 10 µm broad. Gland cells, to 45 µm long and 15 µm broad, were embedded in the perithallium. Most plants bore on their underside colonies of Cyanophyta interwoven with dechending rhizoidal filaments. Cell walls of empty sporangia were observed among epithallial cells.
Collections: A140883.
Note: There are no previous reports of *Haematocelis* in the Aegean Sea, although it should be mentioned that species of this genus are involved in the life history of *Schizymenia dubyi* and *Sphaerococcus coronopifolius* (see Ardré 1977, Maggs & Guiry 1982a). Of these two species, which are both recorded in the Aegean Sea, the latter was also collected at Sithonia.
I am much indebted to Dr. C. Maggs for providing me with detailed information about *H. fissurata.*

METAPEYSSONNELIA Boudouresque, Coppejans & Marcot

Metapeyssonnelia feldmannii Boudouresque, Coppejans & Marcot

Reported from the south coast of Asia Minor (Marcot *et al.* 1976).

PEYSSONNELIA Decaisne

* ***Peyssonnelia bornetii*** Boudouresque & Denizot

This species is considered to be endemic in the Mediterranean and has been reported in the Aegean Sea from Asia Minor (Marcot *et al.* 1976) and Sithonia (Athanasiadis 1985a).

* ***Peyssonnelia crispata*** Boudouresque & Denizot

This Mediterranean species, particularly characterized by the development of horizontal perithallial filaments in its thallus, has been recorded from Asia Minor (Marcot *et al.* 1976) and the Sithonia peninsula (see Athanasiadis 1985a).

* ***Peyssonnelia dubyi*** P. & H. Crouan

Reported from the south coast of Asia Minor (Marcot *et al.* 1976) and the Sithonia peninsula (Athanasiadis 1985a). The Aegean plants bore trichocytes, as also recently reported in British material (Maggs 1983). Examination of plants from Ponza (Italy; 21.09.83), Madeira (Herb. Levring, 1974), Kristineberg (Sweden; Herb. Levring, 1933), and Norway (Herb. Levring, 1935) (all collections at GB) showed that the Scandinavian counterparts lacked trichocytes.

* ***Peyssonnelia harveyana*** J. Agardh

Saxicolous plants were collected in the sublittoral zone. Thalli were reddish, to 1 cm in extent and up to 150 µm thick, hypobasally calcified, and composed of a monostromatic hypothallium

of radial filaments and a perithallium of *P. rubra*-type. Unicellular rhizoids, produced from hypothallial cells, were up to 130 μm long. Trichocytes occurred among epithallial cells. Cruciately divided tetrasporangia, 100 to 125 μm long and 40 to 55 μm broad, borne in superficial sori, were observed in plants collected in July.
Collections: A100581, A100782, A140783, A000883.
Distributed in the Mediterranean and the NE. Atlantic (type locality: Brest; Agardh 1852:501) to the British Isles (see Irvine & Maggs 1983).
Aegean Sea: Sithonia (present study), and S. Archipelagus (Huvé 1962a, as *P. harveyana* Crouan).

* ***Peyssonnelia immersa*** Maggs & Irvine

Saxicolous plants grew in association with *Haematocelis* sp. and other species of *Peyssonnelia* in a shaded habitat in the sublittoral zone (4 m depth). Thalli were dark-red, to 3 cm in extent, composed of a horizontally expanded frond, to 140 μm thick, with hypobasal calcification. The hypothallium was monostromatic and composed of radial filaments, giving rise to an ascending perithallium of *P. rubra*-type. Unicellular rhizoids, to 35 μm long, were borne from hypothallial cells. Isomorphic tetrasporophytes and gametophytes, the latter monoecious and with carposporophytes, bore reproductive structures in immersed sori. Spermatangial structures were formed in clusters developed by apical and intercalary divisions. Carpogonial branches, 3- or 4-celled, and auxiliary cell branches, 3- or 4-celled, the latter more numerous, were laterally developed from vegetative filaments. Carposporangia arose in chains from the connecting filament which linked several auxiliary cells. Tetrasporangial initials were terminally borne among vegetative filaments.
Collections: A140883.
Previously known only from the type locality (British Isles; Maggs & Irvine 1983).
Aegean Sea: Sithonia (Athanasiadis 1985a).

* ***Peyssonnelia polymorpha*** (Zanardini) Schmitz

Saxicolous and epiphytic plants, the latter growing on crustose corallines, were collected in shaded habitats in the sublittoral zone, to at least 20 m depth. They usually grew with parts of their thallus unattached, commonly inhabited on their underside by bryozoans. Thalli were red to pinkish, to 15 cm in extent and 300 μm thick, composed of horizontally expanded, calcified fronds. The hypothallium was composed of radial filaments, giving rise to a perithallium of *P. rubra*-type. Multicellular rhizoids, to 260 μm long, were borne from hypothallial cells. Reproductive structures are unknown in this species.
Collections: A040183, A240883, KI010784, KI100784, SI180784.
Distributed in the Mediterranean, and the Atlantic coast of Iberia (Gallardo *et al.* 1985) including the Canaries (Børgesen 1929).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975), Tenedos island (Lemoine 1915:4; at 35 m depth), N. Sporades (Diannelidis 1950), Attica (Politis 1936), and S. Archipelagus (Huvé 1962a).

* ***Peyssonnelia rosa-marina*** Boudouresque & Denizot

Calcified plants, growing in similar habitats with *P. polymorpha*, were distinguished from this species by a thicker thallus (to 650 μm) and development of unicellular rhizoids (to 650 μm long). Individuals were also larger, to 20 cm in extent, occasionally provided with a secondary erect perithallium of isodiametric cells, 13 to 16 μm in diameter. Tetrasporangial plants with cruciately divided tetrasporangia, 80 to 135 μm long and 35 to 50 μm broad, borne in superficial sori, were collected in December.
Collections: V090680, A171180, A140783, A040183, SI240883, SR300684, SI180784, KI100784.

Distributed in the Mediterranean and the Atlantic coast of Iberia (Portugal; Boudouresque & Ardré 1971).
Aegean Sea: Sithonia (present study) and Asia Minor (Marcot *et al.* 1976).

* ***Peyssonnelia rubra*** (Greville) J. Agardh

Plants growing on the prostrate axes of *Cystoseira corniculata* and on *Posidonia* rhizomes, were collected in the sublittoral zone (ca 10 m depth). Thalli were bright red, to 3 cm in extent, composed of a lobate and horizontally expanded frond, to 150 µm thick, with hypobasal calcification. Sections showed a monostromatic hypothallium of radially arranged filaments, giving rise to nearly vertical, perithallial filaments subdichotomously branched to the second-order, with "boot"-like basal cells. Multicellular and unicellular rhizoids, the latter more numerous, were developed from hypothallial cells. Cystoliths (calcified enlarged basal cells) occurred sporadically in individual specimens. Cruciately divided tetrasporangia, 70 to 90 µm long and 15 to 25 µm broad, borne in superficial sori, were observed in plants collected in November and December. *Polysiphonia* spp. and *Ceramium codii* grew as epiphytes.
Collections: A201180, A041280.
Distributed in the Mediterranean (type locality: Ionian islands; Greville 1826:340, tab. III, fig. 3, as *Zonaria*), the Black Sea (Zinova 1967), the Bermuda Islands (Denizot 1968), and the Red Sea (see Papenfuss 1968).
Aegean Sea: Sithonia (present study), Lesbos (Candargy 1899), Limnos (Diannelidis 1950), Cyclades (Coppejans 1974), S. Archipelagus (Huvé 1962a), and Asia Minor (Güven & Öztig 1971).

* ***Peyssonnelia squamaria*** (Gmelin) Decaisne

Saxicolous, epizoic and epiphytic plants were commonly met with in shaded habitats in the sublittoral zone, to at least 20 m depth. Thalli were dark red-brown, soft (totally uncalcified), to 7 cm in extent, composed of a horizontally expanded and occasionally superimposed, lobate frond, to 260 µm thick. The hypothallium was monostromatic composed of radially arranged filaments. Hypothallial cells cut off from its under side a single drop-like cell and from its upper anterior part an ascending branched filament, to 15 µm broad. Multicellular rhizoids, to 15 µm in diameter, were produced from basal layer cells. Carpogonial and tetrasporangial plants with reproductive structures borne in superficial sori were collected in August, November and December. A 3-celled carpogonial branch and a 4-celled auxiliary cell were observed. Sporophytes developed cruciately divided tetrasporangia, 65 to 75 µm long and 25 µm broad.
Species of *Polysiphonia, Gelidiella* sp. and *Rhizophyllis squamariae* occurred as epiphytes.
Collections: A201180, A211180, A061180, A041280, A100581, A140782, A010882, OI070480.
Distributed in the Mediterranean (type locality) (Gmelin 1768:171, as *Fucus*), the Black Sea (Zinova 1967), the Red Sea (see Papenfuss 1968), and the Atlantic coast of Iberia (Ardré 1970).
Aegean Sea: Makedonian coast (Politis 1925, 1953), Lesbos (Candargy 1899), Attica and Cyclades (Politis 1936, 1938; Coppejans 1974), Limnos and N. Sporades (Diannelidis 1950, 1953), Rhodes (Reinbold (1898), S. Archipelagus (Huvé 1962a; Giaccone 1968a,d, as *P. squamaria* Decne., reported from 60 m depth at the channel of Kithira), and Asia Minor (Güven & Öztig 1971).

* ***Peyssonnelia*** sp.
= *Peyssonnelia codana* Rosenvinge sensu Verlaque

Saxicolous plants, growing with *P. immersa, Haematocelis* sp. and crustose corallines, were found in a shaded habit in the sublittoral zone (4 m depth). Thalli were dark-red, to 3 cm in extent, composed of a superimposed, lobate frond, to 260 µm thick, hypobasally calcified. The hypothallium was composed of polyflabellate filaments with principal axes, giving rise to an ascending perithallium of *P. rubra*-type. Unicellular rhizoids, to 30 µm long, were borne from

hypothallial cells. Gametangial plants were dioecious with reproductive structures borne in superficial sori. Spermatangia-like structures were composed of uniseriate, to 14-celled and 55 µm long, filaments developed by apical divisions. Three-celled carpogonial branches and 4- or 5-celled auxiliary cell branches, the latter more numerous, were developed laterally from vegetative filaments. Carposporangia were developed from the auxiliary cell in chains that were usually branched.
Collections: A140883.
Distributed in the Mediterranean (Corsica) (Verlaque 1978).
Aegean Sea: Sithonia (present study).
Note: The Aegean plants were in good agreement with Verlaque's (1978) concept of *P. codana* Rosenvinge, although according to Irvine & Maggs (1983:59) the type material of this species belongs to *P. dubyi*. Moreover, Maggs (1983) suggested that Verlaque's plants might belong to the same species, after she observed development of principal hypothallial filaments in British material of *P. dubyi* too The present observations show that the carposporophyte development in the Aegean plants is similar to *P. dubyi*, which supports Maggs' hypothesis, while the morphology of their spermatangial structures apparently differs from this species. Although, the nature of the uniseriate spermatangia-like filaments is not fully understood (i. e. whether they represent spermatangial mother cells or spermatangia), they differ from the spermatangial structures of *P. dubyi*, which are shorter and form whorl-branches in early stages of their development (Kylin 1928, Maggs & Irvine 1983). Moreover, Aegean plants identified as *P. dubyi* bore plenty of trichocytes, and such structures were not observed in the material here provisionally referred to as *Peyssonnelia* sp.

POLYSTRATA Heydrich

* ***Polystrata compacta*** (Foslie) Denizot

Tetrasporophytes closely adhering to stones and resembling crustose corallines were found in crevices in the upper sublittoral zone (ca 1 m depth). Thalli were bluish violet, composed of superimposed fronds, to 8 cm in extent and 250 µm thick, strongly calcified. Sections studied in S. E. M. showed a monostromatic hypothallium of subspherical cells, 15 to 25 µm in diameter, giving rise to perithallial filaments composed of gradually diminishing cells with epithallial cells 5 to 6 µm in diameter. Hypothallial cells cut off descending filaments, 1- or 2-celled, composed of rectangular cells, 5 to 10 µm long and 5 to 25 µm broad. Cruciately or irregularly divided tetrasporangia, 60 to 82 µm long and 40 to 50 µm broad, were borne in superficial uncalcified nemathesia, to 0.8 mm in diameter.
Collections: T190884.
Endemic in the Mediterranean (type locality: Adriatic; Foslie 1905b:5, as *Peyssonnelia*).
Aegean Sea: Sithonia (present study).

HILDENBRANDIACEAE Rosenvinge

HILDENBRANDIA Nardo

* ***Hildenbrandia prototypus*** Nardo

Commonly found in distinct littoral belts in sheltered localities and occasionally on pebbles in the sublittoral zone (ca 4 m depth). Thalli were up to 140 µm thick, provided with immersed conceptacles with subspherical cavities, 50 to 90 µm in diameter, and zonately or obliquely divided tetrasporangia, to 50 µm long and 16 µm broad.
Collections: K010882, A040183, A140783 SC230684, SI18784, K280685.
Cosmopolitan.
Aegean Sea: Sithonia (present study).

GIGARTINALES Schmitz
CALOSIPHONIACEAE Kylin

CALOSIPHONIA P. & H. Crouan

* ***Calosiphonia vermicularis*** (J. Agardh) Schmitz

A monoecious gametophyte was collected in a shaded habitat in the upper sublittoral zone (ca 2 m depth). Its thallus was red-brown, mucilaginous, to 2 cm high, composed of a terete and radially and irregularly ramified frond, arising from a basal, a few mm broad, crustose holdfast. Thallus organization was of *Batrachospermum*-type with four whorl-branches developed from each axial cell. Individual whorl-branches were trichotomously and subdichotomously branched to the tenth-order, provided with small isodiametric ultimate cells, 5 to 8 µm in diameter, and deshending rhizoidal filaments, ca 9 µm in diameter, developed from basal and contiguous cells. Spermatangia, ca 2 µm in diameter, were terminally formed in pairs. Carpogonial branches were 3-celled with a conical carpogonium and a twisted trichogyne, the latter occasionally with a characteristic swollen part in the middle. Carpogonial branches were singly and laterally borne on individual whorl-branches. Auxiliary cells were ordinary intercalary cells, and developed gonimoblasts after the zygote transfer through a connecting filament. Mature gonimoblasts were subspherical, to 160 µm in diameter, with carposporangia up to 20 µm in diameter. The cortex was slightly elevated by the development of the carposporophyte.
Collections: K210684.
Distributed in the Mediterranean and the NE. Atlantic between Cadiz (type locality; Agardh 1851:163, as *Nemastoma*) and the British Isles (see Dixon & Irvine 1977a).
Aegean Sea: Sithonia (present study).

SCHMITZIA Silva

* ***Schmitzia neapolitana*** (Berthold) Silva

A carpogonial plant with carposporophytes was encountered in the sublittoral zone (ca 20 m depth). Its thallus was a few cm long, composed of a sparsely branched frond, with a main axis up to 1 mm broad, arising from a crustose holdfast. Thallus organization was of *Batrachospermum*-type with three or four whorl-branches cut off from the middle part of each axial cell. Individual whorl-branches were trichotomously and subdichotomously branched to the seventh-order, composed of clavate cylindrical cells gradually diminishing in length, and provided with isodiametric ultimate cells, ca 5 µm. Downgrowing multicellular rhizoids, ca 8 µm in diameter, were developed from the basal and contiguous cells of the whorl-branches. Three-celled carpogonial branches and auxiliary cells, the latter more numerous, were formed on separate filaments. Gonimoblasts were developed from the connecting filament, which linked several auxiliary cells. Mature carposporophytes were subspherical, to 130 µm in diameter, surrounded by a mucilaginous cover.
Collections: KI010784
Distributed in the Mediterranean (type locality: Naples; Berthold 1884:24, as *Calosiphonia*), and the NE. Atlantic to southern Scandinavia (Waern 1961).
Aegean Sea: Sithonia (present study).

NEMASTOMATACEAE Schmitz

NEMASTOMA J. Agardh

* ***Nemastoma dichotomum*** J. Agardh

Saxicolous plants grew in shaded habitats in the sublittoral zone (ca 20 m depth). Thalli were violet-red to red-brown, more or less cartilaginous and mucilaginous, to 9 cm high, composed

of a terete and subdichotomously divided frond with anastomosed branches up to 4 mm broad, arising from a discoid holdfast. Thallus structure was multiaxial with rhizoidal medullary cells, 6 to 8 µm broad and 30 to 150 (580) µm long, giving rise to a loose cortex of subdichotomously divided filaments composed of cylindrical to subspherical cells, 6 to 10 µm long, occasionally provided with pyriform to subspherical, terminal gland cells, 15 to 25 µm in diameter. Carpogonial plants with carposporophyte-like structures were collected in July. Up to three 3-celled carpogonial branches developed laterally on the distal end of simple or apically branched rhizoidal filaments, at least 220 µm long, formed from inner cortical cells. Auxiliary cells were intercalary developed on the proximal end of similar rhizoidal filaments, and were more numerous, occasionally functioning as the supporting cell of carpogonial branches. Connecting filaments or fusion cells between auxiliary cells and carpogonia, indicating a possible zygote transfer, were not observed. Auxiliary cells were occasionally divided, giving rise to gonimoblast-like, subspherical structures, to 170 µm in diameter, completely immersed between the inner cortex and the medulla. Tetrasporic or spermatangial plants were not seen.
Collections: KI310783, KI010784, SR200784, KC010884.
Endemic in the Mediterranean (type locality: Trieste; Agardh 1842:91).
Aegean Sea: Sithonia (present study), Crete (Politis 1932), S. Archipelagus (Huvé 1962a, Giaccone 1968a), and Asia Minor (Güven & Öztig 1971).
Note: This species is apparently endemic in the Mediterranean since of the two known records outside this region, the one from the British Isles is considered as a misidentification (Dixon & Irvine 1977a), while re-examination of Levring's (1974) record from Madeira showed that the material (GB) is based on a species of *Schmitzia*. The development of carpogonial branches and auxiliary cells on the distal end of rhizoidal filaments is not previously reported in this species and shows some relationship to that described in the endemic genus *Adelophyton* Kraft (1975) from S. Australia. These features necessitate re-definition of the genus and the family Nemastomataceae where *N. dichotomum* represents the generitype. It should also be mentioned that Berthold's (1884) illustrations of post-fertilization stages in this species clearly show the occurrence of connecting filaments linking the carpogonium with auxiliary cells. Since such filaments were not observed in the Aegean plants, the development of gonimoblast-like structures from the auxiliary cells suggests apomixis.
I am grateful to Dr. G. Kraft for helpful comments on the above observations.

PLATOMA Schmitz

*** *Platoma cyclocolpa*** (Montagne) Schmitz

Saxicolous plants grew in shaded habitats in the sublittoral zone (ca 15 m depth). Thalli were red-yellow, more or less cartilaginous and mucilaginous, to 8 cm high, composed of a compressed and subdichotomous to irregularly proliferous frond, to 10 cm broad and 0.6 mm thick, gradually expanded from a discoid holdfast. Thallus structure was multiaxial with a filamentous medulla of thick-walled cells, to 13 µm in diameter, giving rise to a firm cortex of subdichotomously branched filaments with large inner moniliform cells, to 25 µm in diameter, and small apical cells, 8 to 13 µm in diameter. Dioecious gametophytes were collected in July and August. Spermatangia, ca 2 µm in diameter, were terminally developed in pairs, whereas 3-celled carpogonial branches were laterally formed from inner cortical filaments. Carposporophytes were subspherical, to 100 µm in diameter, and developed among cortical filaments.
Collections: KI310783, KI200784, PI020884.
Distributed in the Mediterranean, the West Indies (see Taylor 1960), and the NE. Atlantic (type locality: Canaries; Montagne 1841:163, as *Halymenia*).
Aegean Sea: Sithonia (present study) and S. Archipelagus (Giaccone 1968a, as *P. cyclocolpa* Schmitz).
Note: The occurrence of intercalary gland cells has been reported in this species by Ardré (1980). Such structures were, however, not observed in the Aegean plants and are also lacking in species of the genus from the British Isles (see Dixon & Irvine 1977a).

PREDAEA De Toni

* ***Predaea ollivieri*** J. Feldmann

Saxicolous and epiphytic plants, the latter growing on crustose algae, were found in shaded habitats in the sublittoral zone, between 2 and at least 20 m depth. Thalli were pinkish, mucilaginous and soft, to 8 cm high, composed of a more or less compressed frond, irregularly branched (lobed) and gradually expanded, to 10 cm in diameter, attached to the substratum by means of a narrow discoid holdfast. Thallus structure was multiaxial with a loose filamentous medulla composed of cells 4 to 6.5 µm broad and 8 to 20 µm long, giving rise to a loose cortex of subdichotomously divided filaments. Downgrowing rhizoids, ca 4 µm in diameter, were developed from inner cortical cells. Ultimate cells of the cortex were occasionally converted into hair cells. Gametophytes developed 2-celled carpogonial branches (two only seen) and numerous intercalary auxiliary cells on separate cortical filaments. Auxiliary cells were surrounded by clusters of nutritive cells, 5 to 8 µm in diameter, cut off from contiguous cells. Gonimoblasts were initiated from the connecting filament close to the auxiliary cell. Mature carposporophytes were completely immersed in the cortex with one or two, subspherical to pyriform gonimolobes, to 140 µm long, with carposporangia 6 to 10 µm in diameter. Female gametophytes with carposporophytes were collected in June, July and November, whereas spermatangia and tetrasporangia bearing plants, unknown from the field, were observed in laboratory cultures, the former as diminutive plants and the latter as acrochaetioid filaments with lateral zonately divided sporangia.
Collections: A201180, SI160784, R270684, SR270684, SR150784, KI310783, KI010884.
Endemic in the Mediterranean (type locality: France; Feldmann 1942c).
Aegean Sea: Sithonia (present study), Saronikos Gulf (Diapoulis & Verlaque 1981), and S. Archipelagus (Huvé 1962a).

SCHIZYMENIA J. Agardh

Schizymenia dubyi (Duby) J. Agardh
=? *Schizymenia minor* (J. Agardh) J. Agardh (cf. De Toni 1905:1648)

Reported from Attica (Gerloff & Geissler 1974).
Note: *S. minor* was recorded by Diannelidis (1948, fig. 4; 1953) from the Pagasitikos Gulf and the N. Sporades, although judging from his illustrations the material seems to belong to a plant of *Kallymenia*.

FURCELLARIACEAE Greville

HALARACHNION Kützing

* ***Halarachnion ligulatum*** (Woodward) Kützing

A few saxicolous plants with carposporophytes were found in the sublittoral zone (ca 2 m depth). Thalli were bright red, to 2.5 cm high, composed of a subdichotomously divided, flattened frond with branches up to 1.2 mm broad, and arising from a basal crustose holdfast of *Cruoria*-morphology. Thallus organization was multiaxial with a network of rhizoidal filaments in the medulla, giving rise to a firm cortex composed of polygonal epidermic cells, 6.5 to 13 µm long. Gonimoblasts were subspherical, to 170 µm in diameter, and developed in the inner thallus without elevating the cortex.
Collections: A140684.
Distributed in the Mediterranean and the NE. Atlantic (type locality: British Isles; see Dixon & Irvine 1977a:184) to southern Scandinavia (Kylin 1944).

Aegean Sea: Sithonia (present study) and S. Archipelagus (Giaccone 1968a, as *H. ligulatum* Kütz.).

NEUROCAULON Kützing

Neurocaulon foliosum (Meneghini) Kützing
= *Cryptonemia forbesii* Harvey
= *Neurocaulon reniforme* Schmitz
= *Constantinea reniformis* (Turner) Postels & Ruprecht pro parte (see Silva 1980a:139)

Material collected off the island of Paros (Cyclades) and described by Harvey (Hooker 1844, pl. 679) as *Cryptonemia?forbesii* represents the first record of this species in the Aegean Sea. Harvey's description and illustrations are quite detailed to warrant the correct identification of his material. Additional records of the species have also been made from the Cyclades (Politis 1938, as *C. reniformis* Post. & Rupr.), and the S. Archipelagus [Huvé 1962a, as *N. reniforme* (Post. & Rupr.) Zan.; Giaccone 1968a, as *N. reniforme* Zan.].

Excluded species

Furcellaria lumbricalis (Hudson) Lamouroux
= *Furcellaria fastigiata* (Turner) Lamouroux (Dixon & Irvine 1977b)

The single record from the Makedonian coast [Haritonidis & Tsekos 1975, as *F. fastigiata* (L.) Lamour.] is doubtful, as there is no further evidence of the occurrence of this species in the Mediterranean.

SEBDENIACEAE Kylin

SEBDENIA Berthold

* ***Sebdenia rodrigueziana*** (J. Feldmann) Codomier

Saxicolous plants were collected in shaded habitats (usually crevices) in the sublittoral zone, between 2 and ca 20 m depth. Thalli were red-pinkish to violet, more or less cartilaginous and mucilaginous, to 7 cm high, composed of a cuneate flattened frond, subdichotomously divided and gradually expanded up to 5 mm in diameter, and arising from a small discoid holdfast. Thallus organization was multiaxial with a network of rhizoidal and stellate cells in the medulla, giving rise to a thin cortex with polygonal epidermic cells, 6 to 13 µm in diameter, firmly bounded together. Spherical and deeply stained gland cells, 8 to 16 µm in diameter, were developed from the rhizoidal medullary cells. Tetrasporophytes with irregularly divided tetrasporangia, 20 to 36 µm in diameter, scattered in the cortex, were collected in July.
Collections: SR270684, KI010784, KI310784, KC010884, T280685.
Endemic in the Mediterranean (type locality: Banyuls-sur-Mer; Feldmann 1935:367, as *Halymenia*).
Aegean Sea: Sithonia (present study).

CRUORIACEAE (J. Agardh) Kylin

CRUORIA Fries

Cruoria cruoriaeformis (P. & H. Crouan) Denizot (1968:169)
= *Cruoria purpurea* P. & H. Crouan

Reported from the S. Archipelagus (Huvé 1962a, as *C. purpurea*) and the Saronikos Gulf (Diapoulis & Verlaque 1981).

CYSTOCLONIACEAE Kützing

RHODOPHYLLIS Kützing

* ***Rhodophyllis divaricata*** (Stackhouse) Papenfuss (1950:190)
= *Rhodophyllis bifida* Kützing

Plants were commonly met with as epiphytes on diverse macroalgae in the sublittoral zone. Thalli were dark to light red, to 2 cm long, composed of a subdichotomous to irregularly proliferous, flattened frond, with branches up to 2 mm broad and 85 µm thick and numerous marginal proliferations usually converted into discoid holdfasts. Growth was restricted to the apices and margins, and occurred by means of a group of cells. Transverse sections of branches showed a poorly developed medulla composed of a few filaments and a cortex of one or two layers of polygonal cells, 20 to 30 µm in diameter. Marginal cells were characteristically smaller, 5 to 8 µm in diameter, and usually arranged in one or two series. Individuals with carposporophytes or tetrasporangia were collected in November and December. Cystocarps, to 350 µm in diameter, and zonately divided tetrasporangia, to 40 µm long and 30 µm broad, were usually borne on young blades.
Collections: A290680, A201180, A041280, K010781, K010882.
Distributed in the Mediterranean and the NE. Atlantic (type locality: British Isles; see Dixon & Irvine 1977a:199) between Morocco and southern Norway (see Rueness 1977).
Aegean Sea: Sithonia (present study), N. Sporades [Diannelidis 1950, as *R. bifida* (Goodw. & Woodw.) Kütz.], and the S. Archipelagus (Giaccone 1968a, as *R. bifida*).
Note: Compared to the Atlantic specimens the Aegean plants were more proliferous with narrow branches and reproductive organs restricted to marginal lobes. Thus, they were referrable to *R. apendiculata* J. Ag. which is considered to be a form of the species (Hauck 1885, Dixon & Irvine 1977a).

PLOCAMIACEAE Kützing

PLOCAMIUM Lamouroux

* ***Plocamium cartilagineum*** (Linnaeus) Dixon (1967)
= *Plocamium coccineum* (Hudson) Lyngbye
= *Plocamium coccineum* var. *uncinatum* (C. Agardh) J. Agardh

Infertile plants were sporadically collected in the sublittoral zone, attached to small stones, hydrozoans and macroalgae. Thalli were reddish, to 3 cm long, composed of a compressed frond subdichotomously divided with branches up to 1 mm broad, occasionally converted into rhizoidal attachments. Ultimate branches were chacteristically pectinate.
Collections: A201180, A140782, KI010784.
Cosmopolitan; widely reported from warm-temperate and boreal areas, both in the northern and southern hemisphere.
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), the S. Archipelagus (Huvé 1962a, as *P. coccineum* var. *uncinatum* C. Ag.; Giaccone 1968a, as *P. coccineum* Lyngb. v. uncinatum J. Ag.).
Note: Typical plants from the western Mediterranean basin or the Atlantic coast of Europe may reach a length of 15 cm growing even on rocks. This is not the case in the Aegean plants, which survive with a depauperate and usually epiphytic thallus.

SPHAEROCOCCACEAE Dumortier

SPHAEROCOCCUS Stackhouse

* ***Sphaerococcus coronopifolius*** Stackhouse

Saxicolous plants were sporadically found in shaded habitats (crevices) in the sublittoral zone, between 5 and ca 20 m depth. Thalli were dark red, cartilaginous, to 15 cm long, composed of a compressed frond, irregularly ramified in one plane, and arising from a crustose holdfast. The thallus organization was uniaxial with a conspicuous central axis, cutting of whorls of filaments and giving a characteristic "fish bone" structure to the frond.
Plants with carposporophytes were collected in May. Cystocarps were subspherical, to 800 µm in diameter, and occurred on short laterals.
Collections: A050580, KI100784, SI200784, SI160784.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic (type locality: British Isles; see Dixon & Irvine 1977a:204).
Aegean Sea: Sithonia (present study) and the S. Archipelagus [Huvé 1962a, as *S. coronopifolius* (Good.& Woodw.) C. Ag.; Giaccone 1968a, as *S. coronopifolius* Ag.].
Note: According to Maggs & Guiry (1982a), the tetrasporophytic phase of this species is similar to the crustose alga *Haematocelis fissurata* P. & H. Crouan (not recorded in the Aegean Sea).

GRACILARIACEAE (Nägeli) Kylin

GRACILARIA Greville

Gracilaria bursa-pastori (Gmelin) Silva (1952:265)
= *Gracilaria compressa* (C. Agardh) Greville

Commonly reported as *G. compressa* from the Makedonian coast (Anagnostidis 1968, Haritonidis & Tsekos 1974, 1975), the Maliakos Gulf (Anagnostidis 1968), the Pagasitikos Gulf and the N. Sporades (Diannelidis 1948, 1953), and Rhodes (Reinbold 1898).

* ***Gracilaria corallicola*** Zanardini

Plants grew on crustose corallines and rocks in the sublittoral zone between 10 and ca 20 m depth. Thalli were reddish, cartilaginous, to 5 cm long, composed of one to several stipitate and compressed fronds, subdichotomously to irregularly divided, and attached to the substratum by means of a discoid holdfast. Stipes were terete and branched, to 5 mm long, expanding into divaricate branches, to 15 mm broad and 0.7 mm thick, with blunt apices. Thallus organization was multiaxial with large medullary cells, to 300 µm in diameter (t. s.), and one or two layers of small cortical cells, with epidermic cells 7 to 15 µm in diameter. Subspherical trichocytes, 18 to 25 µm in diameter (s. v.), were borne among cortical cells. Plants with carposporophytes and isomorphic tetrasporophytes were collected in July and August. The former developed wart-like cystocarps, to 1 mm in diameter, with at least 10 cell layers in the pericarp. Cruciately divided tetrasporangia, 28 to 35 µm in diameter (t. s.), were scattered in the cortex.
Collections: SR200784, KC010884.
Endemic in the Mediterranean (type locality: Adriatic; Zanardini 1865:127, tab. LXXI).
Aegean Sea: Sithonia (present study) and S. Archipelagus (Giaccone 1968a).
Note: *G. corallicola* has been regarded as conspecific with or as a form of *G. foliifera* (see Hauck 1885, Gerloff & Geissler 1974), although the latter species is well distinguished both in habit and habitat (see Dixon & Irvine 1977a).

Gracilaria dura (C. Agardh) J. Agardh

Reported from the Makedonian coast (Anagnostidis 1968, Haritonidis & Tsekos 1975, Haritonidis 1978) and the N. Sporades (Diannelidis 1950, 1953).

* ***Gracilaria verrucosa*** (Hudson) Papenfuss (1950:195)
= *Gracilaria confervoides* Greville

Infertile or carposporic plants grew attached to pebbles and stones in the upper sublittoral zone at N. Michaniona and other localities in the vicinity of the Thessaloniki Gulf. Thalli were red-brown, cartilaginous, to 50 cm long, composed of a terete and irregularly branched frond with a main axis up to 2 mm broad, arising from a discoid holdfast. Thallus organization was multiaxial with medullary cells, to 250 μm in diameter (t. s.), giving rise to a thin cortex of smaller cells. Epidermic cells were 8 to 15 μm in diameter, cut off from inner rectangular cells 10 to 60 μm in diameter (l. s.). Trichocytes, 20 to 24 μm long and 8 to 10 μm broad (t. s.) (14 to 28 μm long and 8 to 10 μm broad in s. v.) were commonly developed in the cortex. Plants with carposporophytes were collected in November and December. Cystocarps were hemispherical, to 800 μm in diameter, with up to 10 rows of vegetative cells in the pericarp. Tetrasporophytes with cruciately divided sporangia, 20 to 30 μm in diameter, scattered in the cortex, were collected in Mars.
Collections: NM271180, NM220386.
Widely reported from temperate, subtropical and tropical regions such as the Mediterranean and the Atlantic (type locality: British Isles; see Dixon & Irvine 1977a) (but see Bird *et al.* 1982); in European waters between Morocco and Scandinavia.
Aegean Sea: Makedonian coast [Diannelidis 1950, as *G. confervoides* (L.) Grev.; Anagnostidis 1968; Haritonidis & Tsekos 1974, 1975; Haritonidis 1978], and Rhodes [Diannelidis 1950, as *G. confervoides* (L.) Grev.].
Note: In the absence of spermatangial plants, the material was tentatively referred to this taxon, as spermatangial morphology is of particular significance for species identification in the genus. Trichocyte size was also larger than that attributed to plants from the British Isles (see Dixon & Irvine 1977a).

GIGARTINACEAE Bory

GIGARTINA Stackhouse

* ***Gigartina acicularis*** (Roth) Lamouroux

A few infertile plants were found as epiphytes on a species of *Cystoseira* in the upper sublittoral zone. Thalli were dark red-brown, cartilaginous, to 2 cm high, composed of an irregularly branched, terete and reflexed frond with branches up to 1 mm broad. Thallus organization was multiaxial with a filamentous medulla giving rise to a compact cortex, composed of inner stellate cells and a series of subdichotomously divided isodiametric cells, with epidermic cells ca 2.8 μm in diameter.
Collections: K010882.
Distributed in the Mediterranean (type locality: Adriatic; see Dixon & Irvine 1977a:237), the Black Sea (Zinova 1967), and the Atlantic between the Canaries (Børgesen 1930) and the British Isles, and from N. Carolina to Uruguay (Dixon & Irvine 1977a).
Aegean Sea: Sithonia (present study), Limnos [Schiffner & Schussnig 1943, as *G. acicularis* (Wulf.) Lamx.], and Asia Minor [Güven & Öztig 1971, as *G. acicularis* (Wulf.) Lam.].
Note: The material was tentatively referred to this species, since slender plants of *G. tedii* may exhibit a similar thallus morphology (Guiry 1984a, b).

Gigartina tedii (Roth) Lamouroux

Reported from the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978), Crete and Attica (Politis 1932, 1936). Carposporophytes have been recorded by Tsekos (1981) from material collected in the Gulf of Thessaloniki.

Excluded species

Gigartina pistillata (Gmelin) Stackhouse

The single record from the Makedonian coast (Haritonidis & Tsekos 1975) should be regarded as doubtful, since this Atlantic species is not known to occur in the Mediterranean.

PHYLLOPHORACEAE Nägeli

GYMNOGONGRUS Martius

* *Gymnogongrus griffithsiae* (Turner) Martius

Saxicolous individuals grew in a sheltered habitat in the upper sublittoral zone. Thalli were reddish to green-yellow, cartilaginous, to 1 cm long, composed of one to several terete and subdichotomously divided fronds, to 420 µm broad, arising from a crustose holdfast several mm in extent. Thallus structure was multiaxial with medullary cells, to 8 µm in diameter (t. s.), giving rise to a polystromatic and compact cortex with isodiametric epidermic cells, 2.5 to 3 µm in diameter (t. s.), arranged in radial rows. Individuals bore immature reproductive outgrowths, to 200 µm thick.
Collections: K010882
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic between C. Africa and the British Isles (type locality) (Turner 1808:80, as *Fucus*).
Aegean Sea: Makedonian coast (Politis 1925, 1953; Haritonidis & Tsekos 1975), Pagasitikos Gulf (Diannelidis 1948), Crete and Attica (Politis 1932, 1936), and Cyclades (Coppejans 1974).

PHYLLOPHORA Greville

* ***Phyllophora crispa*** (Hudson) Dixon
= *Phyllophora nervosa* (DC) Greville (Dixon & Irvine 1977a:222)

Saxicolous and drift infertile plants were encountered in the sublittoral zone (ca 10 m depth). Thalli were dark-red, cartilaginous, to 25 cm long, composed of a stipitate and subdichotomous to irregularly proliferous frond with foliose, ligulate branches connected by short stipes, and attached to the substratum by means of a discoid holdfast. Branches were up to 1 cm broad and 5 cm long, with undulate margins and a terete solid stipe, to 5 mm long, extending into a midrib. Outgrowths resembling carposporophytes, but apparently lacking reproductive organs, were seen on drift or attached material collected in November, December, and May. These structures were developed from the medulla elevating the cortex, in contrast to the branches which were developed from the cortex (Dixon & Irvine 1977a).
Collections: A061180, A181180, A041280, A110581.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic (type locality: British Isles; see Dixon & Irvine 1977a:222) between Morocco and Scandinavia (see Rueness 1977).
Aegean Sea: Commonly reported as *P. nervosa* from the northern coast of Greece (Katsikopoulos 1939, Haritonidis & Tsekos 1975), the Pagasitikos Gulf and the N. Sporades (Diannelidis 1948, 1950, 1953), S. Archipelagus (Huvé 1962a), and Asia Minor (Güven & Öztig 1971).

Phyllophora sicula (Kützing) Guiry & Irvine (1976:284)
= *Phyllophora palmettoides* J. Agardh

Reported from the S. Archipelagus (Giaccone 1968a, as *P. palmettoides*).

SCHOTTERA Guiry & Hollenberg

* ***Schottera nicaeensis*** (Duby) Guiry & Hollenberg (1976:149)
= *Petroglossum nicaeense* (Duby) Schotter

Saxicolous, infertile plants growing in distinct patches, to 5 cm in extent, were found in a shaded, sheltered habitat in the upper sublittoral zone. Thalli were bright red, cartilaginous, to 2 cm long, composed of stipitate, foliose fronds, subdichotomously to irregularly branched from the stipe or the foliose margins. Stipes were terete and a few mm long, occasionally divided and partly prostrate, attached to the substratum by means of several holdfasts. Foliose branches were ligulate, to 4 mm broad and 100 µm thick, with blunt apices. Thallus structure was multiaxial with subspherical, medullary cells, to 60 µm in diameter, and polygonal epidermic cells, 3 to 8 µm in diameter.
Collections: K010882, K210684.
Distributed in the Mediterranean (type locality: Marseille; Guiry & Hollenberg 1975:153) and the NE. Atlantic to the British Isles (see Dixon & Irvine 1977a).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975, as *Petroglossum*), S. Archipelagus (Giaccone 1968a, as *P. nicaeense* Schotter).

Excluded species

Chondrus crispus Stackhouse
= *Gymnogongrus norvegicus* (Gunnerus) J. Agardh (see Dixon & Irvine 1977a:217,236)

The binomial *Gymnogongrus norvegicus* has usually been applied in the past to *Gymnogongrus crenulatus* (Turner) J. Agardh, and it is possible that the single record from Crete [Diannelidis 1950, as *G. norvegicus* (Gom.) J. Ag.] actually belong to this species rather than to *C. crispus*, which certainly does not occur in the Mediterranean.

Phyllophora pseudoceranoides (Gmelin) Newroth & Taylor (1971:95)
= *Phyllophora membranifolia* Endlicher

The record from the Saronikos Gulf (Anagnostidis 1968, as *P. membranifolia*), is probably based on a misidentification since this species does not occur elsewhere in the Mediterranean.

HYPNEACEAE J. Agardh

HYPNEA Lamouroux

* ***Hypnea*** cf. ***cervicornis*** J. Agardh

Infertile plants, growing on *Cystoseira corniculata* and *Halopitys incurvus* and forming conglomerate masses up to 20 cm in diameter and ca 10 high, were encountered in a sheltered habitat in the upper sublittoral zone. Thalli were irregularly ramified in a sympodial pattern, with divaricate and usually anastomosed terete branches, to 0.8 mm in diameter. Anatomically the plants were similar to *H. musciformis*.
Collections: K010882, K200685.
Distributed in the Mediterranean (Gallardo *et al.* 1985), the West Indies (Børgesen 1915-20), N. Carolina (Schneider & Searles 1976), the Canaries (Børgesen 1929), and Japan (Tanaka

1941).
Aegean Sea: Sithonia (present study).
Note: The Aegean plants were tentatively referred to this taxon pending examination of the type material (Agardh 1852:451).

Hypnea esperi Bory

Reported from the Saronikos Gulf (Diapoulis & Haritonidis 1985).
Note: This name is applied to a species of the genus with minute (to 3 cm long) and slender thallus, widely distributed in the Indo-Pacific (see Rayss & Dor 1963, Egerod 1971). It has previously been recorded in the Mediterranean from the coast of Israel (Lipkin 1972), although the record has never been confirmed.

* ***Hypnea musciformis*** (Wulfen) Lamouroux

Saxicolous and epiphytic plants were collected in sheltered habitats in the upper sublittoral zone in eutrophic waters. Thalli were red-brown, cartilaginous, to 15 cm long, composed of a terete and radially branched frond, with a percurrent main axis up to 1 mm in diameter, provided with curved apices with prominent thickened parts. Thallus organization was uniaxial with a conspicuous apical cell, obliquely divided, and a central axis surrounded by medullary cells, to 300 µm in diameter, giving rise to a thin cortex with small epidermic cells, 7 to 20 µm in diameter (t. s.). Trichocytes were sporadically developed in the outer cortex. Tetrasporophytes with zonately divided sporangia, to 55 µm long and 25 µm broad, developed on lateral, short branches, were collected in November and August.
Collections: NM271180, Iraclion 290983.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), the West Indies (Børgesen 1915-20), N. Carolina (Searles & Scneider 1978), and the Indian Ocean (Børgesen 1934).
Aegean Sea: Makedonian coast (Politis 1925, 1953; Tsekos & Haritonidis 1975), Crete, Attica and Cyclades (Politis 1932, 1936, 1938), Limnos, Mikonos (Schiffner & Schussnig 1943), Rhodes (Reinbold 1898), and Asia Minor (Güven & Öztig 1971).

Excluded species

Hypnea valentiae (Turner) Montagne

Plants collected at Rhodes by L. J. Nemetz and apparently provided with "characteristischen spinulae stellulaeformis" were referred to this Indo-Pacific species by Reinbold (1898), who also suggested that this alga might had passed into the Mediterranean after the opening of the Suez Channel in 1869. Reinbold's record was later included in Por's (1978) list of probable Lessepsian migrants, although the species was never re-found off the island of Rhodes or elsewhere in the Mediterranean. Whether the record was based on a misidentification or a specimen from the drift is unknown.

CAULACANTHACEAE Kützing

CAULACANTHUS Kützing

* ***Caulacanthus ustulatus*** (Turner) Kützing

Plants were commonly found as epiphytes on species of *Peyssonnelia* in the sublittoral zone. Thalli were dark red to red-violet, to 1 cm long, composed of prostrate and erect, terete branches, to 150 µm broad, irregularly ramified and attached to the substratum by means of several short, rhizoidal holdfasts with discoid pads, to 240 µm in diameter. Thallus organization was uniaxial with an obliquely divided apical cell and a conspicuous central axis composed of cells, to 75 µm long and 20 µm broad. Each axial cell gave rise to two lateral filaments, which

progressively developed a compact cortex surrounding the central axis. Plants with carposporophytes and isomorphic tetrasporophytes were collected in summer. Cystocarps were up to 250 µm in diameter, immersed in lateral branches elevating the cortex. Zonately divided tetrasporangia, 35 to 50 µm long and ca 30 µm broad, were borne in terminal stichidial branches.
Collections: A100581, A250881, A100782, A140782, S100882.
Distributed in the Mediterranean, the Atlantic coast of Iberia (Cadiz: type locality; Turner 1809:143, as *Fucus acicularis* var. *ustulatus*) (Ardré 1970), the tropical coast of Africa (see Price *et al.* 1986) including Madeira (Levring 1974), and the Indo-Pacific (Searles 1968, Jaasund 1976).
Aegean Sea: Sithonia (present study) and Pagasitikos Gulf [Diannelidis 1948, as *C. ustulatus* (Mert.) Kütz.].

RHODYMENIALES Schmitz
CHAMPIACEAE Kützing

CHAMPIA Desvaux

* ***Champia parvula*** (C. Agardh) Harvey

Plants grew as epiphytes on diverse macroalgae in the sublittoral zone, usually attached to their hosts by means of several rhizoidal outgrowths produced from cortical cells, or by a basal holdfast. Thalli were pinkish, to 2 cm long, composed of sparsely branched, hollow fronds, to 0.7 mm broad, occasionally anastomosed, regularly constricted at intervals with conspicuous diaphragms (transverse monostromatic cell layers), and divided in segments, about as long as broad. The cortex was monostromatic, consisting of small cells, 8 to 11 µm in diameter, developed from inner larger ones, 33 to 45 µm in diameter. Longitudinal filaments, linking larger cortical cells, run through the inner thallus periphery. They bore gland cells, which were usually cut off singly from individual cells. Gametophytes collected in July bore, besides a few carpogonial branches, terminal spermatangial structures covering large parts of the individual segments. Mature carposporic individuals, apparently without spermatangial structures, were also observed. Cystocarps were urceolate and up to 620 µm in diameter.
Collections: A140782, A140684, D260784 A230684, SI120784
Distributed in the Mediterranean, the N. Atlantic (type locality: Cadiz; C. Agardh 1824:207, as *Chondria*) to the British Isles (see Irvine & Guiry 1983), the West Indies (Børgesen 1915-20, Taylor 1960), and southern Australia (Reedman & Womersley 1976).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975) and Attica (Gerloff & Geissler 1974).
Note: According to Irvine & Guiry (1983), this species is dioecious.

CHYLOCLADIA Greville

* ***Chylocladia verticillata*** (Lightfoot) Bliding (1928:69)
= *Gastroclonium kaliforme* (Goodenough & Woodward) Ardissone
=? *Chylocladia squarrosa* (Kützing) Le Jolis

Plants grew at diverse habitats in the littoral and sublittoral zone, occasionally in patches on exposed littoral rocks or as epiphytes on *Halimeda tuna* and *Posidonia* leaves. Thalli were green-yellow, to 2 cm long (in drift material to 15 cm long), composed of one to several hollow and septate fronds, to 1 mm broad, with diaphragms and segments, up to 6 times as long as broad. Fronds were developed from a short, less than 1 mm long stipe, and were laterally branched, occasionally with distinct whorl-branches. The cortex was composed of an incomplete superficial layer of small cells, 13 to 15 µm in diameter, cut off from inner larger cells, to 130 µm long and 50 µm broad. Longitudinal filaments run in the inner thallus

periphery linking larger cortical cells and cutting off gland cells, the latter especially numerous near the base of the segments. Gametophytes and tetrasporophytes were collected in summer. Spermatangia were terminally borne at the constrictions of the fronds. Tetrahedrally divided sporangia, 40 to 55 µm in diameter, were developed among cortical cells.
Collections: A041280, A140782, A140684, D260784, A230684, NM220386 Drift.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic (type locality: British Isles; see Irvine & Guiry 1983:81) between Morocco (Gayral 1958) and S. Scandinavia (see Rueness 1977), including the Canaries (Børgesen 1929).
Aegean Sea: Makedonian coast (present study), N. Sporades and Crete (Diannelidis 1950, 1953, as *C. squarrosa*), Smirna (De Toni 1900:568), Attica (Gerloff & Geissler 1974) and Cyclades (Schiffner & Schussnig 1943, as *G. kaliforme*).
Note: Mediterranean plants described by Kützing (1843) as *Lomentaria squarossa* are regarded as a variety or a form of this species (see Ercegovic 1956:33).

GASTROCLONIUM Kützing

* ***Gastroclonium clavatum*** (Roth) Ardissone

Plants grew at shaded habitats in the upper sublittoral zone, occasionally in distinct patches, to 4 cm in extent, on rocks or as epiphytes on diverse macroalgae. Thalli were iridescent, red-brown to greenish, to 2 cm long, composed of a terete and usually branched stipe up to 1 cm long, giving rise to several hollow branches, sparsely ramified and septated by diaphragms, with segments one to two times as long as broad. The cortex was distromatic with small epidermic cells, 9 to 13 µm in diameter, cut off from inner larger cells, to 140 µm long 60 µm broad. Tetrahedrally divided sporangia, 50 to 80 µm in diameter, were borne among cortical cells.
Collections: K100782, K010882, A140684, K200685.
Distributed in the Mediterranean (type locality; Roth 1797:160, as *Conferva*,"inter *Fucum Helminthochortom*") and the Atlantic coast of Iberia (Gallardo *et al.* 1985);
Aegean Sea: Sithonia (present study).

LOMENTARIACEAE J. Agardh

LOMENTARIA Lyngbye

Lomentaria articulata (Hudson) Lyngbye

Reported from Smirna (De Toni 1900:554, with reservetions).

* ***Lomentaria chylocladiella*** Funk

Tetrasporophytes grew as epiphytes on *Laurencia* sp. and *Posidonia* rhizomes in the sublittoral zone. Thalli were red-yellow to pinkish, to 1.5 cm long, composed of one to several terete and sparsely branched fronds, to 260 µm in diameter, attached to their hosts by means of a basal disc and/or rhizoidal outgrowths developed from cortical cells. The cortex was monostromatic composed of a few small cells, 6.5 to 9 µm in diameter, cut off from larger ones, to 50 long and 25 µm broad. Longitudinal filaments in the inner thallus periphery were composed of two distinctive types of cells, i. e. long-narrow (rhizoidal) and broader rectangular cells. Both of them developed gland cells and a network, linking to each other as well as to larger cortical cells. Tetrahedrally divided tetrasporangia, 40 to 65 µm in diameter, were developed among cortical cells.
Collections: A201180, A100581, S100882.
Endemic in the Mediterranean (type locality: Naples; Funk 1955:86, tab. VII, figs 1 to 4) (Ercegovic 1956, with reservations), (Boudouresque 1974, with reservations).
Aegean Sea: Sithonia (present study).

Note: The Aegean plants were distinguished from Funk's original description by the smaller size of the tetrasporangia (40 to 65 µm instead of 80 to 160 µm in the type specimen) and the elaborated network of medullary filaments (not mentioned by Funk). Both these features are, however, attributed to this species in later accounts (Boudouresque 1974, Coppejans 1983).

* ***Lomentaria clavellosa*** (Turner) Gaillon
=? *Lomentaria verticillata* Funk
=? *Lomentaria ercegovicii* Verlaque *et al.* (1977)

Plants grew in the upper sublittoral zone on rocks, bryozoans, and sponges. Thalli were red-pinkish, to 1 cm long, composed of one to several, hollow and more or less compressed fronds distichously and bilaterally ramified, arising from a discoid holdfast. Branches were up to 420 µm broad and usually constricted at their base. The cortex was distromatic composed of small epidermic cells, 5 to 8 µm in diameter, developed from inner larger ones, 35 to 55 µm in diameter. Longitudinal filaments in the inner thallus periphery developed gland cells and a network, linking to each other as well as to larger cortical cells. Tetrahedrally divided, subspherical tetrasporangia, 30 to 45 µm in diameter, were borne in sori in the cortex.
Collections: A100782, SI240883, K210684, D260784.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic (type locality: British Isles: see Irvine & Guiry 1983:87) to Scandinavia (Rueness 1977).
Aegean Sea: Sithonia (present study), Attica (Gerloff & Geissler 1974).
Note: The plants from Sithonia do not represent any of the typical Atlantic forms of this species, which is regarded as polymorphous and may attain a length of 40 cm (see Irvine & Guiry 1983). Comparison with specimens from the Swedish west coast, Banyuls-sur-Mer and Trieste showed that the disposition of epidermic cells and the number of medullary filaments are variable features. The medullary filaments of some Aegean specimens did not form a network, being in a good agreement with *L. verticillata* Funk as interpreted by Boudouresque (1974, fig. 26). Two other taxa with closely related morphology are *L. ercegovicii* Verlaque *et al.* (1977) [= *L. tenera* (Liebmann) Kützing sensu Ercegovic (1956:16)], and *Lomentaria pennata* sp. nov. ideq. (Coppejans 1983, pls 289, 290).

Lomentaria compressa (Kützing) Kylin

Reported from the S. Archipelagus (Giaccone 1968a, as *L. compressa* Kylin).

Lomentaria linearis (Zanardini) Zanardini
= *Lomentaria articulata* (Hudson) Lyngbye var. *linearis* Zanardini

Reported from the S. Archipelagus (Giaccone 1968a, as *L. articulata* Lyngb. f. *linearis* Hauck).

Excluded species

Lomentaria tenera (Liebmann) Kützing

The single record of this Pacific species from the S. Archipelagus (Giaccone 1968a, as *L. tenera* Kütz.) is doubtful and probably based on *L. tenera* Ercegovic (1956:16, nom. illeg.) (= *L. ercegovicii* Verlaque *et al.*, 1977).

RHODYMENIACEAE Harvey

BOTRYOCLADIA (J. Agardh) Kylin

* ***Botryocladia boergesenii*** J. Feldmann

Infertile and tetrasporic plants grew on crustose corallines and *Posidonia* rhizomes in the sublittoral zone (ca 10 m depth). Thalli were red-brown, to 1 cm long, composed of a solid terete stipe giving rise to subspherical, hollow branches (vesicles). Vesicles were up to 3 mm in diameter, composed of a thin cortex of small cells developed around larger ones, and inner medullary cells provided with stellate gland cells. Cruciately divided, subspherical tetrasporangia, 10 to 32 µm in diameter, were developed among cortical cells in plants collected in December.
Collections: A041280, S100882.
Distributed in the Mediterranean (type locality: French coast: Feldmann 1942b:93, figs 32 to 34) and the NE. Atlantic (Portugal; Ardré 1970).
Aegean Sea: Sithonia (present study) and S. Archipelagus Huvé (1962a).

* ***Botryocladia botryoides*** (Wulfen) J. Feldmann
= *Botryocladia uvaria* Kylin (Silva 1980a:124)
= *Chrysymenia uvaria* (C. Agardh) J. Agardh (1842:106)

Plants were commonly found as epiphytes on species of *Cystoseira* and on other macroalgae, or on rocks in the sublittoral zone. Thalli were dark red-brown, to 5 cm long, composed of a branched, solid and terete stipe with bunches of ovate to subspherical hollow branches (vesicles), each up to 3 mm long. Vesicles were polystromatic, to 60 µm thick, composed of 3 or 4 layers of subspherical cells (i. e. one layer of small epidermic and two layers of larger cells, to 60 µm long and 30 µm broad), and provided with gland cells, to 10 µm in diameter, cut off in the inner periphery. Tetrasporophytes with cruciately divided tetrasporangia, 20 to 30 µm in diameter were collected in November. Plants with cystocarps were collected in July.
Collections: A201180, A140782, K010882, K290783.
Distributed in the Mediterranean (type locality: Trieste; see Feldmann 1942b:90) and the NE. Atlantic coast of Iberia (Feldmann 1942a, Gallardo *et al.* 1985), Madeira (Levring 1974), and the Canaries (Børgesen 1929).
Aegean Sea: Makedonian coast (Politis 1925, Haritonidis & Tsekos 1975), Attica and Cyclades [Politis 1936, 1938, Schiffner & Schussnig 1943; as *C. uvaria* (Wulf.) J. Ag.], N. Sporades (Diannelidis 1950,1953), S. Archipelagus (Huvé 1962a, Giaccone 1968a, as *C. uvaria* J. Ag.), and Asia Minor [Güven & Öztig 1971, as *B. uvaria* (Wulfen) Kylin].

CHRYSYMENIA J. Agardh

* ***Chrysymenia ventricosa*** (Lamouroux) J. Agardh

Saxicolous plants were collected at shaded habitats (usually crevices) in the sublittoral zone between low water level and ca 15 m depth. Thalli were yellow-red to red-brown, mucilaginous, to 8 cm long, composed of a single hollow frond subdichotomously and distichously to irregularly ramified, with branches up to 6 cm long and 7 mm broad, and arising from a basal discoid holdfast. Tetrasporophytes and gametophytes with cystocarps were collected in summer. The former developed cruciately or tetrahedrally divided sporangia, 24 to 40 µm in diameter, scattered in the cortex, and the latter hemispherical cystocarps, to 1.2 mm in diameter, with an apical ostiole. Mature gonimoblasts were subspherical and to 0.7 mm in diameter.
Collections: NI040580, NI200680, OI000480, A081081, SR200784, KI100784
Distributed in the Mediterranean [type locality: French coast; Lamouroux, 1813:45, pl. 10 (tab. 4), fig. 6, as *Dumontia*] and Atlantic Morocco (Tanger; Agardh 1851:213).

Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), Attica (Politis 1936) and S. Archipelagus (Giaccone 1968a, as *C. ventricosa* J. Ag.).

FAUCHEA Bory & Montagne

Fauchea repens (C. Agardh) Bory & Montagne

Reported from the Cyclades (Politis 1938) and the S. Archipelagus (Huvé 1962a).

* ***RHODYMENIA*** Greville

Species of this genus were rarely met with at Sithonia. Those collected grew as epiphytes on macroalgae (e. g. *Cystoseira* spp., *Phyllophora nervosa*) or sponges. Since the material was either infertile or rarely tetrasporic and comprised only small specimens (to 1 cm long), partly grazed by herbivorous animals, identification at the species level was not attempted.
Collections: A181180, A201180, A100581, K010882, A100782, A140782, K290783.

Rhodymenia ardissonei J. Feldmann (1942b:97)
= *Rhodymenia corallicola* (Zanardini) Ardissone pro parte

Reported from the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978), the Pagasitikos Gulf and the N. Sporades (Diannelidis 1948, 1953), and Asia Minor (Güven & Öztig 1971, as *R. corallicola* Ardiss.).

Rhodymenia ligulata Zanardini

Reported from the Makedonian coast (Anagnostidis 1968, with reservations).

Excluded species

Rhodymenia pseudopalmata (Lamouroux) Silva (1952:265)
= *Rhodymenia palmetta* (Lamouroux) Greville

The single record of this common Atlantic species from the S. Archipelagus (Giaccone 1968a, as *R. palmetta* Grev.) is doubtful, since there is no further evidence of its occurrence in the Mediterranean Sea (see Ercegovic 1956, Guiry 1977).

CERAMIALES Oltmanns
CERAMIACEAE Dumortier
ANTITHAMNIEAE Hommersand

ANTITHAMNION Nägeli

* ***Antithamnion cruciatum*** (C. Agardh) Nägeli

Infertile and tetrasporangial plants grew as epiphytes on diverse macroalgae in the sublittoral zone. Thalli were red to pinkish, to 1 cm long, composed of prostrate and erect axes with a pair of sub-equal whorl-branches usually borne from each axial cell. They were attached to the substratum by means of multicellular rhizoids developed from periaxial cells. Whorl-branches were provided with small isodiametric basal cells and developed first- and occasionally second-order branchlets. Branchlets were arranged in opposite pairs or singly and were short, 2- or 3-celled, when they developed gland cells. Lateral axes were singly borne, in place of a whorl-branch, or as adventitious (secondarily developed) from basal cells of whorl-branches. Tetrasporophytes were collected in January and March. Mature tetrasporangia were subspherical to elliptical and cruciately divided, 60 to 95 µm long, provided with unicellular pedicels.

Collections: A290680, A181180, A201180, A041280, S100882, A140782, SI240882, A040183, SI160784, D260784, K200386.
Distributed in the Mediterranean (type locality: Trieste; Agardh 1827:637, as *Callithamnion*), the Black Sea (Zinova 1967), and the N. Atlantic to Newfoundland (Whittick & Hooper 1977) and southern Scandinavia (see Athanasiadis 1986).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975), Attica (Politis 1936), S. Archipelagus (Giaccone 1968a, as *A. cruciatum* Naeg.), and Asia Minor (Güven & Öztig 1971).

* ***Antithamnion heterocladum*** Funk

Infertile plants grew in shaded habitats in the sublittoral zone as epiphytes on macroalgae (e. g. *Halopitys incurvus*) and crustose corallines. Thalli were red to pinkish, to 1 cm long, composed of prostrate and erect axes usually provided with a pair of unequal (dimorphic) whorl-branches from each axial cell. Major whorl-branches developed one order of adaxial-monostichous branchlets, whereas minor ones were mostly simple. Lateral axes were borne in place of major whorl-branches or from their basal cells, as adventitious.
Collections: A041280, A100581, SI240883.
Distributed in the Mediterranean (type locality: Naples; Funk 1955:111, fig. 9 to 12, tab. XXI 1 to 6) and Azores (Ardré unpubl. data)
Aegean Sea: Sithonia (Athanasiadis 1983, 1985a).

* ***Antithamnion ogdeniae*** Abbott

Plants grew as epiphytes on articulated corallines and hydrozoans in shaded habitats in the sublittoral zone, to at least 10 m depth. Thalli were red to pinkish, to 1 cm long composed of prostrate and/or erect axes with one pair of sub-equal whorl-branches borne from each axial cell. They were attached to the substratum by means of multicellular rhizoids developed from periaxial cells. Whorl-branches bore small, isodiametric basal cells and developed first- and second-order branchlets in an alternate-distichous pattern, usually with 1 or 2 pairs of opposite branchlets at their lower part. Lateral axes were borne in place of whorl-branches or adventitiously from periaxial cells. Gland cells were adaxially borne on second-order, 2- or 3-celled branchlets. Tetrasporophytes, collected in December and July, bore cruciately divided sporangia, 70 to 90 µm long and 30 to 45 µm broad, sessile and usually borne on the basal cell of first-order branchlets.
Collections:A041280, A100581, A081081, A040183, D260784, K300786.
Distributed in the Aegean Sea, the West Indies (type locality: Virgin Islands; Abbott 1979) and the Canaries (Børgesen 1930, as *A. antillanum* Børgesen).
Aegean Sea: Sithonia (Athanasiadis 1985a).
Note: Tetrasporophytes isolated in culture (A040183) demonstrated a *Polysiphonia*-type of life history as it is reported for other species of the genus. Under optimal culture conditions, similar to those described in a previous study (Athanasiadis 1986), isolates maintained their specific thallus morphology. Under suboptimal conditions, these developed various forms of sub-equal whorl-branches, usually without gland cells.

* ***Antithamnion tenuissimum*** (Hauck) Schiffner
= *Antithamnion cruciatum* (C. Agardh) Nägeli f. *tenuissima* Hauck

This species was studied in laboratory cultures from material collected at Sithonia and Banyuls-sur-Mer (Athanasiadis 1986). It is considered to be endemic in the Mediterranean and has previously been reported in the Aegean Sea from the Makedonian coast (Haritonidis & Tsekos 1975, as f. *tenuissima*).

BALLIELLA Itono & Tanaka

* ***Balliella cladoderma*** (Zanardini) Athanasiadis comb. nov.
= *Callithamnion cladodermum* Zanardini (1846:37)

Infertile plants grew on shells in the sublittoral zone at 20 m depth. Thalli were red to pinkish, to 20 mm long, composed of erect axes with sinusoidal apices and regular development of new axes and whorl-branches in an alternate-distichous branching pattern. Each axial cell cut off a pair of sub-equal and opposite whorl-branches, the basal cells of which developed rhizoidal outgrowths, which progressively formed a dense cortication covering the axes. Whorl-branches cut off opposite-distichous branchlets in pairs and in the plane of the thallus. Subspherical gland cells, to 9 µm in diameter, were usually adaxially borne on the basal (periaxial) cells of the whorl-branches. Basal axial cells were up to 540 µm long and 160 µm broad.
Collections: SR180784.
Distributed in the Mediterranean (type locality: Dalmatia; Zanardini 1846) and the Azores. Usually collected from deeper waters than those mentioned above.
Aegean Sea: Sithonia (Athanasiadis 1985a).
Note: Although procarps and carposporophytes are unknown in this species, it seems here justified to exclude it from the genus *Antithamnion* and place it in *Balliella*, a genus with which has in common most of its vegetative characteristics. Tetrasporangia have been described by Feldmann-Mazoyer (1941, fig. 88 b), as ovoid and cruciately divided structures, ca 40 µm long and 25 µm broad. They were also observed in material from Menorca in the Herb. Hauck (L; sheet 6773/2 and 3) (cf. Athanasiadis 1985a:460).

GYMNOTHAMNION J. Agardh

* ***Gymnothamnion elegans*** (Schousboe ex C. Agardh) J. Agardh

Infertile and monosporangial plants were collected in the upper sublittoral zone on rocks and on diverse macroalgae (e. g. *Seirospora* sp.). Thalli were up to 5 mm long, composed of prostrate and erect axes, the latter usually provided with a pair of opposite-distichous whorl-branches from each axial cell. Prostrate axes were irregularly branched, generally composed of larger cells, and attached to the substratum by means of multicellular or unicellular rhizoids, which developed from cells that also produced erect axes at the same time. Whorl-branches were straight with one order of adaxial and occasionally one order of abaxial branchlets pectinately branched. Elliptical, monosporangial structures, 20 to 55 µm long, were borne terminally on whorl-branches and branchlets.
Collections: K010882, KC260784.
Distributed in the Mediterranean, the Atlantic coast of Morocco (type locality: Tanger; Agardh 1828:162, as *Callithamnion*), Brazil (Joly & Cordeiro 1962), Biarritz (Bornet & Thuret 1876, as *Callithamnion*), and the Indo-Pacific (Balakrishnan 1958, Dawson 1962).
Aegean Sea: Sithonia (present study).
Note: Gametangial plants have been described as dioecious with up to 2 procarps on lateral axes, borne on basal cells of reduced 1- or 2-celled whorl-branches (as in *Antithamnionella* Lyle). Mature carposporophytes are naked and form several elongated gonimolobes (Feldmann & Feldmann 1966). Spermatangia are developed on the adaxial and abaxial branchlets of the whorl-branches (Bornet & Thuret 1876, tab. X; Balakrishnan 1958). These reproductive features along with the pectinate-distichous habit align *G. elegans* with the Antithamnieae.

PTEROTHAMNION Nägeli

* ***Pterothamnion crispum*** (Ducluzeau) Nägeli

Infertile and tetrasporic plants were collected in the upper sublittoral zone as epiphytes on *Stypocaulon scoparium*. Thalli were reddish, to 2 cm long, composed of erect axes with

sinusoidal apices and alternate-distichous arrangement. Each axial cell cut off 4 tetrastichous whorl-branches, two major in the plane of the thallus and two minor transversely and secondarily developed. Well developed whorl-branches were recurved and bore distichous pairs of adaxial, first-order branchlets, the latter provided with second-order branchlets. Individuals with cruciately divided, subspherical tetrasporangia, to 40 µm in diameter, adaxially developed on the branchlets, were collected in November and December.
Collections: A171180, A201180, A041280, A100782.
Distributed in the Mediterranean (type locality: Sète; Ducluzeau 1806:47, as *Ceramium*) and the NE. Atlantic to the British Isles (Sundene 1975).
Aegean Sea: Sithonia (Athanasiadis 1985b).

Excluded species

Antithamnion fragilissimum (Zanardini) De Toni (1903:1408)
= *Antithamnion cruciatum* f. *fragillisima* (Zanardini) Hauck

Reported as f. *fragilissima* from Lesbos (Haritonidis & Tsekos 1974), Attica and the N. Sporades (Diannelidis 1950, 1953).
Note: This taxon was originally described from the coast of Dalmatia (Zanardini 1860-72, tab. III B., as *Callithamnion*) and its current status is obscure. Judging from Zanardini's illustrations it appears to be related to *A. ogdeniae*, but yet exhibits shorter whorl-branches (to 0.26 mm long) and lacks gland cells.

Pterothamnion plumula (Ellis) Nägeli
= *Antithamnion plumula* (Ellis) Thuret in Le Jolis (see Moe & Silva 1980:12)

Antithamnion plumula has been reported from the Makedonian coast (Anagnostidis 1968) and Attica (Gerloff & Geissler 1974) without varietal status, including thus several entities at least one of which is presently considered as a distinct species (*Antithamnion plumula* var. *crispum* = *Pterothamnion crispum*) (see Athanasiadis 1985b). As currently interpreted, *P. plumula* is distributed in the N. Atlantic and probably in the western Mediterranean, but a critical investigation of the Mediterranean representatives is necessary (see Sundene 1975).

PTILOTA C. Agardh

Candargy (1899: VIII) reported *Ptilota* from Lesbos without further comments. As the genus is currently interpreted, no species of it are known in the Mediterranean.

CALLITHAMNIEAE Schmitz & Hauptfleisch

CALLITHAMNIELLA Feldmann-Mazoyer

* ***Callithamniella tingitana*** (Schousboe ex Bornet) Feldmann-Mazoyer

A few infertile plants grew on bryozoans in the upper sublittoral zone. Thalli were bright red, to 2 mm long, composed of prostrate and erect axes, to 20 µm broad, with unilateral arrangement of new axes or branches. They were attached to the substratum by means of unicellular rhizoids borne from the basal cells of laterals. Branches were simple or subdichotomously divided to the first-order, to 220 µm long and 8 to 10 µm broad, composed of cells up to twice as long as broad.
Collections: D260784.
Distributed in the Mediterranean and the C. Atlantic (type locality: Tanger; Bornet 1892:329, as *Callithamnion*) (Brasil and N. Carolina; Schneider 1984).
Aegean Sea: Sithonia (present study).

CALLITHAMNION Lyngbye

* ***Callithamnion*** cf. ***byssoides*** Arnott ex Harvey in Hooker

Bisporangial plants growing on a specimen of *Callithamnion corymbosum* were isolated and studied in culture [15 ± 2 ° C, 14:10 (light:dark)]. Isolates were pinkish, a few mm long, composed of a main axis with alternate-distichous to radial arrangement of new axes and branches, the latter simple or sparsely branched and overtopping their parent axis. They were attached to the substratum by means of subdichotomously or trichotomously branched rhizoidal outgrowths developed from basal axial cell. Vegetative axial cells were cylindrical, to 280 µm long and 35 µm broad. Subspherical to elliptical bisporangia, to 60 µm long and 45 µm broad, and sporangial initials occurred adaxially on the proximal upper end of branch cells. Germlings from bisporangia gave rise to plants with bisporangia and spermatangial structures, the latter borne in place of sporangia. One to four spermatangia developed in whorls around short, 2- to 4-celled, curved and occasionally ramified laterals, 1 or 2 per branch cell.
Collections: A040183.
Distributed in the Mediterranean, the N. Atlantic (type locality: British Isles; Hooker 1833:342) to S. Norway (see Rueness 1977), and the West Indies (see Dixon & Price 1981).
Aegean Sea: Sithonia (present study).
Note: There are several entities confused under the name *C. byssoides* (see Dixon & Price 1981). Typical plants of the species exhibit similar spermatangial structures to those described in the Aegean plants, pyriform gonimolobes, and uninucleate vegetative cells. Sterile or sporangial plants can even be confused with *C. cordatum*, which, however, usually shows a more pronounced lateral branching.

* ***Callithamnion cordatum*** Børgesen
= *Aglaothamnion neglectum* Feldmann-Mazoyer

A common epiphyte on diverse macroalgae (i. e. *Stypocaulon scoparium*, *Laurencia* spp., *Udotea petiolata*) in the upper sublittoral zone (1 to 5 m depth). Thalli were red to red-brown, to 1 cm long, composed of an inconspicuous central axis with radial arrangement of laterals (axes and subdichotomously divided branches), attached to the substratum by means of basal multicellular rhizoids with digitate pads. Laterals were curving inwards surrounding and overtopping the main axis. Specimens with procarps, spermatangia, parasporangial clusters, bisporangia, or tetrasporangia, were collected between June and December. Spermatangial mother cells were aggregated in groups of four on the adaxial side of branches, and cut off up to 4 spermatangia at a time. Carpogonial plants developed up to 6 procarps along a fertile axis, although only one carposporophyte was formed per axis. Two carpogonial branches, one with U-shaped cell arrangement and the other of *C. corymbosum*-type were observed. Mature carposporophytes were composed of two opposite, and subspherical to slightly lobed gonimoblasts, to 140 µm in diameter. Tetrahedrally divided sporangia, 40 to 65 µm in diameter, were adaxially borne at the proximal upper end of branch cells, with one mature tetrasporangium and one or two sporangial initials present at a time. Parasporangial clusters were up to 250 µm long, irregularly lobed, and unilaterally or bilaterally formed on branch cells. They were developed on separate plants or occasionally on tetrasporophytes in place of tetrasporangia.
Collections: A171180, A201180, A041280, A140782, K010882, A140684, SC120784, KC260784.
Distributed in the Mediterranean, the West Indies (type locality; Børgesen 1909:10, figs 5, 6), N. Carolina (Schneider 1980), and the Pacific (S. Japan, Itono 1977).
Aegean Sea: Sithonia (present study).
Note: The type material of this species is housed in Herb. Børgesen (C), and includes several sheets with plants up to 3 cm long. A series of five slide preparations, all numbered 1740, includes several specimens and among them a carposporic plant with cordate to subspherical gonimoblasts and another with spermatangial structures similar to those described in the

Aegean plants. *Aglaothamnion neglectum* Feldmann-Mazoyer (1941:459) was originally described from the Mediterranean coast of France, and was distinguished from *C. cordatum* by lobed gonimoblasts, and "zig-zag" shaped carpogonial branches. Both these features are, however, of little taxonomic significance, as recent studies in the genus have shown (Dixon & Price 1981), and do not justified the segregation of the two taxa at the level of species.

* ***Callithamnion corymbosum*** (J. E. Smith) Lyngbye

Saxicolous and epiphytic plants, the latter growing as epiphytes on *Stypocaulon scoparium*, and *Laurencia* spp.,were collected in the upper sublittoral zone. Thalli were red-brown, to 1 cm long, composed of a percurrent axis, to 450 µm broad, with radial arrangement of laterals (new axes and subdichotomously divided branches). The plants were attached to the substratum by means of basal multicellular rhizoids. Branches were provided with small isodiametric ultimate cells which occasionally bore terminal hair cells. Lateral axes developed from their basal cells descending rhizoidal filaments as cortication. Dioecious gametophytes and tetrasporophytes were collected in summer. Spermatangial mother cells were adaxially borne in aggregations on the proximal upper end of branch cells. Carpogonial plants developed up to 3 procarps along main and lateral axes. Tetrasporophytes developed tetrahedrally divided sporangia, 40 to 45 µm in diameter, and sporangial initials along the adaxial, upper end of branch cells.
Collections: A041280, K010782, K010882, SI240883, K210684, KC260784.
Widely distributed in cold- and warm-temperate regions including the Mediterranean, the West Indies (see Taylor 1960), the NE. Atlantic (type locality: British Isles; see Dixon & Price 1981:137), Scandinavia (see Rueness 1977), and the Black Sea (Zinova 1967).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), Limnos (Schiffner & Schussnig 1943), Cyclades (Coppejans 1974), Crete (Politis 1932), and Asia Minor (Güven & Öztig 1971).
Note: Isolates in culture demonstrated the phenomenon of mixed phases with tetrasporangia, spermatangia and procarps formed on the same specimens. Carposporophytes were, however, not observed.

* ***Callithamnion decompositum*** J. Agardh
= *Aglaothamnion tripinnatum* (C. Agardh) Feldmann-Mazoyer (1941, fig. 184) pro parte

A few plants were collected in the sublittoral zone as epiphytes on *Peyssonnelia* sp. Thalli were up to 1 cm long, composed of a central axis, to 120 µm broad, with alternate-distichous arrangement of lateral axes and branches. The plants were attached to the substratum by means of basal multicellular rhizoids. Branches and new axes developed from their basal cells 1 (2) adaxial branchlets and, in the lower part of the thallus, descending cortical filaments. Dioecious gametophytes and tetrasporophytes were collected in November and December. Spermatangial mother cells formed roundish aggregations, which occasionally covering the whole adaxial side of individual branch cells. Carpogonial plants developed up to 3 procarps along a main or lateral fertile axis, although only one carposporophyte was subapically formed per axis. Mature carposporophytes developed two opposite and subspherical gonimoblasts, to 100 µm in diameter. Tetrahedrally divided sporangia, to 70 µm in diameter, and sporangial initials, were adaxially borne on laterals (new axes, branches, or branchlets).
Collections: A201180, A041280.
Distributed in the Mediterranean, and the Atlantic coast of Europe (type locality: France; J. Agardh 1851:45) to the British Isles (see Dixon & Price 1981).
Aegean Sea: Sithonia (present study), Attica [Gerloff & Geissler 1974, as *A. tripinnatum*(Grateloup) Feldmann-Mazoyer].
Note: As appears in literature, Mediterranean plants with similar morphology have previously been referred to as *Aglaothamnion tripinnatum* (Grateloup) Feldmann-Mazoyer (1941:464), a species whose taxonomic status is obscure (see Dixon & Price 1981:134).

Callithamnion granulatum (Ducluzeau) C. Agardh

Reported from the Makedonian coast (Haritonidis & Tsekos 1975), and Attica (Politis 1936).

Callithamnion hookeri (Dillwyn) S. F. Gray
= *Aglaothamnion brodiaei* (Harvey in Hooker) Feldmann-Mazoyer
= *Aglaothamnion scopulorum*(C. Agardh) Feldmann-Mazoyer (Dixon & Price 1981:122, as to the basionyms)

Giaccone (1968a) reported the latter two taxa (as *A. brodiaei* Harv. and *A. scopulorum* G. Feldm.), from material collected in the S. Archipelagus.

Callithamnion tetragonum (Withering) S. F. Gray

Reported from the island of Thasos (Haritonidis & Tsekos 1974, as *C. tetragonum* Harv.).

SEIROSPORA Harvey

Seirospora seirosperma (Harvey) Dixon (1964:63)
= *Callithamnion seirospermum* (Harvey) Harvey
= *Seirospora griffithsiana* Harvey

Reported from the Makedonian coast (Haritonidis & Tsekos 1975), the N. Sporades (Diannelidis 1950, as *S. griffithsiana*) and the island of Simi (Hauck 1889:176, as *C. seirospermum* Griff.).

* ***Seirospora*** sp.

Plants were collected in the upper sublittoral zone as epiphytes on *Stypocaulon scoparium* and bryozoans. Thalli were bright red to brownish, to 1 cm long, composed of a percurrent axis, to 300 µm broad, with radial to distichous-alternate arrangement of lateral axes and branches. They were attached to the substratum by means of basal multicellular rhizoids. Axial cells near the thallus base were up to 160 µm long and 200 µm broad, whereas in the middle of the main axis up to 220 µm long and 100 µm broad. Vigorous specimens developed a cortex in form of uniseriate, rarely ramified, descending filaments produced from basal and contiguous cells of the lateral axes and branches. Ultimate branchlets were usually curved and occasionally provided with terminal hair cells. Dioecious gametangial plants with carposporophytes were collected in summer; tetrasporophytes between May and August; and some bisporangial plants in December and November. Spermatangia were developed in whorls around 4- to 6-celled, curved, and simple or divided branchlets, that occurred on the proximal adaxial end of branch cells. Carpogonial plants formed up to 3 procarps and/or gonimoblasts along a fertile axis. True procarps, characterized by a 4-celled carpogonial branch of *C. corymbosum*-type and a trichogyne, were observed. Gonimoblasts were developed in opposite pairs from pericentral cells, and were composed of subdichotomously branched moniliform chains of carposporangia, with individual sporangia up to 40 µm in diameter. Tetrahedrally divided, subspherical tetrasporangia, to 50 µm in diameter, were borne singly on the proximal adaxial end of branch cells.
Collections: A171180, A041280, A100881, K010882, K210684, D260784.
Note: Procarps and gonimoblasts in the Aegean plants were in good agreement with those of *S. seirosperma*, as described and illustrated by Dixon (1971, figs 1 to 7), although comparison with (seiro)sporangial material of this species from Plymouth and Kristineberg (GB) showed that it was distinguished by a larger thallus (to 4 cm long), terminal seirosporangia and a more elaborated ramification on the cortical filaments. The Aegean plants were also distinguished from Mediterranean congenerics, the latter as interpreted in literature (Feldmann-Mazoyer 1941, Feldmann 1943, Dixon 1971), whereas comparison with the type material of *Seirospora*

occidentalis Børgesen (1909:14, figs 8, 9; type locality: Virgin Islands) (C) showed apparent differences in the morphology of the reproductive organs.

CERAMIAEAE Schmitz

CENTROCERAS Kützing

Centroceras clavulatum (C. Agardh) Montagne

Reported from the island of Thasos (Haritonidis & Tsekos 1974).

CERAMIUM Roth

* ***Ceramium bertholdii*** Funk

Tetrasporophytes were collected in the sublittoral zone (20 to 30 m depth) as epiphytes on *Dictyota dichotoma*. Thalli were a few mm long, composed of subdichotomously branched axes with straight or slightly curved apices, characteristically provided with swollen apical parts. Axial cells near the base of the thallus were 45 to 90 µm in diameter and 140 to 160 µm long, provided with 5 pericentral cells. Each pericentral cell cut off one or two acropetal filaments, composed of one or two cells, 8 to 16 µm in diameter, and occasionally one basipetal cell. Axial cells along the apical parts of the thallus were progressively enlarged, to 300 µm in diameter, tapering to an acute apex with 3 or 4 conspicuously smaller cells. At the same time the number of pericentral cells increased to 8, and the cortication became more elaborate, composed of two acropetal and two basipetal filaments forming strictly limited nodes, to 170 µm long and 400 µm broad.
Irregularly divided tetrasporangia or bisporangia, to 40 µm in diameter, were immersed in the apical nodes.
Collections: SR180685, KC300784.
Endemic in the Mediterranean (type locality: Gulf of Naples; Funk 1922:239, tab. 5, fig. 14).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975).

* ***Ceramium ciliatum*** (Ellis) Ducluzeau
= *Ceramium ciliatum* var. *robustum* (J. Agardh) Mazoyer (see Dixon 1962:252)

Sporadic plants were collected in the sublittoral zone as epiphytes on diverse algae, whereas dense populations were met with at sheltered habitats in the littoral zone in early spring. Thalli were red-yellowish, to 2 cm long, composed of subdichotomously branched axes, to 260 µm in diameter, with curved apices. Each axial cell developed six to eight pericentral cells,which gave rise to a dense and strictly limited nodal cortication, to 200 µm long and 280 µm broad, composed of ascending and descending filaments of about equal length. Spines, composed of 2 to 6 cells, were developed in whorls from the pericentral cells. The plants were attached to the substratum by means of multicellular rhizoids, to 24 µm in diameter, produced from the nodes.
Collections: OI090680, A101081, A250881, K010882, K170386.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic (type locality: British Isles; Ellis 1768:425, tab. 18, figs H, h, as *Conferva*) between the Canaries (Børgesen 1930) and S. Norway (see Rueness 1977).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978), Pagasitikos Gulf (Diannelidis 1935), N. Sporades (Schiffner & Schussnig 1943), Crete and Attica (Politis 1932, 1936), Cyclades (Coppejans 1974), and Asia Minor (Güven & Öztig 1971, as var. *robustum*). Variety *echinatum* Hauck was reported from the Gulf of Thessaloniki (Haritonidis 1978) and Lesbos (Haritonidis & Tsekos 1974).

* ***Ceramium cinnabarinum*** (J. Agardh) Hauck
= *Centroceras cinnabarinum* Grateloup ex J. Agardh
=? *Centroceras pignattii* Giaccone

Infertile and tetrasporic plants were commonly met with in the sublittoral zone as epiphytes on *Halimeda tuna*, and species of *Peyssonnelia*, *Codium*, and *Amphiroa*. Thalli were reddish to brownish, to 1.5 cm long, composed of prostrate and erect axes, to 120 µm in diameter, subdichotomously ramified and provided with numerous adventitious axes. They were attached to the substratum by means of unicellular rhizoidal outgrowths, to 20 µm broad, with terminal digitate pads. Apices of axes were straight to slightly curved. Axial cells cut off 6 to 8 pericentral cells, each giving rise to two acropetal and two basipetal cells. Acropetal cells further cut off up to two ascending and two descending cells, whereas basipetal cells usually developed one descending, 2- to 10-celled, filament and occasionally one or two ascending cells. Nodal cortication completely covered the axial cells. Tetrasporophytes, collected in June, August and October, developed tetrahedrally divided sporangia, 35 to 50 µm in diameter, borne in swollen, stichidia-like branches. Tetrasporangia were immersed in the cortical nodes, that formed up to 5 sporangia per segment at a time.
Collections: 0I200680, A290680, A201180, A041280, A110581, A081081, K010882, A040183, SI100684, A140684, KC010884.
Distributed in the Mediterranean (type locality) (Agardh 1851:148), and on the Atlantic coast of Iberia (Ardré *et al.* 1982).
Aegean Sea: Sithonia (present study), and Asia Minor [Güven & Öztig 1971, as *C. cinnabareum* (Grat.) Hauck].
Note: *Centroceras pignattii* was originally described by Giaccone (1968b:407, figs 11 to 19) to accommodate some infertile plants collected at Cape Lithinos (S. Crete) and Dia island (N. Crete) The species, which was later reported from eastern Sicily (Furnari & Scammacca 1970), was distinguished from *C. cinnabarinum* by irregular alternate and almost pinnate ramification, although neither of these characters is evident in the illustrations of the type material. Judging from these figures, that show bilateral ramification of adventitious axes, and later accounts on this taxon (Furnari & Scammacca 1970), *C. pignattii* appears to be a common form of *C. cinnabarinum.*

* ***Ceramium circinatum*** (Kützing) J. Agardh
=? *Ceramium ramulosum* Meneghini (cf. Preda 1908-09:103)

Infertile plants grew in the sublittoral zone as epiphytes on *Cystoseira* sp. and other macroalgae. Thalli were up to 2 cm long, composed of prostrate and erect axes, to 0.5 mm in diameter, with curved apices and subdichotomous ramification with a rich development of adventitious lateral axes. Axial cells bore 6 to 8 pericentral cells, each cutting off 2 acropetal and 2 (3) basipetal cells. Acropetal cells usually developed 2 ascending filaments and 2 descending cells, the latter with further acropetal development. Basipetal cells developed 2 short ascending filaments and 2 (3) long descending ones, the latter composed of up to 9 cells arranged in longitudinal series. In well developed axes, a dense secondary cortex of smaller cells was formed around the nodes, which generally extended downwards. Internodal space was insignificant in apical segments but prominent in the main thallus, being about half as long as the nodal cortication. The specimens were attached to the substratum by means of multicellular rhizoids provided with digitate pads.
Collections: OI090680, A081081, V100782, A140782, SI100684.
Distributed in the Mediterranean (type locality: Corsica; Kützing 1841:733, as *Hormoceras*), the Black Sea (see Celan & Serbanescu 1959), and on the Atlantic coast of Iberia (Gallardo *et al.* 1985) to Brittany (Feldmann 1954).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), Limnos and N. Sporades (Schiffner & Schussnig 1943, as var. *syntrophum* Kützing), Lesbos and Crete (Diannelidis 1950).
Note: This species has been considered as a doubtful member of the British marine flora (Parke

& Dixon 1976), and therefore its occurrence in Scandinavia seems doubtful too (cf. Jaasund 1965, Rueness 1977). Re-examination of Jaasund's (1965) plants from N. Norway showed that the record was based on a misidentification. *Ceramium ramulosum* was reported from the Cyclades (Schiffner & Schussnig 1943), and its relationship to *C. circinatum* requires confirmation.

* ***Ceramium codii*** (Richards) Mazoyer (1938:324)
= *Ceramothamnion adriaticum* Schiller

Infertile or sporangial plants grew as epiphytes on diverse macroalgae (e. g. *Codium vermilara*, *Peyssonnelia* sp., *Cutleria multifida*, and crustose corallines) in the sublittoral zone, to at least 20 m depth. Thalli were a few cm long, composed of prostrate and erect axes, subdichotomously ramified with more or less straight apices and adventitious lateral axes. Axial cells were 40 to 220 µm long and 25 to 85 µm broad, and developed 4 or 5 pericentral cells, which remained undivided, or cut off 1 or 2 cells acropetally and rarely 1 or 2 cells basipetally. In well developed nodes, acropetal cells were occasionally further divided, producing 1 or 2 cells (also acropetally). Multicellular rhizoids, 50 to 260 µm long, with digitate pads were borne from the nodes. Individuals with tetrahedrally divided sporangia, 40 to 45 µm in diameter, or bisporangia up to 35 µm in diameter, were collected in June, November and January. Both types of sporangia were laterally placed on the nodes, being partly surrounded by cortical filaments.
Collections: OI090680, A201180, A100581, A040183, SR180684.
Distributed in the Mediterranean, the N. Atlantic including the Bermuda Islands (type locality; Richards 1901:257, as *Ceramothamnion*), the Atlantic coast of Iberia (Gallardo *et al.* 1985) to the Swedish west coast, the Baltic (Heitzmanowna 1923), and the Indo-Pacific (Mauritius, Feldmann-Mazoyer 1952; Tanzania, Jaasund 1970; S. Japan, Itono 1972).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), Limnos and N. Sporades (Schiffner & Schussnig 1943, as *Ceramothamnion adriaticum*).
Note: This species is well characterized by its minute and sparsely corticated thallus. Yet, it might be confused with young plants of *C. strictum* or *C. bertholdii*. It is worth noting that the record from the Swedish west coast is based on a recent collection made in the summer of 1986 at Tjärnö (Bohuslän) (**GB**). The plants were infertile, to 2 cm long, and grew on pebbles entangled with *Antithamnion cruciatum* var. *scandinavicum* Athanasiadis.

* ***Ceramium diaphanum*** (Lightfoot) Roth
=? *Ceramium elegans* (Roth) Ducluzeau (see Price *et al.* 1986:56)

Infertile plants were encountered on drift specimens of seagrasses, whereas minute tetrasporophytes were collected in the sublittoral zone as epiphytes on *Jania rubens*. Thalli were up to 2 cm long, composed of subdichotomous axes and adventitious laterals, to 300 µm in diameter, with more or less curved apices. Axial cells cut off 6 to 8 pericentral cells, that in early stages developed a *C. strictum*-type of nodal cortication, and gradually formed a dense cortex extending more or less equally on both sides of the nodes. Cruciately or irregularly divided sporangia, 50 to 65 µm in diameter, embedded in the nodes, were observed in plants collected in June.
Collections: OI090680, S240882, NM220386, K020786.
Distributed in the Mediterranean, the NE. Atlantic (type locality: British Isles; see Dixon 1982:5) to Scandinavia (see Kylin 1944, Rueness 1977), and the Black Sea (see Celan & Serbanescu 1959, Zinova 1967).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975; Anagnostidis 1968), S. Archipelagus (Giaccone 1968a, as *C. diaphanum* Harv.), and Asia Minor (Güven & Öztig 1971). *C. elegans* was reported from the Makedonian coast (Haritonidis & Tsekos 1975, as *C. elegans* Ducl.) and Asia Minor (Güven & Öztig 1971, as *C. elegans* Ducl.).

Ceramium echionotum J. Agardh

Reported from the Thasos Island (Haritonidis & Tsekos 1974) and the Pagasitikos Gulf (Diannelidis 1935).

* ***Ceramium flaccidum*** (Kützing) Ardissone (Womersley 1978:234)
= *Ceramium gracillimum* Griffiths & Harvey

Infertile plants were commonly met with as epiphytes on *Stypocaulon scoparium*, and *Laurencia* spp. in the sublittoral zone. Thalli were up to 1 cm long, composed of erect axes, to 65 µm in diameter, with slightly curved apices and subdichotomous ramification, and attached to the substratum by means of unicellular rhizoids with digitate pads. Axial cells developed 4 pericentral cells with characteristic nodal cortication composed of two acropetal and one basipetal filaments. Internodal space was variable, being insignificant at the apices to 5 times the diameter of the nodes in the main thallus. Spiniform or clavate hair cells and gland cells were rarely observed on the nodes of some specimens.
Collections: A201180, NM271180, A041280, A100581, A140684, K020786.
Widely distributed in warm-temperate and tropical regions of both hemispheres; the Mediterranean, the NE. Atlantic to the British Isles (type locality; see Womersley 1978:234), the West Indies (see Taylor 1960), the Red Sea (see Papenfuss 1968), and the Indo-Pacific (Itono 1972; Womersley 1978).
Aegean Sea: Makedonian coast [Haritonidis & Tsekos 1975, as *C. gracillimum*(Kütz.) Griff.& Harv.], Thrake (Katsikopoulos 1939, as *C. gracillimum*), Attica (Politis 1936, as *C. gracillimum*), and S. Archipelagus (Giaccone 1968a, as *C. gracillimum* Harv.).

* ***Ceramium rubrum*** (Hudson) C. Agardh

Apparently absent on the southeastern coast of Sithonia. Plants with carposporophytes were found in the vicinity of Thessaloniki Gulf.
Cosmopolitan; widely distributed in the Mediterranean and the N. Atlantic.
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), N. Sporades (Diannelidis 1950, 1953), Crete (Politis 1932), S. Archipelagus (Giaccone 1968a, as *C. rubrum* Ag. var. *barbatum* J. Ag.), and Asia Minor (Güven & Öztig 1971).

* ***Ceramium strictum*** Harvey

Reported from the Makedonian coast (Haritonidis & Tsekos 1974, 1975), the Cyclades [Schiffner & Schussnig 1943, as *C. strictum* Grev. & Harv.; Nizamuddin & Lehnberg 1970, as *C. strictum* (Kützing) Harvey], Attica (Politis 1936, as *C. strictum* Grev.& Harv.), Crete (Schussnig 1943, as *C. strictum* Grev. & Harv.), and Asia Minor (Güven & Öztig 1971, as *C. strictum* Grev. & Harv.).
Note: There are still questions whether Harvey's (1846-51) *C. strictum* is identical with Kützing's (1841:735) *Gongroceras strictum* (see Price *et al.* 1986). Two distinct entities are here provisionally described under this name on the basis of comparison with material from the Swedish east coast and data from the literature.

Variety A

Plants were collected in the sublittoral zone as epiphytes on diverse algae and especially on *Amphiroa rigida*. Thalli were up to 2 cm long composed of prostrate and erect axes, 30 to 160 µm in diameter, with curved apices and subdichotomous main branching with plenty of adventitious lateral axes. The specimens were attached to their host by means of multicellular rhizoids with digitate pads. Axial cells cut off 4 to 6 pericentral cells, each giving rise to 2 (3) acropetal and 2 basipetal cells. In well developed vegetative segments, each acropetal cell

developed 2 or 3 ascending filaments, composed of 1 or 2 cells, whereas each basipetal cell cut off 1 ascending and then 1 or 2 descending filaments composed of 1 to 3 cells. Basipetal cells were generally larger than ultimate acropetal cells. The nodal cortication was more pronounced in the projecting tetrasporangial segments, whereas in slender axes the basipetal branching was reduced and occasionally totally absent. Hair cells and gland cells were observed only in one specimen. Irregularly or cruciately divided subspherical tetrasporangia, to 45 µm in diameter, were embedded in the nodes in plants collected in December. Pyriform parasporangial structures, to 130 µm long, occurred at the apices of tetrasporangial or vegetative branches.
Collections: OI200680, A201180, A041280, K010882, A140684, K210684.
Note: The Aegean plants were in good agreement with *Ceramium tenerrimum* (Martens) Okamura var. *brevizonatum* (Petersen) Mazoyer as illustrated by Coppejans (1983, pls 143 to 146) from material collected on the Mediterranean coast of France, although apparently different from the type specimen of the basionym of this taxon, *Ceramium brevizonatum* Petersen (1918:14, figs 8 and 9, type locality: Algiers harbour and Mentona harbour) (C). The type material of this species comprises a folder labelled "St. 48 Alger leg. P" and a single slide preparation labelled "Original Middelhavet *Ceramium brevizonatum* H. E. P.". The algal fragment on the slide belongs to an infertile species of *Ceramium* with curved apices, 5 or 6 pericentral cells per axial cell, and nodal cortication. In well developed segments, individual pericentral cells cut off two acropetal and occasionally a single 1- or 2-celled filament laterally, whereas basipetal ramification is not evident in the fragment. The acropetal cells may be divided once producing 1- or 2-celled filaments. As appears from the type specimen, *C. brevizonatum* is characterized by strictly reduced basipetal cortication and clearly differs from the Aegean plants, although its relationship to other species of *Ceramium* with similar cortical branching in the nodes (e. g. *C. macilentum* J. Agardh; see Womersley 1978) requires further investigation. Compared to Levring's (1940) specimens of *C. strictum* from the Swedish east coast, the Aegean plants were in good agreement as regards the branching pattern on the young nodes, although in older segments the Swedish plants were distinguished by urceolate axial cells with pronounced acropetal cortication [features ascribed to *C. tenuicorne* (Kützing) Waern; see Rueness 1978].

Variety B

Tetrasporophytes and dioecious gametophytes, growing in the upper sublittoral zone as epiphytes on *Laurencia* spp. and seagrasses, were distinguished from the preceding variety by the following features. Thalli were mainly erect with axes provided with straight apices and vigorous basal rhizoids. The nodal cortication was more pronounced, as acropetal cells usually cut off 1 (2) additional descending filaments composed of 1 or 2 cells. Gametangial plants developed terminal spermatangia around the nodes, or carposporophytes surrounded by 3 to 5 lateral, straight branches. Subspherical tetrasporangia, to 50 µm in diameter, were embedded in the nodes, which were usually projected. The basipetal cortication of the tetrasporangial segments was occasionally reduced or totally absent.
Collections: K010882, K290783, Iraclion 080477 (leg. T. Wennberg).

* ***Ceramium tenuissimum*** (Roth) Areschoug

Gametangial and tetrasporangial plants grew in the upper sublittoral on *Laurencia* sp. and *Rytiphloea tinctoria*. Thalli were reddish, to 3 cm long, composed of subdichotomously divided axes with curved apices and projecting cortical nodes. They were attached to the substratum by means of basal multicellular rhizoids developed from cortical or pericentral cells. Axial cells gave rise to 6 to 9 pericentral cells, each cutting off 2 acropetal and 2 basipetal cells. In well developed nodes, acropetal cells further developed ascending filaments, which were subdichotomously branched to the third-order with elongate ultimate cells; basipetal cells were subdichotomously or trichotomously branched giving rise to 1 (2) descending 1- or 2-celled filaments with rectangular cells and one ascending filament of 1 or 2 cells. Basipetal cells were generally larger than acropetal cells. Gland and hair cells occurred sporadically on the nodes in a

few specimens. Irregularly divided subspherical sporangia, 50 to 60 µm in diameter, developed laterally on the projecting nodes, whereas spermatangia were terminally borne covering the cortex.
Collections: NI200680, A290680, K100782, K010882, Iraclion 080477 (leg. T. Wennberg)
Distributed in the Mediterranean, the Bermuda Islands (Collins & Hervey 1917), N. Carolina (Searles & Schneider 1978), the NE. Atlantic to Scandinavia (see Rueness 1977), and the Black Sea (Zinova 1967).
Aegean Sea: Makedonian coast [Haritonidis & Tsekos 1975, Anagnostidis 1968; as *C. tenuissimum* (Lyngb.) J. Ag.], Pagasitikos Gulf and N. Sporades [Diannelidis 1948, 1950, 1953, as *C. tenuissimum* (Lyngb.) J. Ag.], Cyclades [Nizamuddin & Lehnberg 1970, as *C. tenuissimum* (Lyngb.) J. Ag.], Crete (present study), Rhodes [Diannelidis *et al.* 1977, as *C. tenuissimum* (Lyngb.) Ag.], and S. Archipelagus (Giaccone 1968a, as *C. tenuissimum* J. Ag.).
Note: Compared to specimens from the Swedish west coast, the Aegean plants were distinguished by a more pronounced nodal cortication and rare development of gland cells. The basionym of this species is ascribed to Roth's (1806:156) *C. diaphana* var.*tenuissimum*, although both the origin and the status of this taxon is unknown (Lucas 1953:316). Moreover, the binomial *C. tenuissimum* was first applied by Bonnemaison (1828:132) and therefore antedates Areschoug's combination which is illegitimate (Silva 1983).

Excluded species

Ceramium deslongchampii Chauvin

Originally described from the coast of Calvados (Duby 1830:967) and later widely reported in the British Isles and southern Scandinavia (Harvey 1846-51, Newton 1931, Rosenvinge 1923-24), this species was omitted from the latest version of the check-list of British marine algae (Parke & Dixon 1976). Recent Mediterranean records are not known, except the single record from Asia Minor (Güven & Öztig 1971) that should be regarded as doubtful.

Ceramium flabelligerum J. Agardh

The single record from the Makedonian coast (Haritonidis & Tsekos 1975) is doubtful and probably based on a misidentification, since this species is not known to occur elsewhere in the Mediterranean (see Dixon 1959).

Ceramium hellenicum Giaccone

This species is only known from Giaccone's (1968b:406, figs 2,3) original description which is based on material from "Nautilus reef" (Kithira channel; 30 m depth). According to Giaccone (1968b:398), *C. hellenicum* is most closely related to *C. echionotum*, from which can be distinguished by the development of unicellular, not thorny, rhizoidal hairs in the cortex.

Ceramium nodiferum (Kützing) Schiffner & Schussnig

This taxon was reported from the N. Sporades and Limnos by Schiffner & Schussnig (1943) based on Kützing's (1849:678) *Congroceras nodiferum*. The proposed combination is, however, illegitimate being a later homonym of Agardh's *C. nodiferum* which is dated from 1876. As regards the basionym *Congroceras nodiferum*, it should be mentioned that in the original description Kützing cited "*Ceramium nodosum* Harvey" as a synonym, which, together with *Hormoceras nodosum* Kützing (1841:732), are regarded as taxonomic synonyms of *C. tenuissimum* (see Lucas 1953:324; De Toni 1903: 1450).

Ceramium tenerrimum (Martens) Okamura

Originally described from the Pacific coast of Asia (Martens 1866:146, pl. VIII, fig. 2, as *Hormoceras*), this species was later reported in the Mediterranean by Mazoyer (1937). The Mediterranean record was, however, questioned by Womersley (1978:234) who noticed that the plants illustrated by Feldmann-Mazoyer (1941, fig. 107) were distinguished from Pacific specimens referred to *C. tenerrimum* by Itono (1977). The single record of this taxon from the Makedonian coast [Anagnostidis 1968, as *C. tenerrimum* (Mertens) Okamura] is, therefore, doubtful too, being probably based on Mazoyer's concept.

COMPSOTHAMNIEAE Schmitz

COMPSOTHAMNION (Nägeli) Schmitz

* ***Compsothamnion thuyoides*** (J. E. Smith) Schmitz

A sporangial plant was found as an epiphyte in the sublittoral zone. Its thallus was a few mm long, composed of a percurrent main axis with alternate-distichous arrangement of lateral axes and branches from each axial cell. Sporangial initials were terminally borne on adaxial branches or branchlets of first- or second-order.
Collections: A100581.
Distributed in the Mediterranean and the NE. Atlantic between Madeira (Levring 1974) and S. Scandinavia (see Rueness 1977).
Aegean Sea: Sithonia (present study) and Attica (Gerloff & Geissler 1974).

PLEONOSPORIUM (Nägeli) Nägeli ex Hauck

* ***Pleonosporium borreri*** (J. E. Smith) Nägeli ex Hauck

Plants grew in the upper sublittoral zone as epiphytes on *Halimeda tuna* and *Corallina elongata*. Thalli were reddish, to 1 cm long, composed of a percurrent main axis with alternate-distichous branching restricted to the apices. Laterals produced from their basal cells descending rhizoidal filaments, which anastomosed with axial cells. Individuals, with sporangial initials developed on the proximal end of basal cells of laterals, were collected in June.
Collections: A201180, K010882, SI240883, A230684.
Distributed in the Mediterranean and the NE. Atlantic between Madeira (Levring 1974) and the British Isles (see Parke & Dixon 1976).
Aegean Sea: Sithonia (present study).

CROUANIEAE Schmitz

CROUANIA J. Agardh

* ***Crouania attenuata*** (C. Agardh) J. Agardh

Infertile and tetrasporic plants were collected in the sublittoral zone (to at least 30 m depth) as epiphytes on diverse macroalgae and especially on *Stypocaulon scoparium*. Thalli were up to 2.5 cm long, composed of main and lateral axes. Axial cells cut off three, sub-equal whorl-branches with isodiametric and deeply pigmented basal cells that occasionally developed multicellular rhizoids as holdfasts. Whorl-branches were up to 170 µm long, usually divided up to the fourth-order, and composed of elongate cells, gradually diminishing in breadth and tapering to spiniform ultimate cells. Individuals with tetrahedrally divided sporangia were collected in November and December. Mature tetrasporangia were subspherical, 40 to 50 µm in diameter, and singly borne on the basal cells of the whorl-branches.
Collections: A061180, A041280, A210581, SI100684, A230684, SR200784, PI020884.

Distributed in the Mediterranean, the N. Atlantic (type locality: "in mari Atlantico", Agardh 1824:51; as *Mesogloia*) to the British Isles (see Parke & Dixon 1976) and N. America (Harvey 1851-58), the West Indies (Børgesen 1915-20), the Red Sea (see Papenfuss 1968), and the Indian Ocean (Børgesen 1945, Wollaston 1984).
Aegean Sea: Sithonia (present study), N. Sporades and Limnos [Schiffner & Schussnig 1943, as *C. attenuata* (Bonnem.) J. Ag.], and S. Archipelagus (Giaccone 1968a, as *C. attenuata* J. Ag.).
Note: Isolates (A100581) growing in laboratory cultures [15 ± 2 ° C, 14:8 (day: night)] for over a year maintained their vegetative growth without development of reproductive organs.

* ***Crouania francisci*** Cormaci, Furnari & Scammacca

Reported from the Sithonia peninsula (Athanasiadis 1985a). The species has also been recorded outside the Mediterranean from the coast of Natal (S. Africa) (Norris 1986).

GULSONIA Harvey

* ***Gulsonia nodulosa*** (Ercegovic) J. Feldmann & G. Feldmann

Saxicolous and epiphytic plants, the latter growing on crustose algae, were commonly met with in the sublittoral zone (6 to 30 m depth). Thalli were red-brown, to 20 cm long, composed of a percurrent main axis with radial and irregular arrangement of lateral axes, attached to the substratum by means of a single basal holdfast. Axial cells cut off 4 sub-equal whorl-branches, trichotomously and subdichotomously branched to the seventh-order, and developed a dense cortication around the axes by means of rhizoidal descending outgrowths from their basal cells. Gametophytes bore procarps and young carposporophytes on the basal cells of whorl-branches close to the apices of lateral axes. Spermatangial plants were not seen. Sporophytes with subspherical monosporangia (ca 65 µm in diameter), subovate bisporangia (ca 85 µm long), spherical bisporangia (ca 70 µm in diameter), or tetrahedrally divided tetrasporangia (ca 100 µm in diameter) (each sporangium type developed on separate individuals), were collected in summer. Sporangial structures were developed on the whorl-branches on branch cells of the second- or third-order.
Collections: A230684, SI240684, KI100784, SR150784.
Endemic in the Mediterranean.
Aegean : Sithonia (present study).
Note: This common Mediterranean alga has long been known under various synonyms, such as *Crouania annulata* Berthold, *Crouaniopsis annulata* (Berthold) J. Feldmann & G. Feldmann, *Dudresnaya nodulosa* Ercegovic, and *Gulsonia mediterranea* Kylin. Moreover, it might be identical with Zanardini's (1841, 173, pl. VII, fig. 3) *Callithamnion nodulosum* described from material collected in the Adriatic. *G. nodulosa* is closely related to the generitype, *G. annulata* Harvey, known from southern Australia, and a comparative study showed two main differences in their morphology: the shape and size of the ultimate cells of the whorl-branches, which are subovate and broader in the generitype (14 to 26 µm long and ca 12 µm broad), but elongate to spiniform in *G. nodulosa* (20 to 36 µm long and ca 6 µm broad); and the type of sporangia which are variously divided in *G. nodulosa* (a feature also suggesting peculiarities in its life history). Gland cells were not observed in either of the species (cf. Wollaston & Womersley 1959). The material of *G. annulata*, which kindly provided by Dr. E. Wollaston, was collected from the drift at Pennington Bay, Kangaroo Island, in February of 1956.
It is worth noting that *G. nodulosa* was observed for the first time in the summer of 1984 at several localities, some of which had been monitored since May 1980. On the thallus of some plants an unidentified species of *Streblonema* was observed.

PSEUDOCROUANIA Funk

Pseudocrouania ischiana Funk

Reported from the Saronikos Gulf (Diapoulis & Verlaque 1981).

GRIFFITHSIEAE Schmitz

ANOTRICHIUM Nägeli

* ***Anotrichium barbatum*** (C. Agardh) Nägeli
= *Griffithsia barbata* C. Agardh

A few plants were encountered in the sublittoral zone as epiphytes. Thalli were up to 7 mm long, composed of a main axis subdichotomously divided with cylindrical cells, to 560 µm long and 180 µm broad. Individuals bore on the same axis cruciately divided tetrasporangia, 40 to 47 µm in diameter, and carpogonial branches. The former were developed on the basal cells of trichoblasts, and the latter (two in number) subapically.
Collections: A041280.
Distributed in the Mediterranean, the NE. Atlantic between the Canaries (Børgesen 1930) and the British Isles (see Parke & Dixon 1976), and the West Indies (Børgesen 1915-20).
Aegean Sea: Makedonian coast [Haritonidis & Tsekos 1975, as *G. barbata* (J. E. Smith) C. Ag.], Attica [Politis 1936, as *G. barbata* (J. E. Smith) C. Ag.], Rhodes [Diannelidis *et al.* 1977, as *G. barbata* (J. E. Smith) C. Ag.] and S. Archipelagus (Giaccone 1968a).

Anotrichium furcellatum (J. Agardh) Baldock
= *Neomonospora furcellata* (J. Agardh) G. Feldmann & Meslin

Tetrasporophytes have been reported from the Gulf of Thessaloniki (Tsekos & Haritonidis 1971, as *Neomonospora*), while further records (as *Neomonospora*) have been made from the Makedonian coast (Haritonidis & Tsekos 1975), the Thasos Island (Haritonidis & Tsekos 1974), and the S. Archipelagus (Giaccone 1968a, as *N. furcellata* G. Feldm. & Mesl.).

Anotrichium tenue (C. Agardh) Nägeli
= *Griffithsia tenuis* C. Agardh

Reported from Rhodes (Reinbold 1898, as *Griffithsia*).

BORNETIA Thuret

Bornetia secundiflora (J. Agardh) Thuret

Reported from the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978).

GRIFFITHSIA C. Agardh

Griffithsia flosculosa (Ellis) Batters
= *Griffithsia setacea* C. Agardh

Reported from the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978) and the islands of Thasos and Lesbos [Haritonidis & Tsekos 1974, as *G. setacea* (Ellis) Ag.]
Note: Agardh's (1828:129) *G. setacea* was apparently based on Ellis' (1768) *Conferva flosculosa.*

* ***Griffithsia opuntioides*** J. Agardh

Saxicolous plants grew in distinct patches, 4 or 5 cm in extent, in shaded, sheltered habitats in the upper sublittoral zone. Thalli were bright red, to 2.5 cm long, composed of regularly subdichotomous main axes with moniliform cells, to 1.6 mm long and to 420 µm broad, gradually diminishing in length towards the apex. Apical cells were subspherical and usually less than 300 µm in diameter.
Collections: K210684.
Distributed in the Mediterranean (type locality: "Liburnia, Amalfi, Nizza"; Agardh 1842:76), Madeira (Levring 1974), and on the Atlantic coast of Iberia (Gallardo *et al.* 1985).
Aegean Sea: Sithonia (present study), Crete and Attica (Politis 1932, 1936).

* ***Griffithsia phyllamphora*** J. Agardh

This species was recently reported as new to the marine flora of Greece, on the basis of infertile material collected at Sithonia (Athanasiadis 1985a).

MONOSPORUS Solier

* ***Monosporus pedicillatus*** (J. E. Smith) Solier in Castagne

Plants grew in the sublittoral zone as epiphytes on diverse macroalgae. Thalli were reddish to red-brown, to 1 cm long, composed of regularly subdichotomous main axes and lateral branches. Axial cells were more or less isodiametric up to 270 µm long at the thallus base, becoming cylindrical up to 700 µm long and 200 µm broad in the middle of the thallus, whereas ultimate cells of the lateral branches were 450 to 900 µm long and 25 to 150 µm broad. Multicellular rhizoids, to 5 mm long, developed from axial cells, and were occasionally branched anastomosing with other vegetative cells of the thallus. Individuals bore pedicellate or sessile, elliptical propagules, to 160 µm long, on the proximal apical end of branch cells.
Collections: A200680, A041280, K010882, KI290783, K210684.
Distributed in the Mediterranean, and the NE. Atlantic between the Canaries (Børgesen 1930) and the British Isles (see Parke & Dixon 1976).
Aegean Sea: Sithonia (present study) and Limnos (Schiffner & Schussnig 1943, as *Monospora*).

SPERMOTHAMNIEAE Schmitz

LEJOLISIA Bornet

* ***Lejolisia mediterranea*** Bornet

Plants grew on *Halimeda tuna*, *Corallina elongata* and bryozoans at semi-exposed habitats in the upper sublittoral zone. Thalli were a few mm long, composed of prostrate and erect axes, to 1.2 mm long, attached to the substratum by means of unicellular rhizoids with digitate pads. Cells of the prostrate axes were cylindrical, to 140 µm long and 30 µm broad, each giving rise to one or two erect axes composed of cells up to 140 µm long and 15 µm broad. Individuals with carposporophytes were collected in May. Gonimoblasts were apically borne on short, 2- to 4-celled branches, enclosed in subspherical pericarps, to 100 µm in diameter, provided with a gelatinous cover.
Collections: A100581, K010882, KC260784.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the Indian Ocean (Børgesen 1952).
Aegean Sea: Sithonia (present study).

PTILOTHAMNION Thuret in Le Jolis

* ***Ptilothamnion pluma*** (Dillwyn) Thuret in Le Jolis

Saxicolous and epiphytic plants, the latter growing on crustose and articulated corallines, were found in the sublittoral zone. Thalli were up to 5 mm long, composed of prostrate and erect axes, to 35 µm in diameter, irregularly branched, and attached to the substratum by means of unicellular rhizoids, with digitate pads, developed from the middle part of cells of the prostrate axes. Axial cells of the erect axes were up to 50 µm long and 25 µm broad, usually provided with a pair of opposite, unequal, and distichously arranged simple or bifid whorl-branches, variously elongated and up to 16 µm broad. Whorl-branches were occasionally converted into new axes. Individuals with tetrahedrally divided sporangia and procarps on the same thallus were collected in January. Tetrasporangia were subspherical, to 65 µm long, sessile, and adaxially or abaxially borne on simple branches. Carpogonial branches were 4-celled and occurred subapically.
Collections: A041280, S010882, A040183, A140684, SI160784.
Distributed in the Mediterranean, the Red Sea (see Papenfuss 1968), and the NE. Atlantic to the British Isles (see Parke & Dixon 1976).
Aegean Sea: Sithonia (Athanasiadis 1985a).
Note: The phenomenon of mixed phases is reported for the first time in this species, which exhibits considerable form variation, especially in the arrangement and development of the whorl-branches.

SPERMOTHAMNION Areschoug

* ***Spermothamnion flabellatum*** Bornet

Infertile and tetrasporic plants grew in the sublittoral zone as epiphytes on diverse macroalgae (especially on species of *Codium*) and bryozoans. Thalli were up to 1 cm long, composed of prostrate axes with erect subdichotomously ramified branches, to the tenth-order, cut off from the proximal, apical end of axial cells. They were attached to the substratum by means of unicellular rhizoids, with digitate pads, developed from the proximal, basal end of the cells of the prostrate axes. Axial cells were up to 480 µm long and 140 µm broad. Branch cells were generally shorter, to 430 µm long and 120 µm broad, gradually diminishing in breadth towards the apices, with ultimate cells to 10 µm thick. Tetrahedrally divided sporangia and sporangial initials were successively developed on short, to 7-celled, laterals, which were curved and subdichotomously divided. Mature tetrasporangia were sessile and subspherical, to 60 µm in diameter.
Collections: A201180, A041280, A040183.
Distributed in the Mediterranean (type locality: Antibes; Bornet & Thuret 1876:24) and on the Atlantic coast of Iberia (Gallardo *et al.* 1985).
Aegean Sea: Sithonia (present study).

Spermothamnion irregulare (J. Agardh) Ardissone

Reported from the N. Sporades (Schiffner & Schussnig 1943, on *Dasycladus*).

* ***Spermothamnion repens*** (Dillwyn) Rosenvinge

Plants grew in the sublittoral zone on macroalgae or as understory species, usually in association with species of *Dasya*, *Herposiphonia*, and *Jania rubens*. Thalli were a few mm long, composed of prostrate axes, to 45 µm in diameter, with unilateral or opposite arrangement of new axes and branches. Unicellular rhizoids, provided with digitate pads, were sporadically developed from the proximal basal end of axial cells. Individuals with tetrahedrally divided sporangia were collected in June, August, November and December. Monoecious

gametophytes with spermatangia, procarps and carposporophytes were obtained from drift material of *Sargassum acinarium* in summer. Mature tetrasporangia were up to 45 μm in diameter, borne on short, curved laterals.
Collections: A061180, A041280, K010882, K210684, K170386.
Distributed in the Mediterranean, on the Atlantic coast of Europe to Scandinavia (see Rueness 1977), the West Indies (see Taylor 1960), and N. Carolina (Searles & Schneider 1978).
Aegean Sea: Sithonia (present study).

SPHONDYLOTHAMNION Nägeli

* ***Sphondylothamnion multifidum*** (Hudson) Nägeli

Plants were sporadically found in the sublittoral zone attached to rocks and entangled with other ceramiaceous algae. Thalli were a few cm long, composed of irregularly branched, prostrate and erect axes, with 2 to 4, subdichotomously or trichotomously divided whorl-branches developed from each axial cell. Thallus branching was distichous along the apices with development of 1 or 2 transverse whorl-branches in the main thallus.
Collections: A100581, A040183, A140684.
Distributed in the Mediterranean and the NE. Atlantic (type locality: British Isles; see Dixon 1963) between Morocco (Gayral 1958) and the Swedish west coast (Waern 1961), including the Canaries (Børgesen 1930).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975).

SPYRIDIEAE Schmitz

SPYRIDIA Harvey

* ***Spyridia filamentosa*** (Wulfen) Harvey in Hooker

Saxicolous plants were commonly met with in semi-exposed localities in the upper sublittoral zone during late summer and autumn. Thalli were red-brown to yellow-red, to 15 cm long, composed of main and lateral axes provided with simple and uniseriate branches with a single, terminal, spiniform cell.
Collections: NM271180, A041280, NM191280, A180881, P210881, A140684, SC270684.
Distributed in the Mediterranean (type locality: Adriatic; Wulfen 1803:64, as *Fucus*), the West Indies (Børgesen 1915-20), N. Carolina (Searles & Schneider 1978), the NE. Atlantic to the British Isles (see Parke & Dixon 1976), the Red Sea (see Papenfuss 1968), and the Pacific (see Dawson 1962).
Aegean Sea: Makedonian coast (Politis 1925, 1953, Haritonidis & Tsekos 1975), Pagasitikos Gulf (Diannelidis 1935), Crete, Attica and Cyclades (Politis 1932, 1936, 1938), N. Sporades and Limnos (Schiffner & Schussnig 1943), and Rhodes (Reinbold 1898).

WRANGELIEAE Schmitz & Hauptfleisch

* ***Wrangelia penicillata*** (C. Agardh) C. Agardh

Saxicolous plants grew in dense populations at exposed and sheltered localities in the upper sublitoral zone, whereas single individuals, to 15 cm long, were collected even deeper in the sublittoral zone (6 m depth). Winter plants were red-brown becoming yellow-red or whitish in summer. Thalli were up to 5 (15) cm long, composed of a percurrent main axis with lateral arrangement of new axes. Each axial cell gave rise to 5 subdichotomously ramified whorl-branches, the basal cells of which produced descending rhizoidal filaments that formed a cortex. Individuals with gametangial or tetrasporangial structures were collected in November and December. Spermatangial and sporangial structures were both subspherical, to 65 μm in

diameter, and occurred subterminally on whorl-branches surrounded by involucral, 1- or 2-celled filaments.
Collections: NI200680, A171180, A041280, A100581, K010882, also observed at T.
Distributed in the Mediterranean (type locality: "Ad oras Italiae"; Agardh 1824:143), the West Indies (Børgesen 1915-20), and Madeira (Levring 1974).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), N. Sporades (Schiffner & Schussnig 1943, as *W. penicillata* Ag.), and Asia Minor (Güven & Öztig 1971).

DASYA C. Agardh

* ***Dasya baillouviana*** (Gmelin) Montagne
= *Dasya pedicellata* (C. Agardh) C. Agardh
= *Dasya elegans* (Martens) C. Agardh (Dixon & Irvine 1970:480)

A single infertile plant was found on drift material of *Sargassum acinarium* collected in summer. The thallus was up to 5 cm long, bearing species of *Audouinella* and *Choristocarpus tenellus* as epiphytes.
Collections: K020786 Drift.
Distributed in the Mediterranean (type locality) (see Dixon & Irvine 1970), on the Atlantic coast of Spain and the Canaries (see Børgesen 1930), the West Indies (Børgesen 1915-20), Florida (Taylor 1937) and the northern coast of Europe between Holland and southern Scandinavia (Koster 1952, Nygren 1970, Rueness 1977); also reported from the Black Sea (Zinova 1967) and the Pacific.
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975, as *D. pedicellata* C. Ag.), Pagasitikos Gulf (Diannelidis 1948, as *D. elegans*), Attica (Politis 1936, as *D. elegans*, from the drift), and islands of the S. Archipelagus (Giaccone 1968a, as *D. pedicellata* Ag.).

Dasya corallicola Funk

Reported from islands of the S. Archipelagus (Giaccone 1968a).

* ***Dasya corymbifera*** J. Agardh

Plants grew as epiphytes on diverse macroalgae in the sublittoral zone. Thalli were up to 2 cm long, composed of ecorticate, subdichotomous main axes with 5 pericentral cells, giving rise to uniseriate lateral branches, to 1.6 mm long, with subdichotomous and divaricate ramification. Branches were divided to the fourth-order, provided with elongate ultimate branchlets, to 1.1 mm long. Rhizoidal cortication developed from basal cells of lateral branches close to the thallus base. Tetrasporophytes were collected throughout the year, and spermatangial plants in summer. Spermatangial structures, to 150 µm long and to 40 µm broad, were terminally borne around intercalary cells of ultimate branchlets.
Stichidial branches were up to 480 µm long and 130 µm broad, and contained tetrahedrally divided subspherical sporangia, to 50 µm in diameter.
Collections: A201180, A041280, A100581, K010882, SI120784, K210684.
Distributed in the Mediterranean and the NE. Atlantic (type locality: Atlantic Spain; Agardh 1841:31) to the British Isles (see Parke & Dixon 1976).
Aegean Sea: Sithonia (present study), Attica (Politis 1936), N. Sporades (Diannelidis 1950, 1953), and Rhodes (Reinbold 1898).

* ***Dasya hutchinsiae*** Harvey in Hooker
= *Dasya arbuscula* (Dillwyn) C. Agardh pro parte (see Dixon 1960:309; 1964:72)
=? *Dasya rigidula* (Kützing) Ardissone
=? *Dasya squarrosa* (Kützing) Zanardini

Saxicolous and epiphytic plants, the latter growing on diverse macroalgae, were collected in the

sublittoral zone. Thalli were red-brown, bushy, to 10 cm long, composed of subdichotomous to irregularly ramified, corticate main axes with five pericentral cells, giving rise to lateral uniseriate branches, to 0.7 mm long, with subdichotomous-divaricate ramification, to the fifth-order. Ultimate branchlets were characteristically curved and composed of cells gradually diminishing in length and tapering to small conical cells.
Collections: A041280, SI240883, Iraclion 260983.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic between the Canaries (Børgesen 1930) and the British Isles (type locality; Hooker 1833:335).
Aegean Sea: Makedonian coast [Haritonidis & Tsekos 1975, as *D. arbuscula* (Dillw.) C. Ag.] and Attica (Gerloff & Geissler 1974).
Note: The plants from Sithonia were smaller (to 2 cm long) and provided with sparse cortication, restricted to the base of the fronds. They were, thus, in agreement with Kützing's (1864, band XIV, tab. 85) illustrations of *D. squarrosa* (= *Eupogonium squarrosum* Kütz.) and *D. rigidula* (= *Eupogonium rigidulum* Kütz.), which have previously been reported in the Aegean Sea as separate taxa, the former from the N. Sporades and the Cyclades (Schiffner & Schussnig 1943), and the latter from the Cyclades (Schiffner & Schussnig 1943, Coppejans 1974) and the N. Sporades (Diannelidis 1953).

* ***Dasya ocellata*** (Grateloup) Harvey in Hooker

Minute epiphytic plants, to 1 cm long, provided with immature stichidial branches, to 130 µm long and ca 30 µm broad, were collected in the sublittoral zone.
Collections: A041280.
Distributed in the Mediterranean and the NE. Atlantic between the Canaries (Børgesen 1930) and the British Isles (see Parke & Dixon 1976).
Aegean Sea: Sithonia (present study) and Cyclades (Coppejans 1974).

* ***Dasya punicea*** Meneghini in Zanardini

A few vegetative fragments were identified in samples from the sublittoral zone. They were dark red-brown, to 1 cm long, composed of a terete and densely corticate axis, to 580 µm thick, provided with uniseriate lateral branches to 1.8 mm long.
Collections: A041280.
Distributed in the Mediterranean (type locality: Adriatic; Zanardini 1841:168).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975).

DASYOPSIS Zanardini

Dasyopsis cervicornis (J. Agardh) Schmitz

Reported from islands of the S. Archipelagus (Huvé 1962a).

* ***Dasyopsis plana*** (C. Agardh) Zanardini

Infertile plants, to 20 cm long, were collected as epiphytes on crustose corallines in the sublittoral zone.
Collections: A041280, A201180, A140684.
Distributed in the Mediterranean (type locality: Adriatic; Agardh 1827:645, as *Dasia*) and the Canaries (see Børgesen 1930).
Aegean Sea: Sithonia (present study), Cyclades (Coppejans 1974), and S. Archipelagus (Giaccone 1968a, d, as *D. plana* Zan.; found at the channel of Kithira at 60 m depth).

* ***Dasyopsis spinella*** (C. Agardh) Zanardini

Infertile plants, to 5 cm long, were collected as epiphytes on crustose corallines in the

sublittoral zone (ca 10 m and deeper).
Collections: A100581, A140782, K010882, KI310783.
Endemic in the Mediterranean (type locality: Adriatic; Agardh 1827:645, as *Dasia*).
Aegean Sea: Sithonia (present study), Cyclades (Coppejans 1974), and islands of the S. Archipelagus (Giaccone 1968a, as *D. spinella* Zan.).

HETEROSIPHONIA Montagne

* *Heterosiphonia crispella* (C. Agardh) Wynne (1985b:87)
= *Heterosiphonia wurdemannii* (Bailey) Falkenberg

Minute, infertile specimens, to 1 cm long, were collected as epiphytes in the sublittoral zone.
Collections: A290680, A041280, S100882.
Distributed in the Mediterranean, Atlantic Spain (type locality: Cadiz; Agardh 1828:183, as *Callithamnion*), the West Indies (see Taylor 1960), the Canaries (Børgesen 1930), Madeira (Levring 1974) and the Salvage Islands (Weisscher 1983).

Aegean Sea: Sithonia (present study), Limnos, N. Sporades and Cyclades (Schiffner & Schussnig 1943, as *H. wurdemannii*).

Excluded species

Dasya elongata Sonder
Dasya villosa Harvey
Dasyopsis plumosa (Bailey & Harvey) Schmitz

The records of these three Pacific species from the S. Archipelagus (Giaccone 1968a; the last taxon as *D. plumosa* Schmitz) are doubtful, since these is no evidence of their occurrence in the Mediterranean (see De Toni 1903:1196; Parsons 1975; Kylin 1925).

DELESSERIACEAE Bory

ACROSORIUM Zanardini ex Kützing

* ***Acrosorium uncinatum*** (Turner) Kylin

Infertile plants were commonly found in the sublittoral zone as epiphytes on diverse macroalgae (e. g. *Stypocaulon scoparium*, *Phyllophora crispa*) and *Posidonia* rhizomes. Thalli were dark red to pinkish, to 3 cm long, composed of a membranose frond, to 2 mm broad, irregularly divided into more or less lanceolate blades with curved or blunt apices, and attached to the host by means of rhizoids developed from the margins. Fronds were monostromatic with distromatic parts restricted to the middle of the thallus, where several nerves composed of long-narrow cells occurred. Vegetative growth was restricted to the apices and along the margins with meristematic zones composed of cells, 6.5 to 15 (25) µm long. In the middle of the thallus, vegetative cells were 25 to 80 µm long.
Collections: OI090680, A181180, A201180, A041280, S100882, A140684.
Distributed in the Mediterranean, the Atlantic [Brazil (Taylor 1930), N. Carolina (see Searles & Schneider 1978), and between Morocco (Gayral 1958) and the British Isles (type locality; Turner 1808:151, as *Fucus laceratus* var. *uncinatus*), and the Pacific (see Dawson 1962).
Aegean Sea: Sithonia (present study).

APOGLOSSUM (J. Agardh) J. Agardh

* ***Apoglossum ruscifolium*** (Turner) J. Agardh

Infertile and spermatangial plants were collected in the sublittoral zone as epiphytes on *Posidonia* rhizomes and sponges. Thalli were reddish, to 1 cm long, composed of several ovate monostromatic branches (blades) with a polystromatic midrib arising from a terete and usually branched stipe. Gametangial plants with spermatangial sori formed along both sides of the midrib were collected in November and May.
Collections: A201180, A110581, SI100782.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), the S. Africa (Wynne 1984b), the N. Atlantic to Scandinavia (see Rueness 1977), and N. Carolina (see Searles & Schneider 1978) (type locality: British Isles; Turner 1808:30, as *Fucus*).
Aegean Sea: Sithonia (present study), Cyclades (Coppejans 1974), and S. Archipelagus (Giaccone 1968a, as *A. ruscifolium* J. Ag.).
Note: The plants from Sithonia were conspicuously smaller than the Atlantic counterparts, which may reach a length of 10 cm and even grow on rocks (Newton 1931).

ERYTHROGLOSSUM J. Agardh

* ***Erythroglossum sandrianum*** (Kützing) Kylin

This species is apparently rare on the coast of Sithonia where it occurs as an epiphyte on macroalgae in the sublittoral zone (Athanasiadis 1985a).
Additional collections: SR200784.

HYPOGLOSSUM Kützing

* ***Hypoglossum hypoglossoides*** (Stackhouse) Collins & Hervey
= *Hypoglossum woodwardii* Kützing (Wynne 1984a:85)

Plants were commonly met with in the sublittoral zone as epiphytes on diverse macroalgae (e. g. *Stypocaulon scoparium*, *Corallina elongata*, *Laurencia* sp., *Halimeda tuna*, and crustose corallines) and *Posidonia* rhizomes. Thalli were pinkish, to 3 cm long, composed of several lanceolate monostromatic fronds (blades) with distinct midribs, arising from a solid and usually branched, terete stipe. Growth was uniaxial with a conspicuous apical cell and a central axis, gradually converted into a thick midrib and giving rise to the membranose frond through bilateral development of second-order rows of cells with third-order abaxial rows reaching the margins. Rhizoidal outgrowths occurred from the margins. Plants with carposporophytes and tetrasporophytes were collected in November and December. Cystocarps, to 1 mm long, were developed on the midribs. Tetrahedrally divided sporangia, to 100 µm in diameter, were borne at intervals in round or elongated sori on each side of the midrib.
Collections: A181180, A201180, A041280, A040183, S100882, A140684.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the N. Atlantic (type locality: British Isles; see Wynne 1984a) to the Swedish west coast (Väderö Islands, leg. Åberg and Lunneryd.; GB), including the Bermuda Islands (Collins & Hervey 1917).
Aegean Sea: Sithonia (present study).
Note: The plants from Sithonia were much smaller than typical Atlantic specimens, which may reach a length of 20 cm and even grow on rocks (Newton 1931).

MYRIOGRAMME Kylin

* ***Myriogramme distromatica*** Boudouresque

This species, which is endemic in the Mediterranean, has recently been reported in the Aegean

Sea from infertile material collected at Sithonia (Athanasiadis 1985a).

* ***Myriogramme minuta*** Kylin

Plants were commonly met with in shaded habitats in the sublittoral zone, growing as epiphytes on diverse macroalgae. Thalli were dark red to brownish, to 1.5 cm long, composed of membranose, more or less palmate fronds (blades) with undulate margins, and arising from a terete and usually divided stipe up to 1 cm long. Young fronds were monostromatic, gradually becoming distromatic and tristromatic towards the base. Growth occurred at the apices and along the margins with meristematic zones composed of small cells, 6.5 to 13 µm long. Vegetative cells in the middle of the thallus were 30 to 50 µm long.
Carpogonial plants, with carposporophytes, and tetrasporophytes were collected in November. Procarps were numerous and scattered over the blade surface, although only three carposporophytes were simultaneously formed on the frond. Tetrahedrally divided sporangia, 45 to 60 µm in diameter, were borne in sori below the apices.
Collections: A201180, A041280, S100782, S100882, S100883, K290783, A140684.
Distributed in the Mediterranean (type locality: Naples, Kylin 1924:56, figs 44, 45), and the NE. Atlantic to Brittany (Magne 1957).
Aegean Sea: Sithonia (present study) and the Saronikos Gulf (Diapoulis & Verlaque 1981).

NITOPHYLLUM Greville

Nitophyllum confervaceum Meneghini
= *Arachnophyllum confervaceum* (Meneghini) Zanardini

Reported from the S.Archipelagus (Giaccone 1968a, as *Arachnophyllum confervaceum* Zan.).

* ***Nitophyllum punctatum*** (Stackhouse) Greville

Plants were collected in the sublittoral zone as epiphytes on diverse macroalgae. Thalli were pinkish, a few cm long, composed of monostromatic and subdichotomously branched fronds (blades), to 5 mm broad, arising from an inconspicuous, basal stipe. Meristematic cells along the margins were rectangular and 10 to 30 (50) µm long, whereas those in the middle of the thallus were polygonal and 40 to 80 (90) µm in diameter. Monoecious gametophytes, with reproductive structures scattered on both sides of the fronds, were collected in July and December. Spermatangia, ca 3 µm in diameter, were borne in groups forming patches to 300 µm long.
Collections: A081080, A041280, A140684, SI160784.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), the Red Sea (see Papenfuss 1968), and the NE. Atlantic between Morocco (Gayral 1958) and Scandinavia (see Rueness 1977), including Madeira (Levring 1974).
Aegean Sea: Sithonia (present study), Thasos Island (Haritonidis & Tsekos 1974), and S. Archipelagus (Giaccone 1968a, as *N. punctatum* Grev.).

RADICILINGUA Papenfuss

Radicilingua reptans (Kylin) Papenfuss

Reported from the Saronikos Gulf (Diapoulis & Verlaque 1981).

Excluded species

Delesseria Lamouroux

The single record of *Delesseria* in the Aegean Sea is based on Candargy's (1899) report from Lesbos and lacks any comments. However, as currently circumscribed, the genus does not occur in the eastern Mediterranean basin and it is most likely that Candargy's material actually belonged to an another member of the family Delesseriaceae.

Polyneura laciniata (Lightfoot) Dixon (1983)
= *Porphyra laciniata* (Lightfoot) C.Agardh

The binomial *Porphyra laciniata* has long been attributed to a species of *Porphyra* regarded by some authors as a synonym of *P. purpurea* or even of *P. umbilicalis* (Cormaci & Furnari 1979), but its basionym apparently belongs to a Delesseriaceae (Dixon 1983). In the Aegean Sea, *Porphyra laciniata* has been reported from the Makedonian coast (Haritonidis & Tsekos 1974, Haritonidis 1978) and Crete (Diannelidis 1950).

RHODOMELACEAE Areschoug

ACANTHOPHORA Lamouroux

Acanthophora najadiformis (Delile) Papenfuss

Reported as *A. delilei* Lamouroux (*nomen nudum*; see Papenfuss 1968:96) from the Makedonian coast (Anagnostidis 1968, Haritonidis & Tsekos 1975), the Pagasitikos Gulf (Diannelidis 1948), and Asia Minor (Güven & Öztig 1971).
Note: This species, which is widely distributed in the Pacific and the Red Sea, is regarded as an introduction to the Mediterranean after the opening of the Suez Canal in 1869 (Por 1978).

ALSIDIUM C. Agardh

* ***Alsidium corallinum*** C. Agardh

A single infertile plant was collected in a semi-exposed habitat in the upper sublittoral zone. The thallus was dark red, cartilaginous, ca 6 cm long, composed of a caespitose frond with several terete and irregularly ramified main axes, less than 1 mm broad, arising from a crustose holdfast up to 4 cm in extent. Transverse sections of branches showed a conspicuous central axis, to 120 µm in diameter, surrounded by six pericentral cells. Epidermic cells were polygonal, 20 to 50 µm long and 5 to 20 µm broad.
Collections: A041280.
Distributed in the Mediterranean (type locality: Trieste; Agardh 1827:15), the Black Sea (Zinova 1967), and the Canaries (see Price *et al.* 1986).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978).
Note: The record from Madeira (Levring 1974; Funchal, 12.07.69; **GB**) was found to be based on a species of *Polysiphonia*.

* ***Alsidium helminthochorton*** (La Tourrette) Kützing

Saxicolous plants grew in sheltered habitats in the littoral zone, entangled with species of *Lophosiphonia* and forming sand-binding turfs. Thalli were up to 2 cm long, composed of prostrate and erect terete main axes, to 0.4 mm in diameter, irregularly ramified.
Collections: K010882.
Endemic in the Mediterranean (see De Toni 1903).
Aegean Sea: Sithonia (present study).

BRONGNIARTELLA Bory

* ***Brongniartella byssoides*** (Goodenough & Woodward) Schmitz

Found as an epiphyte on drift material of *Sargassum acinarium* in summer. The associated epiphytic flora included *Polysiphonia elongata*, *Cutleria multifida*, and *Dudresnaya verticillata*, which suggests that the host grew in the deep sublittoral zone.
Collections: K200685.
Distributed in the Mediterranean and the NE. Atlantic (type locality: British Isles; see Parsons 1980) to Scandinavia (see Rueness 1977).
Aegean Sea: Sithonia (present study).

CHONDRIA C. Agardh

* ***Chondria coerulescens*** (J. Agardh) Falkenberg

Minute, slender specimens, to 1 cm long, grew as epiphytes on macroalgae and seagrasses in the sublittoral zone, to a depth of at least 8 m. Thalli were composed of a percurrent terete main frond, to 0.4 mm broad, provided with clavate lateral branches with concave apices, to 160 µm broad, and arising from a basal holdfast. Epidermic cells were 30 to 70 µm long and 20 to 30 µm broad on the lateral branches, and 25 to 90 µm long and 20 to 30 µm broad on the main frond (s. v.). Male individuals with membranose spermatangial structures surrounded by a series of vegetative cells, were collected in June.
Collections: A140782, A040183, A140684.
Distributed in the Mediterranean and the NE. Atlantic (type locality; Atlantic France; Agardh 1863:808, as *Chondriopsis*) to the British Isles.
Aegean Sea: Sithonia (present study).

* ***Chondria collinsiana*** Howe

A infertile specimen was found in the upper sublittoral zone (ca 1.5 m depth), attached to *Dasycladus vermicularis*. It was ca 1.5 cm long, composed of a terete main frond, to 0.5 mm in diameter, provided with a few lateral branches with concave apices and attenuate base, to 2 mm long and 0.45 mm broad. It was firmly attached to its host by means of a well developed crustose holdfast up to 2.3 mm in extent. Growth was uniaxial with a conspicuous central axis composed of cylindrical cells, 160 to 240 µm long and ca 50 µm broad, surrounded by five periaxial cells with prominent apical lenticular thickenings, clearly observable in surface view. Epidermic cells were roundish to elongate, 30 to 60 µm long and 22 to 35 µm broad on the lateral branches, and 65 to 120 µm long and 45 to 50 µm broad on the main frond (s. v.). Trichoblasts, to 1.2 mm long, were subapically borne on the branches, and were composed of cylindrical cells up to 240 µm long and 50 µm broad.
Collections: NI200680.
Distributed in the Aegean Sea, the West Indies (type locality: Bahamas; Howe 1920:568), Florida (see Taylor 1960; examined material from Spanish Harbour Key 27.xii. 75, col. & det. D. Kapraun; **GB**), the Red Sea (see Papenfuss 1968), and Tanzania (Jaasund 1976).
Aegean Sea: Sithonia (present study).
Note: *Chondria collinsiana* exhibits a unique combination of distinctive vegetative features and despite the limited material available, the present record should be regarded as valid. The species is here reported for the first time in the Mediterranean, although it is uncertain whether it represents a recent introduction or a rare alga of the Mediterranean flora.

* ***Chondria dasyphylla*** (Woodward) C. Agardh

Minute, infertile plants grew in the sublittoral zone as epiphytes on diverse macroalgae. Thalli

were up to 2 cm long, composed of a terete main frond, to 0.5 mm broad, provided with clavate lateral branches, to 0.4 mm broad, with concave apex and attenuate base. Epidermic cells were 40 to 110 µm long and 18 to 25 µm broad on the main frond, and 12 to 40 µm long and 12 to 20 µm broad on the branches (s. v.).
Collections: NI200680, A041280, A040183.
Widely distributed in tropical and temperate regions of the northern hemisphere, including the Mediterranean, the Black Sea (Zinova 1967), the N. Atlantic to Scandinavia (Kylin 1944), and the Indo-Pacific (Børgesen 1939, Hollenberg 1970).
Aegean Sea: Sithonia (present study), Crete (Schussnig 1943), and S. Archipelagus (Giaccone 1968a, as *C. dasyphylla* Ag.).

* ***Chondria polyrhiza*** Collins & Hervey

A single tetrasporophyte was collected in a sheltered habitat in the upper sublittoral zone. The thallus was prostrate, ca 5 mm long, composed of a terete and sparsely branched main frond, to 250 µm broad, with acute branch apices. It was attached to the substratum by means of one basal and numerous lateral, multicellular, rhizoidal holdfasts. The basal attachment was provided with a well developed pad, to 0.45 mm in extent. Epidermic cells were more or less rectangular, 60 to 110 µm long and 15 to 20 µm broad (s.v.). Tetrahedrally divided sporangia, 20 to 100 µm in diameter, were developed in stichidia-like, lateral branches, to 325 µm broad. Tetrasporangia were arranged in longitudinal series and developed successively.
Collections: V100782.
Distributed in the Aegean Sea and the West Indies (type locality: Bermuda Islands; Collins & Hervey 1917:121) (examined material from Tuckerstone 6. ii. 1913, col.& det. Hervey; GB).
Aegean Sea: Sithonia (present study).
Note: *Chondria polyrhiza* is here reported for the first in the Mediterranean. Whether the Aegean record represents a recent introduction or a rare alga of the Mediterranean flora is unknown.

* ***Chondria tenuissima*** (Goodenough & Woodward) C. Agardh

Plants were collected in the sublittoral zone as epiphytes on diverse macroalgae and *Posidonia* leaves. Thalli were a few cm long, composed of a terete and percurrent main frond, to 650 µm broad, provided with lateral branches with acute apices, and arising from a basal holdfast. Epidermic cells were roundish to rectangular, 40 to 90 µm long and 14 to 20 µm broad (s. v.). Well developed trichoblasts, to 0.8 mm long, occurred on the branch apices. Dioecious gametophytes with spermatangia or carposporophytes were collected in April and July.
Collections: K100782, A230684, Iraclion 080477 (leg. T. Wennberg)
Distributed in the Mediterranean, the Black Sea (Zinova 1967), the N. Atlantic to N. Carolina and the British Isles (see Parke & Dixon 1976), and the Red Sea (Rays 1959).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), Pagasitikos Gulf (Diannelidis 1948), N. Sporades and Cyclades (Schiffner & Schussnig 1943, Schussnig 1943), and Rhodes (Diannelidis *et al.* 1977).

* ***Chondria*** sp.

A carposporic plant belonging to the subgenus *Euchondria* and superficially related to *C. tenuissima*, as regards cell size and thallus habit, was distinguished from this species by abundant development of lenticular thickenings at the apices of the medullary cells. Since the material was limited and infertile, identification at species level was not attempted pending examination of new collections.
Collections: NI000480.

DIGENEA C. Agardh

* ***Digenea simplex*** (Wulfen) C. Agardh

Found in sheltered and semi-exposed sublittoral habitats, to ca 5 m depth. Individuals were up to 20 cm long, composed of a subdichotomous to irregularly ramified main frond, to 5 mm broad, with dense development of lateral, filamentous branchlets. The latter were simple or branched, to 0.8 mm long and 150 µm broad, with polysiphonous organization. Tetrahedrally divided sporangia, to 90 µm in diameter, occurred on plants collected in summer.
Collections: NI130480, A290680, A091081, T200685.
Distributed in most tropical and subtropical regions, the Mediterranean (type locality: Trieste; Wulfen 1803:17, as *Conferva*), Florida and the Bermuda Islands (Harvey 1851-58, Collins & Hervey 1917), the tropical Atlantic coast of Africa (Price *et al.* 1986), the Red Sea (see Papenfuss 1968), and the Indo-Pacific (see Dawson 1944).
Aegean Sea: Makedonian coast (Politis 1925, 1953, Katsikopoulos 1939), N. Sporades (Diannelidis 1950, 1953), Crete and Attica (Politis 1932, 1936), and Asia Minor (Güven & Öztig 1971).
Note: Perennial plants were overgrown by specimens of *Jania rubens*, *Corallina granifera*, and minute crustose corallines.

DIPTEROSIPHONIA Schmitz & Falkenberg

* ***Dipterosiphonia rigens*** (Schousboe ex C. Agardh) Falkenberg

Infertile plants were found as epiphytes on *Padina pavonica*, *Cystoseira* spp., *Digenea simplex*, and *Gracilaria corallicola*, in the sublittoral zone, to at least 20 m depth. Thalli were dark red-brown (occasionally blackish or even yellowish), ecorticate, to 1 cm long, composed of prostrate axes with 5 to 7 pericentral cells and endogenous development of laterals (axes and branches). Laterals were borne in alternate pairs on segments, which were as long (or shorter) as broad and developed unicellular rhizoids cut off from pericentral cells.
Collections: A290680, A201180, S100882, SI100684.
Distributed in the Mediterranean (type locality: Adriatic; Agardh 1827:638, as *Hutchinsia*), the Canaries (Børgesen 1930), the West Indies (see Taylor 1960), and on the Brazilian coast (De Oliveira Filho & Cordeiro-Marino 1970).
Aegean Sea: Reported as *D. rigens* (Schousboe) Falkenberg from the Makedonian coast (Haritonidis & Tsekos 1974, 1975), the Pagasitikos Gulf (Diannelidis 1948), the Cyclades, Limnos and the N. Sporades (Schiffner & Schussnig 1943).

ERYTHROCYSTIS J. Agardh

* ***Erythrocystis montagnei*** (Derbès & Solier) Silva (1952:308)
= *Ricardia montagnei* Derbès & Solier

Commonly found in the upper sublittoral zone as an obligate epiphyte on species of *Laurencia*. Individuals were red-brown, to 2.5 cm long, and bore tetrasporangia or carposporophytes.
Collections: K100782, K010882, K290783, R270684.
Distributed in the Mediterranean, the Canaries (Børgesen 1930), and Madeira (Levring 1974).
Aegean Sea: Sithonia (present study) and Cyclades (Coppejans 1974, as *Ricardia*).

HALOPITYS Kützing

* ***Halopitys incurvus*** (Hudson) Batters
= *Halopitys pinastroides* (Gmelin) Kützing (see Gmelin 1768:156)

A common macroalga in sheltered, shaded habitats in the upper sublittoral zone, to ca 2 m depth. Individuals were dark red-brown (to blackish), bushy, to 15 cm long, and usually inhabited by ceramiaceous algae such as *Jania rubens*, *Corallina granifera*, and minute crustose corallines.
Collections: A041280, A110581, P210881, K010882, K000685.
Distributed in the Mediterranean and the NE. Atlantic between Morocco to the British Isles (type locality) (Hudson 1762:470, as *Fucus*).
Aegean Sea: Reported as *H. pinastroides* from the Makedonian coast (Haritonidis & Tsekos 1974, 1975), the Cyclades (Schiffner & Schussnig 1943), Attica (Politis 1936), Crete (Diannelidis 1950), and the S. Archipelagus (Giaccone 1968a, as *Halopithys pinastroides* Ktz.).

HALYDICTYON Zanardini
= *Halodictyon* Kützing sensu Montagne (see Farr *et al.* 1979)

* ***Halydictyon mirabile*** Zanardini

Carposporic and tetrasporic plants, to 5 cm long, were collected as epiphytes in the sublittoral zone in autumn and winter.
Collections: A290680, A171180, A041280.
Distributed in the Mediterranean (type locality: Dalmatia; Zanardini 1843:52), the West Indies (see Taylor 1960), and the Canaries (Børgesen 1930).
Aegean Sea: Sithonia (present study) and the Saronikos Gulf (Diapoulis & Verlaque 1981, as *Halodictyon*).

HERPOSIPHONIA Nägeli

* ***Herposiphonia secunda*** (C. Agardh) Ambronn

Plants were commonly found as epiphytes on diverse macroalgae and seagrasses in the littoral and sublittoral zone. Thalli were dark red-brown, to 20 mm long, composed of prostrate main axes with 8 pericentral cells and exogenous development of lateral axes and branches of limited growth, borne at intervals of one to three segments. Branches were usually erect, composed of 10 to 12 segments, about as long as broad, and provided with apical trichoblasts, up to 1 mm long. Prostrate and erect axes were curved at their apices and developed unicellular rhizoids cut off from the proximal end of pericentral cells. Individuals with tetrahedrally divided sporangia, to 45 µm in diameter, were collected in August.
Collections: NI200680, A061180, A201180, A041280, P210881, K010882, A140684.
Distributed in most tropical and subtropical regions, in the Mediterranean (type locality) (Agardh 1824:149, as *Hutchinsia*), the West Indies (Børgesen 1915-20), and the Indo-Pacific (Jaasund 1976, Hollenberg 1968b).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975), N. Sporades, Limnos and Cyclades [Schiffner & Schussnig 1943, as *H. secunda* (Ag.) Falkenbg.], and Attica [Politis 1936, as *H. secunda* (Ag.) Näg.].
Note: The typification of this species by Hollenberg (1968b) appears doubtful. The specimen (no 39158; **LD**) considered as isotype was collected at Tanger by Schousboe and dated from 1825, while the protologue was published in 1824 being based on material from the Mediterranean Sea. The binomial "*Conf. lanosa*, Drap.", cited by Agardh as a synonym, is probably a *nomen nudum* based on herbarium specimens collected on the Mediterranean coast of France and the Ligurian coast (Agardh 1828:106).

* ***Herposiphonia tenella*** (C. Agardh) Ambronn

Sporadic plants grew in the littoral zone as epiphytes on species of *Laurencia* and *Enteromorpha*. Thalli were reddish to pinkish, to 20 mm long, composed of prostrate main axes with 8 pericentral cells and exogenous development of lateral axes and branches of limited growth in a regular ramification pattern, i. e. three branches alternating with a new axis. Branches were simple, composed of 20 to 50 segments, about as long (to twice as long) as broad, and provided with apical trichoblasts to 300 µm long. Prostrate and erect axes were characteristically curved at their apices, and developed unicellular rhizoids cut off from the proximal end of pericentral cells. Individuals with tetrahedrally divided sporangia, 60 to 100 µm in diameter,were collected in July.
Collections: NM191280, SC120784.
Distributed in the tropics, subtropics, and temperate regions, including the Mediterranean (type locality: Sicily) (Agardh 1828:105, as *Hutchinsia*), the West Indies (Børgesen 1915-20), the Black Sea (Zinova 1967), and the Indo-Pacific (Jaasund 1976, Hollenberg 1968b).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975), N. Sporades [Diannelidis 1950, 1953, as *H. tenella* (Ag.) Naeg.], Cyclades [Schiffner & Schussnig 1943, as *H. tenella* (C. Ag.) Falkenbg.], and Asia Minor [Güven & Öztig 1971, as *H. tenella* (Ag.) Näg.].

LAURENCIA Lamouroux

* ***Laurencia*** cf. ***microcladia*** Kützing

Saxicolous and epizoic plants, the latter growing on shells of *Patella* sp., were commonly met with in semi-exposed habitats in the upper sublittoral zone. Thalli were red-brown, soft, to 8 cm long, composed of one to several percurrent, terete main fronds, to 1.4 mm in diameter, arising from a discoid and stoloniferous holdfast. Fronds were radially ramified, with more or less subverticillate lateral branches and branchlets, the former 1 to 6 mm long. Epidermic cells developed longitudinal secondary pit-connections, and were nearly isodiametric at the branch apices, 15 to 25 µm in diameter, and more or less rectangular in the middle of the thallus, 55 to 75 µm long and 15 to 35 µm broad (s. v.). In transverse sections, they were rather elongate 20 to 50 µm long. Medullary cells with lenticular thickenings were sporadically observed in most specimens. Stichidial branches were borne in dense clusters, and were knobby, 570 to 1000 µm in diameter, and less than 2 mm long. Tetrahedrally divided sporangia, to 125 µm in diameter, were abaxially borne from elongate pericentral cells. Tetrasporangia (2 or 3 in number) were initially developed at a right angle to the branch axis, and gradually became arranged in longitudinal series. Female gametophytes developed subspherical to ovate (occasionally urceolate) cystocarps, 650 to 760 µm in diameter.
Collections: K040782, K100782, K010882, K100882, K210684, K260684.
Distributed in the Mediterranean (Verlaque 1981) and the West Indies (type locality; Kützing 1864:22, tab. 60, fig. b).
Aegean Sea: Sithonia (present study).
Note: The material was tentatively referred to this taxon, pending examination of authentic specimens.

* ***Laurencia obtusa*** (Hudson) Lamouroux

Saxicolous plants were collected at semi-exposed and sheltered localities in the sublittoral zone between low water level and at least 15 m depth. Thalli were bright red to red-brown, to 80 mm long, composed of several terete main fronds, to 1.6 mm broad, radially and irregularly ramified, with lateral branches borne at an acute angle (45° or less) to their parent axis and ramified in a similar pattern. Fronds were developed from a discoid holdfast with stoloniferous outgrowths. Epidermic cells developed longitudinal secondary pit-connections, and were more or less isodiametric near to the apices, 10 to 75 µm in diameter, whereas rectangular in the main

axis, to 100 μm long and 20 to 30 μm broad (s. v.). Lenticular thickenings were absent in medullary cells. Tetrahedrally divided sporangia, to 130 μm in diameter, were developed in longitudinal series on stichidial branches, to 830 μm thick and less than 2 mm long.
Collections: NI040580, A201180, NM271180, A100581, P210881, K010882, R270684, KC010884.
Distributed in the Mediterranean, the NE. Atlantic to the British Isles, the Canaries (Børgesen 1930), the West Indies (Børgesen 1915-20), and the Indo-Pacific (Saito 1967, Jaasund 1970).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974; 1975, var. *laxa* Kütz. and var. *pyramidica* J. Ag.), N. Sporades (Schiffner & Schussnig 1943), Pagasitikos Gulf (Diannelidis 1948), Methana (Fauché *et al.* 1832-33), N. Sporades and Cyclades (Schiffner & Schussnig 1943, including var. *laxa* Kütz.; Nizamuddin & Lehnberg 1970), Crete (Diannelidis 1950, including var. *laxa* Kütz.), and Asia Minor (Güven & Öztig 1971).

* ***Laurencia obtusa*** (Hudson) Lamouroux **var. *crucifera*** Hauck

Commonly met with in the upper sublittoral zone, as an epiphyte on *Cystoseira corniculata* or on rocks. Thalli were green to yellow-reddish, cartilaginous, to 15 cm long, composed of several main fronds, arising from a stoloniferous holdfast. Main axes were terete, to 2 mm broad, and radially branched in distinct whorls more or less borne at regular intervals. Lateral branches were generally formed at a fair wide angle (45° to 90°) to their parent axis, cutting off second-order branches in a similar ramification pattern. Transverse sections of branches showed a conspicuous central axis surrounded by five or six pericentral cells. Epidermic cells developed longitudinal secondary pit-connections and were more or less isodiametric close to the apices, 15 to 40 μm in diameter, whereas rectangular on the main axis, 60 to 100 μm long and 35 to 40 μm broad (s. v.). Medullary cells with lenticular thickenings were sporadically observed in groups. Tetrahedrally divided tetrasporangia, to 130 μm in diameter, were borne in longitudinal series in stichidial branches, 450 to 750 μm broad and less than 2.5 mm long.
Erythrocystis montagnei was a common epiphyte.
Collections: A210480, NI040580, A140580, A061180, A181180, KR010581, K010882, K290783, SI100684.
Distributed in the Mediterranean.
Aegean Sea: Sithonia (present study), Limnos, N. Sporades and Cyclades (Schiffner & Schussnig 1943), and Crete (Diannelidis 1950).
Note: No attempt was made to search for the correct name of this entity, which appears to be a common alga on the southern coast of Sithonia. Superficially, it resembles *L. obtusa* and herbarium specimens under this name (or even as *Chondria dasyphylla*) were identified from several localities in the Mediterranean. Hauck (1885:206) united several taxa under *L. obtusa* var. *crucifera*, and his concept is in good agreement with the habit of the Aegean plants. Therefore, the varietal name used by him is here provisionally adopted, although it should be mentioned that the combination of characters found in the Aegean plants is sufficient to warrant a specific status.

* ***Laurencia paniculata*** (C. Agardh) J. Agardh

A few tetrasporophytes grew on rocks in the sublittoral zone in association with *Cryptonemia lomation* and *Cladophora prolifera*. Thalli were bright red, cartilaginous, to 5 cm long, composed of several erect and reflexed fronds, arising from a discoid holdfast, to 4 mm in extent. Fronds were terete, to 1 mm broad, and radially and irregularly ramified, especially along the apices where ultimate branches were slender, 280 to 380 μm broad and 2 or 3 mm long. Epidermic cells were nearly isodiametric close to the apices, 10 to 25 μm in diameter(s. v.), and palisade-like in transverse sections, lacking longitudinal secondary pit-connections. Lenticular thickenings were not observed in medullary cells. Tetrahedrally divided sporangia, to 100 μm in diameter, were borne at a right angle to the branch axis. Stichidial branches were up to 770 μm long and 640 μm thick (measures from a single specimen). *Melobesia membranacea* and other minute crustose corallines, as well as *Jania rubens* and *Dipterosiphonia rigens* grew as

epiphytes.
Collections: SI100684.
Distributed in the Mediterranean (type locality: Adriatic) (Agardh 1822:343, as *Chondria obtusa* var. *paniculata*), the West Indies (Collins & Hervey 1917; although the record is regarded as uncertain by Taylor 1960), southern Australia (Saito & Womersley 1974), Hong Kong (Tseng 1943), and the Iranian Gulf (Børgesen 1939).
Aegean Sea: Makedonian coast [Politis 1925, 1953, as *L. paniculata* (Ag.) Kütz.; Haritonidis & Tsekos 1975], Pagasitikos Gulf and N. Sporades (Diannelidis 1935, 1950, 1953, as *L. paniculata* (Ag.) Kütz.], Crete, Attica and Cyclades [Politis 1932, 1936, 1938, as *L. paniculata*(Ag.) Kütz.], and Rhodes (Reinbold 1898, as *L. paniculata* J. Ag. f. *patentiramea*).
Note: Kützing's (1849:855) *Laurencia paniculata*, which is also based on Mediterranean material, antedates Agardh's combination (1852:755) which is a later homonym and therefore an illegitimate name. Agardh cited Kützing's plant as a potential synonym, but the status of this taxon requires re-investigation.

* ***Laurencia papillosa*** (C. Agardh) Greville
= *Gigartina julacea* Bory

This species is apparently absent from the southern coast of Sithonia, although it has previously been reported from adjacent areas such as: Athos and Chalkidiki (Politis 1925, 1953), Alexandroupolis (Katsikopoulos 1939) and localities on the Makedonian coast (Haritonidis & Tsekos 1974, 1975). Further records have been made from the Pagasitikos Gulf (Diannelidis 1948), Cyclades (Politis 1938, Coppejans 1974), Crete (Politis 1932, as common; Schussnig 1943, on *Cystoseira spinosa*), S. Archipelagus (Schiffner & Schussnig 1943, Giaccone 1968a), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).
Note:In the above records and elsewhere in literature, the basionym of the species is attributed to Forsskål's (1775:190) *Fucus papillosus*, which, however, is an illegitimate name (Papenfuss 1968). *Gigartina julacea* was originally described by Bory (Fauché *et al* 1832-33:321) to accommodate some plants collected on the coast of Milos (Cyclades). Examination of the type material of this species (two sheets, No 1462; **PC**) showed that it apparently belongs to *L. papillosa* as previously suggested by De Toni (1903:789).

Laurencia pinnatifida (Hudson) Lamouroux

Reported from the Makedonian coast (Haritonidis & Tsekos 1975) and the S. Archipelagus (Giaccone 1968a, as *L. pinnatifida* Lamx.).

* ***Laurencia*** sp.

Sporadic plants, entangled with *Corallina elongata* and other macroalgae, grew in the exposed littoral and sublittoral zone, to ca 5 m depth. Thalli were bluish red to greenish, cartilaginous, a few cm in length, composed of erect and reflexed fronds. Fronds were terete to compressed, to 850 μm broad, with alternate-distichous arrangement of lateral branches, to 650 μm broad. Epidermic cells were isodiametric to rectangular, 14 to 50 μm long and 14 to 28 μm broad (s. v.), and provided with longitudinal secondary pit-connections. Medullary cells developed abundant lenticular thickenings, easily detected in surface view of the branches. Tetrahedrally divided sporangia, 45 to 120 μm in diameter, were abaxially developed from pericentral cells.
Collections: A200680, A201180, A041280, KC260784
Note: The Aegean plants belong to the section Planae, subgenus *Laurencia*, where no European species are currently recognized. Superficially, they might be confused with small specimens of *L. pinnatifida*, which is widely reported in the Mediterranean Sea.

LOPHOCLADIA Schmitz

Lophocladia lallemandi (Montagne) Schmitz

Originally described from the Red Sea and later widely reported from the Indo-Pacific, this species was recorded for the first time in the Mediterranean Sea by Petersen (1918) from material collected at Tripoli (Libya), and in the Saronikos Gulf (31.12.1908). Its occurrence in the Mediterranean has been speculated as a possible introduction from the Red Sea after the opening of the Suez Canal in 1869 (Feldmann & Feldmann 1938, Aleem 1948, Por 1978).

Lophocladia trichoclados (C. Agardh) Schmitz

This species was originally described from material collected in eastern India (Agardh 1828:132, as *Griffithsia*), and later reported from the West Indies (see Taylor 1960) and the Mediterranean, first by Güner (Güven & Öztig 1971) from Asia Minor (Agean Sea) and later by Boudouresque & Verlaque (1976, with reservations) from Corsica.

LOPHOSIPHONIA Falkenberg

* ***Lophosiphonia cristata*** Falkenberg

Infertile plants grew in sheltered habitats in the littoral zone, forming sand-binding turfs with other species of *Lophosiphonia*, *Polysiphonia*, and *Alsidium helminthochorton*. Thalli were a few mm long, composed of ecorticate prostrate axes, with 9 (10) pericentral cells and endogenous, erect, simple branches with curved apices bearing dorsal trichoblasts (or scar cells). Unicellular rhizoids were formed in open connection with pericentral cells.
Collections: NI200680, K030884, K200386.
Distributed in the Mediterranean (type locality: Naples; Falkenberg 1901:499), the West Indies (Børgesen 1915-20, Taylor 1960), and the Pacific (Hollenberg 1968a).
Aegean Sea: Sithonia (present study) and the Saronikos Gulf (Diapoulis & Verlaque 1981).

* ***Lophosiphonia reptabunda*** (Suhr in Kützing) Kylin (1956:539)
= *Lophosiphonia obscura* (C. Agardh) Falkenberg pro parte

Plants grew as epiphytes on macroalgae in the littoral and sublittoral zone, occasionally forming sand-binding turfs with other *Lophosiphonia* species and *Alsidium helminthochorton*. Thalli were yellow-brownish, to 1 cm long, composed of prostrate, ecorticate axes, to 325 µm in diameter, with unilateral, endogenous axes with curved apices. Axes were composed of 11 to 17 pericentral cells and segments as long as broad (or shorter). Unicellular rhizoids, to 1.6 mm long, provided with conspicuous coralloid pads were cut off from pericentral cells. Trichoblasts, to 2 mm long, were borne along the branch apices. Plants with cystocarps, to 160 µm long, borne on one-segmented laterals were collected in August.
Collections: A290680, A201180, A041280, P210881, K210684, K030884.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), the CE. Atlantic (type locality: "In mari Atlantico subtropico...", Kützing 1849:806; and "Ad oras africanas", Kützing 1863:12, as *Polysiphonia*) to the British Isles (see Parke & Dixon 1976), and E. Australia (Cribb 1956).
Aegean Sea: Sithonia (present study), N. Sporades [Schiffner & Schussnig 1943, Diannelidis 1950, 1953; as *L. obscura* (C. Ag.) Falkenb.], Cyclades [Coppejans 1974, as *Polysiphonia obscura* (C. Ag.) J. Ag.], and the S. Archipelagus (Giaccone 1968a, as *L. obscura* Falk.).

* ***Lophosiphonia scopulorum*** (Harvey) Womersley

Plants grew as epiphytes on diverse macroalgae (e. g. *Peyssonnelia* spp., *Hydroclathrus*

clathratus, and crustose corallines) in the sublittoral zone, to at least 20 m depth. Thalli were dark red-brown (occasionally blackish), up to 1 cm long, composed of prostrate and erect, ecorticate axes, to 70 µm in diameter, with endogenous lateral axes. Axes were composed of 4 pericentral cells and segments one to twice as long as broad. Unicellular rhizoids were developed on the prostrate axes in open connection with pericentral cells. Trichoblasts, to 400 µm long, were borne along the apices. Individuals with tetrahedrally divided sporangia, to 45 µm in diameter, or subspherical cystocarps, to 160 µm in diameter, were collected in summer.
Collections: A041280, A250881, A100782, A040782, S100782, K010882, SI240684, SR270684, KC260784.
Distributed in the Mediterranean, the Caribbean [see Kapraun & Norris 1982, as *Polysiphonia scopulorum* Harvey var. *vilum* (J. Ag.) Hollenb.], the NE. Atlantic (Portugal; Ardré 1970), and the Pacific (type locality: S. Australia; see Womersley 1979, as *Polysiphonia*).
Aegean Sea: Sithonia (present study) and the Saronikos Gulf (Diapoulis & Verlaque 1981).

* ***Lophosiphonia subadunca*** (Kützing) Falkenberg

Infertile plants grew as epiphytes on *Zanardinia prototypus*, *Peyssonnelia* spp., corallines, and *Posidonia* rhizomes in the sublittoral zone, and occasionally in the littoral zone forming sand-binding turfs with other species of *Lophosiphonia* and *Alsidium helminthochorton*. Thalli were red-brown, a few cm long, composed of a prevailing prostrate system of axes with 6 pericentral cells and usually endogenous lateral axes. Trichoblasts, to 2 mm long, were developed along the apices. Unicellular rhizoids were formed in open connection with pericentral cells.
Collections: A201180, S100782, S100882, A140684, K030884.
Distributed in the Mediterranean (type locality: Corsica; Kützing 1843:418, as *Polysiphonia*), the N. Atlantic to Scandinavia (Kapraun & Rueness 1983, as *Polysiphonia hemisphaerica* Areschoug), the Iranian Gulf (Børgesen 1939), and E. Australia (Cribb 1956).
Aegean Sea: Sithonia (present study), N. Sporades (Schiffner & Schussnig 1943, Diannelidis 1950, 1953), Cyclades (Schiffner & Schussnig 1943), and the S. Archipelagus (Giaccone 1968a, as *L. subadunca* Falk.).
Note: Rueness (1971) and Kapraun & Rueness (1983) cited a long list of synonyms for this species and also suggested that it might be identical to Roth's *Conferva pulvinata* which is dated from 1797 and based on material from the Mediterranean. Reproductive organs, unknown in Mediterranean plants, are commonly found in the Atlantic counterparts, which may form a densely tufted thallus, to 10 cm long (Kapraun & Rueness 1983).

POLYSIPHONIA Greville

Polysiphonia breviarticulata (C. Agardh) Zanardini

Reported from the Pagasitikos Gulf (Diannelidis 1948), the N. Sporades and the Cyclades (Schiffner & Schussnig 1943; Diannelidis 1950, 1953).
Note: A small fragment of the type material, mounted on a slide preparation labelled "*Polysiphonia breviarticulata* Herb. Agardh" and deposited at Herb. Levring (Mondello; **GB**), was available for examination. The authentic specimen represents an apical fragment with cystocarps, 4 pericentral cells and segments about twice as broad as long. The main axis is to 250 µm broad ca 4.5 mm below the apex. The pericentral cells are isodiametric (s. v.), to 90 µm in diameter, and the lateral axes constricted at their base and provided with a few short trichoblasts, to 60 µm long. Cystocarps are ovate, to 415 µm long and 235 µm broad. The species is known in the Mediterranean (type locality: Adriatic; Agardh 1824:153, as *Hutchinsia*) and the Black Sea (Zinova 1967).

Polysiphonia brodiaei (Dillwyn) Sprengel

Reported from islands in the S. Archipelagus (Giaccone 1968a, as *P. brodiaei* Grev.)

Polysiphonia denudata (Dillwyn) Harvey
= *Polysiphonia variegata* (C. Agardh) Zanardini (cf. Agardh 1863:1030)
= *Polysiphonia leptura* Kützing
= *Polysiphonia vidovichii* Meneghini ex Kützing (Veldkamp 1950:522)

Reported as *P. variegata* or *P. vidovichii* from the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978) and the S. Archipelagus (Giaccone 1968a, as *P. variegata* Zan. f. *leptura* Ktz.).

* ***Polysiphonia elongata*** (Hudson) Sprengel

Basal fragments of infertile plants, a few mm long, were collected from the sublittoral zone, whereas entire individuals were encountered on drift material of *Sargassum acinarium*. Thalli were red-brown, to 5 cm long, composed of a main axis, to 1 mm broad, subdichotomously to irregularly ramified with 4 pericentral cells and a dense cortication progressively developed towards the base. Axial segments were about as long as broad in the middle of the frond, whereas longer in the apical parts, and shorter towards the corticate base. Ultimate branches were up to 70 µm in diameter, with slightly attenuate base.
Collections: A290680, K020786 Drift.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), the N. Atlantic (type locality: British Isles; see Kapraun & Rueness 1983) to Norway, and N. America.
Aegean Sea: Makedonian coast [Anagnostidis 1968, as *P.* cf. *elongata* (Huds.) Harv.(?)], and N. Sporades [Diannelidis 1950; 1953, as *P. elongata* ? (Huds.) Harvey in Hooker].

* ***Polysiphonia fruticulosa*** (Wulfen) Sprengel
= *Boergeseniella fruticulosa* (Wulfen) Kylin

Infertile plants grew in the sublittoral zone as epiphytes on species of *Cystoseira*. Thalli were dark red-brown, to 20 mm long, composed of a percurrent main axis with 12 pericentral cells and distichous-alternate ramification. Segments were generally broader than long, being progressively covered by polygonal cortical cells initially developed around the pericentral cells.
Collections: NI200680, A091081, A100881.
Distributed in the Mediterranean (type locality: Adriatic; see Wulfen 1803:56, as *Fucus*), and the NE. Atlantic to the British Isles (see Parke & Dixon 1976), including Morocco (Bornet 1892) and the Canaries (Børgesen 1930).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975, as *Boergeseniella*), Limnos and Cyclades (Schiffner & Schussnig 1943), Crete (Politis 1932), the S. Archipelagus (Giaccone 1968a, as *P. fruticulosa* Spreng.), and Asia Minor (Güven & Öztig 1971).

* ***Polysiphonia furcellata*** (C. Agardh) Harvey in Hooker

Infertile plants grew on polychaete tubes and diverse macroalgae (e. g. *Corallina elongata*) in the sublittoral zone. Thalli were red-brown (occasionally blackish), ecorticate, to 3 cm long composed of regularly subdichotomous and divaricate axes with 7 or 8 pericentral cells, and attached to the substratum by means of numerous unicellular rhizoids cut off from pericentral cells. Segments were one to twice as long as broad. Trichoblasts, to 650 µm long, were independently borne on axial segments.
Collections: A290680, A201180, A100581, A040183, SR200784.
Distributed in the Mediterranean and the NE. Atlantic (type locality: Brittany; Agardh 1828:91, as *Hutchinsia*) to the British Isles (see Parke & Dixon 1976), including the Canaries (Børgesen 1930).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975; Haritonidis 1978), and islands in the S. Archipelagus (Giaccone 1968a, as *P. furcellata* Harv.).

* ***Polysiphonia opaca*** (C. Agardh) Moris & De Notaris
=? *Polysiphonia virens* Kützing

A few apical fragments in samples from the sublittoral zone showed distinctive features attributed to this taxon (see Lauret 1970) such as: subdichotomous branches with ca 20 pericentral cells, segments one to three times as broad as long, and trichoblasts, to 1 mm long.
Collections: K210684.
Distributed in the Mediterranean (type locality: Adriatic; Agardh 1824:148, as *Hutchinsia*), the West Indies (Collins & Hervey 1917), the Canaries (Børgesen 1930), and E. Australia (Cribb 1956).
Aegean Sea: reported as *P. opaca* (C. Ag.) Zan. from the Makedonian coast (Haritonidis & Tsekos 1974, 1975), the N. Sporades (Schiffner & Schussnig 1943), the Pagasitikos Gulf (Diannelidis 1948), Crete and Attica (Politis 1932, 1936), and the Cyclades (Coppejans 1974).
Note: The single record of *Polysiphonia virens* is based on Grunow's (1861) report of material collected at the island of Kithira by Mazziari. In later accounts of the genus (Hauck 1885, Preda 1908-09), this taxon is treated as a synonym of *P. opaca*.

* ***Polysiphonia ornata*** J. Agardh

Plants grew on crustose corallines in the sublittoral zone (ca 15 m depth) and on drift material of *Sargassum acinarium*. Thalli were dark red-brown, to 4 cm long, composed of corticate, prostrate main axes, attached to the substratum by means of a basal and lateral rhizoidal outgrowths. Axes were up to 1 mm broad, irregularly ramified and abruptly tapering to ecorticate apical parts, ca 40 µm in diameter and a few mm long, with 4 pericentral cells and trichoblasts to 325 µm long. Apical (ecorticate) segments were up to twice as long as broad, becoming about three times as broad as long towards the base (because of the cortex). Individuals with cystocarps or tetrahedrally divided sporangia, 65 to 90 µm in diameter, were collected in November and December.
Collections: A041280, A201180, A040782, K020786 Drift.
Endemic in the Mediterranean (type locality: Adriatic; Agardh 1842:135).
Aegean Sea: Sithonia (present study) and islands in the S. Archipelagus (Giaccone 1968a, as *P. ornata* Kütz.).

Polysiphonia sanguinea (C. Agardh) Zanardini

Reported from the Makedonian coast (Haritonidis 1978).

* ***Polysiphonia sertularioides*** (Grateloup) J. Agardh

Saxicolous plants grew in sheltered littoral habitats in spring. Thalli were light red-brown, to 5 cm long, composed of erect and irregularly ramified ecorticate axes, to 200 µm in diameter, arising from a prostrate basal system of axes with numerous unicellular rhizoids cut off from the proximal end of pericentral cells. Main axes were percurrent, with 4 pericentral cells and apical segments nearly isodiametric, becoming two to four times as long as broad in the middle of the frond. Individuals bore spermatangial branches, to 260 µm long, or tetrahedrally divided sporangia, to 50 µm in diameter. Spermatangial branches were characteristically developed on the basal cells of trichoblasts (replacing a part of the trichoblast branch).
Collections: A000480, A110581.
Distributed in the Mediterranean (type locality: Sète; see Womersley 1979:478), S. Australia, and probably the C. & N. Atlantic (see Womersley 1979).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975), Pagasitikos Gulf (Diannelidis 1935), Attica [De Toni 1901, as *P. sertularioides* (Grat.) Ag.], Crete (Schussnig 1943), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

* ***Polysiphonia subulifera*** (C. Agardh) Harvey

Infertile plants grew on *Halimeda tuna* and on drift material of *Sargassum acinarium*. Thalli were red-brown, to 14 cm long, composed of an erect ecorticate axis, to 500 µm in diameter, provided with 8 to 10 pericentral cells and alternate-distichous ramification. Apical segments were generally broader than long, becoming about as long as broad in the main thallus. Pericentral cells were up to 540 µm long and 115 µm broad, usually imbricating at their ends. Trichoblasts, to 1.5 mm long, were borne along the apices.
Collections: KI010784, K020786 Drift.
Endemic in the Mediterranean (type locality: Venice; Agardh 1827:638, as *Hutchinsia*), the Black Sea (Zinova 1967), and the NE. Atlantic to the British Isles (see Parke & Dixon 1976).
Aegean Sea: Makedonian coast (Anagnostidis 1968; Haritonidis & Tsekos 1975), N. Sporades (Diannelidis 1950, 1953), Cyclades (Schiffner & Schussnig 1943), and S. Archipelagus (Giaccone 1968a, as *P. subulifera* Harv.).

* ***Polysiphonia tenerrima*** Kützing

Fertile plants grew as epiphytes on *Nemalion helminthoides* in exposed localities in summer. Thalli were red-brown, to 1 cm long, composed of percurrent, ecorticate main axes, to 90 µm in diameter, irregularly ramified, with 4 pericentral cells. Segments were about as long as broad in the middle of the thallus, becoming about half as long as broad towards the apex and the base. Unicellular rhizoids were cut off from the posterior end of pericentral cells. Gametangial plants were dioecious and developed spermatangial branches, to 160 µm long, on the basal cells of trichoblasts, and carposporophytes on one-segmented lateral branches. Cystocarps were subspherical, to 250 µm in diameter.
Collections: SI100684.
Distributed in the Mediterranean (type locality: "Genua! Livorno! Neapel! auf *Phlebothamnion grande*", Kützing 1843:417).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975), and N. Sporades (Diannelidis 1950, 1953; on *Corallina* and *Dasycladus*).
Note: *P. tenerrima* is closely related to *P. sertularioides* and might well represent a form or a variety of this species (see Hauck 1885). It is chiefly distinguished by the smaller thallus, which could be an ecological adaptation to the particular habitat (exposed littoral zone).

* ***Polysiphonia*** cf. ***tripinnata*** J. Agardh

A few fragments with tetrasporangia were found in collections from the sublittoral zone. The material was tentatively referred to *P. tripinnata*, being in accordance with Lauret's (1970) concept. It was distinguished from *P. opaca* by alternate-distichous ramification, 14 to 16 pericentral cells per segment and short trichoblasts, to 250 µm long.
Collections: A110581.
Endemic in the Mediterranean (type locality: Trieste; Agardh 1842:142).
Aegean Sea: Sithonia (present study).

PTEROSIPHONIA Falkenberg

Pterosiphonia complanata (Clemente) Falkenberg

Reported from the Makedonian coast (Haritonidis & Tsekos 1974, 1975).

Pterosiphonia parasitica (Hudson) Falkenberg

Reported from Lesbos (Haritonidis & Tsekos 1974).

Pterosiphonia pennata (C. Agardh) Falkenberg

Reported from the Gulf of Thessaloniki (Haritonidis 1978).

RODRIGUEZELLA Schmitz

Rodriguezella pelagosae Schiffner

Reported as *R. pelagosae* (Kütz.) Schiffner from Asia Minor (Güven & Öztig 1971).

RYTIPHLOEA C. Agardh

* *Rytiphloea tinctoria* (Clemente) C. Agardh

Saxicolous plants, to 10 cm long, grew in shaded, sheltered habitats in the upper sublittoral zone, as understory species.
Collections: A290680, A201180, A041280, K210684.
Distributed in the Mediterranean and the NE. Atlantic between the Canaries (Børgesen 1930) and the British Isles (see Parke & Dixon 1976).
Aegean Sea: Makedonian coast (Politis 1925, 1953; Haritonidis & Tsekos 1974, 1975), Thrake (Katsikopoulos 1939), N. Sporades (Schiffner & Schussnig 1943), Cyclades (Politis 1938, Coppejans 1974, Nizamuddin & Lehnberg 1970), S. Archipelagus (Huvé 1962a; Giaccone 1968a, as *R. tinctoria* Ag.), and Rhodes (Reinbold 1898).

VIDALIA J. Agardh

Vidalia volubilis (Linnaeus) J. Agardh
= *Volubilaria mediterranea* Bory (see Silva 1952:269)

This species was not encountered on the coast of Sithonia (at least not to depths of ca 20 to 30 m depth), although it has been included in previous lists of marine algae from adjacent areas on the Makedonian coast such as: Athos and Chalkidiki (Politis 1925, 1953), the island of Thasos (Anagnostidis 1968), Thrake (Katsikopoulos 1939). Additional records have been made from Crete, Attica and the Cyclades (Politis 1932, 1936, 1938), the Pagasitikos Gulf and the N. Sporades (Diannelidis 1935, 1950, 1953), Milos (Fauché *et al.* 1832-33, as *V. mediterranea*), the S. Archipelagus (Huvé 1962a; Giaccone 1968a, as *V. volubilis* J. Ag.), and Asia Minor (Güven & Öztig 1971).

Excluded species

Laurencia botryoides (Turner) Gaillon

Bory described this species from material collected at Methana on the eastern coast of Peloponnesus (Fauché *et al.* 1832-33:324, as *Laurencia botryoides* Bory). He cited *Fucus uvifer* Forsskål (1775:192) and *Fucus botryoides* Turner (1811:104, pl. 178) as synonyms, believing that Forsskål's alga represents a plant from the Red Sea, and being aware of that Turner's plant originates from Kent island (S. Australia). *Laurencia botryoides* (Turner) Gaillon is apparently confined to areas around its type locality (Saito & Womersley 1974) and can hardly be identical with Bory's alga which, however, might be related to Forsskål's *F. uvifer*[=*Laurencia uvifera*(Forsskål) Børgesen] which is based on material from Constantinople.

Laurencia cyanosperma Bory

This species was erected by Bory (Fauché *et al.* 1832-33:325) to accommodate some plants

collected on the coast of Peloponnesus, Thermia (Kithnos), and in the Saronikos Gulf. According to his description the material was green to pale bluish or even bleached and composed of erect and well branched fronds with virgate-pyramidal branches, the latter very short, dense, and occasionally corniculate (spiniferous). The species was also considered as one of the largest and most slender of the genus, although this combination of morphological features is rather inadequate to allow specific or even generic identification in modern context. Hence, the status of *L. cyanosperma* necessitates re-examination of Bory's authentic material. It should also be mentioned that this species is usually ascribed to Lamouroux (1813:43) based on Delile's *Fucus cyanospermus* (cited as a synonym by Bory), although both Lamouroux' combination and Delile's basionym are *nomina nuda* (see Stafleu & Cowan 1976:617).

Laurencia gelatinosa (Desfontaines) Lamouroux

This taxon was reported from the Cyclades (Diannelidis 1950), but its taxonomic and nomenclatural status is confused. Lamouroux' (1813:42) combination was apparently based on Desfontaines' *Fucus gelatinosus* which is a later homonym of Hudson's (1762:471) *Fucus gelatinosus*. Hudson's plant is not treated in later accounts of the British marine flora (e. g. Hooker 1833, Harvey 1846-51), whereas, according to De Toni (1903:792) and Preda (1908-09:258), Desfontaines' plant should be considered as a variety of *L. obtusa*.

Polysiphonia cladorhiza Ardissone

Reported from the S. Archipelagus (Giaccone 1968a). According to Preda (1908-09:235), this taxon is characterized by ecorticate fronds with 4 pericentral cells and appears to be related to *P. macrocarpa* (C. Agardh) Sprengel sensu Harvey (= *P. atlantica* Kapraun & Norris 1982). Its status is in need of taxonomic re-investigation.

Polysiphonia deusta (Roth) J. Agardh

Reported from the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978). This species was originally described by Roth (1800:235) as *Conferva deusta*, based on material from the Adriatic, and according to literature (e. g. Preda 1908-09) belongs to the *P. urceolata* complex. Its status requires taxonomic re-investigation.

Polysiphonia lanosa (Linnaeus) Tandy

Polysiphonia lanosa (Linnaeus) Tandy is widely distributed in the N. Atlantic as an epiphyte on *Ascophyllum nodosum* (L.) Le Jol. It certainly does not occur in the Mediterranean, and the single record from the Gulf of Thessaloniki (Haritonidis 1978, as *Polysiphonia fastigiata* Greville) must be regarded as a misidentification.

Polysiphonia leptothrix Zanardini

Reported by Grunow (1861:429) from the island of Kithira. According to De Toni (1924:403), Zanardini never published this taxon that seems to be a *nomen nudum*.

Polysiphonia nigrescens (Hudson) Greville

The sporadic records from the Makedonian coast [Anagnostidis 1968a, as *P. nigrescens* (Dillw.) Grev.; Haritonidis & Tsekos 1974, 1975] are doubtful and probably based on misidentifications, since this cold-temperate species does not occur elsewhere in the Mediterranean.

Polysiphonia sericea Hauck

Reported from the Thasos Island (Haritonidis & Tsekos 1974). The original description of the species (Hauck 1877:273) is based on dredged material off Rovinj, growing on crustose corallines and sponges. The taxon appears to be related to a number of other species with 5 or 6 pericentral cells and ecorticate fonds such as: *P. coarctata* Kützing (1843), *P. polyrhiza* Kützing (1843), and *P. parvula* Zanardini (1847), the status of which requires critical re-investigation.

Polysiphonia setigera Kützing

Reported from the S. Archipelagus (Giaccone 1968a). This species was originally described from the Mediterranean (Kützing 1863:11, tab. 31, d) and its status requires taxonomic re-investigation.

Polysiphonia subtilissima Montagne

The single record from the S. Archipelagus by Giaccone (1968a, as *P. subtilissima* Kütz.) should be considered as a misidentification, since this Pacific species is not known to occur elsewhere in the Mediterranean.

Polysiphonia urceolata (Dillwyn) Greville

Reported from the Makedonian coast (Anagnostidis 1968, with reservations; Haritonidis & Tsekos 1975), and Asia Minor (Güven & Öztig 1971). The occurrence of this cold-temperate species in the Mediterranean is based on sporadic records (Hauck 1885, Ardissone 1883) which require confirmation (De Toni 1903:876).

Polysiphonia violacea (Roth) Sprengel

The single record from Lesbos (Haritonidis & Tsekos 1974, from the drift) should be regarded as doubtful, since this species is considered to be restricted to the Atlantic European coast (see Kapraun & Rueness 1983, Gallardo *et al.* 1985).

PHAEOPHYTA Pascher
ECTOCARPALES Oltmanns
ECTOCARPACEAE C. Agardh

ACINETOSPORA Bornet

* ***Acinetospora crinita*** (Harvey in Hooker) Kornmann

Observed in crude cultures of material from the sublittoral zone. Under laboratory conditions [15 ± 2 ° C, 14:10 (light:dark)], isolates propagated by monosporangia borne singly or in groups.
Collections: A100581.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the E. Atlantic between the tropical coast of Africa (see Price *et al.* 1978) and the British Isles (see Parke & Dixon 1976).
Aegean Sea: Sithonia (present study).
Note: It is widely accepted that plants with similar morphology are involved in the life history of species of *Feldmannia* (see Knoepffler-Péguy 1977).

ECTOCARPUS Lyngbye

* ***Ectocarpus arctus*** Kützing
= *Ectocarpus confervoides* f. *arcta* (Kützing) Kjellman

Saxicolous and epiphytic plants were collected in sheltered habitats close to the water surface. Thalli were up to 5 cm long, composed of irregularly branched filaments with descending rhizoidal outgrowths at the base, and subovate to oblongate plurilocular and/or unilocular sporangia (sessile or pedicellate).
Collections: NM271180, K010882, A170386.
Distributed in the Mediterranean (type locality: Split; Kützing 1843:289), the Atlantic coast of Iberia (Gallardo *et al.* 1985), and the Black Sea (Zinova 1967).
Aegean Sea: Makedonian coast (Anagnostidis 1968, as f. *arctus*; Haritonidis & Tsekos 1974, 1975, Haritonidis 1978), Pagasitikos Gulf (Diannelidis 1935), Crete (Politis 1932), Attica (Gerloff & Geissler 1974), and Rhodes (Diannelidis *et al.* 1977).

Ectocarpus siliculosus (Dillwyn) Lyngbye
= *Ectocarpus confervoides* (Roth) Le Jolis
= *Ectocarpus penicillatus* (C. Agardh) Kjellman (see Russel 1966)

Although cosmopolitan (Müller 1979) and widely distributed on the European coast, this species was not encountered on the coast of Sithonia. It has previously been reported from the Makedonian coast (Anagnostidis 1968, as *E. confervoides* f. *confervoides*, *E. penicillatus* and *E. siliculosus*; Haritonidis & Tsekos 1975, Haritonidis 1978), the Pagasitikos Gulf (Diannelidis 1935, as *E. confervoides*), Cyclades (Politis 1938, as *E. confervoides*), Attica (Politis 1936, as *E. confervoides*; Gerloff & Geissler 1974), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

FELDMANNIA Hamel

Feldmannia globifera (Kützing) Hamel

Reported from Smirna and Lesbos (Kuckuck 1958) and the Cyclades (Nizamuddin & Lehnberg 1970), as an epiphyte on *Dictyopteris*, *Cystoseira* and seagrasses.

* ***Feldmannia irregularis*** (Kützing) Kützing
= *Ectocarpus irregularis* Kützing

Plants grew as epiphytes on species of *Cystoseira*. Thalli were up to 0.5 mm long, composed of irregularly branched filaments with intercalary meristematic zones and apical pseudohairs, and bore a few subovate, sessile plurilocular sporangia, to 70 µm long and 20 µm broad.
Collections: K010882, A140684.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic (see Cardinal 1964), usually found on *Codium*.
Aegean Sea: Makedonian coast (Anagnostidis 1968, with reservation; Haritonidis & Tsekos 1975, Haritonidis 1978), Mikonos (Schiffner & Schussnig 1943, as *Ectocarpus*), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971, as *Ectocarpus*).

Feldmannia paradoxa (Montagne) Hamel
= *Ectocarpus paradoxus* Montagne

Reported from the S. Archipelagus (Giaccone 1968a, as *Ectocarpus*) and Asia Minor (Güven & Öztig 1971, as *Ectocarpus*).

GIFFORDIA Batters

Giffordia mitchelliae (Harvey) Hamel

Reported from the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978, on seagrasses) and Rhodes (Diannelidis *et al.* 1977).

HERPONEMA J. Agardh

Herponema graniferum Kuckuck

Kuckuck (1956) erected this species based on Kützing's (1845) *Ectocarpus monocarpus* from the Adriatic and new material collected at Lesbos and Terracina (Tyrrhenian Sea). According to his description the plants grew on *Cystoseira* and formed small, 1 to 2 mm long, cushions with endophytic basal system growing below the epidermis of the host and giving rise to erect filaments with plurilocular sporangia inclosed in a sheath.

KUCKUCKIA Hamel

Kuckuckia spinosa (Kützing) Kuckuck

Reported from Lesbos (Kuckuck 1958), and Attica (Gerloff & Geissler 1974).

STREBLONEMA Pringsheim

* ***Streblonema sphaericum*** (Derbès & Solier) Thuret

Reported from Sithonia as a common epiphyte on the fronds of *Liebmannia leveillei* and *Cladosiphon mediterraneus* (Athanasiadis 1985a).
Distributed in the Mediterranean (type locality: Marseille; see Le Jolis 1863:73), the Black Sea (Zinova 1967), and the NE. Atlantic to the British Isles.
Aegean Sea: Sithonia.
Note: see note under *Myriotrichia repens*.

Excluded species

Ectocarpus reptans P. & H. Crouan

This species was originally described from Brittany (Crouan & Crouan 1867:161) as an epiphyte on *Fucus serratus* L. and later reported from various localities on the Atlantic coast of France and Scandinavia (see Hamel 1931c, Rueness 1977) and the Baltic (Kjellman 1872). Its taxonomic status is, however, obscure, although some Scandinavian records have been associated with the microthallus stage of *Asperococcus* (see Pedersen 1984:60). In the Mediterranean, the species has been reported by Hauck (1885) from the Adriatic and by Diannelidis (1953) from the N. Sporades. Judging from Diannelidis' description, the Aegean record is doubtful and probably based on a misidentification.

Pilayella littoralis (Linnaeus) Kjellman

Reported from the Makedonian coast (Anagnostidis 1968, with reservations). The species is not known in the Mediterranean except the sporadic records from the Adriatic (Hauck 1885, Schiffner 1931), which require confirmation.

Sorocarpus micromorus (Bory) Silva (1952:272)
= *Sorocarpus uvaeformis* (Lyngbye) Pringsheim

Spongonema tomentosum (Hudson) Kützing
= *Ectocarpus tomentosus* Hudson

The above two species have been reported from Attica (Politis 1936, as *S. uvaeformis* Pringsh.), and the Pagasitikos Gulf [Diannelidis 1935, as *E. tomentosus* (Huds.) Lyngb.]. They should be excluded from the Aegean marine flora as they are considered to be cold-temperate species, not known elsewhere in the Mediterranean (Gerloff & Geissler 1974).

RALFSIACEAE Farlow

LITHODERMA Areschoug

* ***Lithoderma adriaticum*** Hauck

Reported as new to the marine flora of Greece from material collected on the coast of the Sithonia peninsula (Athanasiadis 1985a).

MICROSPONGIUM Reinke

* ***Microspongium gelatinosum*** Reinke

Minute, infertile crusts found near the base of *Scytosiphon lomentaria* were easily distinguished from associated ralfsioid algae by their soft and gelatinous texture. Thalli were up to 200 µm thick, composed of simple erect filaments, 20- to 25-celled, 6.5 to 12 µm broad, easily gliding apart in squash preparations. The filaments were composed of isodiametric cells slightly broader at the apices and usually bounded together at the base forming a polystromatic basal tissue, 2 or 3 cell layers thick.
Collections: K220386.
Distributed in the Aegean Sea, the N. Atlantic (see Rueness 1977, Fletcher 1978) and the Black Sea (Zinova 1967).
Aegean Sea: Sithonia (present study).
Note: It is known that plants with similar morphology are involved in the life history of

Scytosiphon lomentaria (see Wynne 1969, Fletcher 1978), which is widely distributed on the European coast. Curiously, this is the first record of *M. gelatinosum* in the Mediterranean, although the genus is also represented by another species, *Microspongium kuckuckianum* Schiffner (1916:156) from the Adriatic, the status of which requires re-investigation.

RALFSIA Berkeley

* ***Ralfsia clavata*** (Harvey in Hooker) P. & H. Crouan

The identification of this species was based on limited material found on pebbles together with *Lithoderma adriaticum* and *Lophosiphonia scopulorum*. Thalli were up to 200 µm thick, polystromatic, composed of firmly bounded vertical filaments, 9 to 11 µm broad, giving rise to 5- or 6-celled paraphyses and elliptical unilocular sporangia, 40 to 50 µm long.
Collections: A041280.
Distributed in the Aegean Sea and the N. Atlantic (type locality: British Isles; Hooker 1933:391, as *Myrionema*) (see Rueness 1977, Fletcher 1978).
Aegean Sea: Sithonia (present study).
Note: There are no previous records of *R. clavata* in the Aegean Sea or elsewhere in the Mediterranean, although the species is widely reported in the N. Atlantic. Plants with similar morphology are apparently involved in the life history of *Petalonia fascia* (see Edelstein *et al.* 1970), which is widespread on the European coast including the Mediterranean (see Boudouresque *et al.* 1984, Cormaci & Furnari 1979). In the Aegean Sea, *P. fascia* has been reported from Crete (Politis 1932) although the record was never confirmed.

* ***Ralfsia verrucosa*** (Areschoug) J. Agardh

Plants forming discoid patches, several cm in extent, grew on shells, pebbles and rocks in semi-exposed and sheltered habitats close to the surface. Thalli were dark brown, with individual fronds to 650 µm thick, occasionally superimposed and composed of a polystromatic basal tissue with slightly ascending and upward-curving filaments, firmly bounded together. Ascending filaments were 6.5 to 12 µm broad (being generally broader at the base), occasionally branched, and composed of isodiametric to rectangular cells. Phaeophycean hairs, developed from upward-curving filaments, occurred in groups, borne in cavities on the thallus surface. Empty plurilocular sporangial walls, occurring on the thallus surface, were observed on plants collected in summer.
Collections: K010882, K210684, SC120784, SI180784.
Cosmopolitan; distributed in most boreal to warm-temperate regions.
Aegean Sea: Sithonia (present study) and S. Archipelagus (Giaccone 1968a, as *R. verrucosa* J. Ag.).

MYRIONEMATACEAE Nägeli

MYRIONEMA Greville

* ***Myrionema liechtensternii*** Hauck

Reported as new to the marine flora of Greece from material found on crustose and articulated corallines collected on the coast of Sithonia (Athanasiadis 1985a).

Myrionema orbiculare J. Agardh
= *Ascocyclus orbicularis* (J. Agardh) De Toni (Dixon & Russell 1964:281)

Reported from Mikonos [Schiffner & Schussnig 1943, as *A. orbicularis* (J. Ag.) Magnus, on *Posidonia*].

Myrionema strangulans Greville
= *Myrionema vulgare* Thuret (Sauvageau 1898:25)

Reported from the Makedonian coast (Anagnostidis 1968), the N. Sporades (Diannelidis 1950, 1953), and Mikonos (Schiffner & Schussnig 1943, as *M. vulgare*) as an epiphyte on species of *Ulva* and *Cladophora*, *Laurencia obtusa*, and on *Zostera*.

* ***Myrionema*** sp.

Minute discoid crusts, to 0.6 mm in diameter, grew on the fronds of *Laurencia obtusa* var. *crucifera* in the upper sublittoral zone. Thalli were composed of a monostromatic basal disc (hypothallium) to 11.5 µm thick, provided with erect ascocystes, 25 to 70 µm long and 10 µm broad, uniseriate plurilocular sporangia, to 30 µm long and 5 µm broad, and phaeophycean hairs, 8 to 10 µm broad. Cell walls (presumably ascocyste husks), to 120 µm long, were observed among the erect filaments.
Collections: A290783.
Note: This combination of morphological features is not previously ascribed to any species of the genus in the Mediterranean, although some relationship to *M. magni* and *Ascocyclus conchicola* J. Feldmann (1937:254) exists (see table I).

Table I. Morphological characteristics of Mediterranean species of *Murionema* - *Ascocyclus*

	Phaeoph. hairs breadth	Pluril. sp. length x breadth	Ascocystes length x breadth	thallus diameter
Ascocyclus conchicola (Feldmann 1937)	6-8 µm	to 60 µm x 7-8 µm	70-80 µm x 8-10 µm	1-2 mm
Myrionema orbiculare (Feldmann 1937, Loiseaux 1967, Christensen 1958)	6-10.5 µm and 15-20 µm	60-80 µm x 8-10 µm and 12-15 µm	100-170 µm x 10-15 µm	2-10 mm
Myrionema magni (Feldmann 1937 Loiseaux 1967)	8-12 µm	30-70 µm x 8-10 µm	100-200 µm x 8-10 µm and 12-15 µm	0.3-1 mm
Myrionema sp.	8-10 µm	to 30 µm x 5 µm	25-70 µm (to 120 ?) x 10 µm	to 0.6 mm

ELACHISTACEAE Kjellman

ELACHISTA Duby

* ***Elachista intermedia*** P. & H. Crouan

Plants grew on the fronds of *Cutleria multifida*, collected from the sublittoral zone at ca 20 m

depth. Thalli were up to 3 mm long and bore pyriform unilocular sporangia, to 90 µm long, developed at the base of assimilatory filaments, 12 to 45 µm broad.
Collections: SR270684
Distributed in the Mediterranean and the NE. Atlantic to Brittany (type locality; Crouan & Crouan 1867:160, on *Cystoseira*).
Aegean Sea: Sithonia (present study).

CORYNOPHLAEACEAE Oltmanns

LEATHESIA S. F. Gray

* ***Leathesia*** cf. ***mucosa*** J. Feldmann

A single epizoic individual was collected in the sublittoral zone (6 m depth). Its thallus was mucilaginous and subspherical, to 3 mm in diameter, attached to the substratum by a basal holdfast. Squash preparations showed a loose medulla, composed of irregularly branched and reticulate cells, to 160 µm long and 40 µm broad, giving rise to simple assimilatory filaments, to 700 µm long and 10 µm broad, composed of up to 30 cells. Sporangial initials, to 20 µm long, were borne at the base of the assimilatory filaments. Phaeophycean hairs were not seen.
Collections: OI070480.
Endemic in the Mediterranean (type locality: France; Feldmann 1937:297, figs 49 to 53) (Ercegovic 1948).
Aegean Sea : Olibias island (present study).
Note: The Aegean plants were distinguished from the varieties *mucosa* and *condensata* J. Feldmann (1937) by longer assimilatory filaments, which in these two taxa are 350 to 400 µm and 150 to 200 µm respectively, and composed of 10 to 12 cells.

MYRIACTULA O. Kuntze

* ***Myriactula rigida*** (Sauvageau) Hamel

Plants grew in the sublittoral zone (25 to 30 m depth) as epiphytes on the frond of *Cutleria multifida*. Thalli were subspherical, to 700 µm in diameter, composed of a basal prostrate system giving rise to erect, fusiform assimilatory filaments, to 650 µm long and 12 to 35 µm broad, composed of cylindrical cells. Plurilocular or unilocular sporangia were developed at the base of the assimilatory filaments, the former up to 70 µm long and 8 µm broad and the latter up to 100 µm long and 40 µm broad.
Collections: SR200784, KC300784.
Endemic in the Mediterranean (type locality: Villefrance-sur-Mer; Sauvageau 1936:164, figs 11,12, as *Myriactys*) (Ercegovic 1948).
Aegean Sea: Sithonia (present study).

* ***Myriactula rivulariae*** (Suhr in Areschoug) J. Feldmann

Plants grew in the sublittoral zone as epiphytes on the frond of *Cystoseira spinosa*. Thalli were subspherical, to 700 µm in diameter, composed of a basal prostrate system giving rise to erect assimilatory filaments and phaeophycean hairs. Assimilatory filaments were fusiform, to 580 µm long and 40 µm broad at their middle broader part, and composed of cylindrical to moniliform cells. Phaeophycean hairs were to 20 µm broad. Elliptical to pyriform unilocular sporangia, to 170 µm long and 40 µm broad, were borne at the base of assimilatory filaments. Plurilocular sporangia were uniseriate and of two types, each restricted either to the proximal end of the assimilatory filaments, or borne from basal assimilatory cells. The former were simple or branched, to 28 µm long and 8 µm broad, and the latter simple, to 70 µm long and 10 µm broad.
Collections: A290680, KI310783.

Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic (Feldmann 1937) to the British Isles (see Parke & Dixon 1976).
Aegean Sea: Sithonia (present study), Lesbos (Kuckuck 1929), Limnos (Schiffner & Schussnig 1943), and the S. Archipelagus (Giaccone 1968a, as *M. rivulariae* Feldm.).

Myriactula stellulata (Harvey) Levring

Reported from Attica (Gerloff & Geissler 1974).

* *Myriactula* sp.

A few infertile plants were found in the sublittoral zone as epiphytes on the fronds of *Ceramium codii* and *Galaxaura oblongata*. Thalli were hemispherical, to 900 µm long, composed of a monostromatic basal disc, less than 200 µm in extent, giving rise to erect filaments. The erect filaments were subdichotomously branched at the base, composed of elliptical cells, to 40 µm long and 18 µm broad, giving rise to phaeophycean hairs, to 12 µm broad, and simple assimilatory filaments, to 800 µm long. The assimilatory filaments were composed of cylindrical cells, to 40 µm long and 6 to 10 µm broad, gradually becoming oblongate to moniliform and slightly broader towards the apices. Individuals bore uniseriate plurilocular sporangia, to 80 µm long and 6 to 8 µm broad, in groups cut off from basal cells of the assimilatory filaments. Empty uniseriate sporangia were provided with a single apical opening.
Collections: A140782, KI310783.
Note: Although little is known about the morphological variation in species of this algal group, a survey of the relevant literature (Kuckuck 1929, Børgesen 1934, Sauvageau 1936, Feldmann 1937) showed that the Aegean plants are distinguished from congenerics by a unique combination of features based on the shape and size of the assimilatory filaments, and the location and size of the plurilocular sporangia. Judging from these features, the Aegean plants appear to be most related to *Myriactula elongata* (Sauvageau) Hamel (Sauvageau 1936:156), which, however, exhibits longer (to 2 mm) and broader (15 to 20 µm) assimilatory filaments and lacks plurilocular sporangia. On the other hand, Zinova's (1967, fig. 58) concept of *Myriactula arabica* (Kützing) J. Feldmann, based on material from the Black Sea, is in good agreement with the Aegean plants, although apparently different from previous accounts on this species (Kützing 1858, tab. VII, fig. 1 b; Kuckuck 1929, figs 37 to 39; Børgesen 1934, figs 4, 5). According to these authors *M. arabica* (=*Phycophila arabica* Kützing 1858:1) is characterized by slightly fusiform and curved assimilatory filaments, to 400 µm long (after Kützing's and Kuckuck's illustrations), and occasional development of plurilocular sporangia along the proximal (upper) end of assimilatory filaments. These are features not evident either in Zinova's material (as appears from the illustration) or in the Aegean plants.

Excluded species

Leathesia flaccida (C. Agardh) J. Agardh

This species was originally described as *Corynephora flaccida* C. Agardh (1827:630) from material collected at Trieste and later reported from Naxos [Schiffner & Schussnig 1943, as *L. flaccida* (Ag.) Endl.]. Its status is, however, obscure, since it has never been included in earlier taxonomic accounts of the genus (cf. Kuckuck 1929, Hamel 1935).

CHORDARIACEAE Greville

CLADOSIPHON Kützing

* ***Cladosiphon mediterraneus*** Kützing
= *Castagnea mediterranea* (Kützing) Hauck
= *Castagnea fistulosa* (Zanardini) Derbès & Solier
= *Nemacystus posidoniae* (Meneghini) Hauck (Kylin 1940:26)

Plants were commonly met with in the sublittoral zone as epiphytes on the frond of *Halimeda tuna*, species of *Codium*, and *Posidonia* leaves. Thalli were soft and mucilaginous, to 50 mm long, composed of an irregularly ramified frond. Medullary cells gave rise to curved assimilatory filaments, to 400 µm long and 12 µm broad, and phaeophycean hairs. Plurilocular sporangia, to 30 µm long and 8 µm broad, were borne in lateral clusters along the proximal (upper) ends of the assimilatory filaments. A few elliptical unilocular sporangia, to 75 µm long, were borne on the basal cells of assimilatory filaments.
Myriotrichia repens was found as an epiphyte.
Collections: A290680, A100581, A140782, A140684, SR170684, T280684.
Distributed in the Mediterranean (type locality: Naples, Livorno; see Kylin 1940:26), and the Black Sea (Zinova 1967).
Aegean Sea: Sithonia (present study), N. Sporades (Diannelidis 1950, 1953, as *C. fistulosa)*, Mikonos (Schiffner & Schussnig 1943, as *N. posidoniae*), and Attica (Politis 1936, as *C. fistulosa*; Gerloff & Geissler 1974, as *C. mediterraneus*).

GONTRANIA Sauvageau

* ***Gontrania lubrica*** Sauvageau

A single plant was collected in the sublittoral zone (ca 20 m depth) on the frond of *Halimeda tuna*. The thallus was soft and mucilaginous, to 5 cm long, composed of a cylindrical frond, to 1 mm broad,sparsely branched at the base and attached to the substratum by means of a basal holdfast, ca 800 µm broad. The medulla was composed of cylindrical to elliptical cells, to 180 µm long and 60 µm broad, firmly bounded together, giving rise to phaeophycean hairs and simple assimilatory filaments. The former were ca 20 µm broad, and the latter up to 850 µm long and 12 µm broad composed of cells that were cylindrical at the base and isodiametric towards the apex. Elliptical unilocular sporangia, to 120 µm long and 90 µm broad, were borne from basal cells of the assimilatory filaments.
Myriotrichia repens grew among the assimilatory filaments.
Collections: SR200784.
Endemic in the Mediterranean, previously known only from the type locality (Villefrance-sur-Mer; Sauvageau 1936:186,figs 15 to 18).
Aegean Sea: Sithonia (present study).

LIEBMANNIA J. Agardh

* ***Liebmannia leveillei*** J. Agardh

Saxicolous, dense populations were commonly met with in sheltered habitats, to ca 1 m depth, in spring and summer. Thalli were yellow-brown, mucilaginous, 5 to 10 (40) cm long, composed of an irregularly and richly branched frond, to 1 cm broad, becoming hollow in older plants, and attached to the substratum by means of a basal holdfast. Medullary cells were composed of long-narrow to subspherical cells, usually reticulate in the outer periphery, giving rise to simple assimilatory filaments, to 250 µm long, with spherical cells, becoming larger, to 45 µm in diameter, towards the apices. Phaeophycean hairs and lanceolate plurilocular sporangia were present, the former on basal cells of the assimilatory filaments and the latter

terminally on short laterals.
Streblonema sphaericum was a common epiphyte.
Collections: A100581, K010882, SC270684.
Distributed in the Mediterranean (type locality: Trieste and Corsica; J. Agardh 1842:34,35), the Black Sea (Zinova 1967), and the NE. Atlantic to the British Isles (see Parke & Dixon 1976).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975, on rocks and species of *Cystoseira*), and Limnos (Schiffner & Schussnig 1943, on *Cystoseira*).

MESOGLOIA C. Agardh

* ***Mesogloia lanosa*** P. & H. Crouan

A few saxicolous plants were encountered in the sublittoral zone (ca 18 m depth). Thalli were brownish, soft and mucilaginous, to 20 cm long, composed of a sparsely branched and hollow frond, to 5 mm broad, with cylindrical to subspherical medullary cells, to 650 µm long and 70 µm broad, giving rise to simple assimilatory filaments and phaeophycean hairs. Assimilatory filaments were up to 260 µm long and 15 µm broad, composed of moniliform cells and developed elliptical unilocular sporangia, to 65 µm long, from their basal cells.
Myriotrichia adriatica was found as an epiphyte.
Collections: SR200784.
Distributed in the Aegean Sea and the NE. Atlantic (type locality: Brittany; Crouan & Crouan 1867:166, pl. 26, fig. 166) to the British Isles (see Parke & Dixon 1976).
Aegean Sea: Sithonia (present study).
Note: The distinction of this species from *M. vermiculata* (J. E. Smith) S. F. Gray is rather delicate and chiefly based on the shape of the cells of the assimilatory filaments (Crouan & Crouan 1867; cf. Hamel 1935:170), which in *M. vermiculata* progressively become larger and spherical towards the apices.

Excluded species

Sphaerotrichia divaricata (C. Agardh) Kylin

The single record from Asia Minor (Güven & Öztig 1971) is doubtful, as this cold-temperate species does not occur elsewhere in the Mediterranean.

SPERMATOCHNACEAE Kjellman

NEMACYSTUS Derbès & Solier

* ***Nemacystus flexuosus*** (C. Agardh) Kylin (1940:46)
= *Nemacystus ramulosus* Derbès & Solier

Plants were collected in the sublittoral zone as epiphytes on the frond of *Halimeda tuna* and *Posidonia* leaves. Thalli were yellow-brown, soft and mucilaginous, to 5 cm long and 2 mm broad, composed of an irregularly branched frond with medullary cells giving rise to simple and curved assimilatory filaments, to 170 µm long and 7 µm broad, and phaeophycean hairs, to 10 µm broad. Uniseriate plurilocular sporangia were borne on the basal cells of the assimilatory filaments.
Collections: A290680, A100581, K100782, A140684, A230684.
Endemic in the Mediterranean (type locality: Gibraltar; Agardh 1824:256, as *Chordaria*).
Aegean Sea: Sithonia (present study), N. Sporades (Diannelidis 1950, 1953, as *N. ramulosus*), Naxos and Mikonos (Schiffner & Schussnig 1943, as *N. ramulosus*).

SPERMATOCHNUS Kützing

Spermatochnus paradoxus (Roth) Kützing

Reported from the S. Archipelagus (Giaccone 1968a, as *S. Paradoxus* Ktz.), and Asia Minor (Güven & Öztig 1971).

STILOPHORA J. Agardh

* *Stilophora rhizodes* (Turner) J. Agardh

Plants, to 3 cm long, grew in the sublittoral zone (0.4 to 18 m depth) as epiphytes on the frond of *Cystoseira corniculata*. Those collected at semi-exposed habitats, in the upper sublittoral zone (ca 1 m depth), were generally smaller (2 to 4 mm long) and composed of robust fronds, to 0.5 cm broad, with clavate apices, whereas deep water specimens formed a more elongate (typical) frond with branches tapering to acute apices. All individuals bore elliptical unilocular sporangia, to 45 µm long, among assimilatory filaments, to 100 µm long, borne in tufts on the compact pseudoparenchymatous frond.
Collections: A100782, SI299783, SI160784, KI210784, A230684, SI180784.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the N. Atlantic (type locality: British Isles; Turner 1919:91, pl. 235, as *Fucus*) to Scandinavia (see Kylin 1947, Rueness 1977).
Aegean Sea: Sithonia (present study), N. Sporades [Diannelidis 1950, 1953, as *S. rhizodes* (Ehrh.) J. Agardh], Limnos and Mikonos [Schiffner & Schussnig 1943, as *S. rhizodes* var. *adriatica* (C. Ag.) J. Ag.], and Asia Minor [Güven & Öztig 1971, as *S. rhizodes* (Ehrb.) J. Ag.].
Note: The Aegean plants were much smaller than the Atlantic counterparts, which usually attain a length of 15 to 65 cm (Newton 1931). On the other hand, Mediterranean plants with diminutive thallus, smaller sporangia, and shorter assimilatory filaments are referred to var. *adriatica* (C. Agardh) J. Agardh (see Hamel 1937), the status of which requires re-examination.

STRIARIACEAE Kjellman

STRIARIA Greville

Striaria attenuata (Greville) Greville

Reported from the Thessaloniki Gulf (Haritonidis 1978), the Pagasitikos Gulf [Diannelidis 1948, as *S. attenuata* (Ag.) Grev., from the drift], the S. Archipelagus (Giaccone 1968a, as *S. attenuata* Grev.), and Asia Minor (Güven & Öztig 1971, as *S. attenuata* Grev. f. *fragilis*).

Excluded species

Isthmoplea sphaerophora (Carmichael) Kjellman

The single record from the Makedonian coast (Anagnostidis 1968) is doubtful, as this cold-temperate species is not known elsewhere in the Mediterranean.

MYRIOTRICHACEAE Kjellman

MYRIOTRICHIA Harvey

* *Myriotrichia adriatica* Hauck

The material referred to this species was found on the thallus of *Mesogloia lanosa* collected in

the sublittoral zone (ca 18 m depth). Specimens were to 3.5 mm long, composed of a prostrate system, growing on medullary and assimilatory filaments of the host, and erect, uniseriate and unbranched filaments, to 20 µm broad. Uniseriate plurilocular sporangia, to 30 µm long and 8 µm broad, were commonly formed in whorls at irregular intervals along the erect filaments, sometimes mixed with spherical unilocular sporangia, to 50 µm in diameter. A few phaeophycean hairs were laterally and singly formed on the erect filaments.
Collections: SR200784.
Endemic in the Mediterranean (type locality: Adriatic; Hauck 1885:337, on *Stilophora*).
Aegean Sea: Sithonia (present study).
Note: Although Kuckuck (1899) included *M. adriatica* in *M. repens,* later authors have accepted the two taxa as distinct species, following Hauck (e. g. Hamel 1938). This is supported here owing to the fact that *M. adriatica* and *M. repens* were collected at a similar habitat (sublittoral, ca 18 m depth, SR200784), although the plants grew on different hosts.

* ***Myriotrichia protasperococcus*** Kuckuck

Plants were found as epiphytes on the frond of *Cutleria multifida* collected in the sublittoral zone (20 m depth). Thalli were up to 7 mm long, composed of erect unbranched and parenchymatous filaments, to 100 µm broad, with spherical unilocular sporangia, to 40 µm in diameter, borne in sori at intervals with phaeophycean hairs.
Collections: SR200784.
Endemic in the Mediterranean (type locality: Naples; Kuckuck 1899:65, figs 10,11, tab. IV,V).
Aegean Sea: Sithonia (present study).

* ***Myriotrichia repens*** Hauck

Material observed on the fronds of *Stilophora rhizodes* and *Cladosiphon mediterraneus* from the coast of Sithonia was described in a previous paper (Athanasiadis 1985a). In new collections plants were found on the fronds of *C. mediterraneus* and *Gontrania lubrica.* The material on *Cladosiphon* bore spherical to elliptical unilocular sporangia, 30 to 70 µm long and 28 to 45 µm broad. The sporangia were occasionally provided with small isodiametric pedicels, and developed singly or in clusters on the erect filaments and sometimes also on the prostrate system. The erect filaments were simple and straight, to 400 µm long and 15 µm broad, composed of cylindrical cells and tapering to an apical phaeophycean hair. The prostrate filaments were to 10 µm broad and irregularly branched, and grew on outer medullary cells of the host. The material on *Gontrania* was obtained from the sublittoral zone (ca 18 m depth) and was composed of erect uniseriate filaments to 2 mm long and 15 to 20 µm broad, unbranched, and arising from a prostrate system. The erect fronds were provided with 1 or 2 apical and/or a few lateral phaeophycean hairs, and plurilocular sporangia, 28 to 40 µm long and 8 to 10 µm broad, borne in terminal sori.
Collections: A140684, SR200784.
Distributed in the Mediterranean (type locality: Adriatic; Hauck 1879:242, tab. 4 figs 1,2), the Black Sea (Zinova 1967), and the NE. Atlantic to Scandinavia (Rueness 1977).
Aegean Sea: Sithonia (Athanasiadis 1985a).
Note: Pedersen (1978) suggested that *M. repens* and *Streblonema sphaericum* are morphological forms of a single species (*M. clavaeformis* Harvey), basing that on observations from culture material of *M. clavaeformis* from the Danish coast. However, whether Mediterranean plants of these three taxa show a similar morphological variation is uncertain and needs further studies. The present collections support previous observations that *M. repens* is distinguished from *M. adriatica* by shorter and thinner thallus, plurilocular sporangia restricted to the apical parts of the erect filaments and elliptical unilocular sporangia (Hauck 1885).

GIRAUDIACEAE J. Feldmann

GIRAUDIA J. Feldmann

* ***Giraudia sphacelarioides*** Derbès & Solier

Commonly found as an epiphyte on diverse macroalgae and *Posidonia* leaves in the sublittoral zone (0.5 to at least 20 m depth). Individuals were to 7 mm long, composed of several erect and parenchymatous fronds, unbranched and attached to the substratum by means of basal rhizoids. Plurilocular sporangia developed in sori on the fronds, or on specialized short basal laterals, or replaced ordinary vegetative cells of the erect thallus. Phaeophycean hairs were commonly formed terminally and occasionally laterally.
Collections: NI200680, A140782, S100882, SR200784, K170386.
Distributed in the Mediterranean (type locality: Marseille; see Hamel 1937:189), the Black Sea (Zinova 1967), and the NE. Atlantic between the Salvage Islands (Weisscher 1983) and the S. Scandinavia (Rueness 1977).
Aegean Sea: Sithonia (present study), Mikonos (Schiffner & Schussnig 1943, on *Posidonia*).

PUNCTARIACEAE (Thuret) Kjellman

ASPEROCOCCUS Lamouroux

* ***Asperococcus turneri*** (J. E. Smith) Hooker
[*Asperococcus bullosus* Lamouroux 1813:62; *nomen nudum*]

Plants grew on pebbles and rocks in the sublittoral zone between 6 and 20 m depth. Thalli were up to 15 cm long, composed of a single saccate frond, to 25 mm broad, with sori of unilocular sporangia scattered on the surface.
Collections: OI090680, A210480, A140580, A100581, SR200784.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic between the Canaries (Børgesen 1926) and Scandinavia (see Rueness 1977).
Aegean Sea: Makedonian coast (present study), N. Sporades (Diannelidis 1950, 1953, as *A. bullosus*), Attica (Gerloff & Geissler 1974), and Asia Minor (Güven & Öztig 1971, as *A. bullosus*).

PUNCTARIA Greville

* ***Punctaria latifolia*** Greville

Observed as an epiphyte on drift material of seagrasses collected in the vicinity of the Thessaloniki Gulf in March. Thalli were up to 30 cm long, composed of several ovate to lanceolate-lingulate fronds, to 4 cm broad. Plurilocular sporangia and phaeophycean hairs, the latter usually borne in groups, were scattered on the frond.
Collections: NM220386 Drift
Distributed in most temperate seas, the Mediterranean, the Black Sea (Zinova 1967), the N. Atlantic to Scandinavia and Canada, and the Pacific (see Womersley 1967).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978), and Asia Minor (Güven & Öztig 1971).

Excluded species

Asperococcus fistulosus (Hudson) Hooker
= *Asperococcus echinatus* (Mertens) Greville (see Wynne 1973:139)

Reported from the Makedonian coast [Anagnostidis 1968, as *A. echinatus* (forma ?)] and Asia Minor [Güven & Öztig 1971, as *A. echinatus* (Mart.) Grev.]. Apart from these records which seem doubtful, this cold-temperate species has only been reported from eastern Sicily in the Mediterranean (see Cormaci & Furnari 1979).

SCYTOSIPHONACEAE Farlow

COLPOMENIA Derbès & Solier

* ***Colpomenia sinuosa*** (Roth) Derbès & Solier
= *Hydroclathrus sinuosus* (Roth) Zanardini
= *Asperococcus sinuosus* (Roth) Bory

Plants grew on the frond of *Cystoseira corniculata* in the upper sublittoral zone (0.5 to 2 m depth), forming dense populations in spring and summer. Well developed individuals reached a diameter of 10 cm, composed of an irregularly convulated, subspherical thallus.
Collections: OI090680, A100581, K010882.
Distributed in most tropical and subtropical regions (Wynne & Norris 1976); in European waters from the Atlantic coast of Iberia (Ardré 1970) (type locality: Cadiz; Roth 1806:327, as *Ulva*) to the eastern Mediterranean.
Aegean Sea: Makedonian coast (Politis 1925, 1953, as *Hydroclathrus*; Haritonidis & Tsekos 1975), Crete (Politis 1932, as *Hydroclathrus*), Cyclades (Coppejans 1974, as *C. sinuosa* Derb. & Sol.), Lesbos (Candargy 1899, as *Hydroclathrus*), N. Sporades (Schiffner & Schussnig 1943), Attica (Politis 1936, as *Hydroclathrus*; Gerloff & Geissler 1974), Egina Island (Gerloff & Geissler 1974), Methana (Fauché *et al.* 1832-33, as *Asperococcus sinuosus* Bory), Rhodes (Reinbold 1898, Diannelidis *et al.* 1977), and Asia Minor [Güven & Öztig 1971, as *C. sinuosa* (Derb. & Sol.)].
Note: Bory's concept of *Asperococcus sinuosus* was apparently based on *Encoelium sinuosum* (Roth) C. Agardh (1820:146) (Fauché *et al.* 1832-33:326).

HYDROCLATHRUS Bory

* ***Hydroclathrus clathratus*** (Bory ex C. Agardh) Howe

Saxicolous plants were encountered in the sublittoral zone (ca 20 m depth). Thalli were up to 5 cm in length, composed of a roundish compressed frond, characteristically perforated. Drifting individuals collected in the vicinity of Thessaloniki Gulf reached a length of 10 cm.
Collections: SR270684, NM220386 Drift.
Distributed in most tropical and subtropical regions; the Mediterranean (see Hamel 1937), S. Australia (see Womersley 1967), the Red Sea (see Papenfuss 1968), the Caribbean (Howe 1920); in European waters from the Atlantic coast of Iberia (Ardré 1970) to the eastern Mediterranean.
Aegean Sea: Makedonian coast (present study), Attica [Gerloff & Geissler 1974, as *H. clathratus* (Bory) Howe].

PETALONIA Derbès & Solier

Petalonia fascia (O. F. Müller) O. Kuntze

This species was not found on the coast of Sithonia and it is reported only from Crete (Politis

1932). However, it is possible that crusts of *Ralfsia clavata* found in the upper sublittoral zone could represent its crustose stage (see Edelstein *et al.* 1970, Roeleveld *et al.* 1974, Fletcher 1978).

SCYTOSIPHON C. Agardh

* ***Scytosiphon lomentaria*** (Lyngbye) Link

Saxicolous plants were collected in sheltered habitats close to the water level in early spring. Thalli were up to 20 cm long (40 cm in drift material), composed of several cylindrical hollow fronds, to 8 mm broad, with typical constrictions at intervals. Minute infertile crusts of *Microspongium*-like morphology grew near the base of the plants.
Collections: K200386.
Cosmopolitan; reported in most subtropical, temperate and boreal regions.
Aegean Sea: Makedonian coast [Haritonidis & Tsekos 1975, Haritonidis 1978, as *S. lomentaria* (Lyngb.) Endl.], Crete [Politis 1932, as *S. lomentaria* (Lyngb.) J. Ag.], Pagasitikos Gulf [Diannelidis 1948, as *S. lomentaria* (Lyngb.) J. Ag.], Attica [Politis 1936, as *S. lomentaria* (Lyngb.) J. Ag.; Gerloff & Geissler 1974], Egina Island (Gerloff & Geissler 1974), Mikonos [Schiffner & Schussnig 1943, as *S. lomentaria* (Lyngb.) J. Ag.], Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971, as *S. lomentaria*).

CUTLERIALES Kjellman
CUTLERIACEAE Hauck

CUTLERIA Greville

Cutleria adspersa (Roth) De Notaris

Reported from Mikonos (Schiffner & Schussnig 1943; on granite rocks) and Rhodes (Diannelidis *et al.* 1977).

* ***Cutleria multifida*** (J. E. Smith) Greville
= *Aglaozonia parvula* (Greville) Zanardini

Oogonial plants and infertile crusts of *Aglaozonia* were collected in the sublittoral zone (3 to 20 m depth). The gametophytes grew on pebbles and their thalli were up to 15 cm long and 1 cm broad, composed of a subdichotomously to irregularly branched frond, flattened at the base, with branches gradually becoming narrow and terete towards the apex, tapering to a filamentous fringe, a few mm broad. Pedicellate oogonia and phaeophycean hairs were borne in sori scattered on the branches. *Aglaozonia* -crusts were to 20 mm broad, irregularly lobed, and grew on crustose corallines. *Myriotrichia protasperococcus* was found on gametophytes collected at ca 20 m depth.
Collections of *Cutleria*: OI090680, A100782, SR270684, SR200784
Collections of *Aglaozonia*: A201180, A091081, A140782
Distributed in most temperate regions, in European waters from S. Scandinavia to the eastern Mediterranean.
Aegean Sea: Sithonia (present study), Crete (Diannelidis 1950), Attica (Gerloff & Geissler 1974), and Asia Minor (Güven & Öztig 1971). Previous records of the sporophytic stage are lacking.

ZANARDINIA Nardo

* ***Zanardinia prototypus*** (Nardo) Nardo
= *Zanardinia collaris* C. Agardh sensu P. & H. Crouan (Feldmann 1937:305)

Infertile plants grew on rocks, crustose corallines, and species of *Cystoseira* in the sublittoral zone between 0.5 and at least 20 m depth. Thalli were dark brown to blackish, to 5 cm in extent, composed of an horizontally expanded and irregularly lobed frond with filamentous margins. Thallus organization was dorsiventral, composed of large medullary cells with a thick epithallial tissue and ventral rhizoids.
Collections: A201180, A110581, A040183, SR270684; also observed at K.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic to the British Isles (Hiscock & Maggs 1984).
Aegean Sea: Makedonian coast (Anagnostidis 1968, as *Z. prototypus* Nardo), Attica (Gerloff & Geissler 1974), the S. Archipelagus (Huvé 1962a, as *Z. prototypus* Nardo; Giaccone 1968a, as *Z. collaris* Crouan), and Asia Minor (Güven & Öztig 1971, as *Z. prototypus* Nardo).

DESMARESTIALES Setchell & Gardner
ARTHROCLADIACEAE Chauvin

ARTHROCLADIA Duby

* ***Arthrocladia villosa*** (Hudson) Duby

Plants, to 70 cm long, grew with *Sporochnus pedunculatus* on pebbles in the sublittoral zone (ca 30 m depth). Thalli were composed of a single terete and irregularly branched frond with few verticillate lateral axes and a regular arrangement of branches in whorls. Uniseriate unilocular sporangia were formed terminally on lateral branches and were up to 280 µm long and 15 to 20 µm broad.
Collections: KC310784.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic to S. Scandinavia (see Rueness 1977).
Aegean Sea: Sithonia (present study).

SPOROCHNACEAE Greville

NEREIA Zanardini

* ***Nereia filiformis*** (J. Agardh) Zanardini

Saxicolous and epiphytic plants were sporadically found in the sublittoral zone (to ca 15 m depth) as epiphytes on species of *Cystoseira*. Thalli were up to 17 cm long, composed of a terete and irregularly branched frond, to 2 mm broad, with meristematic zones provided with an apical tuft of hairs. Unilocular sporangia were developed among clavate assimilatory filaments, particularly abundant in the meristems.
Collections: OI090680, OI150680, A100782, K100782.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the Atlantic coast of Africa (type locality: "...mari Atlantico ut Senegambiae, ad Tingin...mari mediterraneo..."; Agardh 1841:6, as *Desmarestia*).
Aegean Sea: Makedonian coast (Anagnostidis 1968), N. Sporades (Diannelidis 1950, 1953), and the S. Archipelagus (Huvé 1962a).

SPOROCHNUS C. Agardh

* ***Sporochnus pedunculatus*** (Hudson) C. Agardh

Plants grew with *Arthrocladia villosa* on pebbles in the sublittoral zone (ca 30 m depth). Thalli were up to 30 cm long, composed of a terete and irregularly branched frond, to 0.3 mm broad, attached to the substratum by a small basal holdfast. Unilocular sporangia occurred among assimilatory filaments on the pedicellate receptacles, which were to 1.5 mm long, and characteristically provided with an apical tuft of hairs.
Collections: KC300784.
Distributed in the Mediterranean and the NE. Atlantic to S. Scandinavia (see Rueness 1977).
Aegean Sea: Sithonia (present study).

LAMINARIALES Oltmanns
LAMINARIACEAE Bory

SACCORHIZA Pylaie

Saccorhiza polyschides (Lightfoot) Batters
= *Laminaria blossevillei* Bory (Feldmann 1934:172)

This species is a common alga on the Atlantic coast of Europe, but in the Mediterranean it is restricted to a few localities close to the straits of Gibraltar and Messina (Feldmann 1934). It was once collected by Chaubard & Bory de Saint-Vincent (1838) at Chios (Feldmann 1934). Whether these Aegean plants were dredged or found from the drift is unknown.

Excluded species

Chorda filum (Linnaeus) Stackhouse

Candargy's (1899:VIII) single record from Lesbos is probably based on a misidentification, since this cold-temperate species does not occur in the Mediterranean (Gerloff & Geissler 1974).

SPHACELARIALES Migula
CHORISTOCARPACEAE Kjellman

CHORISTOCARPUS Zanardini

* ***Choristocarpus tenellus*** (Kützing) Zanardini

A specimen with plurilocular sporangia was found on the frond of *Dasya baillouviana* attached to a drift plant of *Sargassum acinarium*.The sporangia were spherical to oblongate, to 40 µm long and 28 µm broad, sessile and laterally borne on subdichotomously branched filaments.
Collections: K020786 Drift.
Distributed in the Mediterranean (type locality: Lessina, Kützing 1849:457, as *Ectocarpus*), the Black Sea (Zinova 1967) and the Atlantic coast of Iberia (Gallardo *et al.* 1985) to the British Isles (Parke & Dixon 1976).
Aegean Sea: Sithonia (present study).

SPHACELARIACEAE Decaisne

SPHACELARIA Lyngbye

* ***Sphacelaria cirrosa*** (Roth) C. Agardh
= *Sphacelaria hystrix* Suhr
= *Sphacelaria irregularis* Kützing
= *Sphacelaria rhizophora* Kützing (Prud'homme van Reine 1982:226)

Commonly found as an epiphyte on the fronds of *Stypocaulon scoparium, Dilophus fasciola*, species of *Cystoseira* and *Laurencia*, and seagrasses. Plants bore propagules with three or four branches.
Collections: NI200680, P000881, A041280, K010882
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic to Scandinavia (Rueness 1977).
Aegean Sea: Makedonian coast (Anagnostidis 1968, Haritonidis & Tsekos 1974, 1975, Haritonidis 1978), Pagasitikos Gulf [Diannelidis 1948, var. *irregularis* (Kütz.) Hauck], N. Sporades [Diannelidis 1953, as var. *irregularis* (Kütz.) Hauck; Schiffner & Schussnig 1943, var. *rhizophora* Kütz.], Limnos and Mikonos (Schiffner & Schussnig 1943), Cyclades (Nizamuddin & Lehnberg 1970, Coppejans 1974, as *S. hystrix)*, Attica (Politis 1936, Gerloff & Geissler 1974), Egina Island (Gerloff & Geissler 1974, as *S. hystrix*), Rhodes (Reinbold 1898, Diannelidis *et al.* 1977), the S. Archipelagus (Giaccone 1968a, as *S. cirrosa* Ag.), and Asia Minor (Güven & Öztig 1971).

Sphacelaria fusca (Hudson) S. F. Gray

Reported from the S. Archipelagus (Giaccone 1968a, as *S. fusca* Ag.).

* ***Sphacelaria plumula*** Zanardini

A few saxicolous, infertile plants, to 5 mm long, were collected in the sublittoral zone (ca 10 m depth).
Collections: S100882.
Distributed in the Mediterranean and the NE. Atlantic to Denmark (see Prud'homme van Reine 1982).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975, Haritonidis 1978) and Rhodes (Diannelidis *et al.* 1977).

* ***Sphacelaria tribuloides*** Meneghini

A few plants were encountered in the sublittoral zone as epiphytes on the frond of a *Peyssonnelia* sp. The thallus formed hemispherical cushions, to 6 mm in diameter, composed of a basal discoid holdfast giving rise to erect filaments, 45 to 50 µm broad, sparsely branched and usually provided with lateral hairs. Tribuliform propagules, to 140 µm long and 120 µm broad, developed on short pedicels, to 15 µm broad.
Collections: A140684.
Distributed in most temperate to tropical regions; in European waters from Denmark to the eastern Mediterranean (see Prud'homme van Reine 1982).
Aegean Sea: Makedonian coast (Anagnostidis 1968, Haritonidis & Tsekos 1975, Haritonidis 1978), Attica (Politis 1936), Cyclades (Politis 1938, Coppejans 1974), and Rhodes (Diannelidis *et al.* 1977).

Excluded species

Sphacelaria nana Kützing
= *Sphacelaria saxatilis* Sauvageau (Prud'homme van Reine 1982:93)

The single record from the Makedonian coast [Anagnostidis 1968, as *S*.sp. (*S. saxatilis* (Kuck.) Sauv.] is doubtful like previous Mediterranean records of this species from the Adriatic (Prud'homme van Reine 1982:101).

Sphacelaria plumosa Lyngbye
= *Chaetopteris plumosa* Kützing (Prud'homme van Reine 1982:116)

The records of this boreal species from the Makedonian coast (Haritonidis & Tsekos 1974, 1975, and Haritonidis 1978, as *Chaetopteris*) are doubtful and probably based on misidentifications.

Sphacelaria radicans (Dillwyn) C. Agardh

The single record from the S. Archipelagus (Giaccone 1968a, as *S. radicans* Harv.) is doubtful and probably based on a misidentification, since this cold-temperate species does not occur elsewhere in the Mediterranean (see Prud'homme van Reine 1982).

STYPOCAULACEAE Oltmanns

HALOPTERIS Kützing

* ***Halopteris filicina*** (Grateloup) Kützing
= *Sphacelaria filicina* (Grateloup) C. Agardh

Plants, to 4 cm long, were sporadically encountered on crustose corallines and *Posidonia* rhizomes in the sublittoral zone, to ca 25 m depth.
Collections: KI290783, SC240684, SR200784.
Distributed in the Mediterranean and the NE. Atlantic between the Canaries (Børgesen 1926) and the British Isles (see Parke & Dixon 1976).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975, Haritonidis 1978), Cyclades (Politis 1938, as *Sphacelaria*; Coppejans 1974), Attica and Egina Island (Gerloff & Geissler 1974), S. Archipelagus (Huvé 1962a, Giaccone 1968a, as *H. filicina* Kütz.), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

STYPOCAULON Kützing

* ***Stypocaulon scoparium*** (Linnaeus) Kützing
= *Halopteris scoparia* (Linnaeus) Sauvageau
= *Sphacelaria scoparia* (Linnaeus) Lyngbye (Prud'homme van Reine 1982:261)

Vertical rock surfaces in semi-exposed habitats in the upper sublittoral zone (to ca 5 meters depth) were commonly covered by dense populations of this species, while sporadic individuals were found to at least 15 m depth. Plants were dark brown, to 10 cm long, composed of several main axes radially irregularly ramified, with lateral branches usually provided with one order of spiniform and distichously arranged branchlets. Pedicellate unilocular sporangia, to 50 µm in diameter, were observed on individuals collected in November. Numerous ceramiaceous species and minute crustose corallines were observed as epiphytes, particularly in late summer and autumn.
Collections: A020480, OI070480, NI130480, A210480, A061180, A100581, A200881,

K010882, A230684; also observed at P, S, SC, and T.
Distributed in the Mediterranean, the Black Sea (Zinova 1967) and the Atlantic between the Cape Verde Islands (see Price *et al.* 1978) and S. Scandinavia (see Rueness 1977).
Aegean Sea: Makedonian coast [Politis 1925, 1953, as *Sphacelaria*; Haritonidis & Tsekos 1974,1975, Haritonidis 1978, as *Halopteris*; Anagnostidis 1968], Thrake (Katsikopoulos 1939), Lesbos (Candargy 1899, as *Sphacelaria scoparia* Ag.), Limnos (Schiffner & Schussnig 1943), N. Sporades (Schiffner & Schussnig 1943 and Diannelidis 1950, 1953, as *Halopteris*), Attica (Politis 1936, as *Sphacelaria*; Gerloff & Geissler 1974, as *Halopteris*), Egina Island (Gerloff & Geissler 1974, as *Halopteris*), Cyclades [Politis 1938, as *Sphacelaria*; Nizamuddin & Lehnberg 1970 and Coppejans 1974, as *Halopteris*], Mikonos (Schiffner & Schussnig 1943), S. Archipelagus (Giaccone 1968a, as *H. scoparia* Sauv.), Rhodes (Diannelidis *et al.* 1977, as *Halopteris*), and Asia Minor (Güven & Öztig 1971, as *Halopteris* and *Sphacelaria*).

CLADOSTEPHACEAE Oltmanns

CLADOSTEPHUS C. Agardh

* ***Cladostephus spongiosus*** (Hudson) C.Agardh f.***verticillata*** (Lightfoot) Prud'homme van Reine (1972:142)
= *Cladostephus verticillatus* (Lightfoot) C. Agardh

Plants, to 15 cm long, grew in semi-exposed and sheltered habitats in the upper sublittoral zone. The ramification of the axes was clearly verticillate, a common feature in Mediterranean populations of this species.
Collections: A210480, A100581, K010882, SC210784.
The species is distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic between the Canaries (Børgesen 1926) and Scandinavia (see Rueness 1977).
Aegean Sea: Reported as *C. verticillatus* from the Makedonian coast (Haritonidis & Tsekos 1975), Attica (Politis 1936), Egina Island (Gerloff & Geissler 1974), and Asia Minor (Güven & Öztig 1971).

Excluded species

Cladostephus dubius Bory

Originally described from material collected at Methana (Peloponnesus) and the Egina Island (Fauché *et al.* 1832-33:331), this species was later found to be a rhodophyte (Prud'homme van Reine 1972).

DICTYOTALES Kjellman
DICTYOTACEAE Dumortier

DICTYOPTERIS Lamouroux

* ***Dictyopteris membranacea*** (Stackhouse) Batters
=? *Haliseris polypodioides* C. Agardh
=? *Dictyopteris polypodioides* Lamouroux

Dense populations were commonly met with in shaded, sheltered habitats in the upper sublittoral zone, while sporadic plants grew to a depth of at least 20 m. Individuals were up to 30 cm long, and in late autumn developed tetrahedrally divided sporangia, to 100 µm in diameter, scattered on both sides of the branches.
Collections: NI040580, A171180, A210481, A100581, A200881, A091081; also observed at P, and K.
Distributed in the Mediterranean and the NE. Atlantic to the British Isles (see Parke & Dixon

1976).
Aegean Sea: Makedonian coast [Politis 1925, 1953, as *D. polypodioides* (Desf.) Lamour.; Anagnostidis 1968, Haritonidis & Tsekos 1974, 1975, Haritonidis 1978], Thrake (Katsikopoulos 1939), Lesbos [Candargy 1899, as *D. polypodioides* (Desf.) Lamr.], N. Sporades (Diannelidis 1950, 1953), Crete (Politis 1932), Cyclades [Politis 1938, as *D. polypodioides* (Desf.) Lamour.; Nizamuddin & Lehnberg 1970, Coppejans 1974], Limnos and Mikonos [Schiffner & Schussnig 1943, as *Halyseris polypodioides* (Desf.) J. Ag. f. *angustior* Schiffner and f. *normalis* Schiffner], Attica [Politis 1936, as *D. polypodioides* (Desf.) Lamour.; Gerloff & Geissler 1974], Egina Island (Gerloff & Geissler 1974), Rhodes [Reinbold 1898, as *Halyseris polypodioides* (Desf.) Ag.; Diannelidis *et al.* 1977] S. Archipelagus (Huvé 1962a; Giaccone 1968a, as *D. membranacea* Batt.), and Asia Minor [Güven & Öztig 1971, as *D. polypodioides* (Desf.) Lamx.].
Note: According to Nizamuddin (1981) *Dictyopteris polypodioides* Lamouroux (1809:131, excl. synonyms) and *Haliseris polypodioides* C. Agardh (1820:142, excl. synonyms) are distinguished by linear arrangement of groups of hair tufts and sporangial sori on each side of the midrib.

DICTYOTA Lamouroux

* ***Dictyota dichotoma*** (Hudson) Lamouroux

Plants grew on rocks, macroalgae, and seagrasses in semi-exposed and sheltered habitats in the sublittoral zone, to at least 20 m depth. Specimens collected in deeper water were generally longer and broader than those growing in the upper sublittoral zone. Thalli were up to 20 cm long, occasionally iridescent, composed of subdichotomous fronds, to 5 mm broad, with one layer of medullary cells covered by the monostromatic cortex. Sporangial structures (monosporangia ?), to 100 µm in diameter, scattered on the branches, were observed on specimens collected in May and June.
Collections: A020480, NI040580, A100782, A150782, A230684, SR200784; also observed at K, and T.
Cosmopolitan; reported from most temperate to tropical regions; in European waters from S. Scandinavia to the eastern Mediterranean.
Aegean Sea: Makedonian coast (Politis 1925, 1953; Anagnostidis 1968; Haritonidis & Tsekos 1974, 1975, Haritonidis 1978), Thrake (Katsikopoulos 1939), Pagasitikos Gulf (Diannelidis 1935), Crete (Politis 1932), Attica (Politis 1936, Gerloff & Geissler 1974), Egina Island (Gerloff & Geissler 1974), Cyclades (Politis 1938, Coppejans 1974), S. Archipelagus (Huvé 1962a; Giaccone 1968a, as *D. dichotoma* Lamx), Rhodes (Reinbold 1898, Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

* ***Dictyota dichotoma*** (Hudson) Lamouroux var. ***intricata*** (C. Agardh) Greville
= *Dictyota dichotoma* var. *implexa* (Desfontaines) S. F. Gray
= *Dictyota implexa* (Desfontaines) Lamouroux (Papenfuss 1944:338)
= *Dictyota dichotoma* f. *implexa* (Desfontaines) Hauck

Saxicolous plants were sporadically encountered in the sublittoral zone. Thalli were up to 10 cm long, composed of main fronds to 4 mm broad, gradually becoming narrow and twisted towards the apices (to 0.1 mm broad). Monosporangial structures, to 70 µm in diameter, were scattered on the branches in plants collected in June.
Collections: A230684.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the NE. Atlantic (type locality: Cadiz; Agardh 1820:134, as *Zonaria dichotoma* v. *intricata*).
Aegean Sea: Sithonia (present study), Thrake (Katsikopoulos 1939, as var. *implexa)* Monembasia (Fauché *et al.* 1832-33, as *Dictyota implexa* Lamx.), Rhodes (Reinbold 1898, as var. *implexa* Lamx.), Pagasitikos Gulf and N. Sporades (Diannelidis 1948, as v. *implexa*

Hauck; 1953, as f. *implexa*), the S. Archipelagus (Giaccone 1968a, as f. *implexa* J. Ag.), Attica [Gerloff & Geissler 1974, as var. *implexa* (Desfont.) J. Ag.], Cyclades [Coppejans 1974, as var. *implexa* (Desf.) J. Ag.], and Mikonos (Schiffner & Schussnig 1943, as var. *implexa* Lamx. & De Toni).

* ***Dictyota linearis*** (C. Agardh) Greville

Infertile plants were collected in the sublittoral zone as epiphytes on crustose corallines and *Posidonia* leaves or rhizomes. They formed tufts to 15 cm in diameter, composed of lingulate, subdichotomous fronds, less than 1 mm broad, with divaricate branches, occasionally broader at the apices than at the base. Phaeophycean hairs occurred in groups, sometimes arranged in a line on the young branches.
Collections: A061180, A081081.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the C. Atlantic (type locality: "ad Gades, etiam ad oras Americae "; Agardh 1820:134, as *Zonaria*), including the west tropical coast of Africa (see Price *et al.* 1978).
Aegean Sea: Makedonian coast (Anagnostidis 1968; Haritonidis & Tsekos 1974, 1975, Haritonidis 1978), Thrake (Katsikopoulos 1939), N. Sporades (Diannelidis 1950, 1953), the S. Archipelagus (Giaccone 1968a, as *D. linearis* Grev., and *D. linearis* f. *divaricata* Ktz.), Attica [Gerloff & Geissler 1974, also f. *divaricata* (Roth) Howe], Egina Island and Cape Sounion (Nizamuddin 1981), Cyclades (Nizamuddin & Lehnberg 1970, Coppejans 1974), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

DILOPHUS J. Agardh

* ***Dilophus fasciola*** (Roth) Howe
= *Dictyota fasciola* (Roth) Lamouroux

Saxicolous, dense populations or single individuals were collected in semi-exposed and sheltered habitats in the sublittoral zone, to ca 5 m depth. Thalli were up to 15 cm long, composed of flattened and subdichotomously to irregularly branched fronds, to 3 mm broad, gradually becoming narrow and tapering to acute and occasionally terete apices. Transverse sections of the fronds showed a polystromatic medulla composed of 2 or 3 cell layers covered by the monostromatic cortex. Tetrahedrally divided sporangia, to 150 µm in diameter, scattered on the branches were observed in plants collected inJune.
Collections: NI130480, A040580, A290680, P210881, A230684.
Distributed in the Mediterranean, the Red Sea (see Papenfuss 1968), the Black Sea (Zinova 1967) and the Atlantic coast of Iberia (Ardré 1970), including the Canaries (Børgesen 1926).
Aegean Sea: Sithonia (present study), Pagasitikos Gulf (Diannelidis 1948), N. Sporades, Limnos and Mikonos (Schiffner & Schussnig 1943), N. Sporades (Diannelidis 1953), Cyclades (Nizamuddin & Lehnberg 1970, Coppejans 1974), Attica and Egina Island (Gerloff & Geissler 1974), S. Archipelagus (Giaccone 1968a, as *D. fasciola* Howe), Crete (Schussnig 1943), and Asia Minor (Güven & Öztig 1971, as *Dictyota*).

Dilophus fasciola var. ***repens*** (J. Agardh) J. Feldmann (1937:312)
= *Dilophus repens* J. Agardh

Reported from the Cyclades (Coppejans 1974, as *D. repens*).

* ***Dilophus mediterraneus*** Schiffner

Saxicolous plants were sporadically encountered in the upper sublittoral zone. Thalli were dark brown to blackish, to 10 cm long, composed of subdichotomously to irregularly ramified fronds, to 2 mm broad, with terete basal proliferations. Erect axes were terete but became flattened below ramifications. Transverse sections of the fronds showed 3 to 5 layers of

medullary cells surrounded by the monostromatic cortex.
Collections: A201180, A041280, KI020883.
Endemic in the Mediterranean (type locality: Dalmatia; Schiffner 1931:186).
Aegean Sea: Makedonian coast (Anagnostidis 1968), Limnos, N. Sporades, Naxos and Mikonos (Schiffner & Schussnig 1943, on *Cystoseira*), and Attica (Gerloff & Geissler 1974).
Note: The Aegean plants were in agreement with Schiffner's original description and were distinguished from congenerics by the polystromatic medulla and the dark colour of the thallus (but see Feldmann 1937:309, and Nizamuddin 1981:54).

* ***Dilophus spiralis*** (Montagne) Hamel (1939:352)
= *Dilophus ligulatus* (Kützing) J. Feldmann

Reported from the Makedonian coast (Anagnostidis 1968; Haritonidis & Tsekos 1974, 1975; Haritonidis 1978), Mikonos (Schiffner & Schussnig 1943, as *D. ligulatus* "mit Oogon "), the Cyclades (Nizamuddin & Lehnberg 1970; Coppejans 1974, as *D. ligulatus*), and the S. Archipelagus (Giaccone 1968a, as *D. ligulatus* Feldm.).
Material collected in the vicinity of the Gulf of Thessaloniki and deposited at Herb. Haritonidis (University of Thessaloniki) includes tetrasporic plants with tetrasporangial aggregations dispersed in more or less distinct sori on typical spathulate branches. Mature tetrasporangia are up to 80 μm in diameter.

PADINA Adanson

* ***Padina pavonica*** (Linnaeus) Lamouroux
= *Fucus pavonicus* Linnaeus
= *Padina mediterranea* Bory

Saxicolous, dense populations were commonly met with in sheltered sublittoral habitats (to ca 10 m depth) in spring and summer. Associated species were *Stypocaulon scoparium*, *Acetabularia acetabulum*, and species of *Cystoseira*, as well as diverse epiphytes such as minute corallines, *Jania rubens*, *Sphacelaria cirrosa*, and *Herposiphonia secunda*. The flabellate fronds were to 8 cm high and 12 cm broad, with rows of calciferous depositions (on both sides of the frond) alternating with rows of phaeophycean hairs and reproductive structures covered by an extra cell wall (inducium). Tetrasporophytes with sporangia, to 100 μm in diameter, were observed in spring.
Collections: A020480, NI130480, A290680, A171180, P210881, A091081, A101081, K010882, SR180784; also observed at V, AR, S, SC, D, OI, and T.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), the Red Sea (see Papenfuss 1968), the NE. Atlantic between the tropical coast of Africa (see Price *et al.* 1978) and the British Isles (see Price *et al.* 1979), and the West Indies (see Taylor 1960).
Aegean Sea: Imbros Island (Forsskål 1775, XXXVI, as *Fucus*), Lesbos [Candargy 1899, as *P. pavonia* (L.) Gaill.], Makedonian coast [Politis 1925, 1953, Anagnostidis 1968, Haritonidis & Tsekos 1974, 1975, and Haritonidis 1978, as *P. pavonia* (L.) Gaillon], Thrake (Katsikopoulos 1939), Pagasitikos Gulf [Diannelidis 1935, as *P. pavonia* (L.) Gaillon], N. Sporades [Schiffner & Schussnig 1943 and Diannelidis 1953, as *P. pavonia* (L.) Gaillon], Limnos and Sira [Schiffner & Schussnig 1943, as *P. pavonia* (L.) Gaillon], Archipelagus and Peloponnesus (Fauché *et al.* 1832-33, as *P. mediterranea*), Cyclades[Politis 1938, as *P. pavonia* (L.) Gaillon; Nizamuddin & Lehnberg 1970 and Coppejans 1974, as *P. pavonica* (L.) Thivy ex Taylor], Attica [De Toni 1901, Politis 1936, and Gerloff & Geissler 1974, as *P. pavonia* (L.) Gaillon], Crete [Schussnig 1943, as *P. pavonia* (L.) Gaill.], Egina Island [Gerloff & Geissler 1974, as *P. pavonia* (L.) Gaillon], S. Archipelagus (Giaccone 1968a, as *P. pavonia* Gaill.), Rhodes [Reinbold 1898 and Diannelidis *et al.* 1977, as *P. pavonia* (L.) Gaill.], and Asia Minor [Güven & Öztig 1971, as *P. pavonia* (L.) Gaill.].
Note: Bory's concept of *P. mediterranea* was apparently based on Linnaeus' *F. pavonicus* (see Fauché *et al.* 1832-33:320; Bory 1827-29:146).

Padina tenuis Bory

This species was recported in the Mediterranean for the first time by Nizamuddin (1981) who based his record on herbarium material originating from several localities, both in the western and eastern basin, including the island of Amorgos (Cyclades), Attica, and Crete in the Aegean Sea. *Padina tenuis* was previously known from the Indo-Pacific (Bory 1828) and the tropical Atlantic coast of Africa (see Price *et al.* 1978).

TAONIA J. Agardh

* ***Taonia atomaria*** (Woodward) J. Agardh

Saxicolous plants were encountered in the sublittoral zone, to at least 10 m depth. Thalli were up to 10 cm long, composed of subdichotomously to irregularly divided fronds, 2 to 5 mm broad, twisted, and arising from a conspicuous basal holdfast (pad) with rhizoidal outgrowths. Transverse sections of the fronds showed a polystromatic medulla composed of 2 to 5 cell layers surrounded by a monostromatic cortex. Phaeophycean hairs and sporangial initials, 70 to 90 µm in diameter, were borne in transverse rows on the branches.
Sporophytes collected in June were commonly inhabited by ectocarpoid species with partly endophytic thallus and pedicellate, elliptical, plurilocular sporangia.
Collections: A100581, K100782, K010882, A230684.
Distributed in the Mediterranean and the NE. Atlantic between the tropical coast of Africa (see Price *et al.* 1978) and the British Isles (see Parke & Dixon 1976), including Madeira (Levring 1974).
Aegean Sea: Makedonian coast (Anagnostidis 1968; Haritonidis & Tsekos 1974, 1975, Haritonidis 1978), Mikonos (Schiffner & Schussnig 1943, var. *ciliaris* Kütz.), Cyclades (Coppejans 1974), Attica and Egina Island (Gerloff & Geissler 1974), and Crete [Nizamuddin 1981, f. *atomaria* J. Agardh and f. *ciliata* (C. Agardh) Nizamuddin].

ZONARIA C. Agardh

Zonaria tournefortii (Lamouroux) Montagne
= *Zonaria flava* C. Agardh (1824:265)

Reported from the Cyclades (Coppejans 1974, a single collection from ca 5 m depth) and the S. Archipelagus (Giaccone 1968a, as *Z. flava*).

Excluded species

Dictyopteris tripolitana Nizamuddin

Nizamuddin (1981:18, pls II B, III A, XIII figs a,b,c) described this species on the basis of material collected from several localities in the Mediterranean, including Attica, Crete and the Egina Island in the Aegean Sea. *Dictyopteris tripolitana* was typified with material from Tripoli, and distinguished from congenerics chiefly by the regular disposition of phaeophycean hairs and sporangial sori in oblique rows. However, its status seems doubtful as individual sporangial structures are neither described, nor depicted.

Dictyota pusilla Lamouroux

According to Nizamuddin (1981:50), Lamouroux' (1809:43) *D. pusilla* should be attributed to a Mediterranean species distinguished from *D. linearis* by linear disposition of sporangial sori on narrow apical branches. Nizamuddin based his taxonomic conclusions on extensive studies of herbarium material originating from several localities in the Mediterranean, including Attica

(Cape Sounion) in the Aegean Sea. However, he neither examined the relevant type material, nor described individual sporangial structures.

FUCALES Kylin
CYSTOCEIRACEAE De Toni

CYSTOSEIRA C. Agardh

Cystoseira adriatica Sauvageau

Reported from the Cyclades (Nizamuddin & Lehnberg 1970), Attica (Gerloff & Geissler 1974), and Asia Minor (Güven & Öztig 1971).

Cystoseira amentacea (C. Agardh) Bory
=? *Cystoseira stricta* (Montagne) Sauvageau
=? *Cystoseira spicata* Ercegovic

This species was not encountered on the coast of Sithonia or the adjacent areas and, according to Huvé (1972, as *C. amentacea* Bory), it is restricted to the S. Archipelagus (Peloponnesus, Santorini, Kea, Euboea, and Kalimnos) and the island of Samothrake (NE. Aegean), although other authors claim a more widespread distribution including localities on the Makedonian coast (Politis 1925, 1953, Haritonidis & Tsekos 1974, 1975, as *C. amentacea* Bory), the Pagasitikos Gulf and the N. Sporades (Diannelidis 1935; 1953, as *C. amentacea* Bory), Attica (Gerloff & Geissler 1974, as *C. amentacea* Bory), Crete, Attica and the Cyclades (Politis 1932, 1936, 1938, as *C. amentacea* Bory), and the island of Kithira (Schiffner & Schussnig 1943, as *C. amentacea* Bory).
Note: In the above records and elsewhere in literature (e. g. Sauvageau 1912, Hamel 1939) this species is ascribed solely to Bory, although he apparently based his concept on Agardh's (1820:53) *C. ericoides* var. *amentacea*, which he referred to as a synonym (Fauché *et al.* 1832-33:319, "*Cystoseira ericoides* γ. Ag. Sp. 63 "). Sauvageau (1912:341) considered Agardh's concept of *C. ericoides* var. *amentacea* to encompass at least two species which he separately described as *C. mediterranea* and *C. stricta*, the latter taxon based on Montagne's (1846:10) *C. amentacea* var. *stricta* from Alger. He also maintained *C. amentacea*, attributing this species solely to Bory, and also suggested that it might represent a modified form of *C. stricta* extending into the eastern Mediterranean (Sauvageau 1912:184). Sauvageau's conclusions were largely accepted by later authors, who applied the binomial *C. amentacea* Bory to ecotypes of *C. stricta* in the eastern basin. Giaccone & Bruni (1971) included both *C. amentacea* Bory and the Adriatic species *C. spicata* Ercegovic (1952:57) within the ecads of *C. stricta*, but later proposed varietal combinations to accommodate these two entities (Giaccone & Bruni 1973). Nevertheless, *C. amentacea* has taxonomic priority over both *C. stricta* and *C. spicata*. In the Aegean Sea, *C. stricta* has been reported from Egina island (Gerloff & Geissler 1974), the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978) and Rhodes (Diannelidis *et al.* 1977); and *C. spicata* from the Makedonian coast (Haritonidis & Tsekos 1975), the S. Archipelagus (Giaccone 1968a, v. *elegans* Erc.), the Cyclades (Coppejans 1974), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971, subsp. *elegans* Erc.).

* ***Cystoseira barbata*** C. Agardh
= *Cystoseira hoppii* C. Agardh (Roberts 1968:262)

Sporadic plants growing on pebbles and rocks were collected at sheltered habitats in the upper sublittoral zone (ca 0.2 to 1 m depth). Thalli were up to 35 cm long, composed of a single main axis with prominent sympodial branching of new lateral axes, radially ramified and giving rise to branches with intercalary aerocysts.

Collections: PC171180.
Distributed in the Mediterranean (type locality: "In mari Adriatico, Mediterraneo, & Atlantico "; Agardh 1820:57), the Black Sea (Zinova 1967), and the Atlantic coast of Iberia (Ardré 1970).
Aegean Sea: Makedonian coast [Politis 1925, 1953, as *C. hoppii*; Katsikopoulos 1939; Anagnostidis 1968, as *C. barbata* (Good. & Woodw.) Ag.; Haritonidis & Tsekos 1975, as *C. barbata* (Good. & Woodw.) J. Ag.; Haritonidis 1978, as *C. barbata* (Good. & Woodw.) C. Ag.], Lesbos (Candargy 1899), Attica [Politis 1936, as *C. hoppii*; Gerloff & Geissler 1974, as *C. barbata* (Good. & Woodw.) J. Ag.], Cyclades [Politis 1938, as *C. hoppii*; Coppejans 1974, as *C.*aff. *barbata* (Good. & Woodw.) J. Ag.], Pagasitikos Gulf (Diannelidis 1935, as *C. hoppii*), Pagasitikos Gulf, N. Sporades (Pelagos channel) and Limnos (Huvé 1972, as *C. barbata* J. Agardh), Crete (Schussnig 1943), the S. Archipelagus (Giaccone 1968a), Rhodes [Diannelidis *et al.* 1977, as *C. barbata* (Good. & Woodw.) C. Ag.], and Asia Minor (Güven & Öztig 1971, as *C. hoppii* and *C. barbata* J. Ag.).
Note: The basionym of this species is occasionally attributed to Linnaeus' *Fucus barbatus* or to Goodenough & Woodward's *F. barbatus* (a later homonym). Because of nomenclatural reasons, it seems convenient to ascribe this species solely to Agardh (Roberts 1968:257).

* ***Cystoseira compressa*** (Esper) Gerloff & Nizamuddin (1975a:342)
= *Cystoseira fimbriata* (Desfontaines) Bory
= *Cystoseira abrotanifolia* C. Agardh
= *Cystoseira filicina* Bory (Sauvageau 1912:475)
=? *Cystoseira planiramea* Schiffner ex Gerloff & Nizamuddin

Saxicolous single individuals or dense populations were commonly met with in exposed and sheltered habitats in the upper sublittoral zone. Thalli were up to 30 cm long, with one to several main axes arising from an irregularly expanded disc. Axes were compressed and ramified in alternate distichous pattern. Individuals from exposed habitats were characteristically smaller and provided with broader, sparsely ramified branches (cf. subspecies *roseta* Ercegovic 1952; Huvé 1972).
Collections: NI040580, OI090680, OI200680, PC161180, A171180, A250881, K010882, K000685.
Distributed in the Mediterranean, the Bermuda Islands (see Taylor 1969) and the Atlantic coast of Iberia (see Gallardo *et al.* 1985) and Morocco (Gayral 1958), including the Canaries (Børgesen 1926), Madeira (see Levring 1974), and the Salvage Islands (Weisscher 1983).
Aegean Sea: Makedonian coast [Politis 1925, 1953, as *C. abrotanifolia* (Ag.) Hauck; Anagnostidis 1968, as *C. abrotanifolia*; Haritonidis & Tsekos 1974, 1975, Haritonidis 1978, as *C. fimbriata*], Pagasitikos Gulf (Diannelidis 1935, as *C. abrotanifolia)*, Crete (Politis 1932 and Schussnig 1943, as *C. abrotanifolia*), Attica [Politis 1936, as *C. abrotanifolia* Ag.; Gerloff & Geissler 1974, as *C. fimbriata*), Egina Island (Gerloff & Geissler 1974, as *C. fimbriata*), Cyclades [Politis 1938, as *C. abrotanifolia* (Ag.) Hauck; Nizamuddin & Lehnberg 1970, as *C. abrotanifolia*; Coppejans 1974, as *C. fimbriata*], Rhodes (Reinbold 1898, as *C. abrotanifolia*; Diannelidis *et al.* 1977, as *C. fimbriata*), S. Archipelagus (Giaccone 1968a, as *C. abrotanifolia*), and Asia Minor (Güven & Öztig 1971, as *C. abrotanifolia*).
Note: *Cystoseira planiramea* first appeared as a *nomen nudum* in Gerloff & Geissler's checklist (1974) of Greek marine algae, attributed to plants seen in Herb. Rechinger (without date or locality). It was later described by Gerloff & Nizamuddin (1975b:567, pls 5 to 8) from herbarium material originating from Ikaria Island (Agios Kirikos; type locality) and Lochum (Dalmatia). Judging from the original description and the illustrations, *C. planiramea* seems to fit within the form range of *C. compressa.*

* ***Cystoseira corniculata*** (Wulfen) Zanardini
=? *Cystoseira erica-marina* Naccari (Gerloff & Nizamuddin 1975a:345)

Cystoseira corniculata was the dominant species of the genus on the coast of Sithonia and adjacent areas. It was commonly found in dense populations in exposed and sheltered habitats in

the sublittoral zone, extending to at least 35 m depth. Associated macroalgal species varied seasonally or according to the habitat. Individuals grew close to each other, forming extensive turf-like mats with hard texture. Thalli were composed of prostrate basal axes that gave rise to erect and irregularly ramified spiniferous branches, to 15 cm long. The length of the branches and the degree of their ramification varied in accordance to wave exposure; i. e exposed plants were more densely branched, compact, and shorter than those from sheltered and deep water habitats. In early spring, the perennial basal system developed new branches with plenty of short spiniform and laterally borne receptacles.
Collections: A020480, OI090680, A290680, A181180, A250881, A100782, A200684, PI020884; also observed at V, P, S, K, and T.
Endemic in the eastern Mediterranean (type locality: Trieste; see Gerloff & Nizamuddin 1975a:345).
Aegean Sea: Makedonian coast (Huvé 1972), Lesbos (Haritonidis & Tsekos 1974, Haritonidis 1978), Sira and Tenedos islands (Sauvageau 1912), Samothrake, Limnos, N. Sporades (Pelagos), N. Evoikos Gulf, Crete (Dia Island), Antipsara and Salamis Island (Huvé 1972), islands of the S. Archipelagus (Giaccone 1968a, as *C. corniculata* Hauck v. *laxior* Erc.), Cyclades (Politis 1938, as *C. erica-marina* Nau), Attica (Politis 1936, as *C. erica-marina* Nau; Gerloff & Geissler 1974), and Asia Minor (Güven & Öztig 1971, as *C. corniculata* Hauck).
Note: The binomial *C. erica-marina* Lamouroux ex Bory was applied by Bory (Fauché *et al.* 1832-33:319) to accommodate some plants collected at Cape Tainaron and localities in the Archipelagus. It is, however, illegitimate being a later homonym of *C. erica-marina* Naccari. According to Sauvageau (1912:218), Bory's plants are closely related to *C. spinosa*.

Cystoseira crinita Duby
=? *Cystoseira graeca* Schiffner ex Gerloff & Nizamuddin

According to Huvé (1972, as *C. crinita* Bory), the distribution of this species in the Aegean Sea is restricted to the S. Archipelagus (Crete, Kea, Rhodes, Kos, Kalimnos, Sira, Paros, Salamis, Cape Kafireas, and Antipsara) and S. Peloponnesus, although other authors claim a more widespread occurrence including localities on the Makedonian coast [Politis 1925, 1953, Anagnostidis 1968, Haritonidis & Tsekos 1974, 1975, and Haritonidis 1978, as *C. crinita* (Desf.) Bory], the Pagasitikos Gulf and the N. Sporades [Diannelidis 1948, 1953, as *C. crinita* (Desf.) Valiante], Crete (Schussnig 1943, as *C. crinita* Bory), Attica [Politis 1936, as *C. crinita* (Desfont.) Duby; Gerloff & Geissler 1974, as *C. crinita* (Desfont.) Bory], the Cyclades [Politis 1938 and Coppejans 1974, as *C. crinita* (Desfont.) Duby], the S. Archipelagus (Giaccone 1968a, as *C. crinita* Bory), Rhodes [Schussnig 1943, as *C. crinita* Bory; Diannelidis *et al.* 1977, as *C. crinita* (Desf.) Bory], and Asia Minor [Güven & Öztig 1971, as *C. crinita* (Desf.) Duby].
Note: Although several authors ascribe this species to Bory (Fauché *et al.* 1832-33:320), the first description of *C. crinita* was provided by Duby (1830:936) who cited *Fucus crinitus* Desfontaines as a synonym. Since the latter name is illegitimate, being a later homonym of Gmelin's (1768:160) *F. crinatus*, *C. crinita* should be ascribed solely to Duby (Voss *et al.* 1983, article 72, note 1) and typified by elements of his type material which is based on collections from Corsica and Nice. Apart from the correct authorship of this species and the typification of Duby's plant that appears problematic (see Sauvageau 1912), the taxonomic status of *C. crinita* is also obscure. Ercegovic (1952, 1959) observed genetic differentiation in Adriatic populations with spiniferous branches and receptacles (features commonly attributed to *C. crinita* in the past; see Sauvageau 1912, Hamel 1939), and plants without such structures, and proposed segregation of *C. crinita* into two entities, attributing the spineless plants to *C. crinita* Bory and erecting *C. crinitophylla* Ercegovic for those with spines. However, his taxonomic conclusions were not widely accepted, and the new entity was later recognized by few authors (e. g. Giaccone & Bruni 1973). The specimens of *C. crinita* sensu lato examined from Sithonia were all spiniferous, showing a remarkable consistence of this feature. They were therefore provisionally referred to *C. crinitophylla* pending the identification and typification of

Duby's type material. *Cystoseira graeca* first appeared as a *nomen nudum* in Gerloff & Geissler's (1974:756) check list of Greek marine algae, and it was attributed to plants collected at Attica. It was later described by Gerloff & Nizamuddin (1975b:565, pls 1 to 4) from material originated from Paphos (Cyprus; type locality), Limnos, Amorgos, Naxos, and Mikonos (Cyclades), and Catania (Sicily) (curiously the record from Attica was not included). Judging from the meagre description and the more detailed illustrations, *C. graeca* might be included within the form range of *C. crinita* sensu lato.

* ***Cystoseira crinitophylla*** Ercegovic

Saxicolous, dense populations grew in semi-exposed habitats in the upper sublittoral zone (0.5 to ca 1 m depth). Thalli were up to 15 cm long, iridescent, bushy with hard texture, usually composed of 2 or 3 main axes, arising from a single and irregularly expanded crustose holdfast. Main axes were usually bare at the base and provided with protuberances (branch rests), giving rise to new axes from their upper part in a sympodial pattern. Branches were alternately and radially ramified provided with terminal receptacles. Axes, branches and receptacles were all spiniferous.
Collections: A201180, A200881, A091081, K000685.
Endemic in the Mediterranean (type locality Adriatic; Ercegovic 1952:112, tab. XXI, fig. 18).
Aegean Sea: Sithonia (present study), and Asia Minor (Güven & Öztig 1971).
Note: See note under *C. crinita.*

* ***Cystoseira dubia*** Valiante
= *Cystoseira fucoides* Ercegovic

Saxicolous individuals were collected in crevices in the sublittoral zone (ca 10 m depth). Thalli were up to 15 cm long, composed of a prostrate basal system of terete and irregularly branched axes, 2 to 3 mm broad, giving rise to gradually compressed and flattened branches, to 4 mm broad, with alternate-distichous ramification. The plants were overgrown by crustose algae.
Collections: KC010884.
Endemic in the Mediterranean (type locality: Naples; Valiante 1883:405, tab. XV).
Aegean Sea: Sithonia (Huvé 1972, as *C. fucoides*), and the S. Archipelagus (Giaccone 1968a, as *C. fucoides*).
Note: *C. fucoides* was proposed as a new name by Ercegovic (1952:109) to substitute Valiante's (1883:405, tab. XV) *Cystoseira* (?) *dubia*. According to article 34.2. of I. C. B. N. (Voss *et al.* 1983), the latter name is validly published and legitimate and thus the correct name for this species.

Cystoseira elegans Sauvageau

Reported from the S. Archipelagus (Giaccone 1968a) and the Makedonian coast (Haritonidis & Tsekos 1975).

* ***Cystoseira ercegovicii*** Giaccone (Giaccone & Bruni 1973:75)
= *Cystoseira discors* (Linnaeus) C. Agardh *emend.* Sauvageau

Saxicolous plants were commonly met with in sheltered habitats in the upper sublittoral zone, to ca 2 m depth. Thalli were up to 30 cm long, bushy and caespitose, usually composed of 3 to 8 main axes, and arose from an irregularly expanded crustose holdfast. Main axes were radially to distichously ramified provided with leaf-like branches, to 5 mm broad, with serrate margins. Receptacles were glabrous, cylindrical and terminally borne on the ultimate branchlets.
Collections: NI040580, NI130480, A171180, PC201180, A200881, A091081.
Distributed in the Mediterranean, the Atlantic Spain (Cadiz), and the Canaries (Sauvageau 1912:534).

Aegean Sea: Makedonian coast [Politis 1925, 1953, Haritonidis & Tsekos 1974, 1975, and Haritonidis 1978, as *C. discors* (L.) C. Ag.], Thrake (Katsikopoulos 1939), Pagasitikos Gulf [Diannelidis 1948, as *C. discors* (L.) Ag.], Attica [Politis 1936, as *C. discors* (L.) Ag.; Gerloff & Geissler 1974, as *C. discors* (L.) Ag. *em.* Sauvag.], Egina Island [Gerloff & Geissler 1974, as *C. discors* (L.) Ag. *em.* Sauvag.], Cyclades [Coppejans 1974, as *C. discors* (L.) C. Ag.], S. Archipelagus (Huvé 1962a, as *C. discors* C. Ag.; Giaccone 1968a, as *C. discors* Ag. f. *latiramosa* Erc. and f. *tenuiramosa* Erc.), S. Peloponnesus, Megara, the channel between the islands Tinos and Andros, the islands Sira, Crete, Santorini, Paros, Antiparos and Rhodes (Huvé 1972, as *C. discors* C. Agardh *emend.* Sauvageau), Rhodes [Diannelidis *et al.* 1977, as *C. discors* (L.) Ag. *em.*Sauv.], and Asia Minor [Güven & Öztig 1971, as *C. discors* (L.) C. Ag.].

Cystoseira mediterranea Sauvageau

Reported from the Makedonian coast (Anagnostidis 1968, with question mark), Attica (Gerloff & Geissler 1974), and Rhodes (Diannelidis *et al.* 1977).

Cystoseira platyramosa Ercegovic

Reported from the Cape Drepanon (Sithonia), the Cyclades (Sira, Naxos, Paros), Antipsara, and the Cape Kafireas, between 40 and 90 m depth in association with *C. dubia* (Huvé 1972).

* ***Cystoseira rechingerii*** Schiffner ex Gerloff & Nizamuddin

This taxon first appeared as a *nomen nudum* in Rechinger's Flora Aegaea (Schiffner & Schussnig 1943), and was later described by Gerloff & Nizamuddin (1975b:568, pls 9 to 12) from herbarium material collected at the Cyclades (type locality: Mikonos), Attica, and the islands Samos and Karpathos. A specimen, apparently belonging to the type material, is deposited at GB with the label: "Kryptogamae exsiccatae editae a Mus. Hist. Nat. Vindobon., 3131. *Cystosira Rechingeri.*, Schiffner, nov. sp. (ined.), Graecia (Insula Mikonos): a mari ejecta, m. Majo, det. V. Schiffner. leg. C. H. Rechinger. ". The thallus is to 13 cm long and 8 cm broad, composed of a main axis, to 10 cm long and 5 mm broad, with radial development of lateral branches provided with basal tophules closely borne to each other resulting in a compact, sand-binding, central frond, to 2.5 cm broad. Branches are terete and radially ramified, provided with spines and occasionally terminal receptacles with subspherical conceptacles.

Cystoseira sauvageauana Hamel (1939:399)
= *Cystoseira selaginoides* Naccari sensu Valiante and Sauvageau

Reported from the Pagasitikos Gulf and N. Sporades (Diannelidis 1948, 1953, as *C. selaginoides* Valiante).
Note: The binomial *C. sauvageauana* was proposed by Hamel to substitute Valiante's (1883) and Sauvageau's (1912:516) concept of *C. selaginoides*. Although the status of Naccari's plant was never clarified, *C. sauvageauana* has been accepted by later authors and is typified by a Sauvageau specimen from Port-Vendres (Roberts 1968:261).

* ***Cystoseira spinosa*** Sauvageau

Saxicolous plants growing singly were commonly met with in semi-exposed and sheltered habitats in the sublittoral zone, to at least 15 m depth. Thalli were up to 15 cm long, composed of a main, radially ramified axis arising from an irregularly expanded crustose holdfast. Branches had basal spiniferous tophules covered by filamentous epiphytes, diverse epizoa and grains of sand, and resulting in a perennial, compact central frond, to 10 cm long and to 3 cm broad. Branches were spiniferous and terete at the base, becoming compressed (leaf-like), serrate, and alternately and distichously ramified towards the apices.

Contarinia peyssonneliaeformis grew as an epiphyte on the basal holdfast.
Collections: NI130480, A210480, NI040581, OI090680, OI150680, A290680, A091081, A040782, A100782, A150782, A140783.
Endemic in the Mediterranean (type locality: Mediterranean France; Sauvageau 1912:201, 519).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1974, 1975), Cyclades (Coppejans 1974), Crete (Schussnig 1943), Attica (Gerloff & Geissler 1974), S. Archipelagus (Huvé 1962a, Giaccone 1968a), Megara, Cape Kafireas (Euboea), the channel between Andros and Tinos, the islands of Thasos, Limnos and Lesbos, Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Huvé 1972).
Note: This species was erected by Sauvageau (1912:519) to substitute Valiante's (1883) concept of *C. erica-marina* Naccari and *C. montagnei* J. Agardh. Although the status of these two taxa was never clarified, *C. spinosa* has been widely accepted by later authors.

Cystoseira squarrosa De Notaris

Gerloff & Geissler (1974) recorded this taxon as new to the flora of Greece on the basis of plants collected at Attica and material sighted in the herbaria of Rechinger, Markovits, Liebetruth, Geissler, Kuhbier, (without giving dates or places). The species has been considered as a variety of *C. spinosa* (Giaccone & Bruni 1973).

* ***Cystoseira zosteroides*** C. Agardh
= *Cystoseira opuntioides* Bory in Montagne (Papenfuss 1967:324)

Huvé (1972) collected this species in the S. Archipelagus off the islands Sira, Kalimnos, Rhodes and Peloponnesus, at depths between 45 to 90 m. It was later recorded from Thasos Island (Haritonidis & Tsekos 1974, as *C. opuntioides* Bory), while a single specimen from N. Sporades (Skiathos 22.06.75, ca 40 m depth) was located in Herb. Haritonidis (University of Thessaloniki).
Note: As interpreted by Papenfuss (1967), this species should be ascribed to Agardh (1820:71) and typified by Turner's (1819:83, pl. 231) *Fucus zosteroides*, which, however, is of unknown origin.

Excluded species

Cystoseira concatenata (Linnaeus) C. Agardh

Reported from Attica (Gerloff & Geissler 1974, as *Cystoseira* cf. *concatenata* J. Agardh). This taxon is considered to be a synonym of the Atlantic species *Cystoseira foeniculacea* (Linnaeus) Greville (see Roberts 1968), since Agardh's (1820:57) concept of *C. concatenata* was apparently based on Linnaeus' *Fucus concatenatus*.

Cystoseira ericoides (Linnaeus) C. Agardh

Reported from the Makedonian coast [Anagnostidis 1968, as *C.*sp. [*C. ericoides* (L.) Ag.] and Crete (Diannelidis 1950, as *C. ericoides* Turner). This taxon is considered to be a synonym of *C. tamariscifolia* (Hudson) Papenfuss, which occurs in the E. Atlantic and the western Mediterranean basin (Roberts 1968, 1970).

Cystoseira montagnei J. Agardh

This taxon has been reported from the Cyclades (Politis 1938), the Makedonian coast [Haritonidis & Tsekos 1974, 1975, and Haritonidis 1978, as *C. montagnei* (J. Ag.) Mont.], Attica (Gerloff & Geissler 1974) and Rhodes (Diannelidis *et al.* 1977), but its status is obscure. According to Papenfuss (1967), Agardh's concept accommodates at least 3 species later

separately described as *C. spinosa, C. adriatica,* and *C. platyramosa.*

Cystoseira myriophylloides Sauvageau

This Atlantic species occurs between the west tropical coast of Africa and the British Isles (Roberts 1968, 1978). Hence, the sporadic records from the Makedonian coast (Haritonidis & Tsekos 1974, 1975) are doubtful and probably based on misidentifications.

Cystoseira selaginoides (Linnaeus) Bory

This binomial was applied by Bory (Fauché *et al.* 1832-33:319) to accommodate some plants collected on the coast of Peloponnesus. It is, however, illegitimate being a later homonym of Naccari's *C. selaginoides* (see Roberts 1968:261). According to Sauvageau (1912:285), Bory's plants belong to *C. mediterranea* or *C. stricta.*

Halidrys siliquosa (Linnaeus) Lyngbye

The records of this N. Atlantic species from Rhodes and the Thasos Island (Tsekos & Haritonidis 1974, Haritonidis & Tsekos 1974, Diannelidis *et al.* 1977) are doubtful and probably based on misidentifications. According to Diannelidis *et al.* (1977), the species grew as an epiphyte on *Stypocaulon scoparium.*

SARGASSACEAE Kützing

SARGASSUM C. Agardh

* ***Sargassum acinarium*** (Linnaeus) C. Agardh
= *Sargassum linifolium* (Turner) C. Agardh (Setchell :208)

Found only from the drift. Thalli were up to 50 cm long, composed of one or two percurrent main axes with radial development of laterals provided with irregularly dentate leaf-like branches up to 4 cm long and 7 mm broad, simple or divided, cylindrical and pedicellate receptacles up to 1 cm long and to 0.5 mm broad, and vesicles borne on terete to compressed and occasionally leaf-like pedicels, to 12 mm long. *Polysiphonia elongata, Brongniartella byssoides, Dasya baillouviana,* and *Cutleria multifida* grew as epiphytes.
Collections: K000686 Drift.
Endemic in the Mediterranean (type locality: Italy; see Setchell 1933:208).
Aegean Sea: Makedonian coast (Politis 1925, 1953, Anagnostidis 1968 and Haritonidis & Tsekos 1974, as *S. linifolium*; Haritonidis & Tsekos 1975, Haritonidis 1978), N. Sporades and Pagasitikos Gulf (Diannelidis 1935, 1953, as *S. linifolium*), Crete (Schussnig 1943 and Politis 1932, as *S. linifolium*), Milos (Fauché *et al.* 1832-33, as *S. linifolium* Ag.), Attica (Politis 1936, as *S. linifolium*; Gerloff & Geissler 1974), Cyclades (Politis 1938, as *S. linifolium*; Coppejans 1974), Limnos, and Mikonos (Schiffner & Schussnig 1943, as *S. linifolium*), Rhodes (Reinbold 1898 and Schiffner & Schussnig 1943, as *S. linifolium*; Diannelidis *et al.* 1977), the S. Archipelagus (Giaccone 1968a, as *S. linifolium* Ag.), and Asia Minor (Güven & Öztig 1971, as *S. linifolium*).

Sargassum hornschuchii C. Agardh

Reported from the Makedonian coast (Politis 1925, 1953, Haritonidis & Tsekos 1975, Haritonidis 1978), the N. Sporades (Diannelidis 1953), Attica and the Cyclades (Politis 1936, 1938), Attica and Egina Island (Gerloff & Geissler 1974), the S. Archipelagus (Huvé 1962a, Giaccone 1968a), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

* ***Sargassum trichocarpum*** (J. Agardh) J. Agardh

Saxicolous plants grew singly in crevices in the upper sublittoral zone between 0.5 and ca 2 m depth. Thalli were 5 to 10 (15) cm long, caespitose, usually composed of one to three terete and spiniferous main axes provided with irregularly dentate and usually sessile leaf-like branches. Branches developed well ramified conceptacles, to 8 mm long, and pedicellate vesicles with compressed and leaf-like pedicels, to 5 mm long.
Collections: A000881, A091081, SC100784, K000686.
Distributed in the Mediterranean, and the Atlantic coast of Spain (type locality: Cadiz; Agardh 1848:343, as *Sargassum vulgare* var.*trichocarpum*).
Aegean Sea: Sithonia (present study), Cyclades (Nizamuddin & Lehnberg 1970, with reservations).

* ***Sargassum vulgare*** C. Agardh

Saxicolous plants were sporadically found in sheltered habitats in the upper sublittoral zone. Individuals were up to 20 cm long, caespitose, composed of one to several percurrent main axes provided with serrate leaf-like branches, ramified, and up to 2 mm long receptacles, and vesicles of variable size (1.5 to 4 mm in diameter) borne on terete pedicels.
Collections: A091081, SC100784.
Distributed in the Mediterranean (type locality: Egypt; Agardh 1820:29), the West Indies (see Taylor 1960), the Atlantic coast of Iberia (see Gallardo *et al.* 1985), and the tropical Atlantic coast of Africa (see Price *et al.* 1978).
Aegean Sea: Sithonia (present study), Lesbos and Thasos Islands (Haritonidis & Tsekos 1974), Attica (Gerloff & Geissler 1974), Cyclades [Coppejans 1974, as *S. vulgare* J. Ag. var. *coarctatum* Kütz. and var. *diversifolium* (Bory) Grün.], and Asia Minor (Güven & Öztig 1971, as *S. vulgare* J. Ag.).

Excluded species

Sargassum ilicifolium (Turner) C. Agardh

The single record from Lesbos (Candargy 1899: VIII, as *S. ilicifolium* Ag.) is doubtful, as this species in not known in the Mediterranean (see De Toni 1895:56).

Sargassum salicifolium (Bertoloni) J. Agardh

Reported from the Makedonian coast (Anagnostidis 1968, with reservations) and Crete (Diannelidis 1950, as *S. salicifolium* Lamour.). The species was established by Agardh (1889:112) based on *Fucus salicifolius* Bert. (Agardh 1848:341), and its current status is unknown.

CHLOROPHYTA Pascher
TETRASPORALES Lemmermann
PALMELLOPSIDACEAE Korshikov

PALMOPHYLLUM Kützing

* ***Palmophyllum crassum*** (Naccari) Rabenhorst

Gelatinous dark green crusts (cell colonies), to 10 cm in extent, grew in submarine caves and crevices between 0.5 to at least 15 m depth. They were attached on rocks, crustose algae and sponges.
Collections: A100782, SC000784
Distributed in the Mediterranean (see Feldmann 1937) and the West Indies (see Taylor 1960).
Aegean Sea: Sithonia (present study), Cyclades (Politis 1938), and the S. Archipelagus (Huvé 1962a, Giaccone 1968a, as *P. crassum* Rabenh.).

PRASIOLALES (Rabenhorst) Borzi
PRASIOLACEAE Blackman & Tansley

PRASIOLA (C. Agardh) Meneghini

Prasiola crispa (Lightfoot) Kützing
Prasiola stipitata Suhr in Jessen

The single records of these two cold-temperate species from the Makedonian coast (Anagnostidis 1968) are doubtful and require confirmation, since the species are not previously reported in the Mediterranean.

ULOTRICHALES Borzi
ULOTRICHACEAE Kützing

ULOTHRIX Kützing

Ulothrix flacca (Dillwyn) Thuret in Le Jolis
= *Ulothrix pseudoflacca* Wille (Lokhorst 1978:207)

These two binomials have been recorded from the Makedonian coast (Anagnostidis 1968) as separate taxa.

Excluded species

Ulothrix implexa (Kützing) Kützing

The single record of this species from the Pagasitikos Gulf (Diannelidis 1935, as *U. implexa* Kütz.) is doubtful and requires confirmation in the light of Lokhorst's (1978) study.

Urospora penicilliformis (Roth) Areschoug
=*Codiolum gregarium* Braun

The record of *C. gregarium* from N. Sporades (Diannelidis 1953, with query) is doubtful, as noted by Diannelidis himself. He was also aware that this organism represents the diploid phase of *Urospora mirabilis* Areschoug (=*U. penicilliformis* (Roth) Areschoug), which is not known in the Mediterranean.

CTENOCLADALES
ULVELLACEAE Schmidle

ACROCHAETE Pringsheim

Acrochaete viridis (Reinke) Nielsen
= *Endoderma viride* (Reinke) Lagerheim

Reported from the S. Archipelagus (Giaccone 1968a, as *E.viride* Lagerh.).

EPICLADIA Reinke

* *Epicladia* sp.

Observed in crude laboratory cultures of material from the sublittoral zone. Isolates grew into pseudoparenchymatous cushions, to 1 mm in diameter, with irregularly branched filaments composed of cells 7 to 6 µm broad and 15 to 60 µm long with one pyrenoid. Hairs were not seen, as it is recognized for the genus (Nielsen 1979, 1980).
Collections: A100581.
The genus is distributed along the coast of Europe (see Gallardo *et al.* 1985) to Scandinavia (Nielsen 1979, 1980).
Aegean Sea: Sithonia (present study).

PHAEOPHILA Hauck

* *Phaeophila dendroides* (P. & H. Crouan) Batters

Observed on the fronds of *Stilophora rhizodes* and *Laurencia* sp. The filamentous thallus grew partly endophytically and bore hairs to 200 µm long.
Collections: L100782, K290783, SI290783.
Distributed in the Mediterranean and the Atlantic to Scandinavia (see Nielsen 1972).
Aegean Sea: Sithonia (present study).

* *PRINGSHEIMIELLA* Höhnel

Monostromatic crusts, commonly found on *Laurencia obtusa* and *Halimeda tuna*, were provisionally referred to this genus pending examination of living material. The circular thallus was up to 1.3 mm in diameter, composed of central rectangular cells, 15 to 12 µm broad and 7 to 38 µm long, usually bifurcated at the margins. At least three species in addition to the generitype occur in the Mediterranean and the Atlantic (see Nielsen & McLachlan 1985).
Collections: A171180, K010882.

Pringsheimiella scutata (Reinke) Marchewianka
= *Pringsheimia scutata* Reinke

Reported from Limnos (Schiffner & Schussnig 1943, as *Pringsheimia*, epiphyte on *Ulva*).

ULVALES Blackman & Tansley
GOMONTIACEAE De Toni

GOMONTIA Bornet & Flahault

Gomontia polyrhiza (Lagerheim) Bornet & Flahault

This cosmopolitan species, commonly found in empty mollusc shells, has been recorded once

from the Makedonian coast (Anagnostidis 1968).

MONOSTROMATACEAE Kunieda ex Suneson

BLIDINGIA Kylin

Blidingia marginata (J. Agardh) Dangeard
= *Enteromorpha marginata* J. Agardh

Reported from the Makedonian coast (Anagnostidis 1968) and the Pagasitikos Gulf (Diannelidis 1948, as *Enteromorpha*).

ULVACEAE Lamouroux ex Dumortier

ENTEROMORPHA Link

Enteromorpha clathrata (Roth) Greville

Reported from Attica [Politis 1936, as *E. clathrata* (Roth) J. Ag.; Gerloff & Geissler 1974], the Makedonian coast (Anagnostidis 1968, with reservations; Haritonidis & Tsekos 1975), Thasos [Haritonidis & Tsekos 1974, as *E. clathrata* (Roth) J. Ag.], Rhodes (Diannelidis *et al.* 1977), and Asia Minor [Güven & Öztig 1971, as *E. clathrata* (Roth) J. Ag.].

* ***Enteromorpha compressa*** (Linnaeus) Greville

Occurred in distinct, littoral belts on rocks in spring and early summer, sometimes in association with *Chaetomorpha aerea* and below a belt of *Bangia atropurpurea*. Individuals were sparsely branched with fronds, to 20 cm long and 5 mm broad, composed of irregularly disposed cells 10 to 20 µm in diameter.
Collections: A201180, K010882, SI240883.
Cosmopolitan.
Aegean Sea: Makedonian coast (Politis 1925, 1953; Haritonidis & Tsekos 1975 Haritonidis 1978), Thrake (Katsikopoulos 1939), Attica (Politis 1936, Gerloff & Geissler 1974), Cyclades (Nizamuddin & Lehnberg 1970), Kithira (Schiffner & Schussnig 1943), and Rhodes (Diannelidis *et al.* 1977).

Enteromorpha flexuosa (Wulfen ex Roth) J. Agardh
= *Enteromorpha jürgensii* Kützing (De Toni 1889:121)
= *Enteromorpha lingulata* J. Agardh (Bliding 1963:106)

Reported from the Makedonian coast (Anagnostidis 1968; Haritonidis & Tsekos 1975, as *E. lingulata*), the Pagasitikos Gulf (Diannelidis 1948, as *E. jürgensii*), Skiathos (Miliarakis 1887, as *E. lingulata*), Mikonos (Schiffner & Schussnig 1943, as *E. lingulata*), Rhodes (Diannelidis *et al.* 1977, as *E. lingulata*), and Asia Minor (Güven & Öztig 1971, as *E. lingulata*).

* ***Enteromorpha intestinalis*** (Linnaeus) Link
= *Fucus intestinalis* Linnaeus

Plants, to 10 cm long and 2 cm broad, were rarely met with in the littoral and sublittoral zone down to ca 8 m depth.
Collections: NI200680, A140782.
Cosmopolitan.
Aegean Sea: Imbros Island (Forsskål 1775, XXXVI, as *Fucus*), Lesbos (Candargy 1899),

Makedonian coast (Politis 1925 1953, Haritonidis & Tsekos 1975, Haritonidis 1978), Thasos (Haritonidis & Tsekos 1974), Thrake (Katsikopoulos 1939), Pagasitikos Gulf (Diannelidis 1935), Cyclades (Politis 1938, Schiffner & Schussnig 1943, Nizamuddin & Lehnberg 1970), Attica (Politis 1936, Gerloff & Geissler 1974), Egina island (Gerloff & Geissler 1974), Crete (Politis 1932), and Rhodes (Reinbold 1898).

* ***Enteromorpha linza*** (Linnaeus) J. Agardh

Plants, to 10 cm long and to 7 mm broad, were encountered in the vicinity of the Thessaloniki Gulf (eutrophic waters) in winter. These grew on pebbles and small pieces of wood in association with *Ulva* sp. and *Gracilaria verrucosa.*
Collections: NM271180.
Cosmopolitan.
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975; Haritonidis 1978), Thasos and Lesbos (Haritonidis & Tsekos 1974), Thrake (Katsikopoulos 1939), Cyclades (Coppejans 1974), Pagasitikos Gulf and N. Sporades (Diannelidis 1948, 1953), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

* ***Enteromorpha multiramosa*** Bliding

Plants, to 1 cm long and 0.3 mm broad, grew in the upper sublittoral zone entangled to species of *Cladophora* and *Stypocaulon scoparium.* The minute thallus was richly branched, composed of cells, 35 to 50 µm in diameter, containing several pyrenoids. Isolates in culture reached a length of ca 1.5 cm.
Collections: A201180, K010882, SI240883.
Distributed in the Mediterranean (type locality: Naples, Split; Bliding 1960:177) (Ionian Sea, Schnetter & Schnetter 1981), and the Virgin Islands.
Aegean Sea: Sithonia (present study).
Note: The record from the West Indies is based on specimens detected in a slide preparation (US-Abbott-12640) including the ceramiaceous alga *Antithamnion antillanum* Abbott (1979).

Enteromorpha prolifera (O. F. Müller) J. Agardh

Reported from the Makedonian coast (Anagnostidis 1968) and the Cyclades (Coppejans 1974).

Enteromorpha ramulosa (J. E. Smith) Hooker
= *Enteromorpha crinita* (Roth) J. Agardh (Bliding 1963:123)

Reported from the Makedonian coast (Anagnostidis 1968), Mikonos (Schiffner & Schussnig 1943, var. *tenerrima* Schiffner), and Asia Minor (Güven & Öztig 1971, as *E. ramulosa* Hook. and *E. crinita*).

ULVA Linnaeus

Ulva fasciata Delile

Reported from Santorini (Fauché *et al.*1832-33), the N. Sporades (Schiffner & Schussnig 1943, as *U. lactuca* var. *fasciata* conf. Schiffner), and the Makedonian coast (Haritonidis & Tsekos 1975, Haritonidis 1978).

Ulva lactuca Linnaeus

Reported from Lesbos [Candargy 1899, as *U. lactuca* (L.) Le Jol.; Anagnostidis 1968, as *U. lactuca* s. l.; Haritonidis & Tsekos 1974], Thasos (Haritonidis & Tsekos 1974), Makedonian coast [Politis 1953, as *U. lactuca* (L.) Le Jol.; Anagnostidis 1968, as *U. lactuca* s. l.;

Haritonidis & Tsekos 1975; Haritonidis 1978, as *U. lactuca* (L.) Le Jol.], Thrake [Katsikopoulos 1939, as *U. lactuca* (L.) Le Jol.], the Pagasitikos Gulf [Diannelidis 1935, as *U. lactuca* (L.) Le Jol.], N. Sporades (Miliarakis 1887, as *U. lactuca* ? Le Jol.; Diannelidis 1953, as *U. lactuca* L. ? -*U. sporadica* Miliarakis), Attica, Crete Cyclades and Chalkidiki [Politis 1932, 1936, 1953, as *U. lactuca* (L.) Le Jol.], Attica and Egina Island (Gerloff & Geissler 1974), Cyclades (Nizamuddin & Lehnberg 1970, Coppejans 1974), Attica (Gerloff & Geissler 1974), Rhodes (Schiffner & Schussnig 1943, Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

* ***Ulva rigida*** C. Agardh
= *Ulva lactuca* Linnaeus var. *rigida* (C. Agardh) Le Jolis

Plants, to 20 cm long, grew in sheltered habitats (harbours) in the upper sublittoral zone. The thallus developed characteristic tooth-like protuberances along the basal part (to 200 µm thick).
Collections: 0I070480, PC171180, NM271180.
According to Agardh (1822:410) and later authors, *U. rigida* occurs in the Atlantic between S. Scandinavia (Bliding 1968) and the Cape of Good Hope, in the Mediterranean, the Red Sea (see Papenfuss 1968), and the Black Sea (Zinova 1967).
Aegean Sea: Makedonian coast [Anagnostidis 1968, with reservation; Haritonidis & Tsekos 1975, as *U. rigida* (C. Ag.) Thur.; Haritonidis 1978], Santorini (Fauché *et al.* 1832-33:327), Rhodes (Reinbold 1898, as var. *rigida* Ag.; Bliding 1968), Simi (Bliding 1968), and Cyclades (Nizamuddin & Lehnberg 1970).
Note: This taxon has long been regarded as one of the most common European species of *Ulva* (Bliding 1968), but this was disputed by Phillips (1984) who claimed that Bliding's plants, some of them collected at Rhodes and the Simi Island in the S. Archipelagus, should be referred to *Ulva laetevirens* Areschoug, a taxon previously known from the Pacific.

Ulva rigida var. ***laciniata*** (Wulfen) J. Agardh

Reported from Limnos and Mikonos (Schiffner & Schussnig 1943, as *U. lactuca* v. *laciniata*, on *Stypocaulon* and *Corallina rubens*).

Ulva rotundata Bliding

This species was reported by Bliding (1968) from Rhodes and Lindos.

Excluded species

Ulva gigantea (Kützing) Bliding (1968:558)
= *Ulva latissima* Linnaeus sensu J. Agardh

According to Bliding (see also Hoeksema & van den Hoek 1983), this species occurs on the N. Atlantic coast of France. Hence, the record from the Makedonian coast (Haritonidis & Tsekos 1975) is doubtful and probably based on a misidentification.
Records of *U. latissima* [= *Laminaria saccharina* (L.) Lamour; Papenfuss 1960] from Lesbos (Candargy 1899, as *Ulva latissima* Ag.), N. Sporades (Diannelidis 1950, as *U. latissima* Ag.; 1953, as *U. lactuca* var. *latissima*), and Rhodes (Reinbold 1898, as *U. lactuca* var. *latissima* Linnaeus) are here associated with this species too, since it is rather possible that they have been based on Agardh's (1883) concept.

CLADOPHORALES G. S. West
ANADYOMENACEAE Kützing

ANADYOMENE Lamouroux

* ***Anadyomene stellata*** (Wulfen) C. Agardh
= *Anadyomene flabellata* Lamouroux (see De Toni 1889:368)

Saxicolous and epiphytic plants, the latter growing on *Posidonia* rhizomes, crustose corallines and *Cystoseira corniculata*, were collected in exposed and sheltered habitats between the upper sublittoral zone and ca 8 m depth. Individuals were to 3 cm long, and occurred in all seasons, most commonly in late summer and autumn.
Collections: NI200680, A290680, A081081, A171180, A041280, A110581, S100882.
Distributed in the Mediterranean (type locality: Adriatic; see Wulfen 1803:6, as *Ulva*), the West Indies (see Taylor 1960), and the Canaries (Børgesen 1925).
Aegean Sea: Makedonian coast (Politis 1925, 1953, Anagnostidis 1968, Haritonidis & Tsekos 1975), Thasos (Haritonidis & Tsekos 1974), Saronikos Gulf (Fauché *et al.* 1832-33, as *A. flabellata*), Cyclades (Politis 1938, Schiffner & Schussnig 1943, Coppejans 1974), Attica (Schmitz 1879, as *A. flabellata*; De Toni 1901, Politis 1936, Gerloff & Geissler 1974), Skiathos (Miliarakis 1887, as *A. stellata* Ag.), Pagasitikos Gulf and N. Sporades (Diannelidis 1935, 1953), Crete (Schussnig 1943), S. Archipelagus (Giaccone 1968a, as *A. stellata* Ag.), Lesbos (Candargy 1899), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

MICRODICTYON Decaisne

Microdictyon tenuius (C. Agardh) Decaisne
= *Microdictyon umbilicatum* (Velley) Zanardini pro parte (Setchell 1929:490)

Reported from the Cyclades [Politis 1938, as *M. umbilicatum* (Velley) Zanardini], the S. Archipelagus (Huvé 1962a, Giaccone 1968a, as *M. tenuis* Decne.).

Excluded species

Microdictyon agardhianum Decaisne

The single record from Asia Minor (Güven & Öztig 1971) is doubtful, as there are no previous reports of this species in the Mediterranean.

Microdictyon schmitzii Miliarakis

This species was described by Miliarakis (1887) with reservations ("An potius *Boodlea*?") from material collected at the island of Skiathos (N. Sporades) (De Toni 1889:362). Its taxonomic status is, however, obscure, since neither the species nor the genus was ever re-found at the island, in spite later investigations (Schiffner & Schussnig 1943, Diannelidis 1953).

CLADOPHORACEAE Willie

CHAETOMORPHA Kützing

* ***Chaetomorpha aerea*** (Dillwyn) Kützing

Saxicolous, dense populations, occasionally growing with *Enteromorpha compressa* and species of *Cladophora*, grew in distinct littoral belts in spring. Individuals were up to 20 cm long and 160 µm thick.

Collections: A171180, A100581, A200386.
Cosmopolitan.
Aegean Sea: Makedonian coast (Anagnostidis 1968), Thasos and Lesbos (Haritonidis & Tsekos 1974), Pagasitikos Gulf (Diannelidis 1935), Crete, Cyclades and Attica (Politis 1932, 1936, 1938), Cyclades (Nizamuddin & Lehnberg 1970; Coppejans 1974), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

Chaetomorpha crassa (C. Agardh) Kützing

Reported from the Makedonian coast (Haritonidis & Tsekos 1975; Haritonidis 1978), Crete, and Cyclades (Schiffner & Schussnig 1943, Schussnig 1943), and Rhodes (Diannelidis *et al.* 1977).

Chaetomorpha linum (O. F. Müller) Kützing
= *Conferva linum* O.F.Müller
= *Chaetomorpha chlorotica* (Montagne) Kützing (Blair 1983:178)

Reported from the Makedonian coast (Anagnostidis 1968, as *C. chlorotica*; Haritonidis & Tsekos 1975, also as *C. chlorotica*; Haritonidis 1978), Thasos (Haritonidis & Tsekos 1974), N. Sporades (Diannelidis 1953), N. Sporades, Cyclades, and Limnos (Schiffner & Schussnig 1943, also as *C. chlorotica* Kütz.), Rhodes (Reinbold 1898, as *C. linum* and f. *longiarticulata* Ard.; Diannelidis *et al.* 1977, also as *C. chlorotica*), Attica and Cyclades (Politis 1936, 1938, as *C. chlorotica* Kütz.), and Lerne on the eastern coast of Peloponnesus (Fauché *et al.* 1832-33, as *Conferva linum* Roth).

RHIZOCLONIUM Kützing

Rhizoclonium riparium (Roth) Harvey

Reported from the Makedonian coast (Anagnostidis 1968, Haritonidis & Tsekos 1975; Haritonidis 1978), and Rhodes (Diannelidis *et al.* 1977).

Rhizoclonium tortuosum (Dillwyn) Kützing
= *Chaetomorpha tortuosa* Kützing
= *Chaetomorpha capillaris* (Kützing) Børgesen (Blair 1983:198)

Reported from the Makedonian coast (Haritonidis & Tsekos 1975, as *C. capillaris*) and Cyclades [Schiffner & Schussnig 1943, as *C. tortuosa* (J. Ag.) Kütz., on *Stypocaulon*; Coppejans 1974, as *C. capillaris*].

CLADOPHORA Kützing

Cladophora albida (Hudson) Kützing
= *Cladophora hamosa* (Kützing) Kützing
= *Cladophora neesiorum* (C. Agardh) Kützing
= *Cladophora pumila* Kützing (van den Hoek 1963:94)

Reported from the Makedonian coast (Anagnostidis 1968, also as *C. pumila*; Haritonidis & Tsekos 1975; Haritonidis 1978), Thasos and Lesbos (Haritonidis & Tsekos 1974, also as *C. hamosa* Kütz.), Pagasitikos Gulf (Diannelidis 1948, as *C. neesiorum* Kütz.), Cyclades (Politis 1938 and Coppejans 1974, var. *albida*), Crete (Politis 1932; Schussnig 1943, also as *C. hamosa* Kütz.), Rhodes (Diannelidis *et al.* 1977), and Attica (Politis 1936).

* ***Cladophora coelothrix*** Kützing
= *Cladophora repens* (J. Agardh) Harvey (van den Hoek 1963:40)

Saxicolous and epiphytic plants grew in moss-like tufts, to 4 cm in extent, in semi-exposed, shaded habitats in the upper sublittoral zone. Thalli were irregularly branched with 2 or 3 laterals per node, and grew together with articulated corallines, *Gelidium pusillum*, and *Cladophora laetevirens*. Apical cells were 65 to 200 µm thick.
Collections: K010882, SI240883.
Distributed in the Mediterranean (type locality: Livorno; see van den Hoek 1963:40; Kützing 1843:272), the Black Sea (Zinova 1967), and the Atlantic to the British Isles (see van den Hoek 1963).
Aegean Sea: Lesbos and Saronikos Gulf (Anagnostidis 1968, as *C. repens*), N. Sporades (Miliarakis 1887, also as *C. repens* Harv.; Diannelidis 1953, as *C. repens*), Rhodes (Reinbold 1898, as *C. repens)*, Mikonos (Schiffner & Schussnig 1943, as *C. repens* Harv.), Attica (Politis 1936, as *C. repens*), and Asia Minor (Güven & Öztig 1971, as *C. repens*).

* ***Cladophora dalmatica*** Kützing
= *Cladophora arachnoidea* Schiffner (van den Hoek 1963:188)

Saxicolous plants were sporadically encountered in semi-exposed habitats in the littoral zone in summer. Thallus organization was acropetal with 2 to 5 laterals developed from axial cells. Apical cells were 15 to 25 µm thick and main axial cells up to 0.5 mm.
Collections: P210881, K010882.
Distributed in the Mediterranean (type locality: Split; Kützing 1843:262; van den Hoek 1963:186), the Black Sea (Zinova 1967), and the N. Atlantic to Scandinavia (see van den Hoek 1963).
Aegean Sea: Makedonian coast (Anagnostidis 1968, with reservations; Haritonidis & Tsekos 1975), Kaki skala (E. Peloponnesus) (van den Hoek 1963:p. 188, 198), Cyclades (Schiffner & Schussnig 1943, as *C. arachnoidea*; Coppejans 1974), Rhodes (Diannelidis *et al.* 1977), and Crete (Politis 1932).
Note: *C. arachnoidea* Schiffner (Schiffner & Schussnig 1943:3) was described from material collected in the Archipelagus (type locality: Mikonos).

* ***Cladophora echinus*** (Biasoleto) Kützing
= *Cladophora cornea* (Kützing) Kützing (van den Hoek 1963:47)

Plants, to 1 cm long, grew in the sublittoral zone on crustose algae. Thalli were irregularly branched with up to 4 laterals per node, and attached to the substratum by means of rhizoids with coralloid holdfasts occasionally penetrating into the host. Apical cells were to 200 µm thick and cell walls to 70 µm thick.
Collections: A201180, A100782, KI020883.
Distributed in the Mediterranean (type locality: Istria; see van den Hoek 1963:46) and the Black Sea (Zinova 1967).
Aegean Sea: Makedonian coast, Lesbos, Maliakos Gulf and Thasos Island (Anagnostidis 1968), N. Sporades and Pagasitikos Gulf (Diannelidis 1935, 1953), and Cyclades (Politis 1938, as *C. cornea* Kütz.).

Cladophora feredayi Harvey
= *Cladophora pellucida* f. *nana* Hauck (van den Hoek 1963:221)

Reported from the N. Sporades (Miliarakis 1887, Diannelidis 1953, as *C. pellucida* f. *nana*) and the S. Archipelagus (Giaccone 1968a).

Cladophora glomerata Kützing

Reported from the Makedonian coast (Anagnostidis 1968), the S. Archipelagus (Giaccone 1968a), and Asia Minor (Güven & Öztig 1971).

Cladophora hutchinsiae (Dillwyn) Kützing
= *Cladophora rissoana* Meneghini ex Kützing (van den Hoek 1963:60)

Reported from the Cyclades (Schiffner & Schussnig 1943, as *C. rissoana*), and Asia Minor (Güven & Öztig 1971).

* ***Cladophora laetevirens*** (Dillwyn) Kützing
= *Cladophora meneghiniana* (Kützing) Kützing
= *Cladophora repens* (J. Agardh) Harvey f. *meneghiniana* (Kützing) Hauck
= *Cladophora utriculosa* Kützing var. *laetevirens* (Dillwyn) Hauck
=? *Cladophora affinis* Schiffner (van den Hoek 1963:60,130)

Saxicolous and epiphytic plants, the latter growing on *Cladostephus spongiosus* f.*verticillata*, were collected at semi-exposed habitats in the upper sublittoral zone. Thalli were subspherical, to 5 cm in diameter, with spongy texture and acropetal organization. Axial cells developed 2 or 3 laterals per node. Apical cells were 50 to 100 µm thick, and main axial cells 95 to 130 µm thick. Specimens with empty apical cells (sporangia or gametangia) were collected in July.
Collections: A140580, NI200680, A110581, K100782, SI240883.
Distributed in the Mediterranean, the Black Sea, and the N. Atlantic (see van den Hoek 1963).
Aegean Sea: Makedonian coast (Anagnostidis 1968, Haritonidis & Tsekos 1975, Haritonidis 1978), Thasos Island [Haritonidis & Tsekos 1974, as *C. laetevirens* (Kütz.) Hamel], Pagasitikos Gulf (Diannelidis 1948, as *C. utriculosa* v. *laetevirens* Hauck), Limnos (Schiffner & Schussnig 1943, as *C. affinis* and *C. meneghiniana)*, Cyclades (Coppejans 1974; Schiffner & Schussnig 1943, as *C. meneghiniana*), Attica (Politis 1936, as *C. repens* f. *meneghiniana* and *C. utriculosa* var.*laetevirens*), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

Cladophora lehmanniana (Lindenberg) Kützing
= *Cladophora utriculosa* Kützing
= *Cladophora utriculosa* var. *longiarticulata* Kützing
= *Cladophora utriculosa* var. *ramulosa* (Meneghini) Hauck
= *Cladophora ramulosa* Meneghini (van den Hoek 1963:122)

Reported from the Makedonian coast (Haritonidis & Tsekos 1975), N. Sporades (Diannelidis 1953, as *C. ramulosa*), Attica (Politis 1936, as *C. utriculosa* var. *ramulosa*), Rhodes (Diannelidis *et al.* 1977), Cyclades (Politis 1936; Schiffner & Schussnig 1943, as *C. utriculosa* and *C. utriculosa* var. *longiarticulata*), and Limnos (Schiffner & Schussnig 1943, as *C. utriculosa*).

* ***Cladophora pellucida*** (Hudson) Kützing
= *Cladophora trichotoma* (C. Agardh) Kützing (van den Hoek 1963:215)

Plants, to 2.5 cm long, were encountered in shaded littoral habitats in association with *Corallina elongata*. Basal cells of the thallus were up to 7 mm long and 0.5 mm broad with vigorous rhizoidal outgrowths developed from the base. Thallus organization was acropetal with 2 to 5 laterals developed from axial cells. Apical cells were 100 to 120 µm thick.
Collections: K010882, SI240883, SC240684.
Distributed in the Mediterranean and the Atlantic coast of Europe to the British Isles (see van den Hoek 1963).

Aegean Sea: Makedonian coast (Anagnostidis 1968, Haritonidis & Tsekos 1975) Thasos and Lesbos (Haritonidis & Tsekos 1974), Skiathos (Miliarakis (1887, as *C. trichotoma* Kütz.), N. Sporades, Pagasitikos Gulf (Diannelidis 1948, 1953), Attica (Politis 1936, van den Hoek 1963), Cyclades (Politis 1938, Coppejans 1974), the S. Archipelagus (Giaccone 1968a), Rhodes (Diannelidis *et al.* 1977), and Asia Minor. *Cladophora trichotoma* was reported by Miliarakis from Skiathos (De Toni 1901).

* ***Cladophora prolifera*** (Roth) Kützing
= *Cladophora prolifera* var. *scoparia* (Kützing) Schiffner (van den Hoek 1963:208)

Saxicolous plants occurred in shaded habitats in the littoral and sublittoral zone, to at least 15 m depth. Thalli were dark green, to 12 cm long, with acropetal organization and rhizoidal cortication developed towards the base. Axial cells cut off 3 or 4 laterals. Apical cells were to 200 µm thick.
Collections: A171180, A201180, P211081, K010882.
Distributed in the Mediterranean, and the N. Atlantic to the British Isles (see van den Hoek 1963).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), Thasos and Lesbos (Haritonidis & Tsekos 1974), N. Sporades (Diannelidis 1953), Cyclades (Politis 1938, Schiffner & Schussnig 1943, Coppejans 1974), Limnos (Schiffner & Schussnig 1943, var. *scoparia* Kützing), Attica (Gerloff & Geissler 1974), Crete (Politis 1932), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

Cladophora retroflexa (Bonnemaison ex P. & H. Crouan) P. & H. Crouan

Reported from the Thessaloniki Gulf [Haritonidis 1978, as *C. retroflexa* (Bouh) Crouan].

Cladophora rupestris (Linnaeus) Kützing
= *Cladophora rupestris* var. *mediterranea* Kützing
= *Cladophora rupestris* f. *mediterranea* (Kützing) Ardissone

Reported from the Makedonian coast (Anagnostidis 1968, Haritonidis & Tsekos 1975; Haritonidis 1978), the Pagasitikos Gulf and N. Sporades (Diannelidis 1948, 1953, as f. *mediterranea* Ardissone), and Rhodes (Diannelidis *et al.* 1977).

Cladophora sericea (Hudson) Kützing
= *Cladophora gracilis* (Griffiths ex Mackay) Kützing
= *Cladophora rudolphiana* (C. Agardh) Harvey
= *Cladophora mediterranea* Hauck (van den Hoek 1963:77)

Reported from the Makedonian coast (Anagnostidis 1968; Haritonidis & Tsekos 1975, also as *C. rudolphiana*; Haritonidis 1978, also as *C. rudolphiana*), Thasos and Lesbos (Haritonidis & Tsekos 1974, as *C. gracilis* or *C. rudolphiana*), N. Sporades [Diannelidis 1953, as *C. gracilis* (Griff.) Zanard.], Rhodes (Diannelidis *et al.* 1977, also as *C. rudolphiana*), and Asia Minor (Güven & Öztig 1971, as *C. mediterranea*).

Cladophora socialis Kützing

Reported by Giaccone (1968a) from the S. Archipelagus.

Cladophora vadorum (Areschoug) Kützing
= *Cladophora corynarthra* Kützing (van den Hoek 1963:141)

Reported as *C. corynarthra* from Rhodes (Reinbold 1898), Attica (Politis 1936), and the Saronikos Gulf (Anagnostidis 1968).

* ***Cladophora vagabunda*** (Linnaeus) van den Hoek
= *Cladophora fracta* (Vahl) Kützing f. *marina* Hauck
= *Cladophora penicillata* Kützing
= *Cladophora utriculosa* Kützing v. *aegaea* (Kützing) Kützing (van den Hoek 1963:144)

Saxicolous plants, to 12 cm long, were encountered in semi-exposed, littoral habitats. Thallus organization was acropetal with 2 to 4 laterals per node. Apical cells were 45 to 100 µm thick. *Collections*: P210881.
Distributed in the Mediterranean, the Black Sea (Zinova 1967), and the N. Atlantic to S. Scandinavia (van den Hoek 1963).
Aegean Sea: Makedonian coast (Anagnostidis 1968, as *C. penicillata*; Haritonidis & Tsekos 1975; Haritonidis 1978), Crete and Attica (Politis 1932,1936, as *C. fracta* f. *marina*), Attica and Egina Island (Gerloff & Geissler 1974), Smirna (Kützing 1849, as *C. utriculosa* var. *aegaea*), Limnos, Mikonos and Kaki Skala (see van den Hoek 1963:155), and Rhodes (Diannelidis *et al.* 1977).
Note: *C. utriculosa* var. *aegaea* [= *Cladophora aegaea* Kützing (1843:266)] was described from material collected at Smirna.

CLADOPHOROPSIS Børgesen

Cladophoropsis membranacea (C. Agardh) Børgesen
=? *Siphonocladus membranaceus* (C. Agardh) Bornet var. *caespitosa* (C. Agardh) De Toni
=? *Siphonocladus psyttaliensis* Schmitz

Siphonocladus membranaceus var. *caespitosa* was reported from Rhodes (Reinbold 1898) and *Siphonocladus psyttaliensis* was originally described by Schmitz (1879) from material collected at the islet of Psyttalia in the Saronikos Gulf.
Note: This species was erected by Agardh (1824:120, as *Conferva*) to accommodate a tropical plant with two varieties, the typical one from the Island of Santa Cruz and var. *caespitosa* from the Antilles and Tenerife. Agardh cited *Conf. caespitosa* Bory as a synonym of var. *caespitosa*, which is probably a *nomen nudum* written on a specimen and sent to him by Bory (see Børgesen 1925:25). *Conferva membranacea* var. *caespitosa* was later transferred to *Siphonocladus* by De Toni (1889:359) and, under that name, was reported from Rhodes by Reinbold (1898), who correctly referred to a previous Mediterranean record of the species from Corsica (Debaux 1874).
Siphonocladus membranacea was considered to represent a new genus, *Cladophoropsis* by Børgesen (1905), who also pointed out the close relationship of this species with *S. psyttaliensis*.

Excluded species

Ceramium fractum (Vahl) Bory var. ***elongatum*** (Roth) Bory

This taxon was erected by Bory (Fauché *et al.* 1832-33:332, as *Ceramium fractum* β. *elongatum* Bory) to accommodate plants collected at the island of Tinos (Cyclades). It was apparently based on *Conferva fracta* O. F. Müller ex Vahl var. *elongata* (Roth) Roth, the identity of which is obscure (van den Hoek 1963:223).

Chaetomorpha fibrosa (Kützing) Kützing

Reported from Rhodes (Reinbold 1898, as *C. fibrosa* Kütz.). Its current taxonomic status is unknown and requires re-investigation.

Cladophora catenata (Linnaeus) Kützing

Reported from Mikonos [Schiffner & Schussnig 1943, as *C. catenata* (Ag.) Hauck], Crete (Politis 1932), and Asia Minor [Güven & Öztig 1971, as *C. catenata* (C. Ag.) Ardiss.]. According to van den Hoek (1963:123), the name has usually been applied to Mediterranean plants of *C. lehmanniana*, although it was originally based on Linnaeus' *Conferva catenata* from the Bahama Islands.

Cladophora crystalina (Roth) Kützing

Reported from Lesbos (Anagnostidis 1968), Cyclades (Nizamuddin & Lehnberg 1970), and Attica (Politis 1936). According to van den Hoek (1963:148), Roth's plant might belong either to *C. glomerata* or *C. vagabunda.*

Cladophora glomerata (Linnaeus) Kützing var. ***marina*** Kützing

Reported from Crete and Attica (Politis 1932, 1936). Its taxonomic status is obscure (van den Hoek 1963:224).

Cladophora graeca Schiffner

Schiffner never described this taxon that appeared as a *nomen nudum* in Rechinger's Flora Aegaea (Schiffner & Schussnig 1943). According to van den Hoek (1963:155), herbarium material collected at N. Sporades and Mikonos and referred to this name is partly based on *C. vagabunda.*

Cladophora lanosa (Roth) Kützing
Cladophora lanosa f. ***uncialis*** (O. F. Müller) Hauck

These two taxa have been reported from the Thasos Island and the Thessaloniki Gulf (Haritonidis & Tsekos 1974, Haritonidis 1978) and the N. Sporades (Diannelidis 1948) respectively, but their taxonomic status is obscure (van den Hoek 1963). The binomial *Cladophora lanosa* has previously been applied to the common cold-temperate alga *S. aeruginosa* (L.) van den Hoek, which is not known in the Mediterranean, while *Conferva uncialis* O. F. Müller might belong to *C. vagabunda* or *C. dalmatica* (van den Hoek 1963:255).

Cladophora refracta (Roth) Kützing

Reported from the Makedonian coast (Anagnostidis 1968, as *C. refracta* Kütz.), but its status is obscure (van den Hoek 1963:224).

Cladophora ruchingeri (C. Agardh) Kützing

Reported from the Egina Island by Gerloff & Geissler (1974, "Die Bestimmung ist nicht ganz sicher.").

Spongomorpha arcta (Dillwyn) Kützing
= *Cladophora arcta* (Dillwyn) Kützing

The records of this cold-temperate species from the islands of Thasos and Lesbos (Haritonidis & Tsekos 1974, as *Cladophora*), and the Gulf of Thessaloniki (Haritonidis 1978, as *Cladophora*) are doubtful and probably based on misidentifications.

SIPHONOCLADALES (Blackman & Tansley) Oltmanns
SIPHONOCLADACEAE Schmitz

SIPHONOCLADUS Schmitz

Siphonocladus pusillus (Kützing) Hauck
= *Siphonocladus wilbergii* Schmitz (see Hauck 1885:470)

Schmitz (1879) described this species, as *S. wilbergii*, from material collected in the Saronikos Gulf.

Excluded species

Siphonocladus concrescens Reinbold
Siphonocladus rhodensis Reinbold

These two taxa are only known from Reinbold's (1898) original account based on material collected at Rhodes. Judging from the protologue, the generic status of the plants is doubtful (Gerloff & Geissler 1974:738) and in need of re-examination.

VALONIACEAE Kützing

VALONIA C. Agardh

Valonia macrophysa Kützing

Reported from the Makedonian coast (Haritonidis & Tsekos 1975; Haritonidis 1978), Thasos and Lesbos (Haritonidis & Tsekos 1974), Skiathos (Miliarakis 1887), Rhodes (Diannelidis *et al.* 1977), and the S. Archipelagus (Huvé 1962a; Giaccone 1968a, 1968d, from Kithira channel, at 60 m depth).

* ***Valonia utricularis*** (Roth) C. Agardh
=? *Valonia caespitula* Zanardini (cf. De Toni 1889:376)

Plants were commonly found on species of *Cystoseira* and *Posidonia* rhizomes in sheltered, shaded habitats in the sublittoral zone, to at least 10 m depth. They occasionally formed extensive cell aggregations, to 20 cm in diameter, with individual cells more or less pyriform, to 1 cm long and 2 mm broad. Under optimum culture conditions, isolates reached a length of 2 cm and a breadth of 6 cm.
Collections: A091081, SI240883, S100882, K100886.
Distributed in the Mediterranean, the Atlantic Spain (Cadiz; Agardh 1823:431), the West Indies (see Taylor 1960), and the Red Sea (see Papenfuss 1968).
Aegean Sea: Makedonian coast (Politis 1925, 1953), Lesbos (Candargy 1899, as *V. utricularis* Roth), Pagasitikos Gulf and N. Sporades (Diannelidis 1948, 1953), Attica and Cyclades (Politis 1936), Mikonos and Naxos (Schiffner & Schussnig 1943), Attica (Gerloff & Geissler 1974), Crete (Schussnig 1943), Cyclades (Coppejans 1974), the S. Archipelagus (Giaccone 1968a, as *V. utricularis* Ag.), Rhodes (Reinbold 1898), and Asia Minor (Güven & Öztig 1971). *Valonia caespitula* was recorded by Miliarakis (1887) from the island of Skiathos (De Toni 1901).

Valonia ventricosa J. Agardh

Reported from the S. Archipelagus (Giaccone 1968a)

BRYOPSIDALES
BRYOPSIDACEAE Bory

BRYOPSIS Lamouroux

Bryopsis adriatica (J. Agardh) Meneghini
= *Bryopsis plumosa* (Hudson) C. Agardh var. *adriatica* (J. Agardh) Hauck

Reported from the Makedonian coast (Anagnostidis 1968, with question mark), Attica (Diannelidis 1950, var.*adriatica*) and Cyclades (Diannelidis 1950, var. *adriatica*; Coppejans 1974).

* ***Bryopsis balbisiana*** Lamouroux
= *Bryopsis balbisiana* Lamouroux var. *disticha* J. Agardh
= *Bryopsis disticha* (J. Agardh) Kützing (Feldmann 1937:225)

Reported from the Makedonian coast (Haritonidis & Tsekos 1975, as *B. disticha*), Thasos (Haritonidis & Tsekos 1974, as v. *disticha*), Attica and Cyclades (Politis 1932, 1936, as *B. disticha* J. Ag.; Coppejans 1974), Rhodes (Diannelidis *et al.* 1977, as *B. disticha*), and Asia Minor (Güven & Öztig 1971).
The species was also collected at Crete (Iraclion 290983) by myself. Saxicolous plants grew in tufts, to 6 cm long, in sheltered habitats in the upper sublittoral zone in association with *Caulerpa prolifera* and *Corallina elongata*. Fronds were simple or sparsely branched and provided with short, 1 to 2 mm long, laterals arranged distichously or unilaterally close to the apices.

Bryopsis corymbosa J. Agardh

Reported from the Makedonian coast (Anagnostidis 1968), Attica (Politis 1936, Gerloff & Geissler 1974), and the N. Sporades (Diannelidis 1953).

Bryopsis cupressoides Kützing

Reported from Mikonos (Schiffner & Schussnig 1943, on *Stypocaulon*).

* ***Bryopsis hypnoides*** Lamouroux

A few saxicolous, infertile plants, to 5 cm long, were encountered in the sublittoral zone.
Collections: A000684.
Distributed in the Mediterranean, the Red Sea (see Papenfuss 1968), and the NE. Atlantic to Scandinavia (see Rueness 1977).
Aegean Sea: Makedonian coast and Lesbos (Haritonidis & Tsekos 1974, 1975; Haritonidis 1978) and Rhodes (Diannelidis *et al.* 1977).

* ***Bryopsis muscosa*** Lamouroux

Saxicolous and epiphytic plants grew in association with *Corallina elongata*, *Gelidium pusillum*, *Cladophora coelothrix*, and *Stypocaulon scoparium*. Fronds were up to 3 cm long and developed simple lateral branches, to 1.5 mm long and to 110 µm broad, in radial pattern close to the apices.
Collections: K010882, SI240883, K210684.
Endemic in the Mediterranean.
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), Crete (Politis 1932), and Rhodes (Diannelidis *et al.* 1977).

Bryopsis plumosa (Hudson) C. Agardh

Reported from the Makedonian coast (Haritonidis & Tsekos 1975; Haritonidis 1978), Thasos and Lesbos (Haritonidis & Tsekos 1974), Crete and Attica (Politis 1932, 1936), Rhodes (Reinbold 1898, Diannelidis *et al.* 1977), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

* ***Bryopsis*** sp.

Saxicolous and epiphytic plants, the latter growing on *Halimeda tuna*, were collected in the sublittoral zone. Thalli were up to 2 cm long, composed of a percurrent axis, to 8 mm broad, with radial development of lateral branches, to 2.3 mm long and 25 to 30 µm broad, along its entire length. Branches bore at their base subspherical gametangia, 70 to 100 µm long and 50 to 70 µm broad.
Collections: A040684, A230684.
Note: The Aegean plants were related to *B. monoica* Berthold, which, however, exhibits bipinnate thallus branching and elongate gametangia (Hamel 1931a, Feldmann 1937).

DERBESIA Solier

* ***Derbesia*** cf. ***tenuissima*** (De Notaris) P. & H. Crouan
= *Halicystis* cf. *parvula* Schmitz

Infertile plants of *Halicystis*, found on *Amphiroa rigida* and *Lithophyllum expansum* sensu Lemoine, were provisionally referred to this species since the preserved material was not suitable for a cytological study. The material was collected in the sublittoral zone (ca 10 m depth).
Collections: A140782, KI310783.
Derbesia tenuissima is the only known species of the genus in the Mediterranean, extending its distribution to the N. Atlantic (Brittany; Magne 1956).
Aegean Sea: Sithonia (present study) and Saronikos Gulf (Diapoulis & Verlaque 1981, as *Halicystis* stadium).

PEDOBESIA Macraid & Womersley

* ***Pedobesia lamourouxii*** (J. Agardh) J. Feldmann *et al.* (1975)
= *Derbesia lamourouxii* (J. Agardh) Solier
=? *Derbesia cervicornis* Schiffner

Saxicolous sporophytes with sparsely branched fronds, to 7 cm long and 250 µm broad, grew in tufts in shaded habitats in the sublittoral zone (1 to 6 m depth). They bore spherical sporangia, to 400 µm in diameter.
Collections: S000882, SI240883, SC010784.
Distributed in the Mediterranean, the Atlantic coast of Iberia (Ardré 1970), and the West Indies (see Taylor 1960).
Aegean Sea: reported as *Derbesia* from the Makedonian coast (Politis 1925, 1953), N. Sporades (Miliarakis 1887, as *D. lamourouxii* Solier; Diannelidis 1950, 1953), Attica (Schmitz 1879, as *D. lamourouxii* Sol.), Rhodes (Reinbold 1898), and Asia Minor (Güven & Öztig 1971).
Note: *Derbesia cervicornis* was originally described by Schiffner (Schiffner & Schussnig 1943:2) to accommodate a few infertile plants collected at Naxos (Cyclades) as epiphytes on *Cystoseira*. Schiffner considered his material distinct from *Pseudochlorodesmis furcellata* and *P. lamourouxii*, although, judging from the protologue, the plants could well belong to a form of *P. lamourouxii* as defined by Hamel (1931b) and Feldmann (1937).

CAULERPACEAE Kützing

CAULERPA Lamouroux

* ***Caulerpa prolifera*** (Forsskål) Lamouroux

This species does not occur on the Makedonian coast, where only drift material has been found (Haritonidis & Tsekos 1975). It is, however, frequently reported from southern areas of the Archipelagus such as, the Pagasitikos Gulf and the N. Sporades (Miliarakis 1887, as *C. prolifera* Lamour.;Diannelidis 1935, 1953), the Saronikos Gulf (Schmitz 1879, as *C. prolifera* Lamx.; Anagnostidis 1968, Gerloff & Geissler 1974), Crete, the Cyclades and Attica (Politis 1932, 1936, 1938), Santorini (Schiffner & Schussnig 1943), the Cyclades (Coppejans 1974), Rhodes (Reinbold 1898, Diannelidis *et al.* 1977), islands of the S. Archipelagus (Giaccone 1968a,d, found at 60 m depth at Kithira channel), and Asia Minor (Güven & Öztig 1971). Saxicolous, dense populations, growing in sheltered habitats in the upper sublittoral zone, were met with at Crete (Iraclion 290983). The leaf-like fronds were up to 8 cm long and 1 cm broad.

CHAETOSIPHONIACEAE Blackman & Tansley

BLASTOPHYSA Reinke

Blastophysa rhizopus Reinke
= *Blastophysa polymorpha* Kjellman (Kylin 1949:64)

Reported from the Saronikos Gulf as an epiphyte on crustose corallines (Diapoulis & Verlaque 1981; as *B. polymorpha*).

CODIACEAE Kützing

CODIUM Stackhouse

* ***Codium bursa*** (Linnaeus) C. Agardh

Saxicolous and epiphytic plants, the latter growing on crustose algae and *Posidonia* rhizomes, were commonly met with in shaded habitats in the upper sublittoral zone, to at least 30 m depth. Thalli were composed of a single hemispherical, hollow frond, to 25 cm in diameter and 10 cm high, with a compact tissue of filamentous branches (utricles) of variable shape (clavate to pyriform or even cylindrical). Ultimate utricles were 1.5 to 2.2 mm long and 250 to 550 µm broad, provided with hairs or hair scars 250 to 400 µm below the apex. Plants with gametangia were observed in November and December.
Collections: OI090680, A181180, A250881, A091081, A100782, SI240884; also observed at P, S, K, D, T, and Palini.
Distributed in the Mediterranean and the NE. Atlantic between the Canaries (see Lawson & Price 1969) and the British Isles (see Parke & Dixon 1976).
Aegean Sea: Makedonian coast (Politis 1925, 1953; Anagnostidis 1968), Thasos (Haritonidis & Tsekos 1974), Thrake (Katsikopoulos 1939), Lesbos (Candargy 1899, as *C. bursa* Ag.), Skiathos (Miliarakis 1887, as *C. bursa* Ag.), Attica and Cyclades (Politis 1936, 1938), Crete (Diannelidis 1950), S. Archipelagus (Huvé 1962a, Giaccone 1968a, as *C. bursa* Ag.), and Asia Minor (Güven & Öztig 1971).

* ***Codium coralloides*** (Kützing) Silva

Saxicolous and epiphytic plants were sporadically found in the upper sublittoral zone, exposed

to the sunlight and down to ca 2 m depth. Thalli were (light) green, soft and crustose, easily detached from the substratum, and composed of an irregularly branched frond, to 4 cm in extent, with branches (projections) usually less than 1 cm long. Ultimate utricles were clavate, 1 to 2 mm long and 200 to 500 µm broad, provided with hairs or hair scars 80 to 120 µm below the apex.
Collections: V100782, K010882, T280685.
Endemic in the Mediterranean (type locality: Adriatic; Kützing 1845:253, as *C. tomentosum* β. *coralloides*).
Aegean Sea: Sithonia (present study) and S. Archipelagus (Huvé 1962a).

Codium decorticatum (Woodward) Howe
= *Codium elongatum* (Turner) C. Agardh (see Silva 1960:516)

Reported from Lesbos (Candargy 1899, as *C. elongatum* Ag.), Thasos (Haritonidis & Tsekos 1974, as *C. elongatum*) and the Makedonian coast (Haritonidis & Tsekos 1975, as *C. elongatum*).

* ***Codium effusum*** (Rafinesque) Delle Chiaje
= *Codium difforme* Kützing

Saxicolous plants were commonly met with in shaded habitats (usually crevices) in the sublittoral zone, to at least 10 m depth. Thalli were dark green, composed of a crustose and smooth frond, to 4 cm in extent and less than 1 cm high, closely adhering to the substratum. Ultimate utricles were clavate to cylindrical, 1 to 1.3 mm long and 90 to 200 (280) µm broad, with hair scars 120 to 180 µm below the apex.
Collections: A091081, A000784, K000784, K000685, T260685
Distributed in the Mediterranean and the NE. Atlantic between the Cape Verde Islands and the English Channel (see Ardré 1970; Silva 1962, fig.10).
Aegean Sea: Sithonia (present study), Cyclades (Coppejans 1974), and Asia Minor (Güven & Öztig 1971, as *Codium difforme* Kütz.).

* ***Codium vermilara*** (Olivi) Delle Chiaje

Reported from Sithonia and adjacent areas (Athanasiadis 1985a). Plants, to 30 cm long, were commonly found in the sublittoral zone, to depths of at least 25 m. Ultimate utricles were clavate to pyriform, 350 µm to 1 mm long and 100 to 300 µm broad, and bore hairs and hair scars 60 to 100 µm below the apex.
Collections: A061180, 100581, P210881, A051081, 091081, A100782, OIO90680; also observed at K, S, SR, and T.
Widely distributed in the Mediterranean (type locality: Croatia; see Silva 1955), the Black Sea (Zinova 1967), and the Atlantic (European coast to southern Norway and Argentina; see Silva 1955, 1962,fig. 12).
Aegean Sea: Sithonia and probably elsewhere in the Archipelagus. The apparent absence of previous records is probably due to misidentifications of this species as *C. tomentosum.*

Excluded species

Codium adhaerens (Cabrera) C. Agardh

Reported from the island of Thasos (Haritonidis & Tsekos 1974), Attica (Schmitz 1879, as *C. adhaerens* Ag.; Gerloff & Geissler 1974), and the S. Archipelagus (Giaccone 1968a, as *C. adhaerens* Ag.). According to Silva (1962a, fig.9), this species does not extend its distribution into the eastern Mediterranean.

Codium tomentosum (Hudson) Stackhouse

This species does not occur in the eastern Mediterranean, and the numerous records from the Aegean (Miliarakis 1887, as *C. tomentosum* Stackh.; Politis 1932, 1936, 1938, 1953; Haritonidis & Tsekos 1975; Diannelidis *et al.* 1977, and others) must be regarded as misidentifications probably based on specimens of *C. vermilara* (Athanasiadis 1985a).

UDOTEACEAE J. Agardh

HALIMEDA Lamouroux

* ***Halimeda tuna*** (Ellis & Solander) Lamouroux

Plants commonly occurred on vertical (shaded) rock surfaces, at depths betweeen 2 and at least 35 m. Thalli were up to 7 cm long, composed of an articulated and dichotomously branched, flattened frond with reniform to roundish segments, to 17 mm broad, more or less calcified in the epithallial tissue.
A common host of ceramiaceous algae, Chordariaceae, and minute crustose corallines.
Collections: NI040580, NI130480, A061180, A171180, A041280, A200881, A100581, SR180784, A130786; also observed at S, P, D, and T.
Distributed in most subtropical and tropical regions, including the Mediterranean, the tropical Atlantic coast of Africa (see Lawson & Price 1969), and the Indo-Pacific (Hillis 1959).
Aegean Sea: Makedonian coast (Politis 1925, 1953; Haritonidis & Tsekos 1975), Thasos (Haritonidis & Tsekos 1974), Crete (Politis 1932, Schussnig 1943), Lesbos (Candargy 1899, as *H. tuna* Lamour.; Anagnostidis 1968, Haritonidis & Tsekos 1974), Attica (Schmitz 1879, as *H. tuna* Lamour.; De Toni 1901, Politis 1936, Gerloff & Geissler 1974), Egina Island (Gerloff & Geissler 1974), Pagasitikos Gulf and N. Sporades (Miliarakis 1887, as *H. tuna* Lamour.; Diannelidis 1935, 1953), Cyclades (Politis 1938, Coppejans 1974), S. Archipelagus (Huvé 1962a, Giaccone 1968a, as *H. tuna* Lamx.), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).

PENICILLUS Lamouroux

* ***Penicillus capitatus*** Lamouroux
= *Espera mediterranea* Decaisne

The bulbous state of this species, known as *E. mediterranea*, was encountered in association with *Symploca*sp. in a sheltered habitat in the upper sublittoral zone. The thallus was up to 2 cm in diameter, composed of subdichotomously divided filaments slightly calcified and up to 100 µm broad.
Collections: K010882.
Distributed in the Mediterranean (mostly found in the *Espera* state) and the Caribbean (Huvé & Huvé 1963, Friedmann & Roth 1977).
Aegean Sea: Sithonia (present study).

PSEUDOCHLORODESMIS Børgesen

* ***Pseudochlorodesmis furcellata*** (Zanardini) Børgesen
= *Bryopsis furcellata* Zanardini

Epiphytic, infertile plants, entangled with *Corallina elongata*, were collected in the upper sublittoral zone, whereas moss-like turfs, to 20 cm in extent and ca 1 cm high, grew on crustose algae at ca 20 m depth. Thalli were dark green, subdichotomously divided with filaments (cells), 60 to 80 µm broad, provided with elliptical chloroplasts aggregated at the

apices.
Collections: K010882, KI010784, SC120784, SR200784.
Distributed in the Mediterranean and the Canaries (Børgesen 1925).
Aegean Sea: Sithonia (present study) and N. Sporades (Diannelidis 1953).

UDOTEA Lamouroux

* ***Udotea petiolata*** (Turra) Børgesen (1925:86)
= *Udotea desfontainii* (Lamouroux) Decaisne
=? *Udotea minima* Ernst (Meinesz 1972)

Saxicolous plants, growing in association with crustose species of *Peyssonnelia*, were commonly met with in shaded habitats in the sublittoral zone, to at least 20 m depth. Thalli were up to 10 cm long, with flabellate fronds up to 8 cm in diameter.
Collections: NI040580, NI200680, A290680, A181180, A100581, V100782, A140782; also observed at S, SR, D, and T.
Distributed in the Mediterranean and the tropical Atlantic coast of Africa (see Lawson & Price 1969) between the Cape Verde Islands and the Canaries (Børgesen 1925).
Aegean Sea: Chalkidiki, Attica, Cyclades (Politis 1953, 1936, 1938, as *U. desfontainii*), Makedonian coast (Haritonidis & Tsekos 1975), Thasos (Haritonidis & Tsekos 1974, as *U. desfontainii*), Thrake (Katsikopoulos 1939), Lesbos (Candargy 1899, as *U. desfontainii* Lamour.), N. Sporades (Miliarakis 1887, as *U. desfontanii* Decne; Diannelidis 1953), Attica (Schmitz 1879, De Toni 1901, as *U. desfontainii* Decne; Gerloff & Geissler 1974), S. Archipelagus (Huvé 1962a; Giaccone 1968a, 1968d, as *U. desfontainii* Decne, found at Kithira channel, at 60 m depth), Cyclades (Coppejans 1974), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971).
Note: On the basis of culture experiments Meinesz (1972) suggested that *U. minima* could represent a reduced form of *U. petiolata.*

Excluded species

Halimeda opuntia Lamouroux

The single record from Mytiline (Candargy 1899) is probably based on a misidentification (Gerloff & Geissler 1974), since this species is not known to occur elsewhere in the Mediterranean.

DASYCLADALES Pascher
ACETABULARIACEAE Nägeli

ACETABULARIA Lamouroux

* ***Acetabularia acetabulum*** (Linnaeus) Silva (1952:255)
= *Acetabularia mediterranea* Lamouroux

Saxicolous, dense populations were commonly met with in sheltered shallow waters, in spring, summer and autumn, whereas sporadic individuals were found in the sublittoral zone, to at least 20 m depth. Thalli were up to 5 cm long with an apical disc up to 5 mm in diameter.
Collections: A210480, A140580, OI090680, NI200680, A290680, KR010581, SR180782; also observed at K,S,P, and T.
Distributed in the Mediterranean, the Canaries (see Lawson & Price 1969), the West Indies (see Taylor 1960), and the Red Sea (see Papenfuss 1968).
Aegean Sea: Makedonian coast (Anagnostidis 1968, Haritonidis & Tsekos 1975, and Haritonidis 1978, as *A. mediterranea*), Thasos and Lesbos (Haritonidis & Tsekos 1974, as *A. mediterranea*), Skiathos (Miliarakis 1887, as *A. mediterranea*), Pagasitikos Gulf and N.

Sporades (Diannelidis 1935, 1950, 1953, as *A. mediterranea*), Crete, Attica and Cyclades (Politis 1932, 1936, 1938, as *A. mediterranea*), Saronikos Gulf (Schmitz 1879, Anagnostidis 1968, as *A. mediterranea*; Gerloff & Geissler 1974), Egina Island (Gerloff & Geissler 1974), Cyclades (Coppejans 1974), Rhodes (Diannelidis *et al.* 1977, as *A. mediterranea*), and Asia Minor (Güven & Öztig 1971, as *A. mediterranea*).

DASYCLADACEAE Kützing

DASYCLADUS C. Agardh

* ***Dasycladus vermicularis*** (Scopoli) Krasser
= *Dasycladus clavaeformis* (Roth) C. Agardh
= *Myrsidium bertolonii* Bory

Saxicolous, dense populations were commonly met with in the upper sublittoral zone (1 to 5 m depth) throughout the year. They usually grew on horizontal rocky substrata close to the level of the accummulated sand and with their thalli partly covered.
Collections: A210480, NI200680, A290680, A171180, A040183; also observed at P, K, and S.
Distributed in the Mediterranean and the Canaries (see Lawson & Price 1969).
Aegean Sea: Makedonian coast (Haritonidis & Tsekos 1975), Thasos (Haritonidis & Tsekos 1974, as *D. clavaeformis*), Lesbos (Candargy 1899, as *D. clavaeformis*), Skiathos (Miliarakis 1887, as *D. clavaeformis* Ag.), Pagasitikos Gulf (Diannelidis 1935), N. Sporades (Schiffner & Schussnig 1943, Diannelidis 1953, as *D. clavaeformis*), Mikonos and Naxos (Schiffner & Schussnig 1943, as *D. clavaeformis*), Crete, Cyclades, and Attica (Politis 1932, 1936, 1938, as *D. clavaeformis*), Saronikos Gulf (Schmitz 1879, as *D. clavaeformis* Ag.; Gerloff & Geissler 1974), Milos (Fauché *et al.* 1832-33, as *M. bertolonii*), Cyclades (Coppejans 1974), S. Archipelagus (Giaccone 1968a, 1968d, as *D. clavaeformis* Ag., found at Kithira channel, at 60 m depth), Rhodes (Diannelidis *et al.* 1977), and Asia Minor (Güven & Öztig 1971, as *D. clavaeformis*).
Note: Bory's concept of *M. bertolonii* (Fauché *et al.* 1832-33:329) was apparently based on Roth's *Conferva clavaeformis* (1806:315), who cited in his turn *Spongia vermicularis* Scopoli as a synonym.

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Alphabetical index of genera