

MORPHOLOGICAL INVESTIGATIONS ON SEAWEED BIODIVERSITY AT VISA KHAPATNAM COAST, BAY OF BENGAL, INDIA

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Abstract: In the current study the morphological investigations were made on marine algae (seaweeds), these are very prominent resources of the ocean. Seaweed utilization for variety purposes has gained importance as their composition having several applications in various beneficial purposes to mankind. This necessitates the need for understanding the morphological characteristics of seaweed flora. In this paper, we focused on describing morphological features of seaweed flora distributed at Visakhapatnam coast.

Keywords: Seaweed, Functional group, Life form, Morphology and Visakhapatnam.

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Introduction

Seaweeds or marine macro algae are majorly categorized into three distinct divisions namely green, brown and red algae which comes under Chlorophyta, Phaeophyta and Rhodophyta respectively. These seaweeds found on rocks in intertidal zones are considered as ecologically and biologically important component and act as indicator species in marine ecosystems to assess marine pollution and quality of sea environment. Macroalgae samples were collected and studied for morphological characteristics from intertidal regions during leap tide periods (low tides) at four seasons were classified into (April-June, July-September, October-December and January-March) from all ten sampling station of Visakhapatnam Coast during the period from April, 2013 to March, 2015.

The first survey on Marine macroalgae of Vishakhapatnam coast was conducted by Umamaheswara Rao and Sreeramulu, (1964

and 1970) documented 80 species of seaweeds. Umamaheswara Rao, (1999) study included additions to the earlier study with 16 species at Visakhapatnam coastline making it to a total of 96 species.

Studies on ecology of some estuarine and marine macroalgae of Visakhapatnam coast reported by several workers (Umamaheswara Rao and Sreeramulu, 1963; Narasimha Rao, 1989; Subba Rangaiah *et al.*, 2003; Satya Rao *et al.*, 2011 and Sarojini *et al.*, 2013; Murthy and Umamaheswara Rao, 2003 and Narasimha Rao and Prayaga Murty (2009) studied on growth and reproduction of marine macroalgae by environmental factors and industrial wastes. Prasanna Lakshmi and Narasimha Rao, (2009) worked on numerical data on marine algae of Visakhapatnam coast. Sarma and Ganapati (1969) and Murali (1983) worked on benthic algae and their association with fauna of intertidal zones of Visakhapatnam. Vishnupriya Sowjanya and Raja Sekhar (2015) in their

two years of study, reported on the status, distribution and diversity of some marine macroalgae along the Visakhapatnam coast of Andhra Pradesh in India.

In all the above studies concentrated at Visakhapatnam coast had not described seaweed morphological characteristics. This paper focuses on describing morphological characteristics of seaweed flora collected from Visakhapatnam coast. Studies on morphological characteristics of seaweeds are important as they act as reference for identification and functional forms studies of seaweeds.

Study area

The study area of the present study is situated in between 17°15' and 18° 32' latitude and 82° 54' and 83° 30' in longitude. Visakhapatnam coastline from Bangarampalem in the south to Bheemunipatnam in the north comprises of shallow water bays formed mainly due to the protruding hills of Eastern Ghat ridges in to the sea. There are several intermediate channels are associated with the coast and they are carrying nutrients and sediments. The Sarada-Varaha estuarine confluence point located at Bangarampalem (Yelamanchili) and Gosthani River at (Bheemunipatnam) are involved in the formation of mangrove forest environment and estuarine back water zones. The study area is well marked by diverse geomorphic features which signify dynamic coastal

process. geomorphic features of the coast line clearly established the sea level oscillations and climatic condition variations along this study area specified. Semidiurnal tides with two spring and leap tides a day. During March to September the waves approach from the southeast, whereas during December to February approach from the east.

The lesser known but vibrant coastal ecosystem of intertidal zone are very important as they are critical component of the interdependent and inter-connected series of coastal ecosystems. The coastline from Bangarampalem and Bheemunipatnam extending over 116 km with outcrops of rocky boulders provide variant habitats suitable for the marine macroalgae growth. In view of variations in the nature of substratum and their ecological conditions there are ten field stations of rocky coast were identified along the coastline for conducting the survey to study on marine macroalgae distribution and evaluation of its ecological status.

Systematic List

During the study period a total number of 48 species were recorded. The two species namely *Ulva lactuca* and *Enteromorpha intestinalis* were new records from Visakhapatnam coast. In our observations 48 numbers of taxa was listed during study period. Genera and species of different algal groups were represented below.

	Chlorophyceae	Phaeophyceae	Rhodophyceae	Total
Genera	08	06	15	29
Species	18	09	21	48

Chlorophyceae

Appearance of grass green colour cells due to the presence of pigments as like chlorophyll a, c-phycoerythrin and c-phyococyanin. Thus, these algae appear in green colour.

I Ulvaceae:

Ulva fasciata Delile:

Functional group: Foliose

Life form: Epilithic and Epipellic

Description: Thin thalli which is sheet like and grow up to 50cm long, with wide blades, at the base 10-15 cm wide, upward tapering and wide at tip less than 2.5 cm. Bases are broadened with ribbon shape segments, upper portions are deeply divided; smooth margins and often undulate, bright grass green to dark green in colour, it attain

reproductive stage appear in gold colour, colourless under stress conditions.

***Ulva lactuca* Linnaeus**

Functional group: Foliose

Life form: Epilithic and Epipellic

Description: Cellophane thin and forms translucent sheets appear in light yellowish green to dark green colour. Lime green slimy mass when it is out of water (seaweed). Blades are round shaped with ruffled edges soft frond slightly and grows as single or irregular. Scattered pores or perforations. 20-30 cm diameter growth, larger sheets feeling slightly thicker than smaller specimens although it is frequently much smaller.

***Enteromorpha compressa* Linnaeus**

Functional group: Foliose

Life form: Epilithic, Epipellic and drift seaweed.

Description: Tissue with hollow tube, rounded top portion. Sheets of tissue are in both forms are very thin and it is like one cell thick. Blades numerous which are arise from a common attachment point and they can reach up to 20 cm long.

***Enteromorpha intestinalis* Linnaeus**

Functional group: Foliose

Life form: Epilithic, Epipellic, Epiphytic and drift seaweed

Description: Bright grass green and conspicuous seaweed inflated irregularly constricted, Discoid base from which tubular fronds can grow. Unbranched-fronds with rounded tips. The usual length is 10-30 cm or sometimes it may reach up to 6-18 mm in diameter. Summer annual, decaying and season ending fronds appear in masses with bleached white in colour.

II Cladophoraceae

***Chaetomorpha antennina* (Bory de Saint Vincent) Kutzing**

Functional group: Filamentous

Life Form: Epilithic

Description: Plants small, filamentous, unbranched, forms tufts. Thalli are attached to substrata by rhizoidal filaments. Consist of cylindrical thallus, between 4-6 cm long and between 0.2-0.3 cm in diameter.

***Chaetomorpha brachygonia* Harvey**

Functional group: Filamentous

Life form: Epiphytic, drift seaweed

Description: Free floating Plants, entangled with other algae and light green in colour. Thallus is cylindrical unbranched forms tufts in most cases.

***Chaetomorpha torta* (Farlow) McClatchie**

Functional group: Filamentous

Life form: Epilithic, Epipellic, Epiphytic

Description: Conspicuous, usually found as curled, tangled masses, glassy appearance and with green filaments.

***Cladophora socialis* Kutzing**

Functional group: Filamentous

Life form: Epilithic, Epipellic

Description: Filamentous, branched slightly or profusely. Normally appear in soft to stiff clumps, often floating, rhizoids (cluster of basal rhizoids), isolated tufts, colour is pale or dark green, axes and branches-with adventitious holdfasts

***Cladophora utriculosa* Kutzing**

Functional group: Filamentous group

Life form: Epilithic and Epiphytic

Description: The growth of plants usually up to 35 cm. Thallus consisting of pseudo dichotomously branching main axes, set with branches of different lengths. Growth is mainly intercalary. As a branch grows older, the position of the wall cutting it off from the axis may become nearly horizontal, thus giving rise to a pseudo dichotomy.

***Cladophora fascicularis* Kutzing**

Functional group: Filamentous

Life form: Epilithic, Epiphytic

Description: Plants large 30-50 cm in length. stout main stout, sparingly branched, ultimate indefinite branches with densely fasciculate ramuli, crowded near their tips, somewhat pectinate in arrangement.

***Cladophora colabense* Borgesen**

Functional group: Filamentous

Life form: Epilithic

Description: Coarse in appearance, with regular branching filaments. Usually *Cladophora* grows like tuft or ball with filaments, that may range up to (13 cm) in length.

***Boodlea struveoides* M.A. Howe**

Functional group: Filamentous

Life form: Epilithic, Epiphytic

Description: Plants are green, sponge like masses consisting of intertwined filaments which are soft and loosely arranged. Habitat is affected by local environment. Seasonally dominant with loose mats appear in several depths.

III Ulotrachaceae

***Spongomorpha indica* Thivy & Visalakshmi**

Functional group: Filamentous

Life form: Epilithic

Description: Thallus is remiform and bushy, grows up to 6.5 cm high. Plants attached by a mat of rhizoidal branches arising from lower parts of filaments; which form rope-like stalks to the lobes of the thallus, filaments repeatedly branched, branches sub-dichotomous, pseudodichotomous or tridichotomous.

IV Bryopsidaceae

***Bryopsis pennata* J.V. Lamouroux**

Functional group: Filamentous group

Life form: Epilithic, Epipellic

Description: Filamentous thallus, bushy, mats tuft like and grown up to height of 10 cm. Feather like pinnately branched fronds and are 8-15 mm wide, length of lateral branches is uniform, base constricted where they attached to main axes. In upper half of the branch the branchlets appear in two in two (2) opposite rows, where as in the lower half of branch is bare, glossy dark green in colour and often with light blue iridescence.

V Caulerpaceae

***Caulerpa fastigiata* Montagne**

Functional group: Corticated-Terete

Life form: Epilithic

Description: Plants 3-9 cm high, forming mat-like colonies, filiform with branched stolon bearing erect axes at intervals of (0.1-1.2 cm), green including stolon, at times chlorotic in the basal region. Branching or erect axes, usually spiral or dichotomous, and in the upper part in addition opposite or subwhorled.

***Caulerpa racemosa* J. Agardh**

Functional group: Corticated-Terete

Life form: Epilithic, Epizoic, Epipellic

Description: Bright green seaweed that looks like tiny grapes with vertical branches. A Rhizomes helps in attachment with the help of horizontal stolon, which eventually giving rise to erect branches at every few centimetres. Branches with large number of stalked branchlets and grow up to 30 cm in height. The shape of the branchlets differs from spherical to ovate, and ice cream cone shape and even to disk shaped.

***Caulerpa sertularoides* (S.G. Gmelin) M.A. Howe**

Functional group: Corticated Foliose

Life form: Epilithic, Epizoic, Epipellic, Epiphytic and drift seaweed

Description: Fronds feather like rising from a common stolon. Usually each frond is upright, branched and appear light to dark green in colour. Opposite branchlets, cylindrical, needle shaped, and upcurved or bluntly pointed tips with straight apices.

***Caulerpa taxifolia* (M. Vahl) C. Agardh**

Functional group: Corticated Foliose

Life form: Epilithic, Epipellic, Epiphytic

Description: Smooth stolons, braches with rhizoids grow downward and photosynthetic branches growing upward direction. short stiped and feather like erect sections. Axis is branched or sparingly branched and 1 mm wide with 3-6 mm long pinnately. Flattened and branchlets flattened and upward bending which are compressed and at the base they are constricted slightly and tip mucronate and narrowing.

Phaeophyceae

Brown algae of the seashore fall under this group. Brown colour is imparted because of the fucoxanthin pigment which masks chlorophyll a pigment.

I Ectocarpaceae

***Ectocarpus mitchellae* (Harv.) Hamel**

Functional group: Filamentous

Life form: Epilithic, Epipellic, Epiphytic and drift seaweed

Description: Colour is medium to dark brown, loosely to densely tufted, A group of rhizoids from the lower cells are descending

and which are attached to the axes, Branching irregular or spiral branching and above. False hairs like filament tapering can be seen.

II Scytosiphonaceae

***Chnoospora minima* (Hering) Papenfuss**

Functional group: Corticated-Terete

Life form: Epilithic, Epiphytic

Description: Tough thallus, cartilaginous, light to dark brown in colour, upon drying colour changes into black. Thallus grows to 8 cm tall. 1 mm wide flattened branches, irregular and dichotomous. Broadened blades can be seen at dichotomies where as tapering towards the rounded tips. On the surface of the blade Small tufts of hairs can be seen.

III Dictyotaceae:

***Dictyota dichotoma* (Hudson) J.V Lamouroux**

Functional group: Corticated-Foliose

Life form: Epilithic, Epizoic, Epipellic, Epiphytic and drift weed

Description: Flat thallus, colour is homogenous yellow brown to darker brown. Dichotomous branches with 30 cm long parallel sides, bifid tips, wide membranous branches without mid rib (3 to 12 mm).

***Padina tetrastratica* Hauck**

Functional group: Corticated-Foliose

Life form: Epilithic, Epipellic

Description: Flabelliform thalli, because of fructiferous organs it is divided into several small lobes with distinct concentric zonation can be seen. Sporangia with dark double lines and colourless hairs in between which helps in easy identification, blades with two layers of cells.

IV Sargassaceae

***Sargassum vulgare* C. Agardh**

Functional group: Leathery Macrophytes

Life form: Epilithic

Description: Thalli reach 15-70 cm high, which is bush like, oval shaped, flattened, fronds are olive green to brown in colour and consists of undulated edge with a central rib. Fronds with hollow base, vesicles spherical and 5-8 mm in diameter. Reproductive bodies appear in clusters and the pedicle helps in held in place. Irregular

rhizoidal branches helps in attachment of alga to the substratum.

***Sargassum ilicifolium* (Turner) C. Agardh**

Functional group: Leathery Macrophytes

Life form: Epilithic

Description: Plants with elliptical leaves in the upper part of the plant and grow up to 30 to 40 cm high. Leaves long which are 1-3 cm and 8-15 mm broad, toothed margins with minute and larger teeth mixed, Visible midrib with 2/3 of the total length of leaf, vanishing near the tip. Mature receptacles either flat and are branched and usually 2-4 mm long or to 1cm long by a breadth of 1mm borne on a branched pedicel.

***Sargassum polycystum* C. Agardh**

Functional group: Leathery Macrophytes

Life form: Epilithic and drift seaweed

Description: The erect branches have numerous spines on the stem. The creeping branches found post maturation are smooth on the edges and form secondary branches with secondary holdfasts on the terminal portions. Leaves are lanceolate to oblong with serrations, and vesicles are spherical. The plants form large communities (1-2m) on rocks specially at calm waters associated with lower intertidal zones.

***Sargassum tenerrimum* J. Agardh**

Functional group: Leathery Macrophytes

Life form: Epilithic and drift seaweed

Description: Plants usually appear in pyramidal, holdfast disc shaped, delicate and colour is in yellowish brown, it can be grow a height of 30 to 40 cm, rounded axis which is glabrous, vesicles and receptacles are resulted due to modification in ultimate branches, leaves thin and transparent, 2 to 6 cm long and 0.5 to 1.5 cm broad and alternately arranged. Leaves are broader, larger in the lower region, at the apex become smaller and narrower. Denate marginal leaves. more or less distinct midrib, stalked spherical shaped vesicles receptacles are spinose with numerous branches.

V Acinetosporaceae

***Giffordia indica* (Sonder) Papenfuss and Chihara**

Functional group: Crustose

Life form: Epiphytic, Epizoic

Description: Thalli with 5-10 mm long clustered erect filaments which are radiating from a system of interwoven branched prostrate filaments. Generally lateral branches uncommon, often short and apices acute or tapering.

Rhodophyceae

The pigments like phycobilin, r-phycoerythrin and r-phyocyanin impart red or bluish colour to the seaweeds fall under this class.

I Bangiaceae

Polyphrya vietnamensis T. Tanaka and Pham-Hoang Ho

Functional group: Foliose

Life form: Epilithic, Epiphytic, or Epizoic

Description: Membranous thalli, purple or pink purple in colour, growing on upper intertidal rocks, monostromatic blades with numerous bladelets which are more or low lacerated from a common base, undulated marginal portion, dentate edge, 0.5-2 cm broad bladelets.

II Stylonemataceae

Bangiopsis subsimplex (Montagne) F. Schmitz

Functional group: Filamentous

Life form: Epilithic, Epizoic

Description: Diminutive thallus, 1.5 mm long, gelatinous and made up of with flexible filaments, appear in reddish-vinaceous colour, Basal disc helps in attachment to the substratum. A filiform axis helps in formation of thallus, apical region uniseriate but becoming irregularly multiseriate, ramifications not observed.

III Lomentariaceae

Gelidiopsis variabilis (Greville ex J. Agardh) F. Schmitz

Functional group: Corticated-Terete

Life form: Epilithic

Description: Thallus stiff, tough, wiry, tangled, to 4 cm high, red, green or purple; branching sparse, irregular; basal axes creeping, prostrate. Erect axes cylindrical, apices bluntly pointed, multi-cellular. Common inconspicuous, in cracks and

crevices on the hard substrates, intertidal to 2 m deep.

IV Gelidiaceae

Gelidium pusillum (Stackhouse) Le Jolis

Functional group: Corticated Foliose

Life form: Epithic, epizoic

Description: Cartilaginous, blackish red or purple in colour and turf forming, 2 to 10 mm high, creeping base from which they arise and usually incorporating small molluscs and shell debris, flattened erect fronds and leaf like with a diameter of 0.5-2 mm broad.

V Pterocladaceae

Pterocladia heteroplatos (Børgesen)

Umamaheswara Rao & Kaliaperumal

Functional group: Corticated-Terete

Life form: Epilithic, Epiphytic

Description: cartilaginous thallus, crispate sometimes and made up of with one or several erect axes, 2 to 40 cm tall, terete or sometimes compressed, distichous or irregular branched leaves. Variations in colour patterns which appear in red, deep purple, deep green or blackish in colour. Plants having extensive basal parts or usually in discrete clumps and appear as mats of algal turfs. At the base axes are erect which are cylindrical, sub-cylindrical (or) sometimes appear as compressed above.

VI Corallinaceae

Amphiroa fragilissima (Linnaeus)

Lamouroux

Functional group: Articulated Calcareous

Life form: Epilithic and drift seaweed

Description: The plants have strongly calcified, dichotomous, cylindrical branches that are pink in colour with obtuse apices. The plant is up to 1 cm high, light, purple, forming small dense cushion, fronds terete, repeatedly dichotomous extremely fragile, only slightly attenuated upwards, axils obtuse, branches divaricated, articulations cylindrical, not swollen at the extremities.

Jania rubens (Linnaeus) J.V. Lamouroux

Functional group: Articulated Calcareous

Life form: Epiphytic

Description: Slender, rose pink in colour, articulated, fronds are calcified, can grow up

to 50 mm high; repeated dichotomous branching, luxuriant specimens secondarily pinnate. Those bearing branches somewhat compressed. Small conical disc by which they fixed, vegetative spreading, attachment discs which are developed from branches helps in contact with solid substratum.

VII Halymeniaceae

***Grateloupia lithophila* Børgesen**

Functional group: Corticated-Foliose

Life form: Epilithic

Description: On hard substratum Plants appear as dense tufts, flat thallus either simple or divided irregularly, 10-15 cm long, 0.5-2 cm broad, tapering can be seen from the middle to both the ends, sinuate and undulating; upper ends of the fronds upper ends are truncate and more or less broadly rounded, proliferation arising from both the upper end and as well as the sides of fronds.

***Grateloupia filicina* (J. V. Lamouroux) C. Agardh**

Functional group: Corticated-Foliose

Life form: Epilithic

Description: Plants can be reach a length to cm, linear and tapering can be seen at both base and apex. From a scutate base one or several fronds arise, gelatinous firmly and subsimple rarely, appear as compressed to flat, with 2-5 mm wide, usually marginally pinnate, sometimes proliferating from the face sometimes, branches are apparently radial. The linear divisions which are 2 mm wide, often pinnate lower branches were seen.

VIII Gracilariaceae

***Gracilaria corticata* J. Agardh**

Functional group: Corticated-Foliose

Life form: Epilithic, epiphytic

Description: 10-12cm long plants, the formation of thallus by blades with 2-3 mm broad segments with flat bundles which are much divided. In young blades dichotomous branching can be seen. Edges of the segments lined by numerous marginal projections in older plants in a pinnate fashion. The plants vary from deep purple to grass green in colour.

***Gracilaria textori* Suring**

Functional group: Corticated-Foliose

Life form: Epilithic and epiphytic

Description: Plants attached to the substratum by a disc and can be reached to height of 10 cm. cylindrical stem expanding into a leaf like frond which are flat and coriaceous, dichotomously lobed with broad segments whose axils are rounded and with linear patent segments. Width of the segment ranges from 1 to 3cm which is generally ending either blunt or sometimes in acute or bifid apices. Terminal segments divided as dichotomous manner repeatedly. Membranous thallus, margin entire, sometimes undulated often provided with proliferous segments.

***Gracilaria edulis* (S. G. Gmelin) P. C. Silva**

Functional group: Corticated-Terete

Life form: Epilithic form

Description: Growth of the plants appear in tufts, number of branches which are arising from the base of the plant in which majority of the branches are irregular with branchlets. Due to this plant bears more branchlets in upper half. Terete thallus growing a height of 10 to 30 cm. Branches attenuating gradually to a sharp point, irregular and dichotomous and in parts distichous pinnate can be seen. The plants are usually appear as yellow to green in colour upon drying changes into purple colour.

IX Cystocloniaceae

***Hypnea valentiae* (Turner) Montagne**

Functional group: Corticated-Terete

Life form: Epilithic and Epiphytic

Description: Callous disc from which fronds arise with incurved creeping fibres and grow up to a height of 10 cm or even some times more height. cylindrical filiform, flexuous. Plants with dichotomously branched and are undivided 2 or 3 times. At every 1mm intervals the branches at are beset with slightly incurved, ramuli spiniform, broad at the base level and acute at the apex region.

***Hypnea musciformis* (Wulfen) J.V Lamouroux**

Functional group: Corticated-Terete

Life form: Epilithic and Epiphytic

Description: Cylindrical branches which are intertwined and form clumps up to 20 cm tall. Branches firm and irregular, narrowing to broad, flattened, hooks tendril like. The colour of the thallus is generally dark reddish brown, pale to yellowish brown colour can be seen when it is growing in poor nutrient water.

X Gigartinaceae

***Gigartina acicularis* (Roth)**

J.V.Lamouroux

Functional group: Corticated-Terete

Life form: Epilithic, Epiphytic, Epizoic

Description: Tufted fronds, 2 to 4 inches in height, Equal length, dichotomous branching forming a roundish general outline, branches cylindrical branches and dichotomous irregular or pinnated, ramuli acute and it is up to inch or more long.

XI Liagoraceae

Liagora visakhapatnemensis

Umamaheswararao

Functional group: Articulated Calcareous

Life form: Epilithic, Epipellic

Description: Tufted thallus, colour is grey purple to greenish-white or even in pink, Almost similar length, branching repeated and branches terete and dense with top tapering. Wide angled bifurcations at the terminal branches and are moderately calcified, texture flexible to firm.

***Liagora erecta* Zeh**

Functional group: Articulated Calcareous

Life form: Epilithic, Epipellic

Description: Plants strongly calcified, profusely branched; branching pinnate; lower branches of considerable length up to 14 cm or more. Branches gradually becoming shorter upwards, uppermost branches 0.5-1 cm in length. Lateral branches in turn ramified like main axis, without secondary branches in younger portions. Plants are 12-40 cm long. Slimy appearance of seaweed when it is out of water

XII Ceramiales

***Centroceras clavulatum* (C.Agardh)**

Montagne

Functional group: Corticated-Terete

Life form: Epipellic

Description: Filamentous turfs thalli appear as entangled mats and grow up to 3 to 5 cm in height. Bright red to dark brown in colour. Un branched or sub-dichotomous, straight as well as incurved apices.

XIII Rhodomelaceae

***Bryocladia thwaitesii* (Harvey ex J. Agardh) De Toni**

Functional group: Crustose

Life form: Epilithic, Epiphytic

Description: Plants grow in tufts, it can be reached up to 4-5 cm height. Decumbent creeping filaments felted together at the bases. Erect shoots are ramified and arose from the decumbent creeping filaments, usually appear in upward bending. Un branched at the lower part and ramification seen at higher up.. In the lower parts the branches are only a few or sometimes absent but placed densely higher up. Spine like Side branches are often unbranched, spiral like branchlets at the upper ends. Slightly curve branches towards main axis. The specimens were observed as intermingled with other algae.

***Acanthophora spicifera* (Vahl) Borgesen**

Functional group: Articulated Calcareous

Life form: Epilithic, Epiphytic, Epizoic

Description: Macroalgae which grows up to 40 cm tall and erect. Solid cylindrical branches which are 2 to 3 mm wide and sparing and repeated branching. Short and determinate main branches, irregular in shape and spinose bearing radially arranged numerous spines. Absence of spines on main axes. Colour patterns are highly variable and these are in shades of purple, yellow, red, brown and orange.

XIV Wrangeliaceae

***Wrangelia argus* (Montagne) Montagne**

Functional group: Filamentous

Life form: Epiphytic

Description: Iridescent thalus, 1.5 cm fuzzy turfs which are in purple red colour. Irregular branching. Cylindrical main filaments and branchlets are soft, thin, arranged in whorls at joints.

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