

NEW RECORDS OF ALGAE FOR PERSIAN GULF AND FLORA OF IRAN

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Nine species of algae (8 *Chlorophyceae* and 1 *Phaeophyceae*) as new records for Persian Gulf and 7 species (1 *Basillariophyceae*, 2 *Chlorophyceae* and 4 *Phaeophyceae*) as new for Iran are reported for the first time.

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گزارشهای جدید از جلبکها در خلیج فارس و فلور ایران

جلوه سهرابی پور و رضا ربیعی

۹ گونه جلبک (۸ کلروفیسه و ۱ فتوفیسه) به عنوان گزارشهای جدید برای خلیج فارس و ۷ گونه (۱ باسیلاریوفیسه، ۲ کلروفیسه و ۴ فتوفیسه) به عنوان گزارشهای جدید برای فلور ایران ذکر می گردند.

INTRODUCTION

The first report of algae from Persian Gulf was published by Endlicher and Deising (1845) which listed eight species. Borgesen (1939) described 103 species of algae which mostly were collected from Bushehr and Khark island by Koie in 1937. Newton (1955a, 1955b) presented the algal flora of Kuwait and Bahrain as lists in Dickson's the Wild Flowers of Kuwait and Bahrain. Nizamuddin and Gessner (1970) reported 68 species which had been collected in "Meteor" expedition in 1965. Basson (1979a, 1979b) described 84 species from Eastern province of Saudi Arabia. In 1989 Basson et al. reported 59 species from Bahrain. Al-Hassan and Jones (1989) published a list of algal flora and seagrasses of Kuwait. In 1992 Basson published a checklist of marine algae of Arabian Gulf.

In this report 9 species are described 9 (8 *Chlorophyceae* and 1 *Phaeophyceae*) as new records for Persian Gulf and 7 species (1 *Basillariophyceae*, 2 *Chlorophyceae* and 4 *Phaeophyceae*) as new for algal flora of Iran which have been collected from sea shores of Hormozgan province in South of Iran (map 1).

The collected materials are pressed and dried as herbarium specimens or preserved

in a solution of %4 formalin and sea water. Sampels are deposited in the herbarium of Natural Resources and Animal Research Center of Hormozgan.

NEW RECORDS FOR PERSIAN GULF

CHLOROPHYCEAE

Ulvaceae

Ulva californica Wille. -Fig. 1.

Plants small, about 1-2 cm high, tuft 1.5-2 cm broad, tufted blades margin very wavy and frill-like, firmly attached to the substratum, cells squarish or polygonal surface view, blades about 40 μm in diameter in the upper part and 75-80 μm in basal portion, chloroplasts discoid with one prynoid and accupoid half of cells.

The plants growing on wave-exposed rocky shores.

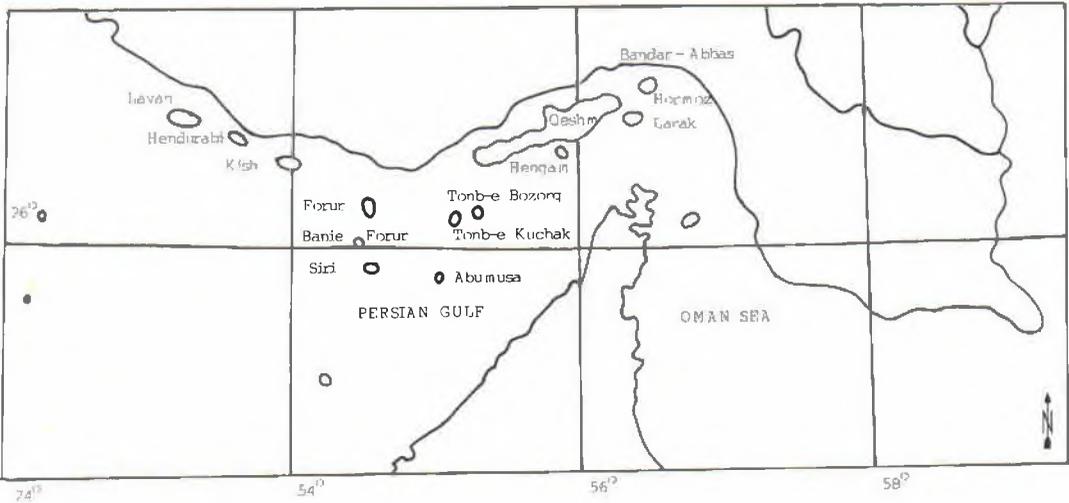
Locality. Abumusa island 1993.6.4, Sohrabi Pour & Rabii 301.

Ref. Abbott and Hollenberg 1976, p. 78.

Ulva fasciata Delile. -Fig. 2.

Plants about 30 cm high, from basal portion divided into segments about 1-4 cm wide, holdfast small and distinctly discoid, blades about 60 μm in diameter in margin and 80-100 μm in basal portion,

Map. 1. Seashores and islands of Hormozgan province in Persian Gulf.



margin of blades undulate and little dentate, cells arranged in two layers in t. s., chloroplasts platform with one prynoid and filling the outer part of cells.

The plants grow in shallow water rock-pools and most of the samples were collected from rock-pools above Sea Anemon community in Koveyi.

Locality. Qeshm island, Koveyi, 1995.4.16, Rabii & Sohrabi Pour 500SH; Qeshm island, 1994.1.30, Sohrabi Pour & Rabii 365.

Ref. Krishnamrthy & Joshi, 1969, p. 126-127; Richardson 1975, p. 83; Taylor, 1975, p. 83; Taylor, 1972, p. 66-67.

Udoteaceae

Avrainvillea calithina Kraft & Olsen-

Stojkovich. -Fig. 3.

Plants erect, up to 7.5 cm high, generally in gregarious clusters, holdfast bulbous, stipes subterete mostly unbranched and bearing a single oblong, cunneate and flabellate blades to about 4.5 cm long and 3.5 cm wide, stipes up to 2.5 cm long and 0.5 cm wide, zonation observed at the upper parts of the blades, blades lacerate, sometimes adjacent blades fusing along the margins, blades consisting of siphonous filaments, filaments dichotomously branched, medullary filaments apices rounded, about 30 μm in diameter, surfaces filaments about 5-12 μm in diameter, interwoven, tapering and very torulous sometimes moniliform, filaments of

medulla mostly cylindrical and condensing less than surface filaments.

Locality. Qeshm island-Salakh, 1994.10.20, Sohrabi Pour, Rabii & Bahmanzadeh 292.

Ref. Kraft & Olsen-Stojkovich 1985, p. 339-345.

Caulerpaceae

Caulerpa peltata (Turn.) Lumoroux. -Fig. 4 A, B.

Plants green to darkgreen, consisting of creeping and erect assimilator systems, stolons freely branched, bearing rhizoids below and erect branches above, creeping branches about 0.8-2.8 mm and rhizoids up to 500 μ m in diameter, erect branches about 1-3 cm high, producing pedicellate branchlets with slender pedicel and cup-shaped or flat-shaped apices about 1.5-8 mm broad.

The plants grow in shallow rocky pools on silt covered stones.

Locality. Abumusa island, 1993.6.4, Rabii & Sohrabi Pour 122; Qeshm island, 1991.3.13, Sohrabi Pour & Rabii 118.

Ref. Anand 1940, p.34-35; Islam 1976, p. 19; Taylor 1972, p. 155.

Caulerpa racemosa (Forsskål) J. Agardh var. *macrophyta* (Kutz.) Taylor.- Fig.4C,D.

Plants green to dark green, consisting of creeping and erect systems creeping system (stolons) branched, bearing rhizoids below and erect or assimilator branches above, Stolons about 1.5 mm in diameter, erect, branches 3 mm in diameter and 10 cm high, producing crowded branchlets, branchlets terete in lower portion and swollen at apices, lower branchlets less swollen, intervals of branchlets 2-4 mm, branchlets up to 6 mm long with truncate apices.

Locality. Larak island, 1992.4.13, Rabii & Sohrabi Pour 115; Larak island, 1992.12.1, Sohrabi Pour & Rabii 124; Qeshm island-city beach, 1995.5.17, Rabii & Khosravi Far 454 and 495SH.

Ref. Anand 1940, p. 34-35; Dawson 1956, p. 72; Islam 1976, p. 19-20; Taylor 1972, p. 151-153.

Siphonocladaceae

Cladophoropsis membranacea (C. Agardh) Borgesen. -Fig. 5. D.

Plants form dense tuft or small mats, to about 2 cm high, irregularly branched and entangled, branches about 150-250 μ m in diameter or more, terminal cells occasionally up to 6 mm long, branchlets secund toward the apex and sometimes

fusing together.

The plants grow on rocks or edge of small tidal pools and strongly attached to the substratum.

Locality. Qeshm island, 1993.6.27, Sohrabi Pour & Rabii 273; Hormoz island, 1992.12.2., Sohrabi Pour & Rabii 271.

Ref. Anand 1940, p.47; Lawson & John 1987, p. 117-118.

Dasycladaceae

Acetabularia mobii Solms- Laubach. -Fig. 5.
A - C.

Plants small, about 3 mm high, stalk rugose with several diaphyses, ending to a flat disc with 9-13 unconnected rays, about 2.5 mm broad; rays inflated with basal portion constricted on both sides, long obovoid, obtuse and rounded at the apex. Corona superior with 2-3 hair scars on coronal segment. Branched hairs not seen.

The plants growing on stones of rocky shores in shallow waters and firmly attached to the substratum.

Locality. Qeshm island, 6 km west of Bahman harbour, 1991.8.10, Sohrabi Pour 105; Qeshm island, city beach, 1995.9.25, Rabii & Khosravifar 108.

Ref. Anand 1940, p. 39-41; Solms- Laubach 1895, p. 30.

Acetabularia sp. -Fig. 6.

Plant small, about 5-6 mm high, stalk rugose with several diaphyses, ending to a flat disc with 17-23 connected rays about 3-5 mm broad, rays long obovoid, obtuse and rounded apices with minute depression at the middle, corona superior with 4-6 hair scars on coronal segments, hairs branched, some of the plants have tufts of hairs on coronal segments. The species is apparently similar to *Acetabularia parvula* Solms-Laubach, but lacking of thick calcification between rays, presence of diaphyses on the stalk and minute depression at the apex of rays differentiate it from *A. parvula*.

Locality. Qeshm island, 4 km west of Bahman harbour 1993.4.3., Rabii & Bahmanzadeh 107; Qeshm island, Mesen 1994.4.11, Rabii & Bahmanzadeh 104; Qeshm island, city beach 1995.9.25, Rabii & Khosravifar 106.

PHAEOPHYCEAE

Punctariaceae

Rosenvingea floridana (Taylor) Taylor. -Fig. 8 A, B.

Plants erect, about 12 cm high, branching fairly abundant near the base and sparse above, irregular branches terete,

tapering, acute, main axis up to 2 mm in diameter, base of branches narrow, internal cells about 80 μm in diameter, hairs up to 15 μm in diameter.

The plants growing in shallow water rock pools, mostly with *Cystoseria myrca* communities.

Locality. Qushm island, Rigoo, 1993.1.2., Sohrabi Pour & Rabii 257; Qeshm island, 1994.4.3., Rabii & Sohrabi Pour 260.

Ref. Abbott & Hollenberg 1976, p. 202; Islam 1976, p. 45; Taylor 1972, p. 262.

scars, gametangia spherical about 90-110 μm in diameter and 50-80 in each ray.

In one case the collected plants had branched stalk and 2 discs.

Basson (1979a, 1992) and Basson et al. (1989) have reported the species from Saudi Arabia and Bahrain, Al-Hassan & Jones (1989) reported it from Kuwait, but for Iranian shores is a new record.

Locality. Bandar Lengeh, 20 km to east, 1993.6.7, Rabii & Sohrabi Pour 101, 1994.4.17, no. 103 and 1994.12.3, Rabii 110. Ref. Al-Hassan & Jones 1989, p. 295; Basson 1979a, p. 53; 1992, p. 220; Basson et al. 1989, p. 29; Islam 1976, p. 24; Solms-Laubach 1894, p. 26; Taylor 1972, p. 105.

NEW RECORDS FOR IRAN

CHLOROPHYCEAE

Dasycladaceae

Acetabularia calyculus Qouy et Gaimard.
-Fig. 7.

Plants about 4 cm high, stalk rigid and calcified, whorls of hair scars present on the upper part of stalk, attached to the substratum by a lobed rhizoid, ending to a cup-shape or flat-disc at the apex; disc about 5-6 mm broad and consisting of about 29-31 connected rays; rays about 3 mm long, rounded apices with a large depression in the middle, corona superior with cylindrical segments, bearing 2-4 hair

Valoniaceae

Dictyosphaeria cavernosa (Forsskal)
Borgesen. -Fig. 8 C, D.

Plants sessile and globular, hollow, attached to the substratum by rhizoids, outline irregular, walls collapsed, about 1-2 cm in diameter or more, consisting of one layer of large cells up to 1500 μm in diameter and 1600 μm long, in surface view subspherical but in t. s. or l. s. polygonal and angular, some of the cells contain 2-8 smaller cells.

The plants were widespread and usually

growing on rocky shores. The species has been previously reported from Qatif well near Ras-Tanura from Esthern province of Saudi Arabia and Bahrain by Basson (1979 and 1989) and from Kuwait by Al-Hassan and Jones (1989), but is a new record for Iran.

Locality. Qeshm island, 10 km after Basaidoo, 1994.6.26, Rabii & Bahmanzadeh 521.

Ref. Al-Hassan & Jones 1989, p. 294; Basson 1979a, p. 51, 1992, p. 219; Basson et al. 1989, p. 29; Dawson 1956, p. 90; Islam 1976, p. 16; Talyor 1972, p. 116-117.

PHAEOPHYCEAE

Ectocarpaceae

Feldmania irregularis (Kutz.) Hamel. -Fig. 9 A, B.

Plants filamentous, saxicolous or epiphyt, branches alternate and divaricate with slightly right angle near the base. Vegetative cells about 35 μm in diameter and 80 μm long, plourangia cylindroconical to conical, 1-3 plourangia near the axial filament, about 120 μm long and 42 μm in diameter, unangia unknown.

The plants growing in rock pools of shallow waters.

The species was reported from Ras-

Tanura in the Esthern province of Saudi Arabia by Basson (1979a as *Ectocarpus irregularis* Kutz. and 1992 as *Feldmania irregularis*) and Jones also reported from Kuwait as *E. irregularis* (1986).

Locality. Qeshm island 1991.3.13, Sohrabi Pour 199; Hormoz island, 1993.12.2, Sohrabi Pour & Rabii 196.

Ref. Abbott & Hollenberg 1976, p. 136; Basson 1979a, p. 35 and 1992, p. 220; Jones 1986; Islam 1976, p. 30 (as *Giffordia conifera* (Borg.) Taylor); Taylor 1972, p. 207 (as *Giffordia conifera* (Borg.) Taylor).

Sphacelariaceae

Sphacelaria nova-hollandia Sonders. -Fig. 9 C, D.

Plants up to 3 cm high, stiff and tufted, branches alternate or irregular, mostly occur in upper portion, tapering, hairs often present, up to 20 μm in diameter, segments of filament about 40-80 μm in diameter and 40-80 μm long, plourangia with one pedicel cell, about 20 μm long, propagul triangular, to about 110 μm in diameter and 140 μm long with 1-3 pedicel cells.

The plants grow on rocks and mixed with *Sphacelaria tribuloides* Menghini or epiphyte on other macroalgae e.g. *Laurencia* sp. or *Sargassum* sp.

Al-Hassan & Jones have reported the species from Kuwait (1989).

Locality. Abumusa island, 1993.6.5, Sohrabi Pour & Rabii 277.

Ref. Al-Hassan & Jones 1989, p. 296; Basson 1992, p. 220; Taylor 1972, p. 211.

Sphacelaria tribuloides Meneghini. -Fig. 9 E, F.

Plants about 1 cm high, tufted, erect, axis stiff and sparsely branched hairs present on terminal branches, about 15 μm in diameter, segment of filaments about 40 μm in diameter below, 60 μm long in basal portion and about 40 μm above, propagul wedge-shape, about 140 μm long, pedicel cells 1-3, biradiate and broadly triangular, plourangia 170 μm long with 5-7 stalked cells.

The plants grow on wave-exposed rocky shores.

The species was reported by Basson from Karan island (1979). Basson & al. from Bahrain (1989) and by Al-Hassan & Jones from Kuwait (1989).

Locality. Abumusa island, 1993.9.5, Sohrabi Pour & Rabii 278.

Ref. Al-Hassan & Jones 1989, p. 296; Basson 1979a, p. 55; Busson & al. 1989, p. 31 and 1992, p. 220; Islam, 1976, p. 35;

Lawson and John 1987, p. 117; Richardson 1975, p. 99.

Sargassaceae

Turbinaria conoides (J. Agard) Kützting var. *conoides* Taylor. -Fig. 10.

Plants erect, to 20 cm high, stalk conspicuous, terete, abundantly branched, leaves obpyramidal, up to 2 cm long and 12 mm in diameter at distal end, margin of leaves sharply dentate, lateral and longitudinal ridges of leaves edentate, subterete, cryptostomate scattered on the leaves, receptacles on the base of leaves, vesicle non prominent.

The species was reported from Karan island by Basson (1979a) but for Iran is a new record.

Locality. Larak island, 1991.3.13, Sohrabi Pour and Rabii 527.

Ref. Basson 1979a, p. 60; Barton 1981, p. 512; Taylor 1964, p. 480.

BASILLARIOPHYCEAE

Nitzschiaceae

Nitzschia martiana (C. Agardh) van Heurck. -Fig. 11.

Plants forming tubular colonies, up to 2.4 mm long, basal stalk up to 160 μm wide, branched to 6-10 tubes, further

subdivide above, terminal tubes fusiform, up to 110 μm long, cells up to 5 μm in diameter, plastid up to 10 μm long and distributed along the cells length, ledge of tubes corrugate, where cells absent the tubes often bent and articulated.

The plants were epiphyte on *Laurencia* sp.

The species was recorded from Bahrain by Basson et al. (1989), but it is a new record for Iran.

Locality. Qeshm island-Basaidoo, 1994. 10.18, Sohrabi Pour & Rabii 998.

Ref. Basson et al. 1989, p. 253-357.

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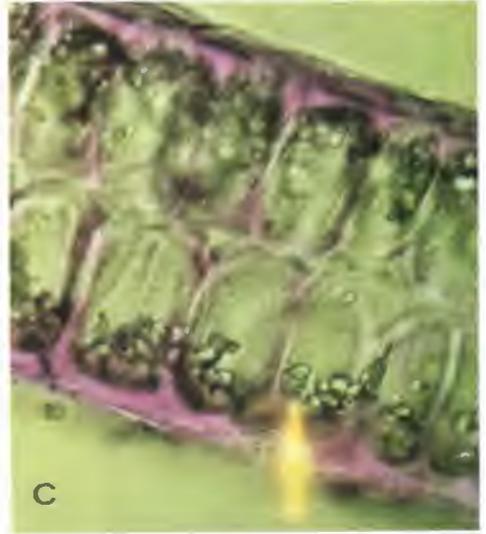
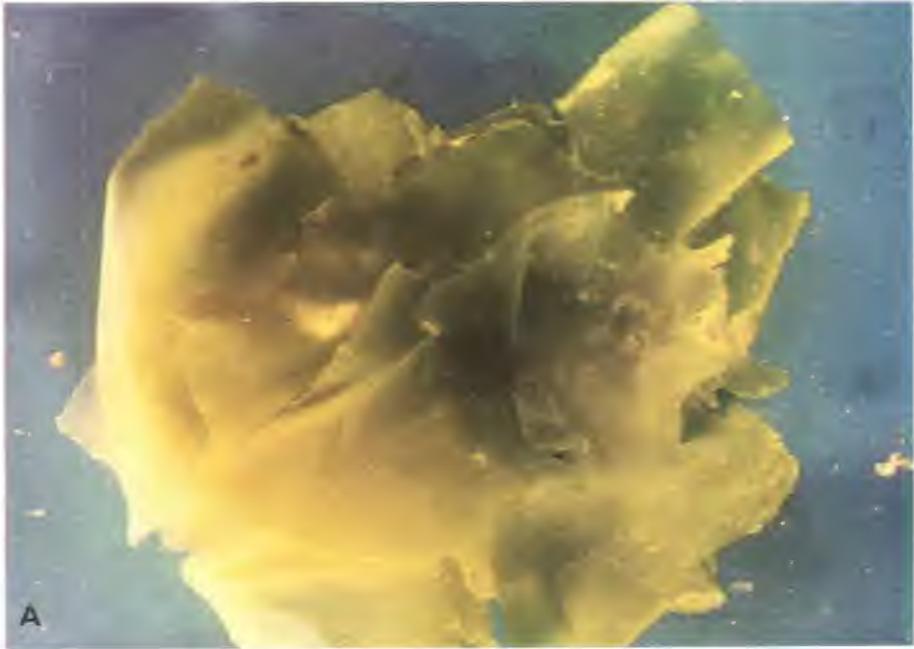


Fig. 1. *Ulva californica*. -A. Habit of liquid-preserved plant (x 6). -B. Surface view of squarish and polygonal cells (x 50). - C. T. S. of blade showing chloroplast (x 250).

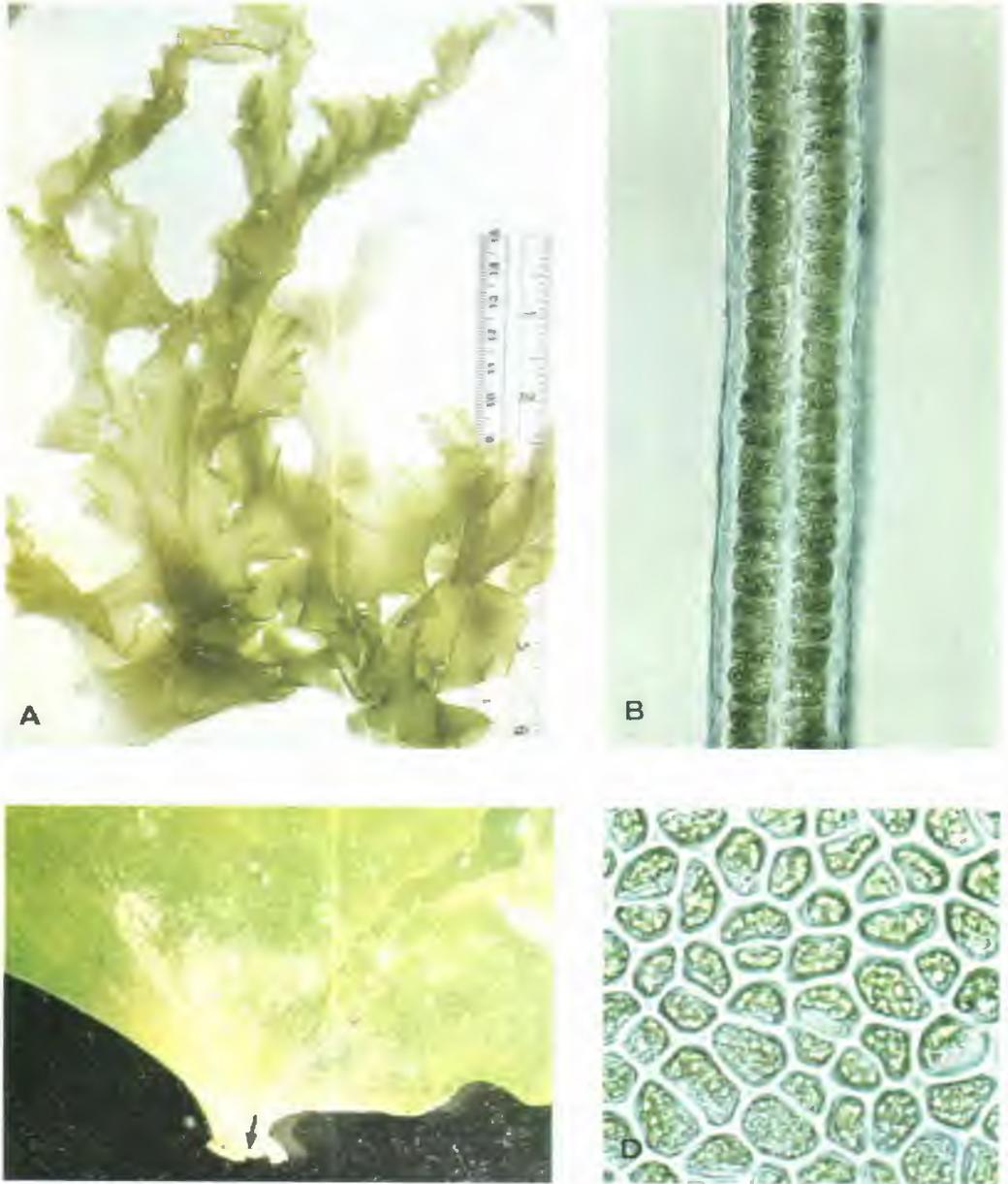


Fig. 2. *Ulva fasciata*. - A. Habit of liquid-preserved plant.-B. T. S. of blade (x 50). -C. Discoid holdfast (x 7). - D. Surface-view of polygonal cells (x 50).

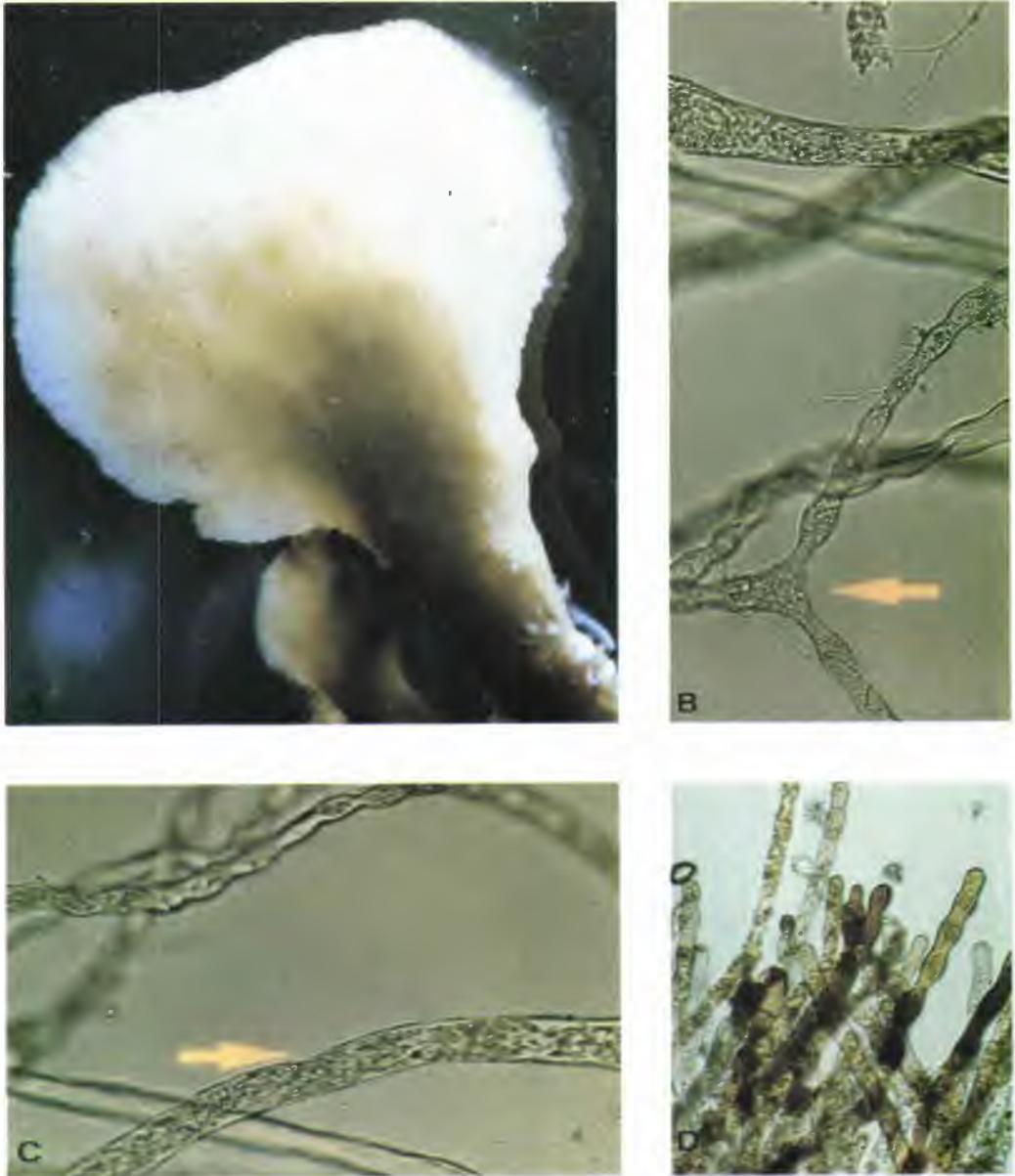


Fig. 3. *Avrainvillea calithina*. - A: Habit of liquid-preserved plant (x 7). - B: Turulous filament and dichotomously branching (x 250). - C: Siphonous filaments of medulla (x 250). -D: Torulous filaments in the margin of blades with rounded apices (x 125).

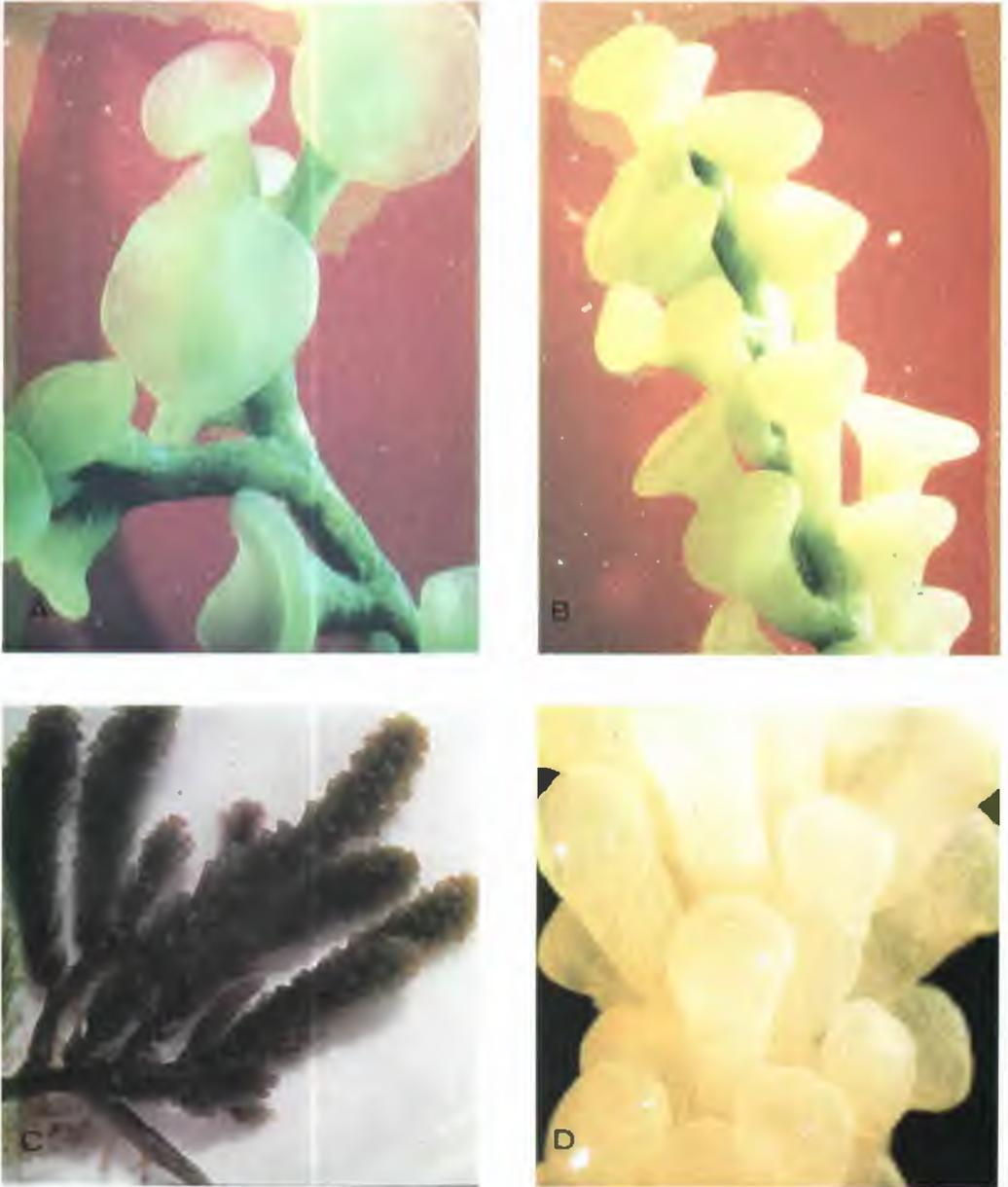


Fig. 4. *Caulerpa peltata* (A-B). -A. Peltate branchlets (x 7). -B. Upper part of erect branches (x 7). -*Caulerpa racemosa* (C-D). - C. Habit of liquid-preserved plant (x 2). -Crowded and swollen branchlets with truncate apices (x 7).

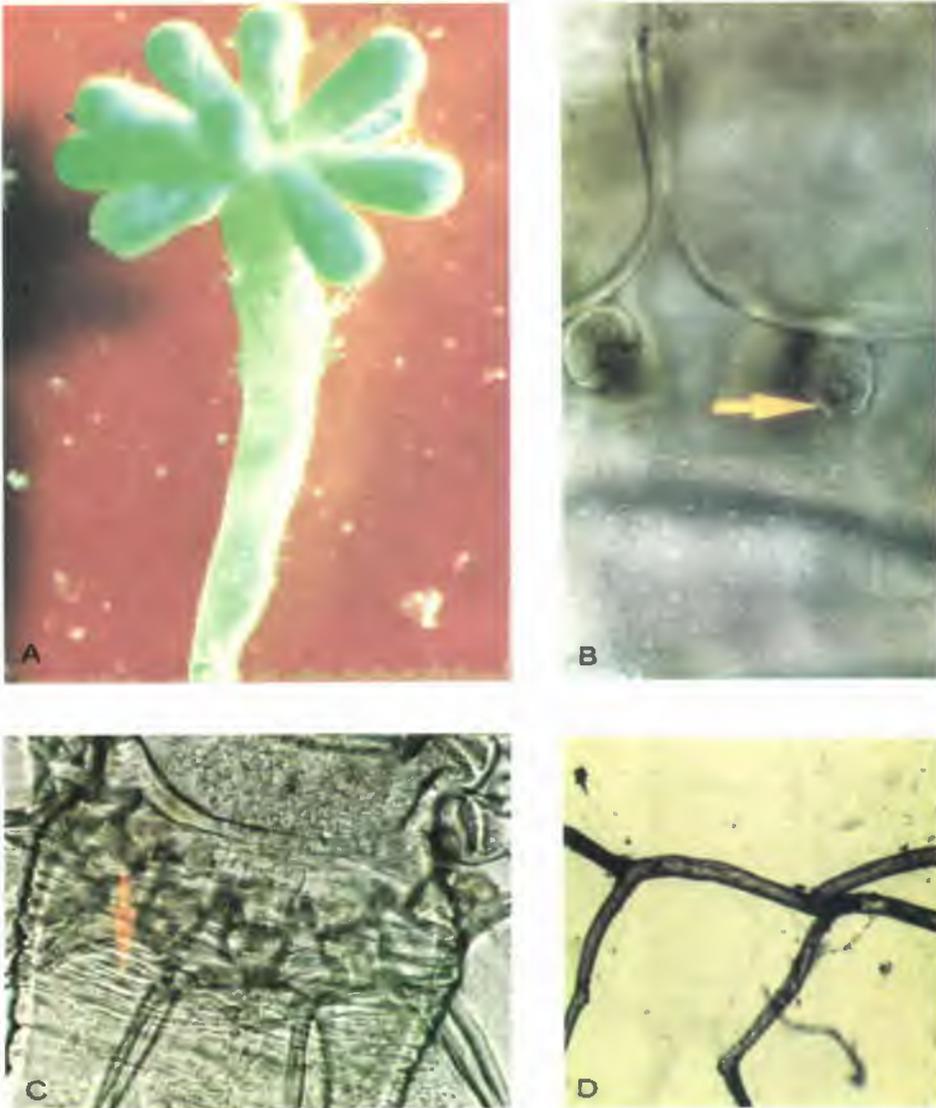


Fig. 5. *Acetabularia mobii* (A-C). -A. Habit of liquid-preserved plant (x 9). -B. Coronal segments with 3 hair scars (x 250). -C. Rugose stalk with several diaphyses (x 125). -*Cladophoropsis membranacea* (D), filaments of plant showing branching and fusing branchlets (x 15).



Fig. 6. *Acetabularia* Sp. - A. Habit of liquid-preserved plant (x 22). - B. Flat disk with gametangial rays (x 20). - C. Corona and coronal segments with 6 hair scars (x 125). -D. Constriction on both sides in the base of rays (x 50).

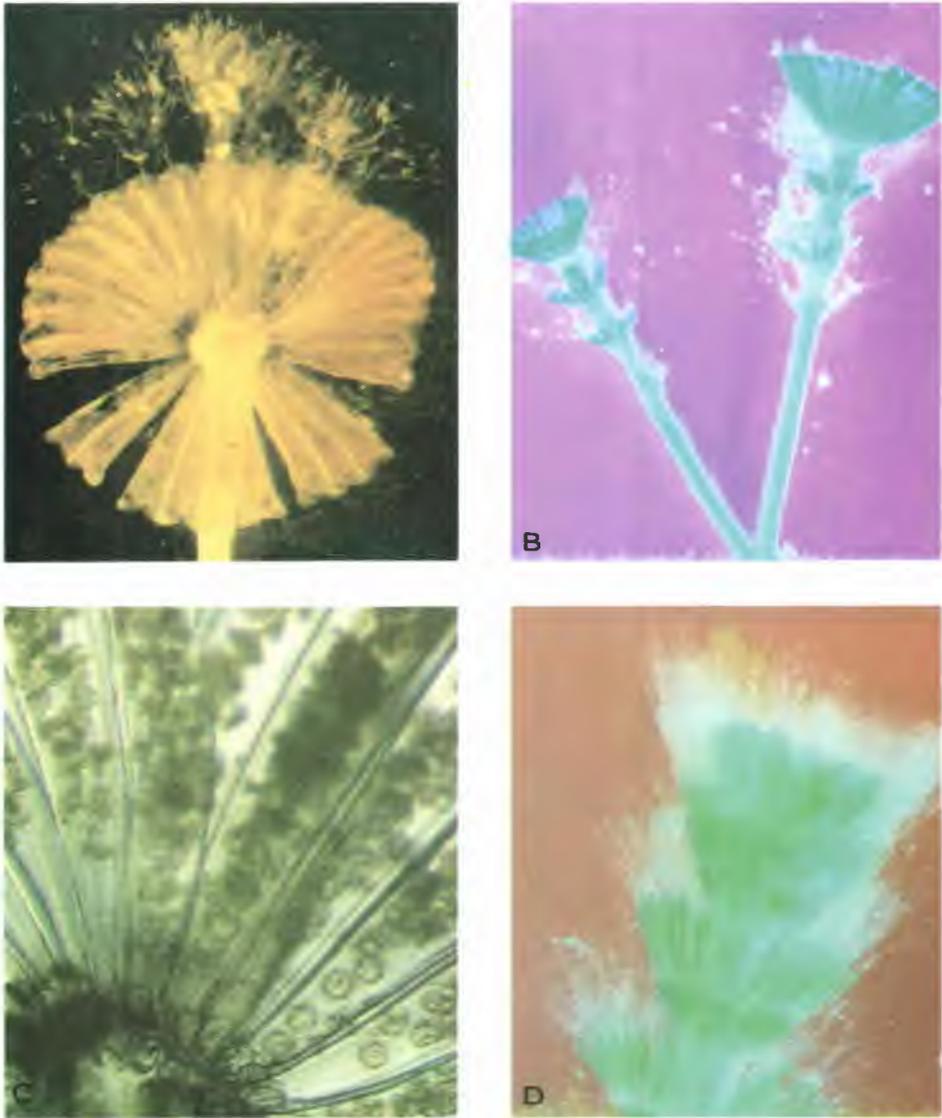


Fig. 7. *Acetabularia calyculus*. -A. Liquid-preserved plant with branched hairs. -B. Liquid-preserved plant with branched stalk (x 7). -C. Corona and gametangial rays (x 50). -D. Young plant with whorls of hairs (x 12).

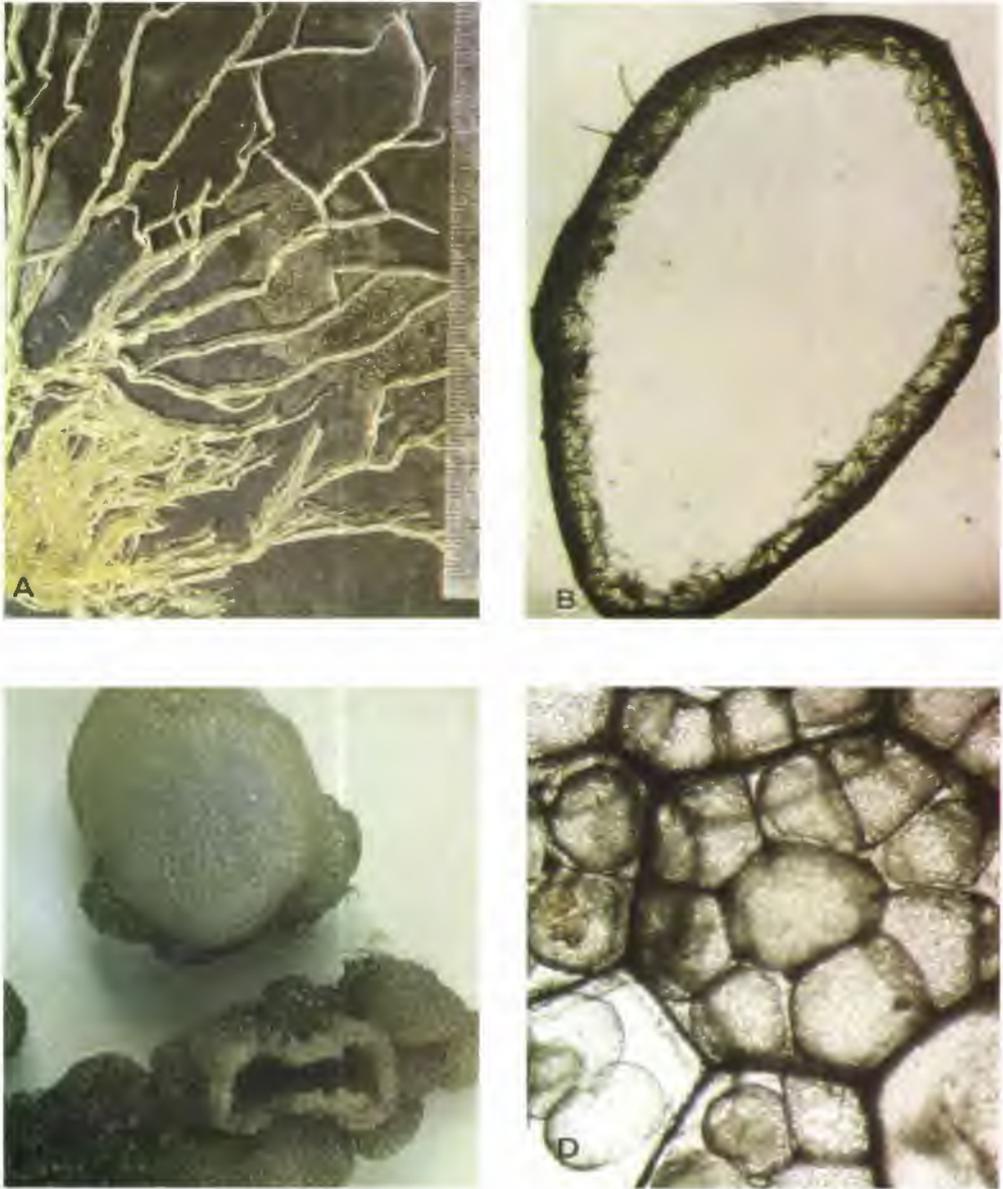


Fig. 8. *Rosenvingea floridana* (A-B). -A. Habit of liquid-preserved plant. - B. T. s. of branches (x 31). -*Dictyosphaeria cavernosa* (C-D). -C. Habit of fresh plants (x 2). -D. T. s. of cells (x 26).

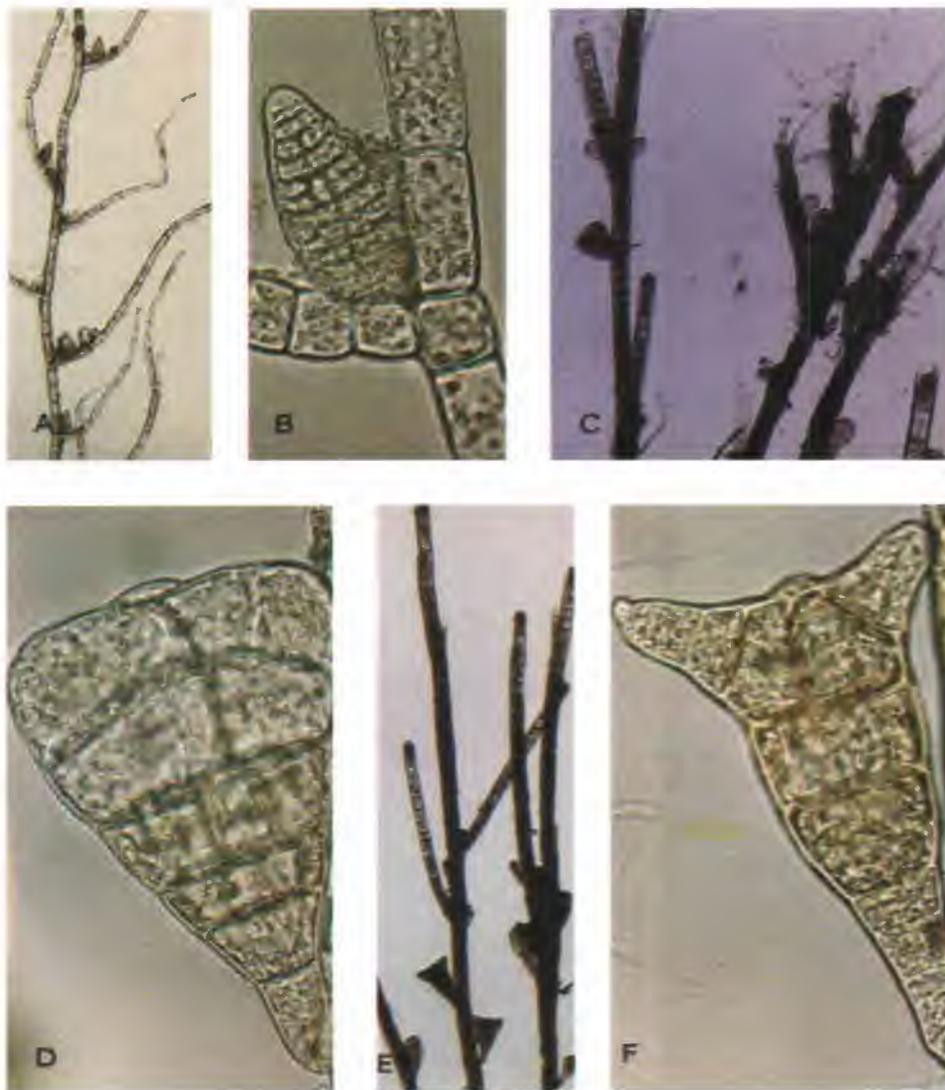


Fig. 9. *Feldmania irregularis* (A-B). -A. Habit of liquid preserved plant. - B. Conical plourangia on the base of branches (x 500). -*Sphacelaria nova-hollandia* (C-D). -C. Upper parts of branches (x 41). -D. Triangular propagul (x 500). - *S. tribuloides* (E-F). -E. Upper parts of branches (x 41). -F. Wedge shape propagul (x 500).



Fig. 10. *Turbinaria conoides*. -A. Habit of liquid-preserved plant. -B. L. s. of central strain in stalk of leaves (x 125). -C. T. s. of leaf stalk, arrow showing cryptostomat (x 50). -D. T. S. of receptacle (x 250).



Fig. 11. *Nitzchia martiana*. -A. Tubular colonies of cells (x 50). -B. Branching and bent where cells are absent (x 125). -C. Corrugation on edge of tubes (x 250). -D. Discoid plastid along the cells length (x 500).