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OCCURRENCE OF THE GENUS *BACHELOTIA* (ECTOCARPALES, PHAEOPHYCOTA) IN THE COASTAL WATERS OF PAKISTAN

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Abstract

A rarely occurring brown alga, *Bachelotia antillarum* (Grunow) Gerloff [=*Ectocarpus antillarum* Grunow] was collected from the coastal areas near Karachi, Pakistan and taxonomically investigated. This is the first report of occurrence of the genus *Bachelotia* (Bornet) Kuckuck *ex* G. Hamel from northern Arabian Sea, It is suggested to place it in the family Pilayellaceae Pedersen, as its thallus becomes parenchymatous due to the formation of a few longitudinal divisions and as its sporangia arise by a simple transformation of vegetative cells.

Introduction

There is a luxuriant growth of brown algae at the coast of Pakistan (Salim, 1965; Begum & Khatoon, 1992a; Shameel & Tanaka, 1992; Shameel *et al.*, 1996; Shameel, 2000). But very few studies have been made on the taxonomy of Ectocarpales growing in the coastal waters of Pakistan (Begum & Khatoon, 1992b; Shaikh & Shameel, 1995). Therefore, a large survey was made to collect brown algae from the coast of Karachi and the neighbouring areas in Balochistan. As a result of that several interesting and new filamentous algae were obtained. The present study describes a rarely occurring species of brown algae *Bachelotia antillarum* which was not known so far from northern Arabian Sea.

Materials and Methods

The material was detached from the stones present in shallow pools near upper littoral zone at the coast of Karachi, Pakistan. It was brought to the laboratory and preserved in 4 % formaldehyde. Slides of filamentous algae were prepared by the whole mounted method. Filaments were stained in 1 % aniline blue for 5 to 10 minutes then washed with tap water and 1 % KI solution was added for 2 to 3 minutes. They were then washed with seawater and mounted in solution of 80 % glycerin (80 mL Gly. + 10 mL Aniline blue + 10 mL of distilled water). After 12 hours of mounting, filaments were observed under microscope.

Results and Discussion

The specimens on general observation and microscope examination revealed the following generic characters and a taxonomic enumeration of the species.

Genus *Bachelotia* (Bornet) Kuckuck *ex* Hamel 1939

Thalli filamentous, epilithic, yellowish brown in colour; attached to rocks by minute disc-shaped holdfast; filaments branched, opposite or alternate; phaeoplast stellate, single

or two in a cell, 1-2 pyrenoids; growth by intercalary meristem; unilocular sporangia intercalary. This genus is being recorded for the first time from the coast of Pakistan. Its following species occurs at Karachi Coast.

Bachelotia antillarum (Grunow) Gerloff 1959:38
(Figs. 1-6).

Basionym: *Ectocarpus antillarum* Grunow 1867: 46.

References: Børgesen, 1920: 43; Hamel, 1937: 9; Lindauer *et al.,* 1961: 141; Earle, 1969: 129; Womersely, 1987: 30; Krishnamurthy & Joshi, 1970: 9; Silva *et al.,* 1996: 571.

Morphological characters: Thalli 2-3 cm high, rough to touch and give *Sphacelaria* like appearance, filamentous, sparsely to irregularly branched, epilithic on stones, attached to substratum by hepteron like filamentous structure.

Cytological features: Filamentous erect portion with rectangular to elongated cells, arranged uniseriately, 34-80 µm in length, throughout same diameter *i.e.* 34 µm; cell wall 1.5-3.0 µm thick, each cell with a single star-shaped or stellate phaeoplast, sometimes two halves joint centrally with one another.

Reproductive structures: Reproductive organs intercalary, only unilocular sporangia present, plurilocular sporangia not observed in these specimens.

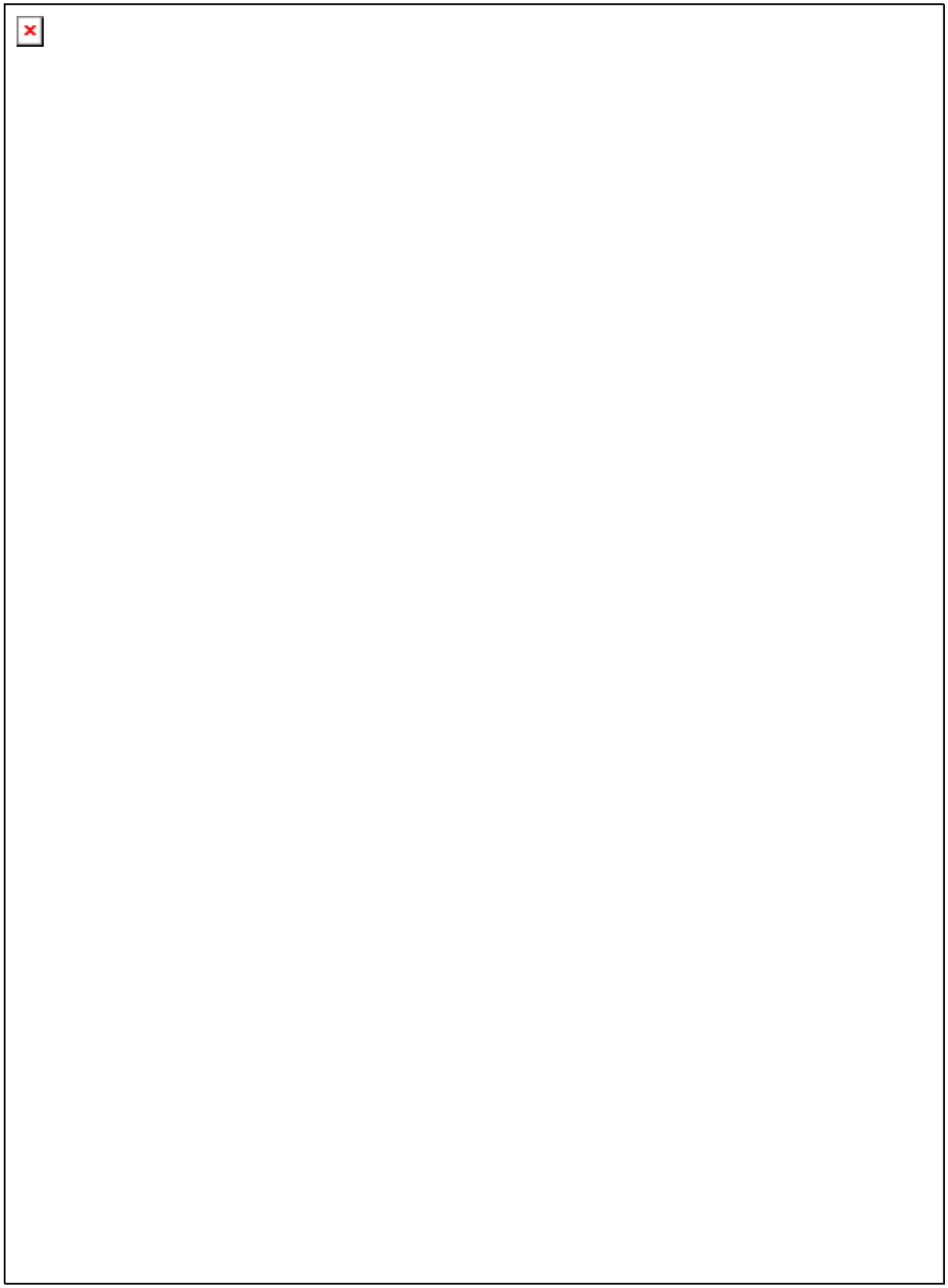
Growth: Each filament with many intercalary, small cells, indicating that growth takes place by intercalary meristem.

Type locality: Guadaloupe, West Indies.

Habitat ecology: It grows epilithic on the stones in shallow pools near upper littoral zone.

Local distribution: Sandspit (*Leg.* Aisha 27-10-92), Nathiagali (*Leg.* Aisha 06-02-92)
Geographical distribution: West Indies, Gulf of Mexico, France, India, South Africa, Tanzania and Australia.

Remarks: The specimens from Karachi Coast have peculiar stellate or star-shaped phaeoplast in each cell, which makes it a distinct member in Ectocarpales. It is characterized by having intercalary reproductive organs and meristematic zones, presence of unilocular sporangia and absence of plurilocular sporangia. Our specimens resembled morphologically as well as cytologically with those of Danish West Indies and in measurement of various dimensions showed complete agreement with them (Børgesen, 1920), while they exhibited little difference in measurement with the specimens of France (Hamel, 1937) and New Zealand (Lindauer *et al.,* 1961). Although they were similar with the specimens of Australia and Gulf of Mexico in morphology and cytology (Womersley, 1937; Earle, 1969) but slightly differed in measurements. This species is being recorded for the first time not only from the coast of Pakistan but also from Arabian Sea.



Figs. 1-6. ***Bachelotia antillarum*** **(Grunow) Gerloff:** 1. Vegetative filaments with basal part, 2. Lateral branch, 3. A part of filament, 4. Filament with reproductive organs, 5. Enlarged view of filament with reproductive organs, 6. Enlarged view of apical part.

Initially this species was placed in the family Ectocarpaceae (C. Agardh 1824) Kützing 1843, but it is suggested to place it in the family Pilayellaceae Pedersen 1984: 54) (order Ectocarpales Oltman 1922, class Dictyophyceae Shameel 2001: 243), phylum Phaeophycota Shameel, 2008: 229). Because its thallus at lower portion becomes parenchymatous due to the occurrence of a few longitudinal divisions and as the unilocular sporangia arise by a simple transformation of vegetative cells. Pedersen (1984) aligned the Pilayellaceae with families traditionally placed in the order Dictyosiphonales, but Silva *et al*., (1996: 571) retained it in the order Ectocarpales. The latter practice appear to be more meaningful due to its branched filaments and mostly monostromatic habit and intercalary growth.

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