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Reproductive Behavior of the Two Estuarine Red Algal Species in The Mangrove Habitats of Visakhapatnam, India.

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Abstract: *Different phases in the life cycles of Bostrychia tenella (Vohl.) J. Ag. and Caloglossa leprieurii (Mont.)J.Ag. were estimated for twelve months in the year of 2010 at mangrove habitats of the Meghadrigedda rain fed drain near naval dock yard of Visakhapatnam. Vegetative plants of these two estuarine red algae occurred throughout the year, while tetrasporophytes occurred from April to November months. Cystocarpic plants occurred only four months in B.tenella, and five months in C.leprieurii, Spermatangial plants occurred in the populations of B.tenella from November to March while in C. leprieurii from October to March. Abundance of various populations varied seasonally in two estuarine red algae.*

Keywords: *Bostrychia tenella, Caloglossa leprieurii, Estuarine red algae, Reproductive behavior, Visakhapatnam, East Coast of India.*

I. Introduction

Estuaries offer a variety of environmental regimes for the growth, survival and development of biological organisms. Biota which grows in these peculiar environmental parameters is able to withstand and maintain its populations successfully. Estuarine red algae occur on the slit roots, prop roots and leaves of some mangrove species in the mangrove habitats. These estuarine red algae are harvested for human consumption in some Asian countries (Chapman and Chapman, 1980) (1), and extraction of some important chemicals (Khan, 1970) (2). Several studies were made on the seasonal distribution, growth and reproductive behaviors of estuarine algae in different parts of the Indian estuarine habitats (Jagtap et al, 1985; Mal et al. 1987; Narasimha Rao and Umamaheswara Rao, 1991; Narasimha Rao.1995; Narasimha Rao and Venkanna, 1996; Narasimha Rao and Vanilla Kumari, 1997; Narasimha Rao et al, 2008 and Narasimha Rao and Murty, 2011) (3, 4, 5, 6, 7, 8, 9, 10). Mangrove populations of Visakhapatnam was studied by Venkanna et al (1989),(11) and Narasimha Rao (2008) (12). The present investigation is aimed to examine the reproductive behavior of two estuarine algal forms of this mangrove habitat.

II. Material And Methods

Tiny mangrove populations are occurring near Naval Dockyard region of the Visakhapatnam. This ecosystem lies between latitudes 17º 14′ to 17º 45′ and longitudes 83º 16′ to 18º 21′ E. A rain fed drain Meghadrigedda merges with Bay of Bengal near outer Harbour of the Visakhapatnam which offers the growth of some mangrove species. Pneumatophores and stilt roots of mangrove plants harbor the growth of some estuarine algae such as *Bostrychia tenella* (Vohl.) J.Ag.and Caloglossa *leprieurii* (Mont.) J. Ag. Studies were carried out for period of one year from January 2010 to December 2010. Every month, fifteen to twenty clumps of *B. tenella* and *C. leprieurii* were collected from the mangrove habitats and transported to the Laboratory. Male and female plants were sorted out by examining them under the microscope. Relative abundance of the tetrasporophytic, cystocarpic, spermatangial and vegetative plants in the population was estimated.

III. Results And Discussion

Mangrove populations of Visakhapatnam were distributed as a narrow patches along the Meghadrigedda rain fed drain near Naval dock yard and extend towards the upward up to 2 KM only. Estuarine algae such as *Bostrychia tenella* and *Caloglossa leprieurii* were collected and samples were analyzed for reproductive behavior. Reproductive behavior of *B.tenella* and *C. leprieurii* was analyzed for twelve months period in the year 2010. Vegetative plants of *B.tenella* and *C. leprieurii* occurred throughout year with higher relative abundance values in the month of December and lower values in July (Table 1 & 2). Tetrasporophytes occurred from April to November months and the relative abundance of these populations was more in June, July & August months and minimum in October and November months. Cystocarpic plants occurred only four months in *B.tenella*, from December to March and five months in *C.leprieurii*, from November to March. Spermatangial plants reported in the populations of *B.tenella* from November to March while in *C. leprieurii* from October to March (Table 1 & 2).

Several studies revealed that salinity plays an important role on the occurrence and distribution of estuarine algae (Coutinho and Seeliger, 1986, Mosisch, 1993 (13, 14) and Narasimha Rao, 1995. Kapraun

(1974) (15) observed that tetrasporophytes of *Bostrychia radicans* present in the summer months only but vegetative plants were recorded throughout the year. He observed that the tetrasporophytes of *C. leprieurii* were present in July and August months only. In the present study also vegetative populations of *B.tenella* and *C.leprieurii* were occurred throughout the year and tetrasporophytes in certain months of the year as reported by the Kapraun (1974). Mohan Joseph and Rama Rao (1977) (16) collected the samples of *B.tenella* from marine habitat of Tamilnadu, they observed that 60% of the plants were tetrasporophytes and the remaining plants were gametophytes. In the present study abundance of the tetrasporophytes were ranged from 27 to 62% in both of the estuarine species. The abundance of the different populations varied seasonally for these two species. Tanaka (1991) (17) reported the reproductive behavior of *B. radicans* from Indonesian mangrove habitats and observed that the three different populations such as cystocarpic, gametophytic and tetrasporophytic phases occurred in the nature. Narasimha Rao (1995) reported that the tetrasporophytes of the three species such as *Bostrychia tenella*, *Catenella impudica* and *Caloglossa leprieurii* were present in all months of the year without any seasonal periodicity and nearly 50% of the populations were tetrasporophytes in the mangrove habitats of the Godavari estuary,India. The gametophytes of *B.tenella* and *C. leprieurii* and cystocarpic plants of *C. impudica* were occurred from October to May with maximum abundance in January. The abundance of the cystocarpic and Spermatangial populations of B.tenella and *C. leprieurii* were only 3 to 15% (Narasimha Rao, 1995). In the present study abundance of various populations of two estuarine species varied seasonally, vegetative populations were occurred throughout the year but tetrasportophytes were occurred certain months of the year (Table 1 and 2).

Table 1. Relative abundance of various populations of *Bostrychia tenella* occurs in mangrove habitats of Visakhapatnam

Month	Tetrasporophytic	Cystocarpic	Spermatangial	Vegetative
January 2010	0	17	14	59
February	0	24	11	65
March	0	28	12	60
April	47	0	0	53
May	45	0	0	55
June	61	0	0	49
July	54	0	0	46
August	51	0	0	49
September	48	0	0	52
October	39	0	0	61
November	27	0	11	62
December 2010	0	12	15	73

Table 2. Relative abundance of various populations of *Caloglossa leprieurii* occurs in mangrove habitats of Visakhapatnam

Month	Tetrasporophytic	Cystocarpic	Spermatangial	Vegetative
January 2010	0	21	16	63
February	0	28	14	58
March	0	24	10	66
April	39	0	0	61
May	41	0	0	59
June	57	0	0	43
July	62	0	0	38
August	56	0	0	44
September	42	0	0	58
October	42	0	12	46
November	0	09	11	62
December 2010	0	15	18	67

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