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Distribution of *Salicornia brachiata* and Other Halophytes along the Estuarine Habitats of Bahuda River, Ganjam District, Odisha

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Abstract **Original Research Article**

Halophytes including *Salicornia* species distributed in Surala Chilaka and other estuarine regions of the Bahuda estuary in Ganjam district, Odisha were studied. *Salicornia brachiata* is a potential halophyte for production of Green Salt, Plants popularly known as Glasswort, Sea Asparagus are cooked and eaten as salad or are pickled. It is also a good fodder for Cattle, Sheep and Goat. Plant material is also used as raw material in paper and board factories. Its seeds yield high quality edible oil which is highly Poly Unsaturated and is similar to Safflower Oil in fatty acid. Three study sites were selected in different parts of the Bahuda Estuary for collection of data on hydrographical studies of the estuary and distribution and density of halophytes including *Salicornia* populations. 4X4M quadrants were used to get the data on density of the *Salicornia* populations in the estuarine regions. Maximum density (3254 plants/hec.) was reported for the species *Salicornia brachiata* and minimum density (97 plants/hec.) for the species *Prosphis chelensis* in the different parts of Bahuda estuarine habitats.

Keywords: Halophytes, *Salicornia brachiata*, Distribution, Surala Chilaka, Bahuda Estuary, Odisha.

INTRODUCTION

Mangroves are the most beautiful tidal formations between land and sea. Three different zones or groups of populations coexisting with each other; those are the true mangroves, mangrove associates and halophytes. Halophytes are salt tolerant, drought resistant plantswhich grows in transitional zone in between terrestrial plants and aquatic plants. The term halophyte was coined by Schorder, (1809) applying to plants growundersalineconditions.Halophytes are highly valuable for their use inbio saline agriculture as vegetable, production of salt, extraction of edible oil and biofuels (Glenn *et al.*, 1991, Glenn *et al*., 1994; Glenn *et al*., 1995 and Weber *et al.*, 2007). In India, species of *Salicornia* species are growing along the estuarine regions of the east and west coasts of India. Several authors studied the ecological, cultural and anatomical aspects on species of *Salicornia* (Sanish *et al*., 1991; Narasimha Rao *et al.*, 2012; Narasimha Rao and Reddi, 2013, Narasimha Rao and Murty, 2013). Narasimha Rao and Murty (2015) studied the distribution of Salicornia in relation to physiochemical and soil charactestics in estuarine regions of Godavari estuary. Several investigators studied the antimicrobial activities of some mangrove and halophytic species (Deepthi Raniand Narasimha Rao, 2013; Prasanna Lakshmi *et al*., 2015) and extraction of edible oils from *Salicornia*sps (Narasimha Rao *et al*., 2015). Species of halophytes are source for detection of unique secondary metabolites which are used as antimicrobial, antioxidant and anti cancer agents. Halophytes are used as food, fodder, fertilizer, salt production and have several medicinal applications by the local communities since long back. However, scientific information about the biological effects of halophytic plants is poorly documented. Zhang *et al*., (2015) studied the reduction in blood press when *Salicornia* derived salt fed by rats. These investigators observed that minerals of *Salicornia*have a protective effect against high levels of blood pressure and the deleterious effects of sodium.

In the present investigation an attempt was made to studythe distribution of*Salicornia brachiata* and other halophytes present along the Bahuda riverine habitats of Chilaka of Surala, Chikiti Block, Ganjam district, Odisha in relationto hydrographical, salinity of water in different parts of the estuary.

MATERIAL AND METHODS

Halophytes are distributed along the estuarine habitats of the Bahuda River. Three study sites were selected in different areas of the Surla of Chilaka which is a creek of Bahuda estuary for collection of data on distribution and composition of halophytes along with *Salicornia*. Latitudes of the study sites are 19º 84′ N and longitudes 84º65′E. Hydrographical parameters such as water temperature, salinityand pH were collected from all the study sites for three months only. Surfacewatersampleswereta kenfromthecenterofthecreek .Temperature, pH and salinity were measured by a thermometer, portablepH meter, and salinometer respectively in all the sampling sites. At each station 10 quadrant (quadrant size4x4m) samples were collected and total 30 quadrant samples were collected to analyze the data on composition halophytes in Bahuda estuary.

RESULTS AND DISCUSSION

Table 1 shows the hydrographical parameters from estuarine habitats of Surala Chilaka which is a major creek form the Bahuda River. Water temperature ranges from 17.5 to 19.5ºC, salinity ranges from 26 to 29 ppt and pH values ranges from 6.6 to 6.9 in the three study sites of the Bahuda estuary. There is no significant difference among the three stations studied, so average results of physico-chemical features were presented in Table 1. Present results on hydrographical features of Bahuda estuary are agrees with the earlier findings of Narasimha Rao (2012) on Godavari estuary, Narasimha Rao and Subba Rangaiah (2010) on Pandi back waters of Gautami Godavari estuary, Narasimha Rao and Murty (2012) on Gamui estuary, Chudamani, Odisha. Table 2 shows the number of halophytes present in the estuarine regions of Bahuda River. Information through the quadrant samples was collected from three different stations of the estuary and was pooled, based on the quadrant data density values were calculated, a total of 06 halophytes were reported in the three study sites of the estuary. Density of the individual plant species was mentioned in the Table 2. Higher density value (3254 plants/hec.) was recorded for the species *Salicornia brachiata*and lower density value (97 plants/hec.) for the species *Prosphis chelensis* (Table 2). In this estuarine region *Salicornia brachiata* dominates the habitat while other halophytes grows here and there as patches. So remaining plants distribution and density also minimal in the study sites. Results of the present investigation agrees with the findings of earlierworkers on halophytic populations of various estuarine habitats of Godavari estuary (Umamaheswara Raoand Narasaimha Rao,1988) and mangroveeco systems of Krishna, Sarada and Varaha estuarine complex and Vamsadhara estuary respectively (Venkannaand Narasimha Rao, 1993; Narasimha Rao, 2008; Narasimha Raoand Murty, 2010). Present information on quantitative data on halophytes also agrees with the earlier studies of Narasimha Raoand Murty (2010a; 2012), Narasimha Rao (2012) Narasimha Rao and Subba Rangaiah, (2010) Narasimha Rao and Reddi (2013), Narasimha Rao *et al.,* (2012).

Mangroves are ever green tropical formations between land and sea. These aquatic ecosystems are coastal barrier and protecting the inhabitants during cyclonic storms and tidal waves from the sea. These ecosystem provide livelihood for coastalinhabitants since longback, besides due to rich organic matter and nutrients it attracts number ofmigratory birds and fish. So it is high time to protect and conserve the ecosystems for the generations to come.

Table 1: Physico-chemical Featuresof Bahuda Estuary

Month	Water temperature (ºC)	Salinity (‰)	pH
December	17.5	26	6.8
January	18	28	6.6
February	19.5	27	6.9

Table 2: Distribution and density of*Salicornia*andotherHalophytesindifferentstationsof the Bahuda estuary

S. No	Name of the species	Density (plants/hec.)
1	*Heliotropiumcurassavicum*	136
2	*Prosophischelensis*	97
3	*Salicornia brachiata*	3254
4	*Sesuviumportucastrum*	264
5	*Suaedamaritima*	496
6	*Suaedamonoica*	378

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