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Ecological Studies on Bryophytes of Maredumilli Forest Division (AP), Eastern Ghats of India

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Abstract **Original Research Article**

Eastern Ghats of East Godavari District consists of a series of detached hill ranges of heterogeneous composition offers variety of plants from lower group of plant kingdom to higher group of plants. Low temperature and high rainfall promote the growth and development of various plant groups especially aerophytic algae (sub aerophytic algae/corticolous algae), Bryophytes and Pteridophytes along with angiosperms. Present investigation was undertaken to study the distribution of bryophytes in the Maredumilli forest division in relation to its seasonal changes. Studies were made in three different seasons of the year during October 2018 to September 2019. A total of 10 species were reported and its frequency was measured by quadrate method. Higher frequency values were recorded during the post monsoon season while lower frequency values were observed in pre monsoon season.

Keywords: Distribution, Seasonal changes, Frequency, Bryophytes, Maredumilli, Eastern Ghats of India.

INTRODUCTION

Bryophytes are cryptogrammic group of plants in the plant kingdom and distributed mostly in subtropical and temperate regions of the globe. In India, Bryophytes are occurs in Himalayas, Western Ghats and Eastern Ghats regions. The role of Bryophytes are also important in plant succession on rocky terrain, nitrogen cycling and carbon fixing (Turetsky, 2003), as bio indicator species (Saxena and Harinder 2004). Some species of Brophytes are important for its ethno medicinal, antimicrobial activities (Glime, 2007; Pant, 1998; Nagashima *et al*., 2003; Asakawa, 1995; Raymuneto *et al*., 1989; and Ucuncu *et al*., 2010). This group of plants consists of several active compounds such as amino acids, oligosaccharides, fatty acids and phenolic compounds (Pant and Tewari, 1990). Few investigators studied the Bryophytes of Eastern Ghats of India. (Rao and Hara Sree Ramulu, 1986; Murty *et. al*., 2012; Narasimha Rao and Dora, 2012; Narasimha Rao and Srinivasa Rao, 2013; Narasimha Rao and Reshmi Chatterjee, 2014 and Narasimha Rao and Dora, 2019) Present study aims to investigate the presence and growth of Bryophytes in relation to its seasonal changes in Maredumilli forest division of Eastern Ghats of India. Andhra Pradesh.

STUDYSITES AND METHODS

The Maredumilli Forest division of East Godavari District located in 17.35º N latitudes and 81.42ºE longitudes and is approximately 90 KM away from the Rajahmundry city of Andhra Pradesh. Semi evergreen forests with rich biodiversity along the hilly terrain is common feature in this forest. Frequent rains, humidity and temperature, many running streams in this forest supports the growth of the bryophytes

Information on air temperature, humidity and rainfall were collect from the local Horticultural Research Station Rampachodavaram. Quadrate method was used for collection of quantitative data on the frequency of bryophytes in different regions of the Maredumilli forest division. Quadrates were placed randomly in the forest region and count the number of plant species present in each Quadrate. A total of 60 quadrate samples were collected in different seasons of the year from October 2018 to September 2019. (i.e., Monsoon, post monsoon, pre monsoon seasons and each season 20 quadrate samples were collected). The values of frequency was calculated by using the following formula (Misra, 1968). Standard literature of Gamble and Fischer (1915), Rao and Hara Sreeramulu, (1986),

Pullaiah and Chennaiah (1997) were used to identify the Bryophytic flora of Maredumilli forest division.

RESULTS AND DISCUSSION

In this present study, information on environmental parameters such as temperature, humidity and rainfall of Maredumilli forest division were collected and presented in the Table 1. Data on these features were collected in three seasons such as monsoon, post monsoon and pre monsoon periods only. Table 1 shows that the humidity values ranged from the 52 to 91% and maximum values were recorded during monsoon season and minimum in post monsoon season. Maximum rainfall was recorded in monsoon season and minimum during pre-monsoon season and rainfall ranges between 15 to 105 mm during the study period. Temperature in this region ranged from 9.6 to 33.4º C with maximum temperature during pre-monsoon and minimum temperature in post monsoon seasons.

In this present investigation a total of 10 species belonging to 6 families of bryophytes were recorded in the forest division of Maredumilli, East Godavari District (Table 2). Bryophytes are in general shade loving plants so plant frequency varied seasonally in the present study site (Table 3). Minimum frequency values were reported for the species *Plagiochasma rupestre* (38%) and *Marchantia delibis* (41%) and higher values for the species *Polytrichum densiforum* (85%) and *Funaria hygrometrica* (84%). As a whole maximum frequency values were reported in post monsoon season and minimum frequency values were in pre monsoon season (Table 3). Hilly terrain and wide surfaces of the lower parts of the angiosperms support the growth of bryophytes such as *Polytrichum* and *Funaria* along with some corticolous algae in Maredumilli forest division. In the forest region local mini temples and its compound wall and related structures are also covered by the some bryophyte and algal species. Present investigation on Bryophytes agrees with the earlier studies on Bryophytes in Visakhapatnam district, Eastern Ghats of India (Murty *et al*., 2011; Narasimha Rao and Dora, 2012; Narasimha Rao and Srinivasa Rao, 2013 and Narasimha Rao and Dora, 2019). In this study higher values in frequency was reported during the post monsoon season. This may be due to the lower temperature and moderate rainfall favours and supports the growth and development of these species of Bryophytes in Maredumilli forest division of Eastern Ghats of India. In pre monsoon season lower frequency values were recorded due to raising the temperature, minimum water level in the streams and invasion of exotic weeds and its dominance may be responsible. Restoration and conservation of this flora is important as they play a vital role in conversion of biomass into organic matter, finally an important role in ecological succession

Table 1: Environmental parameters at Maredumilli forest division during October 2018 to September 2019

Season	Humidity (%)	Rainfall (mm)	Temperature (0ºC)
Monsoon	62-91	105-16.5	19.5 - 26.5
Post Monsoon	52-68	42-68	09.6 - 17.8
Pre Monsoon	72-86	15-39	17.5 - 33.4

Table 2: Species of Bryophytes collected from different regions at Maredumilli forest Division, East Godavari District

S. No	Name of the species	Family
1	*Funaria hygrometrica*	Funariaceae
2	*Marchantia polymorpha*	Marchantiaceae
3	*Marchantia delibis*	Marchantiaceae
4	*Plagiochasma rupestre*	Aytoniaceae
5	*Plagiochasma wrightii*	Aytoniaceae
6	*Polytrichum alpinum*	Polytrichaceae
7	*Polytrichum densiflorum*	Polytrichaceae
8	*Riccia discolor*	Ricciaceae
9	*Riccia fluitans*	Ricciaceae
10	*Sphagnum cymbifolium*	Spagnaceae

Table 3: Frequency data for different species of Bryophytes Present in three seasons during October 2018 to September 2019 in Maredumilli forest division

S. No	Name of the plant	Pre monsoon	Monsoon	Post monsoon
1	*Funaria hygrometrica*	56	67	84
2	*Marchantia polymorpha*	49	63	76
3	*Marchantia delibis*	41	58	69
4	*Plagiochasma rupestre*	38	47	58
5	*Plagiochasma wrightii*	45	66	81
6	*Polytrichum alpinum*	52	67	83
7	*Polytrichum densiflorum*	58	71	85

S. No	Name of the plant	Pre monsoon	Monsoon	Post monsoon
8	*Riccia discolor*	47	58	78
9	*Riccia fluitans*	51	73	79
10	*Sphagnum cymbifolium*	57	62	73

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