LITTER BIOMASS OF A GRASSLAND COMMUNITY OF RAIRANGPUR IN THE DISTRICT OF MAYURBHANJ, ODISHA

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ABSTRACT

The litter biomass of a grassland community of Rairangpur (86^0 11' 45'' E ; 22^0 16' 45''N) in the district of Mayurbhanj, Odisha was studied following "Short term harvest method" as proposed by Odum [1]. The litter biomass value of the experimental site was found to be maximum in the month of April (78.28 g m^{-2}) and minimum in the month of October (7.73 g m^{-2}). The litter biomass of the community exhibited an increasing trend from the month of January to April. Thereafter, the value showed a gradual decrease in trend till October with a little fluctuation in the month of May. Again, a decreasing trend in litter values was observed from October to the end of the sampling period. Compared to other grassland community, the mean litter biomass value of the present study did not show similarity. This might be due to the variation in topography, geographical distribution, species composition, climatic conditions, soil characteristics, rate of decomposition and biotic interference of the locality.

Keywords : Grassland, community, biomass, litter

I. INTRODUCTION

The quantity of organic matter accumulated in a given area of a community is the biomass of that area and when it is referred to a particular time, it is known as "standing crop biomass". Biomass can be represented more appropriately in term of dry weight. Literature review reveals a lot of work on litter biomass in different communities by Odum [1], Ovington **et al.** [2], Wiegert & Evans [3], Golley [4], Kelly **et al.** [5], Choudhury [6], Misra [7], Mall & Billore [8], Singh and Ambasht [9], Jain [10], Trivedi & Misra [11], Rath [12], Malana & Misra [13], Misra & Misra [14], Naik [15], Patnaik [16], Pradhan [17], Behera [18], Barik [19], Rout & Barik [20] and many others. However, very little work has been done particularly in northern reason of the state. Therefore, in this investigation an attempt has been made to study the litter biomass of a grassland community of Rairangpur in the state of Odisha.

1.1 Aim of the Study

The aim of this investigation is to study the litter biomass of a grassland community of Rairangpur in the district of Mayurbhanj, Odisha.

1.2 Study Site and Environment

The experimental grassland was selected at Sanchampauda (86^0 11' 45'' E ; 22^0 16' 45''N,), Rairangpur, situated at a distance of 95 kms from the North Orissa University and 90 kms from Baripada, the district

headquarter of Mayurbhanj in the state of Odisha and is located at an average elevation of 248m. The climate of the locality is monsoonal with three distinct season i.e rainy (July to October), winter (November to February) and summer (March to June). The total rainfall during the study period was 1903mm. Of which a maximum of 652mm was recorded during the month of July. No rainfall was observed in the month of October, November and December. The soil of the experimental site was found to be moderately acidic. The available phosphorous, potassium and organic carbon contents of the experimental site were found to be low [21].

II. MATERIALS AND METHODS

For the determination of various compartmental biomass values "short term harvest method" of Odum [1] was employed. 10 quadrates of 50cm x 50cm size were randomly harvested / clipped, 1cm above the ground during the last week of each month. The dead leaves, stems, seeds, flowers etc. lying on the ground were picked from each quadrate, bagged and labeled separately. The live samples (grasses and non grasses together) and the standing dead parts were collected and packed in sampling bags separately, labeled and brought to the laboratory. These were properly washed and spread on the blotting paper. The plants were then separated compartment wise (i.e. live green, standing dead, litter and below ground parts) and quadrate wise. All these plant materials were labeled and dried in open and then transferred to the oven for drying at 80^0C for 48 hours and weighted and expressed as g m^{-2}.

III. RESULTS AND DISCUSSION

Fig-1 shows the monthly variation in litter biomass value of the experimental site. An increasing trend of litter biomass value was observed from January to April. Thereafter, the value exhibited a decreasing trend. The value started decreasing from April to September (with a little fluctuation in the month of May) and showed a minimum of 7.73 g m^{-2} of litter biomass value during October. Again, an increasing trend in value was observed from October till the end of the sampling period. The community exhibited a maximum of 72.28 g m^{-2} of litter biomass in the month of April.

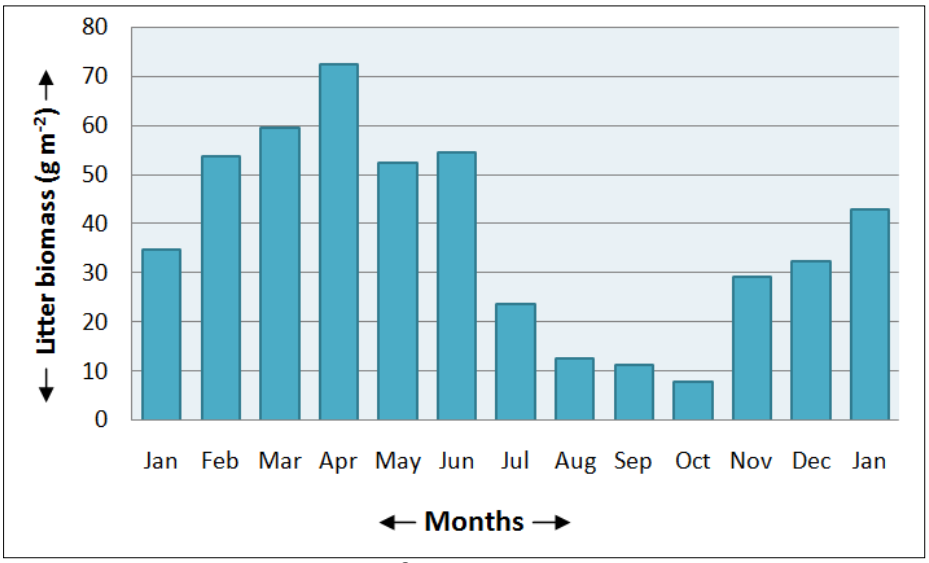

Fig -1 Monthly variations in litter biomass (g m^{-2}) of experimental grassland community during the study period.

The gradual increase in biomass value from January to April and then from October to January might be due to favorable climatic condition. The atmospheric temperature, rainfall, relative humidity, wind velocity and the rate of decomposition might not be favorable for litter formation. As a result a decreasing trend in value was observed from April to October showing a little fluctuation in the month of April. The mean litter biomass of the community when compared with other grassland communities did not show similarity (Table - 1).

Table - 1. Mean litter biomass (g m^{-2}) of different herbaceous communities.

Author (s)	Location	Type of community (dominated)	Mean litter biomass
Odum (1960)	South Carolina	Forb	300
Ovington **et al.** (1963)	Minnesota	*Prairie*	279
Wiegert & Evans (1964)	Michigan	Poa, Upland	202
Golley (1965)	South Carolina	*Andropogon*	250
Kelly **et al.** (1969)	Tennessee	*Andropogon*	181
Choudhury (1972)	Varanasi	*Dichanthium*	098
Misra (1973)	Ujjain	*Dichanthium*	225
Mall & Billore (1974)	Ratlam	*Sehima*	168
Singh & Ambasht (1975)	Varanasi	*Heteropogon*	065
Jain (1976)	Sagar	*Heteropogon*	266
Trivedi & Misra (1979)	Jhansi	*Sehima*	044
Rath (1980)	Berhampur	*Aristida*	055
Malana & Misra (1982)	Berhampur	*Aristida*	051
Misra & Misra (1984)	Berhampur	*Aristida*	057
Naik (1985)	Rourkela	Mixed type	055
Patnaik (1993)	South Orissa	*Heteropogon*	062
Pradhan (1994)	Bhubaneswar	*Aristida*	131
Behera (1994)	Phulbani	*Heteropogon*	049
Barik (2006)	Berhampur	*Aristida*	065
Rout & Barik (2013)	Bangiriposi	*Cynodon*	066
Present study	Rairangpur	*Chrysopogon*	037

The mean litter biomass value of the present study was found to be comparatively less than most of the values reported by Odum [1], Ovington **et al.** [2], Wiegert & Evans [3], Golley [4], Kelly **et al.** [5], Choudhury [6], Misra [7], Mall & Billore [8], Singh & Ambasht [9], Jain [10], Trivedi & Misra [11], Rath [12], Malana & Misra [13], Misra & Misra [14], Naik [15], Patnaik [16], Pradhan [17], Behera [18], Barik [19] and Rout & Barik [20].

IV.CONCLUSION

The litter biomass values of the experimental grassland community of Rairangpur in the district of Mayurbhanj, Odisha did not show similarity with other grassland communities of various locations. The topography, atmospheric temperature, physico-chemical characteristics of soil, rate of decomposition, presence of micro organisms in the soil, species composition, precipitation and biotic interference might be responsible for variation in litter biomass value in the community.

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