STANDING DEAD BIOMASS OF A GRASSLAND COMMUNITY OF BANGIRIPOSI IN ODISHA

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ABSTRACT

The standing dead biomass of a grassland community of Bangiriposi ($86^0$32'30'' E ; $22^0$08'30'' N) in the district of Mayurbhanj, Odisha was studied following "short term harvest method" of Odum [1]. The value exhibited an increasing trend from January to March and was maximum in the month of April (415.36 g m^{-2}). Onwards, a gradual increase in standing dead biomass value was observed showing a minimum of 236.73 g m^{-2} of value in the month of September. Thereafter, the value again, showed an increasing trend till the end of the sampling period. The mean standing dead biomass of the community, when compared to other grassland communities did not show similarity. This variation in standing dead biomass value might be due to the variation in topography, geographical distribution, climatic conditions, soil characteristics and biotic interference of the locality.

Key words: Grassland, community, biomass, standing dead.

I. INTRODUCTION

Grassland plays an important role not only for the survival of animals but also for human beings. Most of the herbivores are directly dependent on grassland where as the carnivorous are indirectly dependent on grassland flora. From the prehistoric times to till date, man has been dependent on the grasses for food, shelter and unani medicine. The knowledge about the standing dead biomass of various plant species is essential for analysis of functional aspects of a community. Literature review reveals a lot of work on standing dead biomass of different climatic regions by Odum [1], Golley [2], Kelley **et al.** [3], Choudhury [4], Misra [5], Mall & Billore [6], Jain [7], Trivedi & Misra [8], Rath [9], Malana & Misra [10], Misra & Misra [11], Naik [12], Patnaik [13], Pradhan [14], Behera [15], Pucheta **et al.** [16], Barik [17], Chawpattanayak & Barik [18] and many others. However, very little work has been made so far on the standing dead biomass of a grassland community of Mayurbhanj district in the state of Odisha.

1.1 Aim of the Study

The aim of this investigation is to study the standing dead biomass of a grassland community of Bangiriposi in the district of Mayurbhanj, Odisha.

1.2 Study site and environment

The experimental grassland community was selected at Silpunji ($86^0$32'30'' E ; $22^0$08'30'' N), Bangiriposi, in the district of Mayurbhanj, Odisha (Fig.-1 & 2). The site is situated at a distance of 40 kms. away from North Orissa University and 36 kms. from Baripada, the district head quarter of Mayurbhanj in the state of Odisha.

The altitude of the site is above 104.6m. The climatic condition of the locality is monsoonal with three distinct seasons i.e. rainy (July to October), winter (November to February) and summer (March to June). The seasons are classified basing upon the amount of rainfall and the prevailing atmospheric temperature. The total rainfall during the study period was found to be 2537.1 mm, of which a maximum of 634.6 mm was recorded during July. No rainfall was observed in the month of December. Total number of rainy days was found to be 114 days. The mean minimum and mean maximum atmospheric temperature recorded during the study period was found to be normal. December showed the lowest temperature (11.53^0C) whereas May experienced the highest temperature (37.35^0C) during the study period. The soil of the experimental site was found to be strongly acidic (pH < 5.0). The available phosphorus and potassium content of the soil was found to be very low. The organic carbon (%) also showed very low in concentration [19].

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 separately, packed in sampling bags, 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, weighted and expressed as g m^{-2}.

III. RESULTS AND DISCUSSION

Fig - 1 shows the monthly variation in standing dead biomass of the experimental site. It was observed that, the standing dead biomass of the community gradually increased from January to April. Thereafter, the value showed a decreasing trend till September. Onwards, again an increasing trend in value was observed till the end of the sampling period. The community exhibited a maximum of 415.36 g m^{-2} standing dead biomass value during April and a minimum of 236.73 g m^{-2} in the month of September. Increase in standing dead biomass from January to April and from September to January might be due to favorable climatic conditions of the locality. The amount of precipitation, water holding capacity of the soil, soil porosity, atmospheric temperature and wind velocity were perhaps not favorable for formation of standing dead parts in the community. As a result, a gradual decrease in standing dead biomass was observed from April to September.

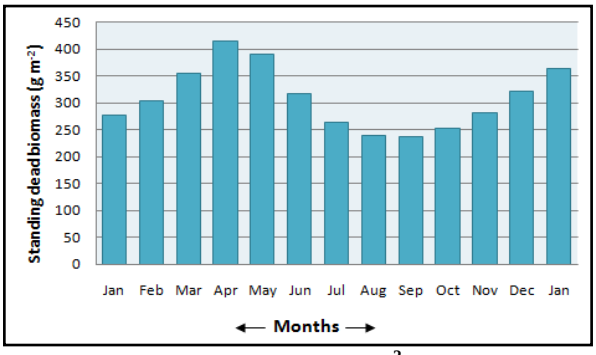

Fig -1 Monthly variation in standing dead biomass value (g m^{-2}) of the experimental site during the study period.

Table-1 reveals the mean standing dead biomass of different herbaceous communities. On comparison, the mean standing dead biomass of the present community did not show similarity with the others. The value was found to be less than the values reported by Golley [2], Kelley **et al.** [3] and Jain [7] whereas higher than that reported by Choudhury [4], Misra [5], Mall & Billore [6], Trivedi & Misra [8], Rath [9], Malana & Misra [10], Misra & Misra [11], Naik [12], Patnaik [13], Pradhan [14], Behera [15], Pucheta **et al.** [16], Barik [17] and Chawpattanayak & Barik [18].

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

Author (s)	Location	Type of community (dominated)	Mean standing dead biomass
Golley (1965)	South Carolina	*Andropogon*	335
Kelly **et al.** (1969)	Tennessee	*Andropogon*	650
Choudhury (1972)	Varanasi	*Dichanthium*	129
Misra (1973)	Ujjain	*Dichanthium*	164
Mall & Billore (1974)	Ratlam	*Sehima*	190
Jain (1976)	Sagar	*Heteropogon*	338
Trivedi & Misra (1979)	Jhansi	*Sehima*	104
Rath (1980)	Berhampur	*Aristida*	124
Malana & Misra (1982)	Berhampur	*Aristida*	184
Misra & Misra (1984)	Berhampur	*Aristida*	232
Naik (1985)	Rourkela	Mixed type	267
Patnaik (1993)	South Orissa	*Heteropogon*	073
Pradhan (1994)	Bhubaneswar	*Aristida*	279
Behera (1994)	Phulbani	*Heteropogon*	179
Pucheta **et al.** (2004)	Argentina	*Deyeuxia*	157
Barik (2006)	Berhampur	*Aristida*	272
Chawpattanayak & Barik (2013)	Rairangpur	*Crysopogon*	199
Present study	Bangiriposi	*Cynodon*	310

IV. CONCLUSION

The standing dead biomass of a grassland community varies from place to place and from time to time. It might be due to the variation in climatic condition, topography, physic-chemical characteristic of soil, species compassion and biotic interference of the locality.

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