# STANDING DEAD BIOMASS OF A GRASSLAND COMMUNITY OF RAIRANGPUR IN THE DISTRICT OF MAYURBHANJ, ODISHA

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**ABSTRACT**

*The standing dead 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 (1960). The community exhibited a gradual increase in standing dead biomass value from January to May. Thereafter, it showed decreasing in trend and showed a minimum of 89.21 g $m^{-2}$ in the month of September. Onwards, again an increasing trend in value was observed from September to till the end of the sampling period. Standing dead biomass was found to maximum in the month of May (299.65 g $m^{-2}$). Compared to other grassland community, the mean standing dead biomass value of the present study did not show similarity. This might be due to the variation in topography, geographical distribution, soil characteristics, climatic conditions, species composition and biotic activity of the locality.*

***Keywords : Grassland, Community, Biomass, Standing Dead***

## 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 standing crop of biomass in different herbaceous communities by Golley [1], Kelley **et al**. [2], Choudhury [3], Misra [4], Mall & Billore [5], Jain [6], Pandey [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] 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 standing dead 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 standing dead 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. (Fig – 1 & 2).

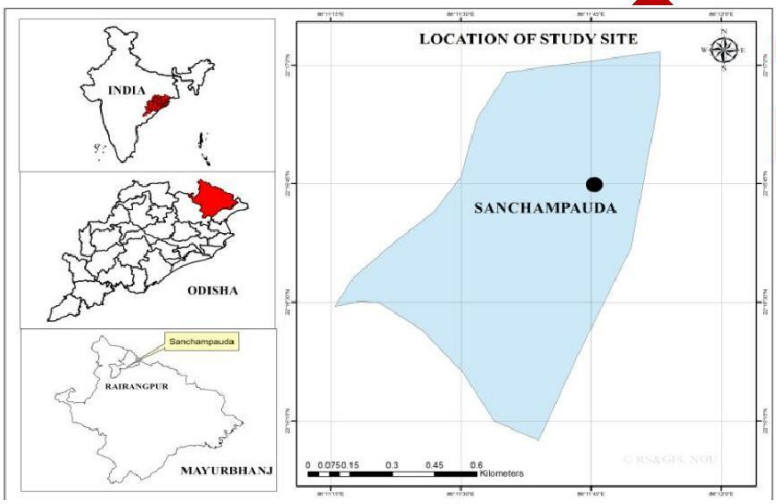


**Fig. -1 Map showing the location of Experimental site**

**Fig. -2 Photograph showing the Experimental site**

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. (Table-1).

**Table – 1 Monthly rainfall and number of rain days of the experimental site during the study period.**

| Month (s) | Rainfall (mm) | No. of rainy days |
|---|---|---|
| Jan. 2007 | 11 | 01 |
| Feb. 2007 | 10 | 01 |
| Mar. 2007 | 08 | 01 |
| Apr. 2007 | 55 | 02 |
| May. 2007 | 170 | 04 |
| June. 2007 | 118 | 09 |
| July. 2007 | 652 | 18 |
| Aug. 2007 | 468 | 12 |
| Sept. 2007 | 363 | 13 |
| Oct. 2007 | - | - |
| Nov. 2007 | - | - |
| Dec. 2007 | - | - |
| Jan. 2008 | 48 | 02 |
| Total | 1903 | 33 |

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 (Table -2).

**Table - 2 The pH, conductivity, organic carbon (%), available phosphorus and potassium content of the soil of the study site (n=5 each)**

| Surface depth in cm | pH | Conductivity | Organic carbon (%) | Available phosphorus (ppm) | Available potassium (ppm) |
|---|---|---|---|---|---|
| 0 to 10 | 5.18 | 0.5 | 0.532 | 0.4 | 15.2 |
| 10 to 20 | 5.22 | 0.5 | 0.474 | 0.34 | 11.4 |
| 20 to 30 | 5.3 | 0.5 | 0.392 | 0.16 | 12.5 |

## II. MATERIALS & METHODS

For the determination of various compartmental biomass values "short term harvest method" of Odum [18], 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) along with the standing dead parts were collected and packed in sampling bags, and 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 $80^0$C for 48 hours

and weighted and expressed as g $m^{-2}$.

## III. RESULTS & DISCUSSION

Fig-3 reveals the monthly variation in standing dead biomass value of the experimental site. A gradual increase in biomass value was observed from January to April and attained a peak during May. 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.


**Fig -3 Monthly variations in standing dead biomass value (g $m^{-2}$) of experimental grassland community during the study period.**

The community exhibited a minimum of 89.21 g $m^{-2}$ of standing dead biomass value in the month of September. The increase in value from January to May and from September to January might be due to gradual transformation of live green to yellow standing dead. The atmospheric temperature, rainfall, soil characteristic, precipitation might not be in favour of formation of standing dead biomass. As a result, a gradual decrease in value was observed from May to September.

Table-3 shows the means standing dead biomass value of different herbaceous communities. The mean standing dead biomass of the present study was found to be less than the value obtained by Golley [1], Kelley **et al.** [2], Jain [6], Pandey [7], Misra & Misra [11], Naik [12], Pradhan [14] and Barik [17] and higher as reported by Choudhury [3], Misra [4], Mall & Billore [5], Trivedi & Misra [8], Rath [9], Malana & Misra [10], Patnaik [13], Behera [15], and Pucheta **et al**.[16]. The topography, geographical distribution, rain fall, atmospheric temperature, physic-chemical characteristic of soil, species composition and biotic interference might be responsible for variation in mean standing dead biomass values of the community.

**Table - 3. 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 |
| Pandey (1978) | Varanasi | *Aristida* | 845 |
| 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 |
| Present study | Rairangpur | *Crysopogon* | 199 |

## IV. CONCLUSION

The standing dead biomass value 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, temperature variability, physico-chemical characteristics of soil, species composition, precipitation, solar insolation, biotic interference etc. might be responsible for variation in standing dead biomass value in the experimental site.

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