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PRODUCTIVITY OF PROTECTED GRASSLAND OF CHAMPA,C.G.

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Abstract - The grasslands of India are an important segment, it contributes to the development of the country environmentally , economically and socially. Unfortunately in our country grassland are very poorly developed and the neglected wasteland that is unfit for crop cultivation. Study was carried out in a protected grassland at Champa (C.G.). Champa has an average elevation of 253m(830feet). It is situated between north 21°39'54" to 22°18'05" and east longitude82°15'55" to 83° 22'17". A harvest method used for sampling of aboveground plant parts. A quadrate 0.25m^{-2} was used for this purpose. The size of quadrate was determined by species area curve method. The sampling was done every month. The below-ground plant parts were estimated by monolith method (25 x 25 x 30cm). The peak value of aboveground productivity (green, dead) was recorded in the month of September 243.17gm-2 and belowground productivity peak value was in the month of February 250.51gm-2. Total annual net live green production 1409.70gm-2/year. The grassland community comprised of 17 species (9 ware grasses and 8 ware non grasses).

Key words : Net primary production, Aboveground, Belowground

Introduction

The grassland also known as rangeland, provide forage and habit to domestic animals and wildlife. Grasslands are one of the most important of terrestrial ecosystems types. In India, grassland areas are frequently overgrazed. The number of animal grazing has been found to be greater than the capacity of the grassland to feed the animals. The lack of plant cover due to overgrazing cause soil erosion. The total dry weight of material present in the ecosystem at any time is considered to as the biomass. The rate of biomass production is called productivity. The biomass and productivity of grassland ecosystem types of world have received much attention (Murphy 1975; Numata 1979; Wielgolaski et al. 1981).

As the grassland is ecologically fragile and sensitive to the climate changes (Qi et al. 2012). Anderson et al. (2006) concluded that the role of grazing in regulating the function and structure of the grassland ecosystem. The influence of grazing on plant and soil mainly effected from the animals trample (Yates, 2000), that do not allow grassland to attain their fullest development. Grazing also associated with the organic content like Nitrogen (N), Phosphorous (P), Potassium (K), and pH values in soil (Yates, 2010). Almost 50% of the worlds terrestrial land base is grazed by domestic livestock (Havstad 2008).

The impact of grassing on the productivity, mineral status has been explained by studying the biomass structure and minerals status of the protected grassland of Champa during 2020-21. Indian grasslands are entirely depending upon the climatologically factors and various biotic

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interferences. Human activities have mainly affects the grassland all over the world and much of the area has been converted in to agricultural land. As a result of excessive human interference it is difficult to locate virgin grassland in our country. The grassland plants mostly consist of a number of annual and perennial grasses mixed with legumes and fob's.

The customary approach in ecologically works is to evaluate production as a parameter of productivity as a functional aspect of the ecosystem has attracted much attention during recent year's and much information is available now on primary production & turnover parameters for grassland of tropical & temperate regions. Tiwari and Singh (1981) highlighted the important contributions of grassland communities' production in India.

Litter decomposition plays an vital role in terrestrial ecosystem for maintaining productivity and to regulates the availability of nutrients needed for plant growth. Basic processes of decomposition in their study namely as biological action withering and leaching are the key factor affecting decomposition (Kar 2013).

Material and Method

Climate condition

Study was carried out in a grassland at Champa (C.G.). Champa has an average elevation of 253m(830feet). It is situated between north 21°39'54" to 22°18'05" and east longitude82°15'55" to 83° 22'17". Champa is a sub-tropical region. The temperature here remains moderate for most of the year apart from the summer from March to June which can be approx 46°C. Champa experiences a hot and semi-humid climate. The soil of the studies site was moderately acidic (pH= 6).

Sample collection and identification

Plant sampling

The study was conducted in protected grassland for above ground biomass in a monthly sampling in a random way. Small fenced area of grassland is protected site. A harvest method used for sampling of plant parts. A quadrate $0.25m^{-2}$ was used for this purpose. The size of quadrate was determined by species area curve method. Clipping of aboveground plant parts within the quadrate were harvested at close to the ground level with the help of scissors. The clipped sample aboveground biomass of each quadrate were collected separately species-wise in polythene bags. The productivity for each category of plant material (live green, standing dead, litter and below ground parts) was calculated by summing up of the positive increments in biomass of respective compartment during the study period. The below-ground plant parts were collected by monolith method (Weaver and Dariand1949) 3 monoliths of 25 x 25 x 30cm, The belowground part sample in the monoliths were carefully washed. The ground litter was collected quadrate wise separately.

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Aboveground net primary productivity was calculated as the sum of increments in the live green and standing dead compartments. litter and below ground parts were calculated by summing up of the positive increments of concerned biomass in gm-2/year. Similarly, calculation of litter disappearance (LD) was done by subtracting the total litter during the year from the difference between final and initial litter biomass (Golley, 1965). Total net primary productivity was calculated by summing the value of aboveground net production and below ground net production of the community.

Table -1 : Biomass (gm-2) of different species during the study period

Month	Live Green			Standing dead	Litter	Aboveground		Belowground	Total
	Grasses	Non grasses	Total			LG+SD	LG+SD+L		
July	40.06	33.05	73.11	29.2	__	102.31	102.31	189.44	291.75
August	69.05	52.14	121.19	30.04	__	151.23	151.23	89.15	240.38
September	96.41	68.20	164.61	78.56	24.65	243.17	267.82	194.58	462.40
October	92.22	63.35	155.57	37.52	39.42	193.09	232.51	201.25	433.76
November	89.06	58.12	147.18	33.36	75.15	180.54	255.69	191.34	447.03
December	79.15	58.22	137.37	64.28	69.12	201.65	270.77	212.25	483.02
January	93.30	62.42	155.72	75.20	73.46	230.92	304.38	200.33	504.71
February	62.14	51.02	113.16	65.06	37.31	178.22	215.53	250.51	466.04
March	37.81	53.10	90.91	68.40	74.05	159.31	233.36	90.74	324.10
April	30.25	30.18	60.43	46.88	72.28	107.31	179.59	75.65	255.24
May	23.09	25.80	48.89	35.08	25.57	83.97	109.54	78.49	188.03
June	34.61	24.51	59.12	49.23	__	108.35	108.35	159.51	267.86
July	45.18	37.26	82.44	28.71	__	111.15	111.15	197.60	308.75
Total	792.33	617.37	1409.70	641.52	491.01	2051.22	2542.23	2130.84	4673.04

Result and Discussion

Table 1shows the monthly variation of various biomass compartments of the community. The green biomass of grasses peak during September 96.41gm-2 and minimum in May 23.09gm-2. The live green non-grass production ware found to be maximum during September 68.20gm-2. and minimum in June 24.51gm-2. The total aboveground standing dead biomass in the study site was minimum July 28.71gm-2 and maximum78.56gm-2 in September. The litter in site increase in September and reached its peak of 75.15gm-2 in November. The below ground biomass values in site between 75.65gm-2 April to 250.51gm-2 February . The aboveground biomass (LG+SD) of increased 83.97gm-2 in May to 243.17gm-2 in September where as it fluctuated throughout the year .

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Result of the study the live green biomass (grasses and non grasses and total live green) of the protected site was found peak during September 164.61gm-2 and minimum May 48.89gm-2. Total aboveground biomass is the sum of total live green biomass and standing dead biomass and litter it was found to be minimum in the month of July 102.31gm-2 and maximum in January304.38gm-2.

The litter biomass of the community did not showed any trend. The value of litter biomass minimum in September 24.65gm-2 and maximum in month of November 75.15gm-2. Litter was totally absent in June, July and August. The total biomass of the community (aboveground , belowground) ranges from 188.03gm-2 in May and maximum 504.71 gm-2 in January. The annual non grass production recorded 617.37gm-2. Total live green grass values recorded within the range of minimum and maximum during May 23.09gm-2 and September96.41gm-2. The annual net live green production 1409.70 was contributed by grasses 52.94%and 47.05% by non grasses. The standing dead production was found to be 641.52gm-2/year.

DISCUSSION

In view of the present findings the annual green grass production of this protected grassland was observed that the present value showed 792.33gm-2/year and annual non grass production was 617.37gm-2/year. The Annual litter production was 491.01gm-2/year. litter production of the community was evident from September to May. No litter production was observed during June, July and August. This may perhaps be due to rapid decomposition of litter. The total annual standing dead production was 641.52gm-2/year. The total annual belowground production was 2130.84gm-2/year. Total annual above ground production (LG+SD) was 2051.22gm-2/year and Total annual above ground production(LG+SD+L) was 2542.23gm-2/year. Total annual net primary productivity (above ground + belowground) of the site 4673.04gm-2/year.

The rain fall was not the only factor responsible for the variation in primary production. There were some other factors such as atmospheric temperature, rate of evaporation, variability and soil condition were not found to be suitable for the growth and development of all species so that decline in green biomass till to the end of the sampling period. These all factors might have been responsible for variation in net primary production of the community.

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