Original Research Article Website : www.ijbasr.org.in ISSN : 2349-1965
Peer Reviewed and Refereed Journal Impact factor 0.9 2015; 2 (2); 178 - 181
International Journal of Basic & Applied Science Research

EFFECT OF CEMENT DUST ON BIOMASS AND PRIMARY PRODUCTIVITY OF GRASSLANDS OF UTTAR PRADESH

Maheshwari Singh Mahesh

P.G Department of Botany,Nalanda College Biharsharif ,Nalanda ,Bihar

ABSTRACT

The study area was confined to the grasslands situated in the vicinity of cement factory, Chunar, Mirzapur District, Uttar Pradesh (24°42' North latitude and 83°5' East longitude) dominated by Heteropogon contortus to assess effect of cement dust on biomass and primary productivity of grasslands. The maximum biomass of above ground parts of Heteropogon contortus was recorded 1959.38g/m² (October) on control and 1117.75g/m² (November) on polluted grasslands. The primary productivity was comparatively higher on control than polluted grasslands.

Keywords: Biomass, Productivity, Cement Dust, Grasslands, Uttar Pradesh

INTRODUCTION:

A Heteropogon contortus is a perennial grass growing in the hilly area of cement factory, Chunnar, Mirzapur District, Uttar Pradesh. Several investigators have studied biomass and primary productivity of several grasslands in india (Singh and Yadava,1974; Singh and Ambasht,1975; Pandey and Sant,1980; Mishra and Mishar,1984; Bisht and Gupta,1985; Sundravalli and Paliwal, 2005;). The Biomass and primary productivity of Heteropogon contortus dominated grasslands around cement factory area of Chunnar, Mirzapur District, Uttar Pradesh have been almost neglected. This research paper deals with effect of cement dust on biomass and primary productivity of control and polluted grasslands of cement factory, Chunnar, Mirzapur district, Uttar Pradesh.

MATERIAL AND METHODS:

The study area was confined in the vicinity of cement factory, Chunar, Mirzapur District Uttar Pradesh (24°42' North latitude and 83°5' East longitude). Dust load was estimated at different distances (1 to 2Km) from cement factory in prevailing Wind direction (SW-NE) by dust collection jar method . The grassland

Corresponding Author : M. S Mahesh

E-mail : drmsmahesh@gmail.com
Date of Acceptance : 12.09.2015
Date of Publication : 30.10.2015

Original Research Article Website : www.ijbasr.org.in ISSN : 2349-1965
Peer Reviewed and Refereed Journal Impact factor 0.9 2015; 2 (2); 178 - 181
International Journal of Basic & Applied Science Research

in the vicinity of cement factory area where dust load was found zero was treated as control grassland. Where the dust load was estimated in between 1-3g/m²/day was considered as polluted grassland.

Estimation of the biomass on control and polluted grasslands was made at monthly interval from June 2004 to June 2005 by harvest method. The clipping of Heteropogon contortus present in the sampling area was done close to the ground surface on control and polluted grasslands. The species was sorted into standing live and standing dead. The plants were put in an oven at 80°C for 48 hours and dry weight was estimated. An average of monthly data of the sampling of standing libel and standing dead was made and standard deviation was calculated. The primary productivity was calculated by the negative differences in biomass values between successive months (Singh and Yadav; 1974).

RESULTS AND DISCUSSION:

The monthly variation in the aboveground standing live biomass of Heteropogon contortus was maximum 1505.22g/m² (October) on control where it was reported maximum 655.10g/m² (November) on polluted grassland (Table-1). The growth of standing live part of Heteropogon contortus on control and polluted grasslands was found to be better in the rainy season .The biomass in the rainy season was due to most favourable climatic conditions. After the rainy season growth of Heteropogon contortus became less on control and polluted grasslands. However, at the end of winter season there was a slight increase in biomass on control and polluted grasslands owing to the vigorous growth of Heteropogon contortus. The maximum standing dead was recorded 996.59g/m² (March) on control and 802.18g/m² (February) on polluted grasslands. The change in biomass of standing dead part of Heteropogon contortus was found to be maximum in summer and minimum in rainy season on control and polluted grasslands due to rapid senescence of the plan and transfer to standing live into standing dead compartment . The total biomass of standing live and standing dead is shown in Table 1.The total production of Heteropogon contortus was 1749.20g/m/ year on control and 1505.54g/m²/year on polluted grasslands. The average daily rate of production was 4.79g/m²/day on control and 4.12g/m²/day on polluted grasslands (Table-2).The Total aboveground production on control grassland was higher as compared to

Original Research Article Website : www.ijbasr.org.in ISSN : 2349-1965
Peer Reviewed and Refereed Journal Impact factor 0.9 2015; 2 (2); 178 - 181
International Journal of Basic & Applied Science Research

polluted grasslands due to deposition of cement dust on aboveground vegetative parts of the plant. Greater biomass accumulation and increase in production on control grassland was due to free from cement dust pollution where the cement dust pollution decreased the net aboveground production on polluted grasslands (Pandey and Singh, 1985; Singh *et al.,* 1999; Sundervalli and Paliwal, 2005).

Table 1: Monthly variation in the mean standing live, standing dead and total above ground biomass (g/m²/±SD) of Heteropogon contortus on control and polluted grassland.

Month	Control Grassland			Polluted Grassland		
	Standing Live	Standing Dead	Total	Standing Live	Standing Dead	Total
June	248.92 ±29.79	319.64 ±44.66	568.56 ±74.45	72.81 ±9.36	99.08 ±15.84	171.89 ±25.20
July	662.78 ±105.92	203.12 ±32.48	865.90 ±138.40	441.46 ±52.92	113.64 ±13.55	555.10 ±66.47
August	1216.08 ±218.88	332.68 ±43.16	1548.76 ±262.04	289.90 ±46.24	41.12 ±6.15	331.02 ±52.39
September	1351.24 ±175.63	399.28 ±59.85	1750.52 ±235.48	519.30 ±88.23	109.81 ±17.44	629.11 ±105.67
October	1505.22 ±255.85	454.16 ±77.18	1959.38 ±333.03	614.21 ±98.24	194.43 ±34.92	808.64 ±133.16
November	1255.41 ±200.80	551.62 ±99.18	1807.03 ±299.98	655.10 ±117.90	462.65 ±60.06	1117.75 ±177.96
December	840.73 ±109.20	615.85 ±98.40	1456.58 ±207.60	199.41 ±25.87	616.05 ±86.24	815.46 ±112.11
January	403.77 ±72.54	850.73 ±102.00	1254.50 ±174.54	246.90 ±31.98	794.89 ±127.04	1041.79 ±159.02
February	508.52 ±81.28	845.18 ±143.65	1353.70 ±224.93	348.88 ±62.64	802.18 ±96.24	1151.06 ±158.88
March	272.40 ±35.36	996.59 ±149.40	1268.99 ±184.76	63.23 ±7.56	786.15 ±94.32	849.38 ±101.88
April	151.21 ±18.12	858.85 ±154.44	1010.06 ±172.56	30.94 ±4.80	713.58 ±128.34	744.52 ±133.14
May	44.06 ±7.92	955.48 ±124.15	999.54 ±132.07	22.72 ±3.96	648.36 ±97.20	671.08 ±101.16
June	207.17 ±27.04	901.38 ±153.17	1109.55 ±180.21	65.49 ±8.45	598.58 ±95.68	664.07 ±104.13

Original Research Article Website : www.ijbasr.org.in ISSN : 2349-1965
Peer Reviewed and Refereed Journal Impact factor 0.9 2015; 2 (2); 178 - 181
International Journal of Basic & Applied Science Research

Table 2: Mean standing live and standing dead production (g/m²/day) of Heteropogon contortus on control and polluted grassland.

Month	Control Grassland		Polluted Grassland	
	Standing Live	Standing Dead	Standing Live	Standing Dead
June	-	-	-	-
July	13.35	-3.76	11.89	0.47
August	17.85	4.18	-4.89	-2.34
September	4.51	2.22	7.65	2.29
October	4.97	1.77	3.06	2.73
November	-8.33	3.25	1.36	8.94
December	-13.38	2.07	-14.70	4.95
January	-13.22	7.58	1.53	5.77
February	2.68	-0.19	3.52	0.25
March	-7.62	4.88	-9.21	-0.52
April	-3.84	-4.59	-1.08	2.42
May	-3.65	3.12	-0.27	-2.10
June	5.47	-1.80	1.43	-1.66

ACKNOWLEDGEMENT:

Author is thankful to the Principal, Nalanda Collage, Biharsharif, Nalanda, Bihar for providing library and laboratory facilities.

REFERENCES:

1. Bisht N.S. and Gupta, K. Dry matter dynamics in a grassland community at foot hills of Garhwal Himalayas. Ind. J. Ecol.1985; 12: 200-204.
2. Mishra M.K and B.N. Biomass and primary production of Indian grassland. Trop.Ecol.1984; 25:239-247.
3. Pandey D. D and Sant, H.R. The plant biomass and net primary production of the protected and grazed grasslands of Varanasi. Ind. J. Ecol,1980; 7: 77-83.
4. Pandey D. D and Singh S. N. Biomass primary productivity and nutritive value of aristida cyanantha on protected and grazing land. J. Ecoli,1995; 7:103-107.
5. Singh J.S. and Ydava P. S. Seasonal variation in composition, plant biomass and net primary production of tropical grassland at kurukshetra, India Ecol. Monoger, 1974; 44: 351-375.
6. Singh U.N and Ambasht, R.S. Biotic stress and Variability in structure and organic (net primary) production of grassland community at Varansi, India. Trop. Ecol. 1975; 16: 86-95.
7. Sundervalli V.M and paliwal , K. Primary production and nutrient dynamics of grazing land in the semiarid region of Madurai. Range Mgmt. & Agroforestry 2005; 26(2B) 371-372.