Plant Height At Successive Crop Growth Stages Of Maize Varieties (H 405 and Chandan – 3) in NPE and PE

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Abstract - Crop Production depends upon the number of factors that causes direct or indirect harm to natural resources; industrial waste cause hazardous to the environment.

Keywords - Water Pollution, Non-Polluted Environment(NPE), Polluted Environment (PE)

I. INTRODUCTION

Industries exert demand on environmental resources causing migrant labor and other problems to resources. Industrial Pollution comes from many sources harmful to soil and microflora.

In the agriculture context, the use of effluent sewage for irrigation of cropland is a major concern since it may cause possible harmful effects on micro soil flora and soil fertility. Paliwal and Yadav have given their extensive work over the field of effluent irrigation.

Among cereals, Maize(*Zea Mays*) is one of the important crops of the world. This crop species is most efficient in the utilization of solar energy by virtue of having a C_4 carbon cycle. India stands only next to the USA, Brazil, China, and Mexico in terms of average but placed eleventh in production.

In M.P., Maize is grown in 8.89 thousand hectares with a total production of 125 thousand tonnes with a mean average yield of 1.14 tons per hectare. It is very sensitive to the environment, also known as an" Indicator for nutrient deficiency".

Oswald observed that industrial waste after the treatment could be used for irrigation purposes. Harmen(1968)

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suggested that industrial waste returning to land had a new role in agriculture.

II. MATERIAL METHODS

To understand a research study accurately and the material used in a study, and detailed description of the method used is most essential.

A. Experimental area

The experimental area is situated south of the shivana river. The raja ram factory is situated upstream on the north side of the river shivana. The industrial wastewater of the starch factory is pumped across the shivana river to the south bank of the shivana river to the ody farm of the factory. The area of ody farm had been selected for studies as a polluted environment.

To the south of the shivana river, about 1.5 km away, situated a badhari research farm. This area had also been purposely selected for irrigation by tubewell or well as a non-polluted environment.

Both sites had medium black soil. The soil was deep and free from water logging conditions.

B. Study of crop growth in polluted and non-polluted environments

A field experiment was conducted during 1989-90, 1990-1991,1991-1992 at ody farm and corresponding set a badhari research farm. Two varieties of maize were sown with uniform conditions in two sites, the differential behavior of crop responses growth parameters are evacuated in these two environments

C. Experimental details	
a) PlotSize:	$2.4*6m^2$
b) Spacing between two plots	50 cm
c)Spacing between rows	30 cm
d)No. of rows	8
e) Varieties	Maze
f) Symbols used	V ₁ - H-405
	V_2 - Chandan -3
g) Field operation	The experimental field at both sites were prepared with



the help of bullock drawn equipment

h) Seed treatment thirum 3gm per kg	The seed of maize varieties are treated with fungicide
i)Observation	Ten random plants were tagged for observation in each

In the plot, only tagged plants were harvested for recording yield parameters.

III. OBSERVATION RECORDED

Observations were recorded on the randomly selected plant. Mean of these was computed and used for further statistical analysis. Plant height was recorded from ground level to apical leaves, starting from 30 days up to harvest to obtain an idea of the extent of plant growth

IV. RESULT AND DISCUSSION

The results obtained during the course of the investigation depend upon the economic yield of a crop plant depend upon the number of complex characteristics and are influenced by the interaction between the morphological, physiological, and environmental conditions of the plants. The responses of characteristics as influenced by effluents irrigation with advancement in age with comparatively at a faster rate in early growth period as compared to later growth period. Maize variety Chandan-3 recorded inferior in experiment no1. In the experiment, no 1 plant height was observed high in the non-polluted environment as compared to polluted environment

Table 1.1: Characteristics and nature of Industrial Wastewater(effluent) M/S Rajaram Brothers, Mandsaur

S.No	Particulars	1989	1990	1991
1.	Raw water flow (m^3/d) (Average)	120	65	65
2.	Treated waste water	100	55	55
	flow(m ³ /d)(Average)			
3.	Color/Odor	Dirty white	Dirty alcoholic	Dirty alcoholic
4.	Ph	4.2	4.0	4.5
5.	Temperature(^o C)	28°	29°	31°
6.	B.O.D(mg/l)	1095 mg/l	1542 mg/l	1456 mg/l
7.	C.O.D	2310 mg/l	2605 mg/l	2127 mg/l
8.	Suspended solids	8325mg/l	8718 mg/l	9968mg/l
9.	Chloride concen.			
10.	Toxic element			

Note: Data obtained M.P. Pradushan Niweran Mandal . Discharge monitoring report

Table 1.2: Plant height at harvest of Maize varieties in polluted and non-polluted environments (cm)

Treatment	V_1	V_2	Mean
NPE	227.05	242.93	234.99
PE	221.40	243.75	232.57
MEAN	224.20	243.34	
	<u>V</u>	E	<u>V X E</u>
SE+-	2.44	3.25	4.88
CD (P=0.05)	7.03	9.37	14.06

Table 1.2 shows Maize Variety V_2 had significantly lower height in comparison to V_1

Treatment	30 days	45 days	60 days	Harvest
NPE V ₁	70.57	119.97	170.65	227.05
V ₂	38.96	116.60	174.02	242.93
Mean	54.77	118.29	172.34	234.99
PE V ₁	65.19	78.42	167.47	221.40
V2	38.06	100.19	171.60	243.75
Mean	51.63	89.31	169.54	232.58

Table 1.3: Plant Height at successive crop growth stages of maize in polluted and non-polluted environments

Table 1.4: Crop growth rate of different varieties of maize NPE and PE.

Treatment		30-45	45-60	60-Harvest
NPE	V ₁	0.0022	0.00072	0.00025
	V_2	0.0025	0.00067	0.00023
	Mean	0.0034	0.0010	0.0003
PE	V ₁	0.0011	0.00087	0.00050
	V2	0.0010	0.00092	0.00047
	Mean	0.0016	0.0013	0.0007

Table 1.4 shows Plant height increased with the advancement in age at a steady rate in maize. V_2 recorded the lowest plant height in all growth stages

V. CONCLUSIONS

Plant height increased at a faster rate in early growth stages and slowed down in later growth stages. Better plant height was observed in NPE as compared to PE in maize. The concentration of effluent adversely affects the plant height in maize varieties.

The effluent was highly acidic, with a PH ranging from 4.0 to 4.5 with high BOD and COD. Effect of different concentrations of effluent as well as varietal responses found evident for growth characteristics.

To summarize the result of the investigation, it is concluded that there was no practically no significant difference observed except plant height and relative growth rate. Maize variety H-405 was found to be the best suitable variety; therefore, in future studies, it may be conducted on a group of crops.

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