

Comparative Analysis of Growth Parameter Plant Height of Zea Mays and Glycine Max in Polluted and Non- Polluted Environment

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Abstract

The aspect of pollution from industry is one of the greatest challenges of environment health problem .In agriculture context the use of effluent for irrigation of crop land is a major concern since it may cause possible harmful effect on soil fertility .Maize (Zea mays) is one of the important crop of the world .It is rich source of cellulose and starch. This crop is also called as indicator for nutrients deficiency. Soybean is oil seed crop of India , plays important role in oil economy .It is a cheap source of protein and oil.

Key words

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

I. INTRODUCTION

Industrial Development is essential for providing basic human needs ,food shelter and health for human beings .Technologically and economically in advanced countries the biological effect of various forms of physical and chemical pollution of the environment is apparent. The effect on health due to the environmental factors are relatively well known in occupational exposure or accidental contamination , the aspects of pollution from industry is one of the greatest challenge of environmental health problem. Water is a exlizer of life ,as a direct result of industrial activities, number of pollutant which are highly toxic entered into natural water system , the water pollution will be limiting factors in days to come to mankind (1969), the studies of water pollution are initially provided by hynes(1960), hawkes (1963)and warren (1971) .Water pollution can be of four major types seth(1976).several workers like davidson and clymer(1966) , parker(1968),willisetal(1975),trivedi(1979) have made significant studies on consumption and conservation of oxygen and effect of industrial waste on river .

II. MATERIAL METHOD

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

In agriculture context the use of effluent sewage for irrigation of crop land is a major concern since it may cause possible harmful effect on soil micro flora and soil fertility paliwal and yadav have given their extensive work over the field off effluent irrigation.

Maize(*Zea Mays*) is one of the important crop of the world .This crop species is most efficient in utilization of solar energy by virtue of having C₄ carbon cycle Among pulses, Soybean is important oil seed crop of India and play important role in economy .It is a cheap source of protein and oil. It is miracle crop or kalptara .Madhya Pradesh ranking first in area and production. M.P. alone contribute 80.4% of area and 78% of total production.

Oswald observed that industrial waste after the treatment can be used for irrigation purposes . harmen(1968) suggested that industrial waste returning to land had new role in agriculture

A) Experimental area

Te experimental area is situated south of shivana river . The raja ram factory is situated up stream on north side of river shivana .The industrial waste water of starch factory is pumped across shivana river to south bank of shivana river to ody farm of

factory .The area of ody farm had been selected for studies as polluted environment.

To south of shivana river about 1.5 km away situated badhari research farm. This area had also been purposely selected for irrigated by tubewell or well as a non polluted environment . Both sites had medium black soil .the soil deep and free from water logging condition

III. EXPERIMENTAL DETAILS

a) *Varieties Maize H-405*

Chandan-3, Soybean
JS72-44, Soybean JS75-46

b) *Symbols used*

V₁ - Maize H-405
V₂ - Maize Chandan-3
V₃ - Soybean JS72-44
V₄ - Soybean JS75-46

c) *Characteristics of varieties Maize H-405*

The variety is medium in maturity .This variety is adopted and suitable for cultivation, matures in 80-82 days. The average yield is 35 kg/ha Maize Chandan-3 The variety is medium in maturity .The variety is adopted and suitable for kharif but can grown in rabi season .The variety is suitable for cultivation Observation were recorded on randomly selected plant .Mean of these was computed and used for further statistical analysis. Plant height was

The results obtained during the course of investigation depend upon economic yield of a crop plant depend upon number of complex characteristics and influenced by interaction between morphological , physiological and environmental condition 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 experiment no 1 plant height was

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

Soybean JS72-44 This variety is widely adopted and suitable for different agro-climatic zones of Madhya Pradesh . It matures in 100-105 days after sowing .Average yield is 24-26 q/ha Soybean JS75-46 It is semi determinate erect type variety. This variety is widely adopted and suitable for different agro- climatic zones of Madhya Pradesh . It matures in 100-105 days after sowing .Average yield is 24-26 q/ha

d) *Field operation*

The experimental field at both sites were prepared with the help of bullock drawn equipment

E) *Seed treatment*

The seed of maize varieties are treated with fungicide thirum 3gm per kg

IV. OBSERVATION RECORDED

recorded from ground level to apical leaves , start from 30 days up to harvest to obtain idea of extent of plant growth

V. RESULT AND DISCUSSION

observed high in non polluted environment as compared to polluted environment

Soybean variety JS72-44 recorded better height in experiment no1.,responses of varieties of soybean was affected by effluent irrigation. it affects on height , dry weight , fresh weight. In experiment no 1 plant height was observed high in non polluted environment as compared to polluted environment .plant height of soybean depend basically on genetically makeup and climatic condition(Laurete 1979)

Table 1.1: Characteristics and nature of Industrial Waste water (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 flow(m ³ /d)(Average)	100	55	55
3.	Color/Odor	Dirty white	Dirty alcoholic	Dirty alcoholic
4.	Ph	4.2	4.0	4.5
5.	Temperature(°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 concn.	-----	-----	-----
10.	Toxic element	-----	-----	-----

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

Table 1.2: Plant height at 30days crop growth stage of Maize varieties in polluted and non-polluted environments

(cm)

Treatment	V ₁	V ₂	Mean
NPE	70.57	38.96	54.76
PE	65.19	38.06	51.62
MEAN	67.88	38.51	
	<u>V</u>	<u>E</u>	<u>V X E</u>
SE+-	3.70	4.93	7.47
CD (P=0.05)	10.66	14.21	21.31

Table 1.3: Plant height at 30days crop growth stage of Soybean varieties in polluted and non-polluted environments

(cm)

Treatment	V ₃	V ₄	Mean
NPE	29.96	30.92	30.42
PE	25.41	25.90	25.65
MEAN	30.42	28.41	
	<u>V</u>	<u>E</u>	<u>V X E</u>
SE+-	0.60	0.80	1.20
CD (P=0.05)	1.73	2.30	3.46

Table 1.3 , shows Soybean variety significantly better height was recorded by V₃ as compared to V₄ in NPE

Table 1.4 :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>	<u>E</u>	<u>V X E</u>
SE+-	2.44	3.25	4.88
CD (P=0.05)	7.03	9.37	14.06

Table 1.4, shows Maize Variety V₂ had significantly lower height in comparison to V₁

Table 1.5 :Plant height at harvest of Soybean varieties in polluted and non-polluted environments in cm

Treatment	V ₃	V ₄	Mean
NPE	105.6	114.92	110.26
PE	102.27	113.15	107.71
MEAN	103.93	114.03	
	<u>V</u>	<u>E</u>	<u>V X E</u>
SE+-	1.30	1.74	2.61
CD (P=0.05)	3.76	5.01	7.52

Table 1.5, shows Soybean variety V₃ recorded better plant height in NPE

Table 1.6: Plant Height at successive crop growth stages of maize in polluted and non-polluted

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
V ₂	38.06	100.19	171.60	243.75
Mean	51.63	89.31	169.54	232.58

Table 1.6, shows Plant height increased with advancement in age at a steady rate in maize. V₂ recorded lowest plant height in all growth stages

Table 1.6: Plant Height at successive crop growth stages of maize in polluted and non-polluted environment

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
V ₂	38.06	100.19	171.60	243.75
Mean	51.63	89.31	169.54	232.58

Table 1.6, shows Plant height increased with advancement in age at a steady rate in maize. V₂ recorded lowest plant height in all growth stages

Table 1.7: Plant Height at successive crop growth stages of Soybean in polluted and non-polluted environment

Treatment	30 days	45 days	60 days	Harvest
NPE V ₃	29.92	67.17	75.27	105.60
V ₄	30.92	61.42	76.90	114.92
Mean	30.42	64.30	76.85	110.26
PE V ₃	25.41	63.75	73.70	102.27
V ₄	25.90	59.09	74.55	113.15
Mean	25.66	61.42	74.13	107.71

Table 1.7 , shows Plant height increased with advancement in age at a steady rate in Soybean. V₄ recorded lowest plant height in all growth stages.

VI. CONCLUSIONS

Effluent was highly acidic with pH ranging from 4.0 to 4.5 with high BOD and COD .Effect of different concentration of effluent as well as varietal responses found evident for growth characteristics .

Plant height increased as 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 affect the plant height in maize varieties .

To summarize the result of 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 group of crops .Soybean variety JS72-44 was found to be the best suitable variety , therefore in future studies it may be conducted on group of crops.

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