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# Comparison of yield and yield parameter and plant height in *Glycine max (L)* (JS72-44 and JS75-46) in polluted and non-polluted environment

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**ABSTRACT**

India is a land of agriculture, the production of crop depend upon use of agro-technique for crop production, yield is a cumulative characteristic of a crop. The factors which govern the production of crop are quality of seed, fertilizers, irrigation and soil fertility. Soybean oil crop of India, plays in agriculture seed. 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. 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, plant height yield, yield parameter polluted and non-polluted environment.

## INTRODUCTION

The basic problem of Indian agriculture is low productivity .To increase the productivity modern techniques should be used. 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. Parker (1968), willisetal (1975),trivedi (1979) have made significant studies on consumption and conservation of oxygen and effect of industrial waste on river.

## MATERIAL METHODS

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

**1. Experimental area :**

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

**2. 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 behaviour of crop responses growth parameters are evacuated in these two environments.

**3. Experimental details**

a) Plot Size: $2.4*6m^2$
b) Spacing between two plots 50 cm
c) Spacing between rows 30 cm
d) No. of rows 8
e) Varieties Soybean : JS72-44, Soybean JS75-46
f) Symbols used : $V_3$ - JS72-44, $V_4$ - JS75-46

g) Field operation: The experimental field at both sites were prepared with the help of bullock drawn equipment.
h) Seed treatment: The seed of maize varieties are treated with fungicide thirum 3gm per kg.
i) Observation: Ten random plants were tagged for observation in each plot, only tagged plant were harvested for recording yield parameter.
j) Characteristics

***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.

**RESULTS & DISCUSSION**

Observation were recorded on randomly selected plant .Mean of these was computed and used for further statistical analysis. Plant height was recorded from ground level to apical leaves, start from30 days up to harvest to obtain idea of extent of plant growth.

**Table 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($^0$C) | $28^o$ | $29^o$ | $31^o$ |
| 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 2: Yield and Yield components of different varieties of Soybean in NPE and PE**

| Treatment | | Seed yield (gm./plant) | No. of pods/plant | No. of grains/pod | 100 seed weight (gm.) |
|---|---|---|---|---|---|
| NPE | $V_3$ | 4.51 | 27.85 | 1.55 | 10.36 |
| | $V_4$ | 7.17 | 35.32 | 1.88 | 10.95 |
| MEAN | | 5.84 | 31.59 | 1.72 | 10.66 |
| PE | $V_3$ | 3.94 | 26.65 | 1.44 | 10.18 |
| | $V_4$ | 6.26 | 33.96 | 1.69 | 10.52 |
| MEAN | | 5.10 | 30.30 | 1.57 | 10.35 |

**Table 3: Plant height at 45 days crop growth stage of Soybean varieties in polluted and non-polluted environments** (cm)

| Treatment | $V_3$ | $V_4$ | Mean |
|---|---|---|---|
| NPE | 67.17 | 61.42 | 64.29 |
| PE | 63.75 | 59.09 | 61.42 |
| MEAN | 65.46 | 60.25 | |
| | V | E | V X E |
| SE+- | 0.74 | 0.99 | 1.49 |
| CD(P=0.05) | 2.14 | 2.86 | 4.29 |

**Table 4: 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 | |
| | V | E | V X E |
| SE+- | 0.60 | 0.80 | 1.20 |
| CD(P=0.05) | 1.73 | 2.30 | 3.46 |

**Table 5: Plant height at harvest of Soybean varieties in polluted and non-polluted environments** (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 | |
| | V | E | V X E |
| SE+- | 1.30 | 1.74 | 2.61 |
| CD(P=0.05) | 3.76 | 5.01 | 7.52 |

**Table 6: Plant Height at successive crop growth stages of Soybean in polluted and non-polluted enivornment**

| 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 |

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. Significantly better seed yield was recorded in NPE as compared to PE. $V_4$ recorded better yield plants. No. of pods/plant significantly better in $V_4$ as compared to $V_3$.. No significant difference was recorded in No. of grains/pod.

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 plant .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. Soybean variety JS72-44 recorded better height

in experiment no. 1. responses of varieties of soybean was affected by effluent irrigation. It effects on height, dry weight and 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)in 1979.

## CONCLUSION

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 .Yield is a complex characteristic governed by external and internal factors. In the experiment the varietal responses was significantly marked by effluent. Soybean variety JS72-44, JS75-46 practically same yielding variety .No significant differences could be observed.

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

**Conflicts of interest:** The authors stated that no conflicts of interest.

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