Effect of Ggrowth ~~r~~Regulators on ~~g~~Growth and ~~y~~Yield ~~a~~Attributes of ~~b~~Black Ggram (~~v~~*Vigna mungo L.*)

ABSTRACT

The field experiment was conducted during Zaid season of 2022 at the Crop Research Farm, Department of Agronomy, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.) India. To study the Influence of Growth Regulators ~~on~~ on the growth and yield of Black gram. The treatments consist of levels of Gibberellic Acid (GA_3 – 15 ppm, GA_3 – 30 ppm, GA_3 – 45 ppm) and Salicylic acid (SA – 50 ppm, SA – 75 ppm, SA – 100 ppm). The soil of experimental plot was sandy loamy in texture, nearly neutral in soil reaction (pH 7.8), low in organic carbon (0.35%). Results revealed that application of GA3 45 ppm + 50 ppm Salicylic acid (Treatment – 10). recorded with plant height (40.08 cm), plant dry weight (7.13 g/plant), number of pods/plant (36.27), number of seeds/pod (7.12), test weight (35.29 gm), 29.3 seed yield (957.86 kg/ha) were also recorded in treatment - 10 GA_3 45 ppm + 100 ppm Salicylic acid at 15 & 40 DAS.

ADD CONCLUSION

Keywords: *Black Gg~~g~~ram*, Gibberellic Acid, *Gg~~g~~rowth ~~p~~Parameters*, Salicylic A~~a~~cid, ~~y~~*Yield* ~~a~~*Attributes* and *Economics.*

INTRODUCTION

Black gram belongs to family Leguminosae. Black gram (Vigna mungo L.) is the important pulse crop of India cultivated over a wide range of agro-climatic zones of the country. This crop is grown in Kharif and Rabi seasons, however, maximum area is under Kharif cultivation where intercropping with sorghum, pearl millet, maize, cotton, castor, pigeon pea is very popular. Out of the major pulse crops in India, Black gram occupies important place. Black gram is a perfect combination of all nutrients which include 20 to 25% proteins, 40 to 47% starch, ash fats, carbohydrates and essential vitamins. All India area, production and productivity of Black gram was 3.11 m ha, 1.90 m tones and 611 kg/ha, respectively, during 2012-13 **(Anonymous et al. 2014).**

The gibberellins are a large family of tetracyclic diterpenoid plant growth substances. The 0function of GA_3 as a hormone in regulating plant growth was known as early as the 1950s (Solanki Mittal et al., 2018). Salicylic acid is ortho-hydroxybenzoic acid and is a secondary metabolite acting as analogous of growth regulating substances. significant in raising the productivity of the crop **(Reham Dawar *et al.*, 2020).**

Salicylic acid commonly called "Aspirin" in acetylated form. Salicylic acid is involved in signaling. Salicylic acid belongs to an extraordinary diverse group of plant phenolic defined as ~~substance that possess~~substance that possesses an aeromatic ring bearing hydroxyl group. Thus, the green house experiment was conducted to investigate the effect of exogenous application stress on antioxidative enzymatic of salicylic acid (SA) under salt activities in black gram. The grain yield of black gram crop has mostly increased due to cumulative effect of yield attributing characters, enhanced photosynthetic efficiency and improvement in the capacity of the reproductive and sinks to utilize the incoming assimilates due to the foliar application of GA_3.

MATERIALS AND METHODS

A field experiment was conducted during z*aid* ~~2022 at~~2022 at the Crop Research Farm, Department of Agronomy, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences~~SHUATS~~, Prayagraj (U.P.) India. The soil of experimental plot was sandy loamy in texture, nearly neutral in soil reaction (pH 7.2), low in organic carbon (0.72%), The treatments consist of Control, GA_3 15 ppm + 50 ppm salicylic acid at 15 & 40 DAS, GA_3 15 ppm + 75 ppm salicylic acid at 15 & 40 DAS, GA_3 15 ppm + 100 ppm salicylic acid at 15 & 40 DAS, GA_3 30 ppm + 50 ppm salicylic acid at 15 & 40 DAS, GA_3 30 ppm + 75 ppm salicylic acid at 15 & 40 DAS, GA_3 30 ppm + 100 ppm salicylic acid at 15 & 40 DAS, GA_3 45 ppm + 50 ppm salicylic acid at 15 & 40 DAS, GA_3 45 ppm + 75 ppm salicylic acid at 15 & 40 DAS, GA_3 45 ppm + 100 ppm salicylic acid at 15 & 40 DAS. The experiment was laid out in Randomized Block Design, with 10 treatments replicated thrice. The collected data was subjected to statistical analysis by analysis of variance method **(Gomez and Gomez, 1976).**

RESULT AND DISCUSSION

PRE AND POST-HARVEST PARAMETERS

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Plant height - At 60 DAS, the significantly higher plant height of (40.08 cm) [Table.1] was recorded with treatment-10 (GA_3 45 ppm + 100 ppm salicylic acid at 15 & 40 DAS). However, treatment-9 GA_3 45 ppm + 75 ppm salicylic acid at 15 & 40 DAS (39.34cm) was found to be statistically at par with treatment-9 (GA_3 45 ppm + 100 ppm salicylic acid at 15 & 40 DAS). The plant height of Black ~~g~~Gram increased significantly due to with At Harvest, Foliar application of GA3 significantly influenced the black gram plant height (cm), number of pods/cluster, length of pod (cm), number of seedspod, number of pods/plant and grain yield/ plant (g). Two applications of 30 ppm GA_3 at flower and pod initiation stages (T10) recorded significantly higher number of pods/cluster, length of pod (cm), and grain yield/ plant. Similar results were reported by **Rehem Dawar *et al.* (2020) and Kodhati Vishnu *et al.* (2020).**

Number of pods/plant – The significant and higher number of Pods/plant (36.27) were observed in treatment-10 with (GA_3 45 ppm + 100 ppm Salicylic acid), which was significantly superior over rest of the treatments. However, treatment-8 (GA_3 45 ppm + 50 ppm Salicylic acid), was found to be statistically at par with treatment-9(GA_3 45 ppm + 75 ppm Salicylic acid). A significant increase in number of pods per plant as a consequence of seed inoculation with growth regulators in the present investigation is attributed to an improvement innutrition status of the soil and creation of congenial environment for better root growth through secretion of growth promoting substances such as Gibberellin, cytokinin and auxin and availability **(Singh and Totawat, 2002).**

Number of seeds/pod - The significant and higher number of Seeds/pod (7.12) were observed in treatment-10 with (GA_3 45 ppm + 100 ppm Salicylic acid), which was significantly superior over rest of the treatments. However, treatment-8 (GA_3 45 ppm + 50 ppm Salicylic acid), was found to be statistically at par with treatment-9 (GA_3 45 ppm + 100 ppm Salicylic acid). Combined application of growth regulators has increased the number of seeds per pod insignificantly in this field experiment. The increment in number of seeds per pods might be due to the presence of magnesium in multi-nutrients solution as seeds number are directindex of pollen viability and where magnesium is proved to increase fruit set and pollen viability and significant effect on pollen formation as reported by **Solanki mittal *et al*., (2018).**

Seed yield - The significant and higher Seeds yield (957.86 kg/ha) were observed in treatment-10 with (GA3 45 ppm + 100 ppm Salicylic acid), which was significantly superior rover rest of the treatments. However, treatment-8 (GA3 45 ppm + 100 ppm Salicylic acid), was found to be statistically at par with treatment-9 (GA3 45 ppm + 100 ppm Salicylic acid). Maximum seed yield (q) per hectare was recorded in T4 (SA 150 ppm). While, minimum seed yield (q) per hectare was recorded with treatment T7 (GA3 150 ppm) over the control. These results were strongly supported by noted that the effect of salicylic acid in mung bean recorded higher seed yield. reported the effect of salicylic acid on chickpea increased the seed yield. reported that all the yield and yield components was increase in pea plant treated with salicylic acid improve the physiological efficiency of crop and result in better growth and yield of black gram cv. NDU-1. The present findings indicate possibility of use of PGRs in enhancing productivity of urd bean by improving parameters responsible for yield **Manjari *et al*. (2018).**

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CONCLUSION - It was concluded that with the application of GA_3 45 ppm along with 50 ppm Salicylic acid at 15 & 40 DAS [Treatment-10, has performs positively and improves growth and yield parameters. Maximum seed yield, gross returns, net return and benefit cost ratio were also recorded with the application of GA_3 45 ppm along with 100 Salicylic acid at 15 & 40 ~~DAS~~[DAS [Treatment-10]. These findings are based on one season therefore, further trials may be require for further conformation

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Table 1. Influence of Pphosphorus and fFoliar aApplication of zZinc on Growth and Yyield Aattributes of Black

Treatments	Plant Hheight (cm)	Plant Dry Wweight (g/plant)	Pods/Pplant	Sseeds/pPod	Ttest wWeight (g/)	Seed Yyield (kg/ha)

gGram.

Control	35.05	5.43	26.28	3.72	29.87	627.50
T_2	35.28	5.57	32.15	4.46	31.11	631.65
T_3	36.28	5.73	33.19	4.91	32.18	670.77
T_4	36.75	6.11	33.63	5.03	32.68	743.68
T_5	37.12	6.13	34.06	5.27	32.97	754.60
T_6	36.62	6.35	34.29	5.89	33.21	758.11
T_7	37.83	6.38	34.54	6.19	33.54	784.53
T_8	37.87	6.41	35.12	6.39	33.84	791.74
T_9	39.34	6.53	35.73	6.83	34.47	932.33
T_{10}	40.08	7.13	36.27	7.12	35.29	957.86
F test	**S**	**S**	**S**	**S**	**S**	**S**
S Em. (±)	0.49	0.23	1.06	0.21	0.38	12.04
CD (P=0.05)	1.47	0.69	3.15	0.62	0.96	35.78