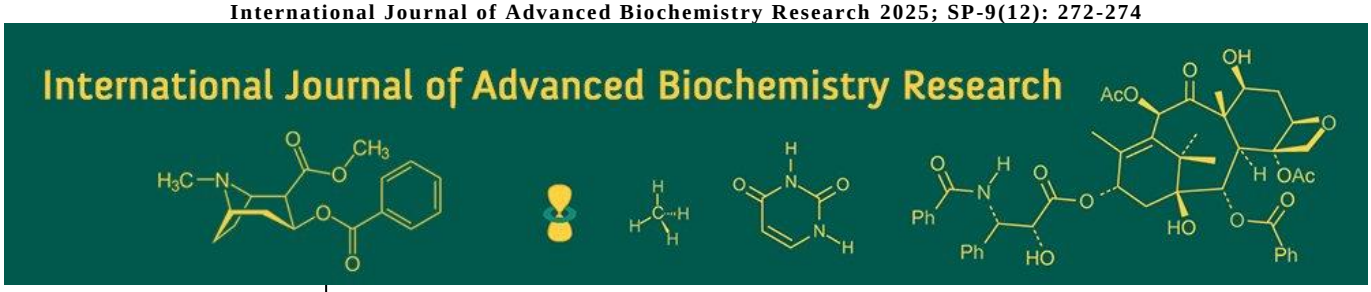

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Response of growth regulators and nutrients on growth and yield parameters of black gram (*Vigna mungo* L.) Hepper, CV. VBN 11 growth regulators in mung bean

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Abstract
The present study was documented to determine about growth regulators and nutrient response on the black gram growth and yield parameters. The treatments include Gibberellic acid, salicylic acid, manganese sulphate, zinc sulphate, magnesium sulphate and Calcium chloride. The results revealed that the seeds fortified with gibberellic acid recorded higher growth & quality parameters like germination percentage (96), speed of germination (29.65), seedling length (39.41), dry matter production (g) (0.48), vigour index I (3783.36), vigour index II (46.08), field emergence (94.00), days to 50% flowering (30.59) and yield parameters viz., no. of plants/plant (6.06), no. of nodules/plant (11.84), pod length (8.84), number of pods per plant (35.28), number of seeds per pod (7.28), Seed yield/pt (6.22), 100 seed weight (6.83) significantly higher when compared to control.

Keywords: Black gram, calcium chloride, growth regulators, nutrients, pulses

Introduction
Black gram (*Vigna mungo* L.) is cultivated in southern Asia. It belongs to Fabaceae family. Pulses are the most important source of nutritional security to mitigate malnutrition in under developed and under developing countries. Pulses are the good sources some of the vitamins viz., vit A, vit B1 and B3 and nutrients like Ca, Na, Fe and amino acids such as thiamine, riboflavin, and niacin. The seeds of Mung bean are excellent nutritious. It is used as fodder for cattle & green manure for improving soil fertility. It is a N-fixing legume that improves soil physical properties. Black gram accounts for 40% of total traded legume seeds. Considering the importance of black gram the crop needs to be improved quantitively and qualitatively. To meet the protein requirement the pulse production has to be increased by three folds. The low yield of pulse crops is due to the improper obtainable of short duration and improved good vigour seeds. Therefore, the production constraints have to be minimized for successful establishment of crop. Rapid emergence and germination are the important factors for the better crop growth. Among various practices PGRs are considered very important to enhance yield. They are the one chemicals that helps in providing optimum vegetative growth and also yield by the regulation of plant growth and also architecture. through the improved source partitioning in plant reproductive organs. They are magic chemicals that increase crop yield. Plant growth regulators stimulate the regulatory mechanism during critical growth periods from the period of seed germination to the end stage i.e., senescence in almost all the crops (Manonmani, V. and Srimathi, P. 2009) [3]. In mung bean, nutrients perform a vital role in calculating the yield potential The nutrients play a significant role in determining the yield potential in pulses. The nutrients are known to increase the physiological parameters Viz., promotion of photosynthesis, uptake of nutrients, N metabolism, flowering, source-sink relationship and improved seed quality. By keeping in view, this experiment was performed to find the studies on Response of growth regulators and nutrients on growth and yield parameters of black gram VBN 11, Department of Genetics & Plant breeding, Faculty of Agriculture, Annamalai university during 2024.

Materials and Methods

The pure seeds of black gram cv. VBN 11, the base material that was brought from National pulses research station located at Vamban. Growth regulators Viz., gibberellic acid, salicylic acid and nutrients Viz., manganese sulphate, zinc sulphate, magnesium sulphate and calcium chloride were prepared according to the treatments. Chemicals were taken and laboratory work was done in Department of Genetics & plant breeding, Faculty of Agriculture, Annamalai university. The treatment solutions were prepared by mixing the chemicals at appropriate concentration in 100 ml in water. 6% chemical solution was used for the preparation of treatments. This experiment was analysed using randomized complete block design (RBD) with the three replications and the seeds were sown with 30X10 cm spacing and the crop was well brought up with recommended parameters of practices. The random sampling method was adopted to record the observation for various characters of black gram.

T_0: Control (without treatment)
T_1: Manganese sulphate ($MnSO_4$)
T_2: Zinc sulphate ($ZnSO_4$)
T_3: Salicylic acid
T_4: Gibberellic acid (GA_3)
T_5: Magnesium sulphate ($MgSO_4$)
T_6: Calcium chloride ($CaCl_2$)

Results and Discussion

In this experiment it was identified that the mung bean seeds were fortified using gibberellic acid 6% recorded higher seed germination (96 %), speed of germination (29.65), seedling length (39.41), dry matter production (g) (0.48), vigour index I (3783.36), vigour index II (46.08), field emergence (94.00) and days to 50 % flowering (30.59) against control (Table 1). Because of enlarged embryos, highest metabolic activity rate, highest respiration, well utilization and movement to growing plant parts and higher enzymatic activity there is such increase in the growth of seeds and also seed quality parameters. Gibberellic acid helps in the germination process and also it acts as a α-denovo synthesis. Through the growth regulator solutions sugar mobilization and protein hydrolysis initiates the hormonal and enzymatic mechanisms thus further initiates the metabolic process. GA3 has been noticed more effective in radicle elongation and plumule regulation. It improves elongation growth through cell division, elongation and extensibility of cell wall. According to Rahman *et al.*, 2004 [1] in case of soybean this GA3 results in internodal suppression such it leads to shoot growth elongation and helps in more dry matter production. Higher vigour index would be because of effective protein synthesis and best source to sink relationship that later resulted in higher quality development of seeds. These findings were also agreed with the findings of Kumar *et al.* 2004 [2] in French bean. Gibberellic acid will release hydrolytic enzymes that are required for digestion of endospermic starch during the time of germination.

The highest values for number of branches/plant (6.06), number of nodules/plant (11.84), pod length (8.84), number of pods/plant (35.28), number of seeds/pod (7.28), seed yield/plant (6.22), 100 seed weight (6.83) against control (Table 2). It is might be because of improved nutrient uptake of black gram by the efficient mobilization of effective nutrients from the sink to the reproductive area of the plant. Application of GA3 hardly boosted the amount of seeds/pod. It has also been observed that increased fruit set, viable pollen and a similar impact on pollen formation. GA3 treated seeds helps in improving the physiological nature of the crop and also in better growth and also black gram yield. The study finalises that PGRs ought be used to increase the productivity by for the greater yield related parameters.

Table 1: Effect of growth regulators & nutrients on growth and quality parameters of Black gram CV. VBN11

Treatment	Germination (%)	Speed of germination	Seedling length (cm)	Dry matter production	Vigour index I	Vigour index II	Field emergence (%)	Days to 50% flowering
T_0 (Control)	88	19.83	31.30	0.34	2757.04	29.92	78.00	38.93
T_1 ($MnSO_4$)	91	23.25	33.66	0.36	3063.66	31.85	82.00	35.43
T_2 ($ZnSO_4$)	93	23.01	35.68	0.38	3318.24	35.34	83.00	38.33
T_3 (Salicylic acid)	94	28.36	38.86	0.42	3652.84	39.48	90.00	31.22
T_4 (GA_3)	96	29.65	39.41	0.48	3783.36	46.08	94.00	30.59
T_5 ($MgSO_4$)	89	23.70	36.11	0.41	3213.79	41.83	87.00	32.78
T_6 ($CaCl_2$)	91	21.87	35.06	0.39	3190.46	35.49	85.00	37.44
Mean	91.71	23.59	35.72	0.40	3282.77	37.133	85.576	34.961
SED	3.047	2.650	1.130	0.025	103.83	1.186	2.684	0.627
CD ((P = 0.05)	6.535	5.685	2.423	0.054	222.736	2.544	5.758	1.367

Table 2: Effect of growth regulators & nutrients on yield parameters of Black gram CV. VBN11

Treatment	No. of branches/plant	No. of nodules/plant	Pod length (cm)	No. of pods/plant	No. of seeds/pod	Seed yield/plant (g)	100 seed weight
T_0 (Control)	3.96	7.82	6.42	31.83	5.45	4.38	4.38
T_1 ($MnSO_4$)	4.14	9.94	6.88	32.42	5.83	4.69	5.17
T_2 ($ZnSO_4$)	4.58	9.61	7.13	32.83	6.06	5.18	5.63
T_3 (Salicylic acid)	5.77	11.18	8.36	34.93	7.13	6.12	6.46
T_4 (GA_3)	6.06	11.84	8.84	35.28	7.28	6.22	6.83
T_5 ($MgSO_4$)	4.81	10.77	7.86	34.36	6.86	5.92	6.13
T_6 ($CaCl_2$)	4.61	10.46	7.43	33.93	6.45	5.82	5.88
Mean	4.852	10.228	7.55	33.64	6.45	5.47	5.74
SED	0.100	0.213	0.167	0.651	0.128	0.117	0.120
CD (P = 0.05)	0.217	0.465	0.365	1.420	0.279	0.255	0.262

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Conflict of Interest
There is no such conflict of interest.

References
1. Rahman MS, Islam MN, Tahar A, Karim MA. Influence GA, and MH and their time of spray on morphology, yield contributing characters and yield of soybean. Asian J Plant Sci. 2004;3:602-609.
2. Kumar M, Sinha KK, Roy SRP. Effect of organic manure, NPK and boron application on the productivity of French bean in sandy loam soil of North Bihar. Indian J Pulses Res. 2004;17(1):42-44.
3. Manonmani V, Srimathi P. Influence of mother crop nutrition on seed and quality of black gram. Madras Agric J. 2009;96(16):125-128.
4. Manjiri, Singh A, Gupta SD, Bahadur R, Singh AK. Response of black gram (*Vigna mungo*) to foliar applied plant growth regulators. Int J Curr Microbiol Appl Sci. 2018;7:4058-4064.
5. Surendar KK, Vincent S, Vanagamudi M, Vijayaraghavan H. Plant growth regulators and nitrogen responses on improving nutrient content of black gram (*Vigna mungo* L.). Plant Gene and Trait. 2013 Aug 5;4(1).