



Effect of Growth Regulators and Nutrients on Growth, Yield and Yield Attributes of Black Gram under Upland Conditions

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ABSTRACT

The effect of different growth regulators viz., GA₃, NAA, SA and triacontanol nutrients viz., KNO₃ and urea on growth, yield and yield attributes of black gram under upland conditions was studied in the present investigation at agricultural college farm, Bapatla during rabi 2006. The results revealed that KNO₃ treatment @ 1% significantly increased the seedling vigour and morphological parameters like no. of leaves per plant and no. of branches per plant, yield and yield parameters in black gram.

Key words : Black gram, Growth regulators, Yield and Yield attributes.

Black gram is one of the important pulse crops grown throughout India. It contributes 13% to total pulse area and 10% total pulse production. This crop is having wider adaptability, suitability under mixed cropping and also has intensity in crop rotation. Black gram is cultivated as pure crop in Kharief or in rice follows (rabi) or as a mixed crop with another pulse (pigeonpea) or millet (sorghum) during rabi loamy to clay and black cotton soils in rainfed situations of Andhra Pradesh.

Plant growth regulators are useful in modifying the morphological characters and increasing seed yields. Shinde *et al.*, (1991) reported that NAA applications increased seed yield in cowpea.

Certain chemicals like urea and KNO₃ in the form of nitrogen and Potassium nitrate have been reported playing significant role in source sink relationships and ultimately increasing seed yield. Several reports (Hammid, 1991; Kalita *et al.*, 1994) suggested that supplementing urea at the reproductive stage significantly enhanced seed yield by delaying leaf senescence in mungbean. Therefore, the present investigation was undertaken to evaluate the effect of growth regulators and nutrients on yield and yield attributes of black gram under upland conditions.

MATERIAL AND METHODS

An investigation was undertaken at Agricultural college farm, Bapatla (A.P.) during rabi 2005. The experiment was laid out in a randomised block design with ten treatments replicated thrice. The variety used for this study was LBG623 with a spacing of 13x10cm.

The treatments were as follows :

- T1- seed treatment and foliar application of GA₃ @ 2.5 ppm,
- T2- seed treatment and foliar applications of GA₃ @ 5.0 ppm
- T3- seed treatment of foliar applications of NAA @ 10 ppm,
- T4- seed treatment of foliar applications of NAA @ 15 ppm,
- T5- seed treatment of foliar applications of KNO₃ @ 1%,
- T6- seed treatment of foliar applications of Urea @ 2%,
- T7- seed treatment of foliar applications of SA @ 10 ppm,
- T8- seed treatment of foliar applications of Triacontanol @ 1.5 ppm,
- T9- Water spray
- T10- Control.

Seeds were presoaked for overnight in the respective concentration of foliar spray and dibbled. Foliar sprays were given at 50% following and ten days thereafter.

The cultural agronomic measures were taken as per the need and recommendations. The data on various morphological parameters, yield and yield attributes were recorded and statistically analysed.

RESULTS AND DISCUSSION

The data on various morphological parameters were presented in table 1

Seedling vigour :

The treatment KNO₃ @ 1% exhibited highest seedling vigour (4.98 at 15 DAS and 4.94 at 25

DAS) where as lowest values recorded in control (3.87 at 15 DAS and 3.88 at 25 DAS) similar findings were reported by Jayarami Reddy *et al* (2004) in blackgram .

Plant height : The maximum plant height was recorded in GA₃ @ 5.0 ppm (27.74) and least in control (23.70) . Ashwini (2005) reported that GA₃ @ 20 ppm increased plant height in frenchbean .

No.of Leaves plant⁻¹ The treatment KNO₃ @ 1 % recorded maximum no.of leaves per plant (17.25) and lowest in control (13.52) RamaRao (2003) reported that foliar application of Triacantanol @ 0.2 % increased no.of leaves per plant greengram.

No .of branches plant⁻¹ KNO₃ @ 1 % recorded maximum no. of branches per plant (6.85) and lowest incontrol (5.78) RamaRao (2003) revealed that foliar applications of Triacantanol @ 0.2 % increased no.of branches per plant in greengram .

The data on yield and yield attributes were present in (table 2)

Number of pods plant⁻¹

The treatemete KNO₃ @ 1% recorded maximum no.of pods per plant (21.25) and control recorded lowest (16.95) . Jayarami Reddy *et.al* (2003) stated that no.of pods plant⁻¹ was more with KNO₃ @1 % and urea @ 2 % pigeonpea.

No.of seeds pod⁻¹ :

The no .of seeds per pod significantly differr among treatemets . Maximum no.of seeds pod⁻¹ was recorded by KNO₃ @ 1 % (6.15) and least control (5.26) Senthil Kumar and Jai Kumar (2004) observed that nitrogen @ 50kg ha⁻¹ along with, NAA @10 ppm increased no. of seeds per pod in greengram .

100 seed weight (g):

Highest 100 seed weight was recorded by treatment KNO₃ @ 1 % (5.94) and least in control (5.25) . Radhamani *et. al.* (2003)observed that increase in test weight was due to NAA @ 10 ppm in greengram .

Seed yield(q ha⁻¹):

Significant differences among treatments shown by seed yield KNO₃ @ 1 % recorded highest seed yield (12.93) as against control (8.06) . Kaur and Jegatiya (2005) studied that spraying of KNO₃ @ 2 % increased seed yield in soybean.

Harvest Index (%)

Harvest index also showed significant differences among treatemets .KNO₃ @ 1 % recorded maximum harvest index (28.67) and control recorded lowest (21.57) . Ramarao (2003) stated that SA @ 0.1 % and triacantanol @0.2% increased harvest index greengram .

Shelling per cent (%)

The treatments significantly differed with respect to shelling per cent . Shelling percent was highest in KNO₃ @ 1 % treatment (41.89) and lowest in control (32.00) . Petra *et. al.* (1995) stated that KNO₃ @ 0.5% increased shelling per cent in groundnut .

The result concluded that KNO₃ @ 1 % could increase the yield parameters and yield of blackgram under upland conditions .

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Table 1. Effect of pre-sowing and foliar applications with growth promoting chemicals on morphological parameters in blackgram.

Treatments	Seedling Vigour		Plant height (cm)	Number of leaves plant ⁻¹	Number of branches plant ⁻¹	Days to 50% Flowering	Days to Maturity
	15 DAS	25 DAS					
GA ₃ @ 2.5 ppm	4.73	4.84	27.60	16.80	6.70	43.21	73.11
GA ₃ @ 5.0 ppm	4.62	4.72	27.74	16.43	6.54	43.60	74.10
NAA @ 10 ppm	4.67	4.77	27.70	16.58	6.60	43.58	73.83
NAA @ 15 ppm	4.76	4.86	27.51	16.95	6.75	43.16	72.84
KNO ₃ @ 1%	4.89	4.94	27.45	17.25	6.85	42.36	71.36
Urea @ 2%	4.79	4.88	27.40	17.01	6.80	42.80	72.31
SA @ 10 ppm	4.58	4.67	27.33	16.30	6.50	43.65	74.35
Triacantanol @ 1.5 ppm	4.71	4.81	27.28	16.70	6.56	43.50	73.50
Water spray	4.06	4.15	27.13	16.00	6.44	43.85	74.42
Control	3.87	3.88	23.70	13.52	5.78	44.00	74.65
SEm ±	0.18	0.18	1.38	0.84	0.23	NS	NS
CD @ 5%	0.54	0.54	3.69	2.50	0.67	NS	NS
CV (%)	6.90	6.79	10.21	8.98	6.04	NS	NS

Table 2. Effect of pre-sowing and foliar applications with growth promoting chemicals on yield and yield parameters in blackgram.

Treatments	No of pods per plant	No of seeds per pod	100 seed weight (g)	Seed yield (q ha ⁻¹)	Harvest index (%)	Shelling percentage (%)
GA ₃ @ 2.5 ppm	20.00	5.95	5.70	11.30	25.50	36.85
GA ₃ @ 5.0 ppm	18.85	5.80	5.50	10.01	23.11	34.50
NAA @ 10 ppm	19.25	5.85	5.56	10.43	23.90	35.05
NAA @ 15 ppm	20.60	6.00	5.76	11.85	26.55	37.15
KNO ₃ @ 1%	21.25	6.15	5.94	12.93	28.67	41.89
Urea @ 2%	20.85	6.05	5.84	12.26	27.34	38.45
SA @ 10 ppm	18.15	5.75	5.45	9.46	22.10	33.85
Triacantanol @ 1.5 ppm	19.65	5.90	5.63	10.86	24.70	36.00
Water spray	17.90	5.60	5.40	9.01	21.91	33.05
Control	16.95	5.26	5.25	8.06	21.51	32.00
SEm ±	0.73	0.21	0.12	0.56	0.77	1.11
CD @ 5%	2.17	0.62	0.37	1.68	2.29	3.29
CV (%)	6.56	6.18	3.91	9.26	5.44	5.36

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