



## **Effect of Growth Regulators On French Bean (*Phaseolus Vulgaris* L.) Var. Arka Komal**

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### **ABSTRACT**

*The growth parameters like height of plant, plant spread, number of leaves, number of branches, number of green pods were influenced significantly due to application of plant growth regulators.*

*In French bean, the maximum height of plant (34.53 cm), plant spread (31.46 cm), number of leaves per plant (15.73) and number of branches (7.66) in treatment where GA<sub>3</sub> 200 ppm was applied (T<sub>4</sub>) while minimum height of plant (25.93 cm), plant spread (24.70 cm), number of leaves per plant (11.66) and number of branches (5.20) per plant respectively observed in the treatment (T<sub>8</sub>) in Cycocel 200 ppm. The treatment T<sub>9</sub> (35.93) days to 50 per cent flowering and it was most effective treatment for inducing earlier 50 per cent flowering and significantly superior over rest of the treatments. Longer green pod length (19.50 cm) were harvested from treatment (T<sub>2</sub>) GA<sub>3</sub> 100 ppm while shortest green pods (18.13 cm) were harvested in treatment (T<sub>8</sub>) CCC 200 ppm.*

**Keywords:** growth, GA<sub>3</sub>, CCC, ppm.

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### **INTRODUCTION**

The French bean (Syn. Kidney bean, haricot bean, snap bean and heavy bean) is one of the most important leguminous vegetable. It is the world's most important legume food. The French bean green pod is used as green vegetable. It contains protein 22 per cent, lime, iron potash, phosphorus, sulphur, vitamin 'A' in large quantity. Area under vegetables in India is estimated around 6.2 million hectare with an annual production of about 71.66 million tonnes. India is the second largest producer of vegetables with 2.8 per cent total cropped area under vegetables. India contributes about 13.6 per cent to the world's vegetable production (2). The French bean growing leading states in India are Maharashtra, Andhra Pradesh and Punjab. In Maharashtra the mostly French bean producing districts are Pune, Ahmednagar, Solapur and Nasik. The French bean green stage contain high level of vitamin 'A' which is beneficial for the controlling night blindness in human being (4). Gibberellin is a plant growth regulator which promotes the cell elongation and induces the cell division. It plays a great role in retarding the abscission like that of IAA in lower concentrations. Crane (5) observed that stimulation of fruit development and retardation of abscission in young fruits due to gibberellin. Therefore, a role of gibberellins is strongly implicated in the control of abscission. An investigation was therefore conducted to find out the effect of growth regulators on growth and yield of French bean (*Phaseolus vulgaris* L.) cv. Arka Komal.

### **MATERIALS AND METHODS**

The field experiment was conducted during *Kharif* season 2007-2008 at Horticultural farm, Department of Horticulture, College of Agriculture, Latur. The experiment was laid out in randomized block design with nine treatments viz., T<sub>1</sub>- GA<sub>3</sub> 50 ppm T<sub>2</sub>- GA<sub>3</sub> 100 ppm T<sub>3</sub>- GA<sub>3</sub> 150 ppm T<sub>4</sub>- GA<sub>3</sub> 200 ppm T<sub>5</sub>- CCC 50 ppm T<sub>6</sub>- CCC 100 ppm T<sub>7</sub>- CCC 150 ppm T<sub>8</sub>- CCC 200 ppm and T<sub>9</sub>- Control (Water spray). The 50 ppm, 100 ppm, 150 ppm and 200 ppm solutions of plant growth regulators were prepared by dissolving 50 mg, 100 mg, 150 mg and 200 mg is in small quantity of acetone dissolve all granules of PGR in acetone completely. Make final volume of 1 litre by adding double distilled water slowly. Finally the 50 ppm, 100 ppm, 150

ppm and 200 ppm concentrations of plant growth regulator solutions were prepared. Observations were recorded and statistically analyzed as per method given by (8).

## RESULTS AND DISCUSSION

### Effect on growth parameters

The vegetative growth parameters like height of plant, plant spread, number of leaves per plant and number of branches per plant were significantly influenced by application of plant growth regulators (Table 1) **Plant height**

The data presented in Table 1 on plant height was statistically significant. At 30 days after sowing the maximum height of plant (20.46 cm) was recorded in treatment GA<sub>3</sub> 200 ppm (T<sub>4</sub>) while minimum (16.86 cm) was recorded in treatment CCC 200 ppm (T<sub>8</sub>). The data on height of plant 50 days after sowing, showed that the maximum height of plant (33.00 cm) was recorded in GA<sub>3</sub> 200 ppm (T<sub>4</sub>) this treatment was significant over the rest of all treatments. The lowest height of plant (24.53 cm) was recorded in treatment Cycocel 200 ppm (T<sub>8</sub>). Observations recorded at 70 days after sowing, showed that the maximum height of plant (34.53 cm) was recorded in treatment where GA<sub>3</sub> 200 ppm (T<sub>4</sub>). The treatments T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> statistically significant over the control. The lowest height of plant (25.93 cm) was observed in treatment (T<sub>8</sub>) Cycocel 200 ppm.

Application of plant growth regulators alone influenced the height of plant beneficially during early growth stage. This might be due to presences sufficient amount of available nitrogen in the soil at this stage. However, integration of plant growth regulators showed significant differences and found better in respect of height of plant than water spray alone (7).

### Plant spread

Data on spread of plant at 30 days after sowing showed that the treatment GA<sub>3</sub> 200 ppm (T<sub>4</sub>) was recorded maximum plant spread (21.40 cm) while lowest plant spread (17.20 cm) was observed in the treatment CCC 200 ppm (T<sub>8</sub>). Data recorded at 50 days after sowing indicated that maximum spread of the plant (30.03 cm) in GA<sub>3</sub> 200 ppm (T<sub>4</sub>) this treatment was significantly superior over the rest of all treatments. The minimum plant spread was (24.63 cm) recorded in treatment T<sub>8</sub> receiving CCC 200 ppm. Observations recorded at 70 days after sowing on plant spread was significant. The maximum plant spread (31.46 cm) was observed in treatment GA<sub>3</sub> 200 ppm (T<sub>4</sub>), while lowest plant spread was (24.70 cm) observed in treatment T<sub>8</sub> CCC 200 ppm.

### Number of leaves per plant

At 30 days after sowing the treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> these treatments are statistically significant over the control treatment T<sub>9</sub>. The maximum number of leaves (8.46) were recorded in treatment T<sub>4</sub> while lowest number of leaves (7.73) observed in the treatment T<sub>8</sub>. At 50 days the maximum number of leaves (14.60) recorded in treatment GA<sub>3</sub> 200 ppm (T<sub>4</sub>). This treatment was significant over the rest of all treatments. The lowest number of leaves per plant (12.80) recorded in treatment (T<sub>8</sub>) CCC 200 ppm. At 70 days after sowing the treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub> and T<sub>6</sub> these treatments are statistically significant over the control treatment T<sub>9</sub> receiving water spray. The maximum number of leaves per plant (15.73) recorded in treatment GA<sub>3</sub> 200 ppm (T<sub>4</sub>) and minimum number of leaves per plant (11.66) recorded in treatment (T<sub>8</sub>) CCC 200 ppm.

### Number of branches per plant

At 30 days after sowing the treatments are non-significant. The data on number of branches per plant after 50 days after sowing the treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>7</sub> these treatments are statistically significant over the control treatment T<sub>9</sub> receiving water spray. The treatment GA<sub>3</sub> 200 ppm (T<sub>4</sub>) recorded more number of branches (6.46) per plant while the lowest number of branches per plant (4.86) observed in treatment (T<sub>8</sub>) CCC 200 ppm. Number of branches recorded at 70 days the more number of branches (7.66) were obtained from the treatment GA<sub>3</sub> 200 ppm (T<sub>4</sub>). This treatment significant over the rest of all the treatments. The lowest number of branches (5.20) per plant observed in the treatment (T<sub>8</sub>) CCC 200 ppm. Similar results were reported by (7) & (1).

### Cropping period

Data on number of days required from sowing to 50 per cent flowering presented in Table 2. The treatment (T<sub>9</sub>) receiving water spray required (35.93) days to 50 per cent flowering and it was most effective treatment for inducing earlier 50 per cent flowering and significantly superior over rest of the treatments under study. The next best treatment was (T<sub>2</sub>) which received GA<sub>3</sub> 100 ppm. The treatments T<sub>3</sub>, T<sub>7</sub> and T<sub>8</sub> statistically similar to each other for days to 50 per cent flowering. The treatment (T<sub>2</sub>) GA<sub>3</sub> 100 ppm recorded maximum number of days (42.08) to 50 per cent flowering and it was statistically at par with treatments T<sub>3</sub>, T<sub>7</sub> and T<sub>8</sub>(3).

**Green pod length**

The significant difference were observed among different treatment during investigation. Longer green pod length (19.50 cm) were harvested from treatment (T<sub>2</sub>) GA<sub>3</sub> 100 ppm. The treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>, T<sub>6</sub> and T<sub>7</sub> these treatments are statistically significant over the control treatment (T<sub>9</sub>) receiving water spray. The shortest green pods (18.13 cm) were harvested in treatment (T<sub>8</sub>) CCC 200 ppm. The maximum green pod length due to application of GA<sub>3</sub> 200 ppm (6).

**Table 1: Effect of Growth Regulators on Growth of French Bean (*Phaseolus vulgaris* L.) var. Arka Komal.**

Tr. No	Treatment	Plant Height (cm)			Plant Spread (cm)			Number of leaves per plant			Number of branches par plant		
		30	50	70	30	50	70	30	50	70	30	50	70
T <sub>1</sub>	GA <sub>3</sub> at 50 ppm	18.73	28.06	30.06	17.43	25.93	27.23	8.66	13.53	14.13	1.66	5.80	6.13
T <sub>2</sub>	GA <sub>3</sub> at 100 ppm	18.86	29.60	31.86	19.60	27.26	29.00	7.80	13.80	14.40	1.86	6.20	7.40
T <sub>3</sub>	GA <sub>3</sub> at 150 ppm	19.80	31.80	33.33	21.03	28.63	29.60	8.33	14.00	14.40	1.66	5.53	6.46
T <sub>4</sub>	GA <sub>3</sub> at 200 ppm	20.46	33.00	34.53	21.40	30.03	31.46	8.46	14.60	15.73	2.06	6.46	7.66
T <sub>5</sub>	CCC at 50 ppm	18.73	28.46	29.93	19.33	25.90	27.63	7.73	13.20	14.00	1.73	5.40	6.46
T <sub>6</sub>	CCC at 100 ppm	18.73	27.66	29.26	18.06	26.56	28.03	8.53	13.73	13.86	1.53	5.26	6.46
T <sub>7</sub>	CCC at 150 ppm	19.20	27.73	28.93	17.80	25.83	27.76	8.06	13.20	13.40	1.73	5.60	5.83
T <sub>8</sub>	CCC at 200 ppm	16.86	24.53	25.93	17.20	24.16	24.70	7.73	12.80	11.66	1.33	4.86	5.20
T <sub>9</sub>	Control (water spray)	17.58	25.53	27.80	17.73	24.63	26.36	8.06	12.00	13.16	1.86	6.00	7.33
	SE ±	0.589	0.991	1.127	0.90	0.780	0.974	0.330	0.307	0.430	0.292	0.221	0.277
	CD at 5 %	1.763	2.967	3.375	2.704	2.336	2.917	0.989	0.920	1.288	N.S.	0.663	0.831

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