

PGR'S And Decapitation Affect the Seed Yield and its Attributing Traits in Cluster Bean cv. Pusa Navbahar

Dholariya, N. D. *, Joshi, V. I., Katba, P. J. and Delvadiya, I. R.

Main Vegetable Research Station, College of Agriculture
Anand Agricultural University, Anand -388 1100, Gujarat, India

*Corresponding Author E-mail: ndbreeder787@gmail.com

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ABSTRACT

An experiment was carried out to study the effect of decapitation and PGR's on seed yield and its attributes in cluster bean cv. Pusa Navbahar with 3 (three) decapitation treatments and three plant growth regulators each at two concentrations with water spray as control in factorial randomized design with three replications at Main Vegetable Research Station, Anand Agricultural University, Anand during Kharif season of 2012-2013, 2013-14 and 2015-2016. The results showed significant differences among the yield parameters due to decapitation treatments. Decapitation at 70 DAS registered significantly the highest number of pods per cluster (8.05), number of clusters per plant (20.39), number of pods per plant (160.00), pod length (13.02 cm) and weight of 1000 seeds (42.32 g) in pooled analysis. However, maximum number of seeds per pod (9.15) was found in treatment decapitation at 85 DAS. Similar trend was also noted in seed yield (2174 kg/ha) in decapitation at 70 DAS, which was 10.52 % higher than control (Without decapitation). Among the PGR's treatment spraying of GA₃ 20mg/l at flowering stage recorded significantly the maximum number of pods per cluster (7.55), number of clusters per plant (18.21), number of pods per plant (125.58), and number of seeds per pod (9.29). Maximum seed yield (2446 kg /ha) was also recorded by the same treatment and registered 74.34 % higher seed yield than control.

Key words: Decapitation, PGR's, Cluster bean.

INTRODUCTION

Cluster bean [*Cyamopsis tetragonoloba* (L.) Taub.] popularly known as guar is an important legume vegetable crop. Cluster bean is grown for its young tender green immature pods, which are used as a nutritive vegetable. It can be grown on almost all types of soil. It can grow well in *Kharif* and *Summer* seasons. In spite of commercial importance of cluster

bean crop in our daily diet and wide spread cultivation, availability of pure and a good quality seed is not satisfactory. Among the various factors responsible for increasing seed production source manipulation through decapitation play an important role in diversification of food materials from sink to source to *i.e.* seed yield.

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Plant growth regulators play a role to initiate the flowering and fruiting on the plant when applied at the time of flowering and it also reduce flower drop to some extent. Thus, PGR's play a role in reducing flower abscission and also increased biomass production and ultimately yield. However, very rare information is available on this matter, therefore, the present study was undertaken to study the effect of decapitation and PGR's on seed yield and its attributes of cluster bean.

MATERIALS AND METHODS

A field study was undertaken during *Kharif season* of 2012-2013, 2013-14 and 2015-2016 at Main Vegetable Research Station, Anand Agricultural University, Anand. The experiment was laid out in factorial randomized block design replicated thrice. Treatment comprised three decapitation levels and seven PGR's treatments along with water spray as control. The PGR's were NAA (20 and 40 mg/l), GA₃ (20 and 40 mg/l) and thiourea (500 and 1000 mg/l). All the concentrations of PGR's were applied at flowering stage. Five tagged plant from each net plot were selected for recording observations of yield attributes. Weight of 1000 seeds worked out by randomly counting 1000 seed and weighing them on top pan electrical balance. Seed yield was worked out by recording the dried weight of biological yield and seed yield obtained from net plot.

RESULTS AND DISCUSSION

The results obtained from the present investigation have been discussed in details as under:

Effect of decapitation:

Results presented for various yield parameters showed significant differences among the different decapitation treatments (Table 1). The treatment D₂ (Decapitation at 70 DAS) registered significantly the highest number of pods per cluster (8.05), number of clusters per plant (2039), number of pods per plant (160.00), pod length (13.02 cm) and weight of 1000 seeds (42.32 g). Whereas, number of seeds per pod (9.15) were found maximum in

treatment D₃ (Decapitation at 85 DAS). Maximum seed yield per hectare (2174 kg) was recorded under the decapitation treatment D₂ (Decapitation at 70 DAS). This showed that decapitation of main shoot at 70 DAS significantly affected most of the yield parameters and ultimately seed yield. This might be due to diversification of photosynthetic materials towards the source i.e. pods and seeds at optimum growth phase. These results are in agreement with findings of Argall and Stewart¹ who reported that decapitation of cowpea at 5th leaf stage resulted an increased in seed yield and harvest index in cowpea. Similar, results were also noted by Yadav and Dhukia⁶, Arora *et al.*² and Yadav *et al.*⁷ in cluster bean.

Effect of plant growth regulators:

Plant growth regulators also recorded significant effect on yield attributing parameters (i.e. number of pods per cluster, number of clusters per plant, number of pods per plant, length of pod, weight of 1000 seeds and seed yield) However, non-significant difference was observed for number of seeds per pod (Table 1). Significantly, the highest number of pods per cluster (7.55), number of clusters per plant (18.21), number of pods per plant (125.58), and number of seed per pod (9.29) were recorded by the treatment G₄ (GA₃ 20 mg/l). However, length of pod (12.97 cm) was recorded with the treatment G₆ (thiourea 500 mg/l). The maximum weight of 1000 seeds (43.02 g) was recorded with the treatment G₅ (GA₃ 40 mg/l) which was at par with treatments G₄ (GA₃ 20 mg/l) (42.57). The maximum seed yield per hectare was also recorded by the treatment G₄ (2446 kg) and remained at par with treatment G₆ (2326 kg/ha).

This might be due to exogenous application of plant growth regulators (G₄ - GA₃ 20 mg/l and G₆-Thiourea 500 mg/l), which stimulate the effects of natural occurring hormones that accelerated and modified the growth and development of plants. Similar results were also reported by Sharma *et al.*⁴, Yadav *et al.*⁵ and Burman *et al.*³ in cluster bean.

Interaction effects between decapitation and parameters except number of pod per plant. PGR's were found non-significant for yield

Table 1: Effect of decapitation and plant growth regulators on growth of cluster bean cv. 'Pusa Navbahar' (Pooled data of three years)

Sr. No.	Treatment	Pooled						
		Number of pods /cluster	Number of cluster/ plant	Number of pods per plant	Dry pod length (cm)	Number of seeds / pod	Test Weight (g)	Seed Yield (kg/ha)
A. Decapitation								
1	D ₁ No decapitation (C)	6.57	17.11	110.50	11.50	8.60	42.16	1967
2	D ₂ Decapitation at 70 DAS	8.05	20.39	160.00	13.02	8.22	42.32	2174
3	D ₃ Decapitation at 85 DAS	6.43	18.10	108.00	10.92	9.15	42.19	1813
	S. Em. ±	0.08	0.27	1.24	0.18	0.09	0.20	35.37
	CD @ 5%	0.26	0.72	3.96	0.56	0.28	NS	99.04
B. PGR's Treatment								
1	G ₁ (C)	6.83	16.40	98.40	10.52	8.06	41.57	1403
2	G ₂ (NAA @ 20 mg/l)	7.04	17.23	120.61	10.97	8.86	42.09	2018
3	G ₃ (NAA @ 40 mg/l)	6.88	18.08	122.40	10.47	8.70	41.95	1807
4	G ₄ (GA ₃ @ 20 mg/l)	7.55	18.21	125.58	12.69	9.29	42.57	2446
5	G ₅ (GA ₃ @ 40 mg/l)	6.95	18.18	124.88	11.87	8.90	43.02	2057
6	G ₆ (Thiourea @500 mg/l)	6.94	16.26	121.50	12.97	8.92	42.11	2326
7	G ₇ (Thiourea @1000 mg/l)	6.94	17.72	122.13	11.39	8.56	42.24	1832
	S. Em. ±	0.11	0.36	1.98	0.28	0.33	0.30	54.02
	CD @ 5%	0.34	1.08	3.78	0.79	NS	0.85	151.29
Interaction effect								
Y		NS	NS	NS	NS	NS	NS	NS
YxD		NS	NS	NS	NS	NS	NS	NS
YxG		NS	NS	NS	NS	NS	NS	NS
DxG		NS	NS	8.45	NS	NS	NS	NS
YDG		NS	NS	NS	NS	NS	NS	NS
CV%		4.57	7.85	14.63	12.70	7.97	3.01	14.15

CONCLUSION

The final conclusion that can be reached from study of the effect of decapitation and PGR's on seed yield and its attributes in cluster bean among the various factors responsible for increasing seed production source manipulation through decapitation play an important role in diversification of food materials from sink to source to *i.e.* seed yield.

Plant growth regulators play a role to initiate the flowering and fruiting on the plant when applied at the time of flowering and it also reduce flower drop to some extent. Thus, PGR's play a role in reducing flower abscission and also increased biomass production and ultimately yield. However, very rare information is available on this matter, therefore, the present study was

undertaken to study the effect of decapitation and PGR's on seed yield and its attributes of cluster bean.

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