GAU Research Journal 37 (2) : 86-88 July 2012

Influence of apical pinching on growth and seed yield attributing characters in okra (*Abelmoschus esculentus* (L.) Moench)

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Received : 31 August, 2010

ABSTRACT

A field study on influence of apical pinching on growth and seed yield attributing characters in okra was conducted with three varieties *viz.*, GO-2, Parbhani Kranti and VRO-6. The variety GO-2 had maximum days to first flowering (46.820), number of nodes per plant (6.548), number of branches per plant (2.696), fruit length (17.186 cm), number of fruits per plant (6.036) and number of seeds per fruit (40.082), whereas days to maturity (112.298) and fruit girth (1.667 cm) was maximum in VRO-6. Parbhani Kranti was early by recording minimum days to flowering (46.229). The maximum plant height (41.132 cm) and fruit length (17.516 cm) were recorded in no pinching treatment which resulted in maximum number of nodes per plant (9.881) and number of seeds per fruit (40.600), respectively. The maximum fruit girth (1.725 cm), number of fruits per plant (6.770) and 100-seed weight (6.319 g) were recorded in pinching at 20 DAS, while maximum days to flowering (48.612) and days to maturity (114.313) were recorded in pinching at 30 DAS. Fruit length (17.516 cm) and number of seeds per fruit (40.600) was recorded maximum in no pinching treatment. The results indicated that pinching at 20 DAS had increased the seed yield contributing traits whereas, pinching at 30 DAS had delayed the crop growth.

Key words : Apical pinching, growth parameters, seed yield, okra

Okra (*Abelmoschus esculentus* (L.) Moench), also called as "Lady's finger" in English and as "Bhindi" in Hindi, is one of the most important vegetable crops grown extensively throughout the country during summer and rainy seasons. Okra is also used in food processing and in the extraction of oil as the ripe seeds contain about 20 per cent edible oil (Reddy *et al.*,1997).

Besides, being used as the food product, mature fruits and stems of the plant containing crude fibers are also used in the paper industry,while roots and stems are used for cleaning the cane juices (Singh, 1989). The intact apical bud prevents the growth of auxiliary buds as a result of the interplay of growth regulators which cause apical dominance. Apical pinching (also called as nipping or apical bud topping or apical debudding) is a well known practice for breaking apical dominance to encourage the lateral growth, thereby increasing the potential fruiting area (Gujar and Srivastava, 1972). Apical pinching also helps in production of more lateral branches resulting in increased photosynthetic activity, accumulation of more photosynthates, ultimately resulting in increased seed size and yield (Thakral *et al.* 1991). A direct promotional effect of pinching on pod yield provides a possible strategy for growing okra for better pod harvest. A pinching from the upper parts of the main stem of plants ensures good production and quality of pods. Franco and Ortegn (1997) recorded better pod and seed yield by pruning the okra plants. As there is meagre research on these aspects, the present investigation deals with the apical bud pinching in okra with a view to promoting its commercial exploitation.

MATERIALS AND METHODS

A field experiment was carried out in strip-split plot design with four replications during summer-2009 at Instructional Farm, College of Agriculture, Junagadh Agricultural University, Junagadh. Besides control, the treatments consisted of three pinching levels *viz.*, no pinching (P_0), apical pinching at 20 DAS (P_1) and apical

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pinching at 30 DAS (P_2) and three varieties of okra *viz.*, GO-2, Parbhani Kranti and VRO-6. Seeds were planted in rows at a spacing of 60 x 30 cm and all the recommended fertigation, agronomical practices and plant protection measures were followed timely to grow a healthy crop of okra. The apical portion was removed with scissors as per treatments. The observations *viz.*, days to flowering, days to maturity, number of nodes per plant, number of branches per plant, plant height, fruit length, fruit girth, number of fruits per plant, number of seeds per fruit, 100-seed weight and seed yield per plant were recorded from randomly selected ten plants. The fruits were harvested at physiological maturity when the hair line cracks were developed all along the edges of fruits. The fruits were dried to 8.0 to 9.0 per cent moisture level. Seeds were separated, cleaned properly and weighed.

RESULTS AND DISCUSSION

Effect of varieties

The growth and yield contributing parameters were significantly influenced by different varieties of okra (Table 1). The maximum days to flowering (46.820), number of nodes per plant (6.548), number of branches per plant (6.696), number of fruits per plant and the highest number of seeds per plant (40.082) were recorded in variety GO-2, while Parbhani Kranti was early by recording minimum days to first flowering (46.229). The observed differences among the varieties for growth and yield contributing characters may be due to inherent genotypic differences among the three varieties.

The effects of varieties on plant height, 100-seed weight and seed yield per plant were statistically non significant. However, numerically the highest plant height (38.467 cm), 100-seed weight (6.110 g) and seed yield per plant (18.879 g) was recorded in variety Parbhani Kranti. Similar findings have been reported by Sajjan *et al.* (2004)

Effect of apical pinching

The growth parameters as well as seed yield contributing attributes were significantly influenced by apical pinching. Apical pinching at 20 DAS had significantly improved the number of branches per plant (3.158), fruit girth (1.725 cm), number of fruits per plant (6.770), 100-seed weight (6.319 g) and seed yield per plant (20.265 g), while pinching at 30 DAS had delayed the days to first flowering (48.612) and days to maturity (114.313) (Table 1). The increased seed yield due to apical pinching at 20 DAS could be due to the proportionate increase yield contributing characters

Table 1 Effect of apical pinching and fruit picking on yield attributing characters in okra

Treatments	Growth parameters				Yield attributing trais						
	Days to first flowering	Days to maturity	Number of nodes per plant	Number of branches per plant	Plant height (cm)	Fruit length (cm)	Fruit girth (cm)	Number of fruits / plant	Number of Seeds / fruit	100 seed weight (g)	Seed yield per plant (g)
Varieties (V)											
GO-2 (V1)	46.820	111.001	6.548	2.696	37.984	17.186	1.623	6.036	40.082	6.060	18.582
Parbhani Kranti (V2)	46.229	111.481	5.618	2.534	38.467	16.510	1.674	5.724	39.174	6.110	18.879
VRO-6 (V3)	46.467	112.298	5.680	2.570	37.320	16.409	1.677	5.194	39.330	6.082	18.690
SEm ±	0.122	0.213	0.043	0.028	0.928	0.153	0.010	0.076	0.088	0.038	0.119
CD (0.05)	0.422	0.738	0.148	0.095	NS	0.530	0.035	0.262	0.304	NS	NS
Apical Pinchings (P)											
No pinching (P0)	44.095	108.563	9.881	1.909	41.132	17.516	1.595	4.490	40.600	5.834	17.279
Pinching at 20 DAS (P2)	46.759	112.063	4.341	3.158	36.765	16.639	1.725	6.770	39.546	6.319	20.265
Pinching at 30 DAS (P2)	48.612	114.313	3.623	2.732	35.940	15.862	1.654	5.695	38.438	6.062	18.606
SEm ±	0.124	0.105	0.050	0.023	0.477	0.081	0.006	0.048	0.295	0.071	0.086
CD (0.05)	0.350	0.297	0.141	0.064	1.347	0.228	0.016	0.134	0.833	0.201	0.244
Interactions											
V x P	NS	NS	NS	NS	NS	NS	Sig	Sig	NS	NS	NS

Table 2 Interaction effects of varieties x apical pinching on fruit girth and number of fruits per plant in okra.

Treatments	Fruit girth			Number of fruits per plant		
	V_1	V_2	V_3	V_1	V_2	V_3
P_0	1.545	1.624	1.616	4.714	4.559	4.197
P_1	1.712	1.714	1.749	7.305	6.960	6.047
P_2	1.613	1.683	1.666	6.094	5.652	5.338
mean	1.624	1.674	1.677	6.038	5.724	5.194
SEm ±		0.010			0.082	
CD (0.05)		0.028			0.232	

particularly number of fruits per plant and test weight. Further, higher number of fruits per plant may be due to more number of branches per plant (Table 1). The apical pinching might have mobilized the metabolites from leaves as a result of strong carbohydrate sinks furnished by developing pods and enhanced the lateral branches to carry more fruits. Similar results have been reported by Abduljabbar *et al.*, (2007), Sajjan *et al.* (2004), Sajjan *et al.* (2002), Reddy *et al.* (1997) and Gujar and Srivastava (1972).

No pinching treatment expressed significantly the maximum fruit length (17.516 cm) as compared to pinching at 20 and 30 DAS. Due to high length of fruit, the number of seeds per fruit was also maximum (40.600) but, on the contrary due to high length, fruit girth was reduced (1.595 cm). The findings are akin with those of earlier reported by Sajjan *et al.*, (2002).

Interaction effects

The interaction effects of varieties x pinchings were observed to be significant in respect of fruit girth and number of fruits per plant only (Table 2). The highest number of fruits per plant was found in treatment combination V_1P_1 (7.305), while the highest fruit girth was found in treatment V_3P_1 (1.749 cm). Bhat (1994), Reddy *et al.* (1997), Sajjan *et al.* (2002) Sajjan *et al.* (2004) have also reported the similar findings.

The results indicated that apical pinching at 20 DAS with one fruit picking increased the seed yield per plant. For getting the maximum profit by producing more fruits and there by more seeds, apical pinching is a good device for getting better seed yield.

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