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Growth, yield and sex-expression as influenced by plant growth regulators in sponge gourd cv. PUSA CHIKNI

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ABSTRACT : The study on sponge gourd revealed that application of MH 400 ppm at 2-true leaf stage and 4 leaf stages significantly reduced the length of main axis (356.25cm) and increased the fruit girth (15.25cm). The treatment with NAA 200 ppm lowered the node number. The treatment with ethrel 500 ppm increased the length of ovary (6.77cm), length of fruit (26.50cm) and fruit volume (229.75cc) as well as weight of fruit (168.75g). The treatment of ethrel 250 ppm increased the number of branches per vine (13.75) and number of female flowers per vine (44.75) while, reduced the days to first female flower appearance (58.25) and lowered the male: female sex ratio (7.00:1) and increased the number of fruits per vine (25.75), fruit yield per vine (3.97kg) as well as fruit yield per hectare (17.68 t). Finally, it was inferred that ethrel 250 ppm was most effective in improving femaleness and yield of sponge gourd cv. PUSA CHIKNI.

KEY WORDS : Sex expression, Plant growth regulators, Vine, Internodes, Fruit yield

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The sponge gourd (*Luffa cylindrica* L.) is one of the important cucurbitaceous crop, grown extensively throughout India. The tender fruits are used as vegetable or cooked as various purposes. The sponge gourd is strictly monoecious in nature. The mechanism of sex expression in most of the cucurbitaceous crops which have monoecious plants are considered to be controlled by genetical and environmental factors.

Plant growth regulators have profound influence on fruit production in cucurbits. It can modify growth and sex expression, improve fruit set and ultimately increase the yield in number of cucurbits. Sex modification shift towards femaleness by exogenous application of auxins, gibberellins, growth retardants, other plant growth regulators, macro and micro nutrients have been reported in many cucurbits. The growth regulators suppress the number of male flowers on lateral branches. Therefore, they increase the female flower production on lateral branches and thereby ultimately increase the yield.

RESEARCH METHODS

The present investigation was carried out at College farm, Department of Horticulture, N.M. College of Agriculture, Navsari Agricultural University, Navsari Campus, Navsari having tropical climate characterized by fairly hot and humid summer, warm and humid monsoon and moderately cold winter with well drained typical sandy loam soil. The treatments comprised of two foliar sprays of MH (100, 200 and 400ppm), Ethrel (125, 250 and 500ppm) and NAA (50, 100 and 200ppm) in Randomized Block Design with four replications. Recommended fertilizers (80 kg N, 40 kg P_2O_5 and 40

kg K_2O per hectare) with F.Y.M. (20 tonnes/ha) were applied. First spray of growth regulators was applied at 2 true-leaf stage and the second spray was applied at 4 true-leaf stage during the morning hours. Both the surface of leaves and apical meristems were fully moistened. The growth characters *viz.*, length of main axis (cm), average number of branches per vine, average inter nodal distance (cm), flowering and sex behaviour (days required for appearance of first male/female flower, node number on which first male/female flower appeared, average length of ovary (cm) and number of staminate as well as pistillate flowers produced per vine and sex ratio), fruit characters *viz.*, average length of fruits (cm), average girth of fruits (cm), volume of fruit (cc) and yield characters *viz.*, number of fruits per vine, average weight of fruit (g), fruit yield per vine (kg) and fruit yield (tonnes /ha) were recorded.

Statistical analysis :

The obtained data was analyzed by statistical significant at P<0.05 level, S.E. and C.D. at 5 per cent level by the procedure given by Gomez and Gomez (1984).

RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Growth characters :

The results revealed that the application of MH 400 ppm recorded significantly minimum length of main axis (356.25 cm) followed by ethrel 500 ppm and 250 ppm (364.00 cm and 373.00 cm, respectively) (Table 1). The maximum length of main axis was recorded with NAA 200 ppm (490.00 cm) while, significantly maximum number of branches per vine was produced with ethrel 250 ppm (13.75) followed by MH 100 ppm (13.00) and NAA 200 ppm (12.50) over the control (8.50). The treatment with MH 400 ppm produced the minimum number of branches per vine (8.25). The internodes were significantly shorter in plants treated with ethrel 500 ppm (7.25 cm) followed by MH 400 ppm (7.50 cm), whereas, the more inter-nodal distance (12.12 cm) was recorded under control (Table 1).

Flowering and sex expression :

An early initiation of first female flower was

Table 1 : Effect of plant growth regulators on growth, sex expression and flowering of sponge gourd

Treatments	Length of main axis (cm)	Number of branches per vine	Inter- nodal distance (cm)	Days required for first flower appearance		Node number on which first male flower appeared	Node number of which first female flower appeared	Average length of ovary (cm)	Number of male flowers per vine	Number of female flowers per vine	Sex ratio male : female
				Male flower	Female flower						
MH 100 ppm	400.50	13.00	10.25	54.95	61.25	13.35	17.00	5.27	281.75	33.50	8.75:1
MH 200 ppm	374.37	10.25	8.25	54.60	64.50	13.00	20.75	5.22	239.75	25.25	9.50 : 1
MH 400 ppm	356.25	8.25	7.50	58.35	65.50	15.00	23.75	5.50	247.75	22.25	10.50 : 1
Ethrel 125 ppm	403.75	11.75	9.00	55.85	59.50	13.80	18.25	5.17	295.25	33.25	8.25 : 1
Ethrel 250 ppm	373.00	13.75	8.75	56.50	58.25	14.20	17.51	5.17	307.25	44.75	7.00 : 1
Ethrel 500 ppm	364.00	11.75	7.25	56.00	60.50	15.45	21.25	6.77	305.00	33.25	9.00 : 1
NAA 50 ppm	449.00	8.75	10.25	58.95	65.75	16.25	22.75	4.87	273.00	20.50	12.25 : 1
NAA 100 ppm	485.75	9.75	10.75	55.70	63.50	15.85	19.00	5.35	267.25	23.25	11.25 : 1
NAA 200 ppm	490.00	12.50	11.25	55.25	60.25	14.50	16.75	6.00	302.25	38.25	7.25 : 1
Control (water spray)	438.00	8.50	12.12	54.45	69.75	14.75	24.25	3.65	367.75	19.50	17.25 : 1
S.E. ±	2.19	0.25	0.28	--	0.33	--	0.29	0.16	3.58	0.98	0.30
C.D. (P=0.05)	6.36	0.74	0.83	NS	0.97	NS	0.86	0.47	10.41	2.85	0.87
C.V. (%)	1.06	4.76	6.01	--	1.07	--	2.96	6.20	2.49	6.69	6.00

NS = Non-significant

observed in all the treatments as compared to control. The foliar spray of ethrel 250 ppm recorded significantly minimum number of days (58.25) followed by ethrel 125 ppm (59.50 days) and NAA 250 ppm (60.25 days), while in control it required maximum number of days (69.75) for initiation of female flower (Table 1). The appearance of first female flower in the vine treated with ethrel 250 ppm was about 11.5 days earlier to the control. The number of node on which first male flower appeared was not significantly influenced due to various treatments, whereas, the number of node on which first female flower appeared was reduced by all the treatments. The treatment with NAA 200 ppm recorded significantly least number of nodes on which the first female flower appeared (16.75) followed by MH 100 ppm (17.00) and ethrel 250 ppm (17.50), while the maximum node number was recorded in the control (24.25) for appearance of first female flower (Table 1). Significantly the maximum length of ovary was shown with ethrel 500 ppm (6.77 cm) followed by NAA 200 ppm (6.00 cm) as compared to control (3.65 cm). The least number of male flowers was produced with MH 200 ppm (239.75) followed by MH 400 ppm (247.75) and NAA 100 (267.25) as compared to the (367.75).

All the treatments of growth regulators were found superior in producing more number of female flowers over the control. The significantly maximum number of female flowers was recorded with ethrel 250 ppm (44.75) followed by NAA 200 ppm (38.25), while, in control there was minimum number of female flowers per vine (19.50) (Table 1).

Male: female sex ratio was significantly lowered by all the treatment as compared to the control. The lowest male: female sex ratio was recorded with ethrel 250 ppm (7.00:1) followed by NAA 200 ppm (7.25:1) and ethrel 125 ppm (8.25:1). Maximum male: female sex ratio (17.25:1) was recorded in control (Table 1). The findings are in conformity with those of Dubey (1983a), Arora *et al.* (1985) and Kooner *et al.* (2000).

Fruit characters :

The maximum fruit length was recorded with ethrel 500 ppm (26.50 cm) followed by NAA 200 ppm (24.50 cm), ethrel 250 ppm (23.00 cm) and MH 400 ppm (22.25 cm). All the concentrations of MH increased the girth of fruit. The treatment with MH 400 ppm recorded the maximum girth of fruit (15.25 cm), whereas, NAA 200 ppm recorded the minimum girth of fruit (11.50 cm) (Table 2). Significantly, the maximum volume of fruit was recorded with ethrel 500 ppm (229.75 cc) followed by ethrel 250 ppm (207.50 cc) and MH 400 ppm 98.00 cc), whereas, minimum volume of the fruit (113.75 cc) was observed in control. The study is in consonance with the findings of Dubey (1983); Arora *et al.* (1985); Singh and Choudhary (1988) and Kooner *et al.* (2000).

Yield characters :

All the treatments except NAA 50 ppm gave significantly more number of fruits per vine than control. The maximum number of fruits per vine were recorded with ethrel 250 ppm (25.75) followed by NAA 200 ppm (21.25) and ethrel 500 ppm (20.25). Minimum number of fruits per vine (12.00) was recorded in control Table 2). All the treatments except MH 100 ppm and 200 ppm

Table 2 : Effect of plant growth regulators on fruit and yield characters of sponge gourd

Treatments	Average fruit length (cm)	Average fruit girth (cm)	Volume of fruit (cc)	Average number of fruit per vine	Average weight of fruit (g)	Yield per vine (kg)	Yield per hectare (tonnes)
MH 100 ppm	19.50	14.75	122.25	19.00	118.75	2.29	13.53
MH 200 ppm	20.50	14.75	167.50	15.50	129.75	2.68	13.18
MH 400 ppm	22.25	15.25	198.00	14.75	134.00	2.24	11.55
Ethrel 125 ppm	21.50	12.00	180.00	20.50	151.50	2.30	15.55
Ethrel 250 ppm	23.00	12.50	207.50	25.75	157.50	3.97	17.68
Ethrel 500 ppm	26.50	13.50	229.75	20.25	168.75	3.37	16.50
NAA 50 ppm	20.50	13.25	172.25	13.50	148.25	2.98	11.35
NAA 100 ppm	20.50	12.50	171.50	16.50	142.50	1.77	11.35
NAA 200 ppm	24.50	11.50	187.00	21.25	149.75	2.70	15.85
Control (water spray)	16.75	14.25	113.75	12.00	108.75	1.70	9.05
S.E.±	0.74	0.25	8.56	0.88	5.45	0.14	0.28
C.D. (P=0.05)	2.17	0.74	24.84	2.55	15.83	0.41	0.82
C.V. (%)	6.95	3.81	9.97	9.85	7.74	10.84	4.22

significantly increased the weight of fruit than control. The maximum weight of fruit was recorded with ethrel 500 ppm (168.75 g) followed by ethrel 250 ppm, 125 ppm and NAA 200 ppm (157.50 g, 151.50 g and 149.75 g, respectively) while, minimum weight of the fruit (108.75g) was recorded under control (Table 2).

All the treatments except MH 400 ppm and NAA 50 ppm gave significantly higher yield than the control. The treatment with ethrel 250 ppm gave the highest yield per vine (3.97 kg) as well as per hectare (17.68 tonnes) followed by ethrel 500 ppm (3.37 kg per vine and 16.50 t/ha) and NAA 200 ppm (2.70 kg per vine and 15.85 t/ha) (Table 2). The lowest yield per vine (1.70 kg) as well as per hectare (9.05 tonnes) was recorded in control. The findings are in accordance with those of Kaushik and Singh (1977); Dubey (1983); Arora *et al.* (1985); Patel *et al.* (2009); Khule, *et al.* (2011); Sanandia *et al.* (2010) and Kooner *et al.* (2000).

REFERENCES

Arora, S.K., Pandita, M.L., Pratap, P.S. and Sidhu, A.S. (1985). Effect of ethephon, gibberellic acid and MH on vegetative growth, flowering and fruiting of cucurbitaceous crops. *J. Amer. Soc. Hort. Sci.*, **110** (3): 442-445.

Dubey, K.C. (1983). Effect of ethrel, naphthalene acetic acid and maleic hydrazide on growth, flowering and yield of sponge gourd. *Indian J. Agric. Sci.*, **53** (6): 437-441.

Gomez, K.A. and Gomez, A.A. (1984). *Statistical procedures for Agricultural Research*. A Willey International publication, John Willey and Sons, NEW YORK, U.S.A.

Kaushik, M.P. and Singh, I. (1977). Effect of ethrel on sex expression, fruit set and yield in *Lagenaria siceraria* (Molina) Standl. *Geobios.*, **4** (1): 27-28.

Khule, A.A., Tikka, S.B.S., Jadhav, D.J. and Kajale, D.B. (2011). Correlation and path co-efficient analysis in sponge gourd [*Luffa cylindrica* (Linn.) M. Roem.]. *Internat. J. Plant Sci.*, **6** (2): 277-279.

Kooner, K.S., Singh, J. and Saimbhi, M.S. (2000). Effect of plant growth substances on growth, sex expression and fruit yield in bottle gourd cv. PUNJAB KOMAL. *Haryana J. Hort. Sci.*, **29** (3 & 4): 268-269.

Patel, H.B., Kakade, D.K., Tomar, Rukam S. Kulkarni, G.U., Memane, P.G., Deshmukh, N.A., Sharma, Seema J. and Patel, C.D. (2009). Effect of plant growth regulators on sex expression and yield of sponge gourd [*Luffa Cylindrica* (Roem.)] cv. 'PUSA CHIKNI'. *Asian J. Hort.*, **4** (2) : 408- 410 .

Sanandia, S.T., Mehta, D.R. and Tarpara, V.D. (2010). Inheritance of fruit yield and its components in sponge gourd [*Luffa cylindrica* (ROEM) L.]. *Veg. Sci.*, **37**(1): 25-29.

Singh, R.K. and Choudhary, B. (1988). Differential response of chemical on sex modification of three genera of cucurbits. *Indian J. Hort.*, **45** (1-2): 89-99.