Website : www.asthafoundation.in
Progressive Research : An International Journal
Vol 17 (2) : 159-160 (July-2022), Print ISSN : 0973-6417, Online ISSN : 2454-6003
Society for Scientific Development in Agriculture and Technology, Meerut (U.P.) India

Effect of Plant Growth Regulators on Growth Parameters of Bottle Gourd [*Lagenaria siceraria* (Mol.) Standl.] Var. Pusa Summer Prolifc Long

Surender Mittal*, Makhan Lal and Rahul
Department of Vegetable science, CCSHAU, Hisar, Haryana
**Email : sr.srmittal@gmail.com*

Abstract

The present investigation was conducted at Research Farm of Department of Vegetable Science in Chaudhary Charan Singh Haryana Agricultural University, Hisar to find out the effect of plant growth regulators on growth of bottle gourd variety Pusa Summer Prolifc Long (PSPL) during 2016-2017. The treatments comprising five concentrations of plant growth regulators (Ethrel @ 100 ppm, Ethrel @ 200 ppm, GA_3 @ 25ppm and GA_3 @ 50 ppm) and control (water spray) were laid out in Randomized Block Design with three replications. Maximum reduction in vine length and inter-nodal distance was observed with foliar application of ethrel @ 200 ppm, whereas, number of branches per vine increased significantly when ethrel was sprayed @ 200 ppm.

Key words : *bottle gourd, etheral and GA_3.*

Introduction

Bottle gourd (*Lagenaria siceraria*) is a member of Cucurbitaceae family having origin from South Africa (1) is one of the oldest cultivated plants in the tropics (2) which is grown for immature fruits used for culinary purposes. It is popularly known as *lauki, ghia* or *dudhi* in India (3). This is a monoecious, annual, trailing or climbing vine with hairy stems, long forked tendrils, bears hard-shelled fruits with distinct (long, oblong and round). It is grown in rainy season as well as summer season and its fruits are available in the market throughout the year (4). It is widely cultivated throughout the tropics, especially in India, Sri Lanka, Indonesia, Malaysia, Philippines, China, Tropical Africa and South America. The major bottle gourd producing states are Bihar, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Orrisa, Punjab, Telangana, Andhra Pradesh, Jammu & Kashmir, Rajasthan, Tripura, Delhi, Karnataka, Meghalaya, Tamil Nadu, Kerala, Jharkhand, Sikkim, Haryana and Assam (5). Plant growth regulators are organic chemical substance, other than nutrients and vitamins which regulate the growth of plant when applied in small quantities. Gibberellins are the most powerful growth promoters because they increase internodes spacing, induce and promote flowering in many plants and modify the flower sex expression in some plants (6).

Materials and Methods

The experiment was conducted at Research Farm of Department of Vegetable Science, Chaudhary Charan Singh Haryana Agricultural University, Hisar to study the effect of plant growth regulators (Ethrel @ 100 ppm, Ethrel @ 200 ppm, GA_3 @ 25 ppm and GA_3 @ 50 ppm) on growth parameters of bottle gourd var. Pusa Summer Prolific Long. Seed of Pusa Summer Prolific Long (PSPL) variety of bottle gourd were obtained from Department of Vegetable Science, CCS Haryana Agricultural University, Hisar. The seeds were sown directly on the edges of the furrow. Two to three seeds were sown per hill about 3 to 4 cm depth. When the seedlings attained 10-15 cm height or two to three leaves stage and hard enough then one healthy seedling was selected to remain in each pit and others were thinned out. Two different plant growth regulators with different concentration were used in the experiment. Ethrel and GA_3 were used to prepare ethrel (100 ppm), ethrel (200 ppm), and GA_3 (25 ppm), GA_3 (50 ppm) solutions, respectively. As per the treatment experimental dose of plant growth regulators solution were applied in two installments. 1st spray was done at 2 true leaf (fully expanded) stage of seedlings and 2nd spray was done at 4 true leaf (fully expanded) stage of seedling with the help of a hand sprayer. Stem length was taken at final harvest and measured in centimeter from ground level to tip of the each vine and mean value was calculated. Total number of primary branches were counted at final harvest from each vine of the each treatment and mean value was calculated. Internodal distance between nodes on vine was recorded from the vines in each treatment by centimeter scale and average internodal distance was calculated.

Results and Discussion

Length of vine at final harvest (cm) : Length of vine of bottle gourd under different plant growth regulators was recorded and is presented in Table-1. Length of vine was found significantly different from each other in respect of different growth regulators treatment. It is clear from the data that length of vine reduced with ethrel application. Maximum reduction in length (385.11 cm) was observed with foliar spray of ethrel @ 200 ppm which was at par with ethrel spray @ 100 ppm (396.22 cm) as compared to water spray treatment (451.00 cm). The reason behind this reduction may be due to decreased level of gibberellin

Received : April-2022; Revised : April-2022; Accepted : May-2022

Table-1 : Effect of plant growth regulators on length of vine at final harvest (cm), branches per vine at final harvest and Inter-nodal distance at final harvest (cm) of bottle gourd.

Parameters / PGR	Length of vine at final harvest (cm)	Branches per vine at final harvest	Inter-nodal distance at final harvest (cm)
Water spray (Control)	451.00	6.18	14.14
Ethrel @ 100 ppm	396.22	6.97	13.14
Ethrel @ 200 ppm	385.11	7.47	12.61
GA_3 @ 25 ppm	488.00	6.49	14.79
GA_3 @ 50 ppm	551.45	6.77	15.44
CD at 5% level	8.50	0.27	0.28

after ethrel application may be the possible reason for reduced vine growth. These findings are in close agreement with the results of (7, 8). Similar results were obtained by (9, 10). While, length was found to be maximum (551.45 cm) when GA_3 was sprayed @ 50 ppm followed by GA_3 @ 25 ppm (488.00 cm).

Branches per vine at final harvest : A persual of data presented in Table-1 on number of branches per vine showed that application of growth regulators on bottle gourd lead to increase in number of branches per vine. Among plant growth regulators, maximum branches (7.47) were observed with the application of ethrel @ 200 ppm followed by (6.97) by ethrel spray @ 100 ppm, whereas, under control treatment (water sprayed) produced minimum number of branches per vine (6.18). Foliar spray of GA_3 @ 25 & 50 ppm resulted significantly higher number of branches (6.49 and 6.77), respectively than control treatment. The reason responsible for this increase might be due to antimitotic action of ethrel and also acts as a gibberellin antagonist which creates an inhibitory effect on the suppression of the apical growth of main axis and thereby increased number of branches. Earlier such findings were reported in watermelon (*Citrullus lanatus*) by (11) that the application of ethrel at 500 ppm concentration brought significant improvement in number of secondary branches per plant. Similar results were obtained by (12) in ridge gourd, (13) in bitter gourd.

Inter-nodal distance at final harvest (cm) : Data regarding inter-nodal distance of bottle gourd as affected by plant growth regulators have been presented in Table-1. Among growth regulators minimum inter-nodal distance (12.61 cm) was found with the application of ethrel @ 200 ppm followed by ethrel @ 100 ppm and control treatment (13.14 and 14.14 cm), respectively whereas, it was recorded maximum (15.44 cm) with GA_3 @ 50 ppm foliar spray. This result can be attributed to the reason that application of ethrel inhibits both the cell division and cell elongation in the meristematic shoots resulting in production of shorter shoots, as reported by (14). The results of the present study are in conformity with the reports of (15). They stated that the ethephon at 250 mg per liter resulted in the shortest inter-nodal length in long melon crop.

References

1. Chakravarty H.L. (1982). Fascicles of flora of India: fascicle 11. Cucurbitaceae. Howrah: Botanical Survey of India, pp.136.
2. Purseglove J.W. (1968). Tropical crops. Dicotyledons 1 and 2. Tropical Crops. pp 1-2.
3. Sharma S.K., Puri R., Jain A., Sharma M.P., Sharma A., Bohra S. and Prasad M. (2012). Assessment of effects on health due to consumption of bitter bottle gourd (*Lagenaria siceraria*) juice. Indian Journal of Medical Research, 135(1): 49.
4. Thakur P., Sharma D., Visen V.K. and Dash S.P. (2013). Evaluation of bottle gourd [Lagenaria siceraria (mol.) standl.] genotypes. *Plant Archives*, 15(2): 1037-1040.
5. National Horticulture Board (2015). Indian Horticulture Database. Ministry of Agriculture, GOI, Gurgaon.
6. Davies, P. (2013). Plant hormones: physiology, biochemistry and molecular biology. Springer Science & Business Media.
7. Rudich J., Kedar N. and Halevy A.H. (1970). Changed sex expression and possibilities for F 1-hybrid seed production in some cucurbits by application of ethrel and alar (B-995). *Euphytica,* 19(1): 47-53.
8. Shalini T., Chamundeswari N., Satyanarayana P.V., Lal Ahmed M., Sireesha A. and Srinivasa Rao V. (2021). Screening of rice germplasm for iron and zinc content in brown and polished rice using ED-XRF. *Frontiers in Crop Improvement*, 9(2): 170-173.
9. Sims W.L. and Gledhill B.L. (1969). Ethrel effects on sex expression and growth development in pickling cucumbers. *California Agriculture,* 23(2): 4-6.
10. Mishra R.S., Panigrahi R.K. and Panda S.C. (1976). Chemical regulation of sex expression in relation to growth and yield in cucumber. *Orissa Journal of Horticulture,* 4(1-2): 57-61.
11. Dixit A., Rai N. and Kumar V. (2001). Study on the effect of plant growth regulators in watermelon (Citrullus janatus) cv. Sugar Baby. *Indian Journal of Agricultural Research,* 35(1): 13-17.
12. Hilli J.S., Vyakarnahal B.S., Biradar D.P. and Ravi H. (2010). Effect of growth regulators and stages of spray on growth, fruit set and seed yield of ridge gourd (*Luffa acutangula* L. Roxb). *Karnataka Journal of Agricultural Sciences,* 23(2): 239-242.
13. Mia M.B., Islam M.S. and Shamsuddin Z.H. (2014). Altered sex expression by plant growth regulators: An overview in medicinal vegetable bitter gourd (*Momordica charantia* L.). *Journal of Medicinal Plants Research,* 8(8): 361-367.
14. Thappa M., Kumar S. and Rafiq R. (2011). Influence of plant growth regulators on morphological, floral, and yield traits of cucumber (*Cucumis sativus* L.). *Kasetsart Journal* (Naural Scence), 45: 177-188.
15. Arora S.K., Pandita M.L., Pandita P.S. and Batra B.R. (1994). Response of long melon (Cucumis melo var. utilissimus) to foliar application of plant-growth substances. *Indian Journal of Agricultural Sciences,* 64(2): 841–844.