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Review Article

Effect of Plant Growth Regulators on Growth and Flower Yield of Jasmine

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ABSTRACT

A study was conducted in Floriculture Unit of the Department of Horticulture, Naini Agriculture Institute, SHUATS, Prayagraj during 2019-20 to evaluate the growth, flowering and yield of Jasminum nitidum CO-1(Star Jasmine) with the effects of four growth regulators namely Naphthalene acetic acid (NAA), Gibberellic acid (GA3), Cycocel and Maleic hydrazide (MH) each at 3 concentrations. The experiment comprised of 13 treatments, T1-Control(water spray), T2-NAA(25ppm), T3-NAA(50ppm), T4-NAA (75 ppm), T5-GA3 (25ppm), T6-GA3 (50ppm), T7-GA3 (75ppm), T8-CCC (500ppm), T9-CCC (750ppm), T10-CCC (1000ppm), T11-MH (100ppm), T12-MH (200ppm), T13-MH(250ppm), and was laid out in Randomized Block Design and replicated thrice. The results were revealed that plant height with 80cm was superior at GA3 75ppm concentration over rest of the treatments. Cycocel at 750ppm and MH at 250ppm were equally effective in increasing the plant spread in N-S (47.7cm) and E-W (46.3 cm) and closely followed by NAA at 75ppm (47.7 cm and 41.7 cm). MH at 250 ppm increased number of primary branches per plant (5.7) followed by NAA at 75 ppm. MH at 200 ppm significantly increased secondary branches per plant (11.3) followed by GA3 at 75 ppm. Cycocel at 1000 ppm induced early flowering (78.67 days) followed by GA3 at 75 ppm and MH at 250 ppm with 80 days.MH significantly increased flower yield (2.03kg/plant/year) at 250ppm.Based on these studies, it can be recommended that primary branches and flower yield can be increased by spraying of MH at 250ppm in Jasmine CO-1(star jasmine).

Keywords: Cycocel; GA3; Star jasmine

INTRODUCTION

Jasmine is one of the oldest of fragrant flowers and is specially appreciated in India, where most people have a love for the fragrant flowers. The word Jasmine has been derived from Persian word. Yasmyn meaning fragrance since time immemorial, it is considered as a spiritual flower of India. Jasmine is considered as the "King of Oils" (Rose is the "Queen") especially for its flowers and sweet fragrance. A single jasmine vine can perfume an entire room or garden. India is one of the centers of origin of jasmine. For the past many centuries jasmines have adorned the gardens of Central and South East Asia, Afghanistan, Iran, Nepal and many other tropical and sub-tropical countries and many of the jasmine species are native of India and have their origin in the Southern Foothills of the Himalayas. The jasmine belongs to family Oleaceae and the Genus Jasminum comprises of about 500 species, which are dispersed in the warmer parts of Europe, Asia, Africa and the Pacific region. A critical analysis of these species, however, has revealed the number of true species to be only 89, of which 40 inhabit the Indian sub-continent. Recently, jasmine cultivation has received a fillip through research findings which indicated the potentiality of South Indian Jasmine. But one of the serious limiting factors which affects both jasmine flower growers and the consumers and which is likely to affect commercial production, is that the flowering of all the Jasminum species is seasonal. There are peak and lean productive seasons with consequent gluts and scarcity which affect the price trends greatly. Tamil Nadu Agriculture University (TNAU) newly-released CO-1 Star jasmine which promises flower throughout the year as an alternate to the traditional jathi malli. A main stay in temple rituals, jathi malli becomes expensive and unavailable during winter (between November and February) because it is off season for the variety [1]. To address the issue, TNAU developed the new variety of jasmine, which will flower throughout the year especially in the lean season (Nov-Feb). Jasminum nitidum CO-1(star jasmine) is an evergreen and bears dual characteristics, it acts like a shrub when planted alone and can be pruned to desired shape to act like a ground cover, as well as like a twining vine (semi-climber) and climbs using tendrils or twines when planted near a support, reading up to 3-4 feet as shrub alone and can climb up to 20 feet as a vine. It has a fast-growing habit and can be used as indoor plant too.

The plants, have long woody stem and bold buds with pinkish

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tinge, which blooms into snow white star shaped flower with 10 petals which are leaner, longer and spread out. The flower bears a mild pleasing scent and appears in cluster forms (inflorescence) with slaver form shape (tubular base and open flat petals). The flowers bloom at night and easy to pluck, with its long stem and bold buds, it is easier to string them too. The flowers will not droop for four to five hours. The buds, after plucking and even stringing, remain unopened for 12 hours under room temperature and could remain so for 60 hours under refrigeration. Leaves are smooth, leathery, simple (not divided), lanceolate (broad at center) with opposite arrangement and dark glossy green which in addition makes the plant attractive. Developments after the discovery of growth regulators and their application in agriculture and more especially in horticulture are significant [2]. Regulation of plant growth and development using natural plant hormones for greater production have received the utmost attention. Growth and flowering responses of ornamental plant to these chemical substances have been intensively studied with a view to have compact plants with greater number of flowers and also to hasten or delay flowering according to the needs of the grower.

MATERIALS AND METHODS

The present investigation was carried out in form of a field experiment in the garden of the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India during 2019-20. This area is situated on the right side of the Yamuna river by the side of Prayagraj-Rewa road about 12 km from the city. Prayagraj has a subtropical and semi-arid climatic condition, south-eastern part of Uttar Pradesh prevails with both extremes of temperature, in winter, during December and January temperatures sometime fall very low up to 3, while the weather becomes very hot in summer with the temperatures sometimes soaring to a high of over 48 in May and June. For yield attributes, the number of days taken for flower bud initiation was recorded by counting the days, the number of flower buds per plant were counted and average numbers of flower buds were recorded, the yield of flowers per plant is weighed daily and calculated per year and converted it into tonnes hectare per year [3]. The data from the experiments were analyzed statistically, wherever treatment differences were found significant, the critical differences were worked out at 5% level of probability (P=0.05).

DISCUSSION AND CONCLUSION

The highest plant height was observed with the application of GA3-75 PPM (80.00 cm) which was significantly superior over control (32.70 cm). The PGR'S when applied as foliar spray were absorbed by the leaves and readily translocated in both xylem and phloem tissues resulting in distribution throughout the plant system. This might be the reason for the enhancement in plant height (Table 1) GA3 can affect plant growth by its effect on cell growth and cell elongation leading to bigger plants. The number of primary branches was found to be significant among the treatment. The maximum numbers of primary branches (5.7) were recorded in treatment with MH 250 ppm. The highest secondary branches were observed with the application MH 200 ppm (11.30 cm) which was significantly superior over control (6.00 cm). Effect of MH significantly decreased plant height and intermodal length, increased plant spread, number of branches [4,5]. MH probably interfered with metabolic activities of the plant by intercepting nutrient assimilation and growth. The highest plant spread (N-S) was observed with the application of NAA-75 ppm and CCC-750 ppm (47.7 cm) which was significantly superior over control (24.3 cm) by 96.2%. Auxin is probably investigated plant hormone and to be involve in virtually in every aspect of plant growth and development. Auxin group NAA increase the growth of the plants by cell division, cell elongation apical dominance [6]. The highest plant spread (E-W) was observed with the application of MH 250ppm (46.3) which was significantly superior over control (26.00 cm) by 78%.

Table 1: Effect of Plant Growth Regulators on Growth Parameters of Jasmine

Tretements	Plant Height (cm)	Primary Branches (no.)	Secondary Branches (no.)	Plant Spread (N-S) (cm)	Plant Spread (E-W) (cm)
CONTROL	32.7	2.7	6	24.3	26
NAA - 25 PPM	26.7	2.3	4.7	41.3	40.7
NAA - 50 PPM	44.8	3.7	7.3	36.7	36
NAA - 75 PPM	47.9	5	6	47.7	41.7
GA3 - 25 PPM	27	1.7	1.7	17.7	29
GA3 - 50 PPM	52	4.7	7.7	42	37.3
GA3 - 75 PPM	80	4.3	11	38.3	30.7
CCC - 500 PPM	33.7	4.7	6.7	35	31.8
CCC - 750 PPM	53.3	4.3	8.3	47.7	45.7
CCC - 1000 PPM	36	2.7	6.7	30.7	34.7
MH - 100 PPM	41	4	11	42	32.7
MH - 200 PPM	29.3	4	11.3	28.7	32.7
MH - 250 PPM	53.3	5.7	10.7	47.3	46.3
F-test	S	S	S	S	S
CD (0.05)	24.85	2.27	5.42	17.68	12.21

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