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EFFECT OF PLANT GROWTH REGULATORS ON FLOWERING AND YIELD OF MUSKMELON (*CUCUMIS MELO* L.)

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Abstract

The effect of plant growth regulators on flowering and yield of muskmelon (*Cucumis melo* L.) was carried in January – April 2015. Two sprays of plant growth regulators *i.e.* Ethrel, Naphthalene acetic acid, Gibberellic acid, SADH and Kinetin were given at 2nd and 4th leaf stages in the treatment NAA 150 ppm + Ethrel 250 ppm. The lowest number of male flowers (63.23), the highest number of female flowers (17.43), the number of fruits per vine (10.63) and fruit weight (0.679) were recorded. The yield characters such as fruit diameter (12.97) and yield per plant (7.01) were observed maximum in the treatment NAA 150 ppm + Ethrel 250 ppm. The application of NAA 150 ppm + ethrel 250 ppm observed the best treatment, while compared to other treatment and control.

Key words : Ethrel, Naphthalene acetic acid, gibberellic acid, SADH (Succinic acid 2-2- dimethyl hydrazide), Kinetin.

Introduction

The muskmelon (*Cucumis melo* L.) is one of the most important vegetables crop. It belongs to the family Cucurbitaceae. Edible melon belongs to either *Cucumis melo* var. *reticulatus* or *C. melo* var. *cantaloupensis*. In India, this crop is popular in northern states especially in Uttar Pradesh and Punjab and in most every place in plains. It is said to be the native of Tropical Africa with Central Asia and North - West India as secondary centres of origin (Whitaker and Davis, 1962). The total area under muskmelon cultivation in world estimated to be 803 thousand hectare with an annual production of 13.8 million metric tonnes (Anonymous, 2014). Plants are either monoecious or andro-monoecoius annuals with long trailing vines, with shallow lobed round leaves, small and yellow coloured flower and show considerable variation in fruit size and shape. In muskmelon, 250 ppm of ethrel is generally recommended to promote more number of female flowers (Rudich *et al.*, 1969). Growth regulators have tremendous effects on sex expression and flowering in various cucurbits leading to either suppression of male flowers or increase in number of female flowers (Al-Masoum and Al-Masri, 1999). Growth regulators plays an important role in both morphology and physiology of the plants. The exogenous application of plant growth regulators can alter the sex ratio and sequence when applied at two or four leaf stage (Hossain *et al.*, 2006).

Materials and Methods

The present investigation was carried out at Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu, India. It is geographically situated at 11°24' North latitude and 79°41' East longitude and at an altitude of ± 5.79m above the mean sea level. The seed of the muskmelon variety "Pusa Sharbati" was chosen for the investigation. The experiment was laid out in Randomized Block Design with three replications and ten treatments *viz.*, T_1 : Absolute control, T_2 : NAA 50 ppm + Ethrel 250 ppm, T_3 : NAA 150 ppm + Ethrel 250 ppm, T_4 : SADH 500 ppm + Ethrel 250 ppm, T_5 : SADH 1000 ppm + Ethrel 250 ppm, T_6 : GA_3 10 ppm + Ethrel 250 ppm, T_7 : GA_3 20 ppm + Ethrel 250 ppm, T_8 : Kinetin 10 ppm + Ethrel 250 ppm, T_9 : Kinetin 20 ppm + Ethrel 250 ppm, T_{10} : Ethrel 250 ppm. Observations were recorded days to first male and female flowering, number of male and female flowers per vine and yield characters number of fruits per vine, fruit weight, fruit yield per plant and yield per hectare.

Results and Discussion

In different concentrations response of NAA with Ethrel on days to first male and female flowering and number of male and female flowers was found significant over control. Stankovic *et al.* (2001) also reported that the NAA effect has got in sex expression and delayed

Table 1: Effect of plant growth regulators on flowering and yield of muskmelon

S. no.	Days to first male flowering	Days to first female flowering	No. of male flowers per vine	No. of female flowers per vine	No. of fruits per vine	Fruits weight (kg)	Fruit yield per plant (kg)	Fruits yield (t ha^{-1})
T_1	18.22	49.07	120.53	8.45	3.39	0.159	0.53	1.30
T_2	31.97	32.12	80.92	13.95	8.63	0.433	3.22	7.01
T_3	42.76	21.42	63.23	17.43	10.63	0.679	7.01	16.4
T_4	36.52	28.61	72.69	15.49	9.40	0.527	4.73	10.50
T_5	26.09	36.51	92.14	12.27	6.45	0.412	2.42	5.09
T_6	32.02	33.05	82.95	12.41	8.47	0.509	4.18	9.41
T_7	40.57	25.10	64.46	16.31	9.68	0.603	5.76	13.15
T_8	26.36	40.07	101.37	11.25	7.47	0.336	2.24	5.49
T_9	23.11	44.16	103.22	9.71	5.43	0.310	1.53	3.51
T_{10}	20.06	48.12	105.13	9.51	4.42	0.234	1.42	2.84

the staminate flowering process for 25 to 30 days compared to control in muskmelon. Earlier finding confirmed with Vadigeri *et al*. (2001) in cucumber, Hidayatullah *et al*. (2012) in bottlegourd and Baset Mia *et al*. (2014) in bittergourd. NAA can increase the fruit set ratio, prevent fruit dropping and promote sex ratio in plant (Raoofi *et al*., 2014). Among the treatment earliest male flower was observed (18.22) in control, earliest female flowering (21.42) was observed in the treatment NAA150 ppm + ethrel 250 ppm. Manzano *et al*. (2008) reported that ethrel promotes feminization of melon plants, but concluded that ethrel had strongest effect in gynoecious than in monoecious and andromonoecious in plant. Minimum number of male flowers (63.23) and maximnum number of female flowers (17.43) was recorded in the treatment NAA150 ppm + ethrel 250 ppm. Ethrel is the substances that slow down the cell division and cell elongation in meristamatic tissue of shoot and regulated the plant height without change in the morphology and physiology of the plant (Hilli *et al*., 2010) in ridgegourd. Similar result was observed by Chaudhry and Khan (2006). The response of different concentrations of NAA with Ethrel on number of fruit per vine, fruit weight, fruit yield per vine and yield per hectare was found significant overcontrol.

Among the treatment NAA 150 ppm with ethrel 250 ppm concentrations recorded the maximum fruit per vine (10.63), fruit weight (0.679), fruit yield per vine (7.01), yield per hectare (16.4). Vadigeri *et al*. (2001) reported that application of ethrel (200 and 400 ppm) at 4 to 6 true leaf stage proved effective in increasing number of fruits per plant and improved the quality of fruits as compared to GA_3 at 5 and 10 ppm in cucumber. Hidayatullah *et al*. (2012) reported that application of GA_3 (30 ppm) at 2 and 3 leaf stages recorded maximum fruit per plant as compared to control in bottlegourd. It was concluded that the among all the treatments, treatment NAA 150 ppm + Ethrel 250 ppm showed significant difference over control. This treatment improve earliness in male and female flowers and number of male and female flowers per vine and yield attributing characters like number of fruits per vine, fruit weight, fruit yield per plant and fruit yield per hectare. A increase in fruit yield in treated plant may attributed to reason that plants remain physiologically more active to build up sufficient food for developing flowers and fruits, ultimately leading to higher yield. Similar results was reported by Arora and Pratap (1988) in pumpkin.

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