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Assessment the efficacy of plant growth regulators on growth and yield of Chilli (*Capsicum annuum* L.) in Koshi region of Bihar-an on farm Trial

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Abstract

The present on farm trial was carried out at 8 farmers field of Madhepura district under supervision of KVK, Madhepura, BAU, Sabour (Bhagalpur) during kharif 2019 to assess the effect of plant growth regulators (PGRs) on promoting growth and yield of Jwala, a local cultivar of chilli. NAA @ 40 ppm and triacontanol @ 5 ppm were sprayed at 46, 82 and 157 DAT. Result indicated that the use of Triacontanol @ 5 ppm at all the three stages showed for the highest plant height (94.52cm), fruit setting percentage (55%), number of fruits per plant, fruit weight, fruit length, number of seeds per fruit, seed weight per fruit and fruit yield (86.56q/ha), whereas, the yield and yield attributing traits were less under the farmer's practice, where there was no use of PGRs. The spray of Triacontanol @ 5 ppm at all the three stages also gave the highest net profit and B:C ratio (1: 3.09). The study revealed that the foliar spray of Triacontanol @ 5 ppm is more effective than NAA @ 40 ppm and the farmers practice (no use of PGR)

Keywords: Triacontanol, NAA, chilli, net profit, B:C ratio

Introduction

Chilli (*Capsicum annuum* L.) is one of the most important annual spice cum vegetable crops belonging to solanaceae family, grown extensively in most parts of Bihar. The fruits are available in the market throughout the year since chillies are produced in all the three seasons in one or other part of the country. The production of chilli is affected by several factors governed not only by the inherent genetic factors but also by several environmental factors and good management practices. Lower production of chilli is mainly due to flower and fruit drop, lower percentage of fruit setting which is caused by physiological and hormonal imbalances in the plants particularly under unfavorable environments, such as extremes of temperature i.e. too low or high temperatures (Rylski and Halevy, 1975; Erickson and Markhart, 2001) [8, 4]. Several research work on the effect of plant growth regulators in solanaceous fruit and vegetable crops have revealed that the application of some of the plant growth regulators at different stages of crop growth has been found effective in reducing the flower and fruit drops thereby enhancing production of chilli per unit area. The varying responses of chilli to plant growth regulators have been reported by Chattopadhyay and Sen (1974) [2], Minraj and Shanmugavelu (1987) [6], Balraj *et al.*, (2002) [1] and Joshi *et al.* (1999) [5]. However awareness among the farmers about response of PGRs on growth and yield of chilli is meagre in koshi region. Keeping this view in consideration the present on farm trial was conducted in farmers' field to validate the effectiveness of PGRs as foliar spray to on growth and yield of commercial chilli cultivar Jwala.

Materials and Method

The present investigation was carried out by Krishi Vigyan Kendra, Madhepura during kharif (April-August) of 2019 on eight farmers' field of different villages of madhepura district. The soil of experimental field was sandy to sandy loam in texture. The nursery of local cultivar of chilli i.e. Jwala was raised in the month of April and transplanted in the month of May, 2019 at a spacing of 60 cm x 45 cm during evening hours and a light irrigation was given to the crop. The crop was fertilized with recommended dose of 120 kg N, 60 kg P₂O₅ and 60 kg K₂O per hectare. Half of N (60kg/ha) and full of P and K was applied at the time of field preparation and Remaining half of N (60 kg) was applied as side dressing in three equal split doses at 30, 60 and 127 days after transplanting.

Three treatments i.e. NAA @40 ppm, triacontanol @5 ppm and farmers practice (No spray of PGRs) were arranged in Randomized Block Design with eight replications (Eight farmers plot). The intercultural operations and plant protection measures were followed as per the recommendations of the crop.

Results and Discussion

Growth, development and productivity of chilli crop largely depend on plant genetics, hormonal and environmental condition under which the crop is grown. Data on various growth, yield attributes and yield displayed in mean summary Table 1 revealed that the use of PGRs showed the better response as compared to farmers' practice (no use of PGRs). The highest plant height (93.60 cm), number of branches per plant (6.25), fruit setting (55.00%), number of fruits per plant (75.25), fruit weight (339.5 g), fruit length (6.27cm), number of seeds per fruit (56.75), seed weight per fruit (0.19g) and fruit yield (86.56 q/ha) was recorded under the treatment when Triacontanol was applied @ 5ppm at 42, 86 and 157 DAT, which was statistically superior to all other treatment except NAA @ 40ppm for plant height, number of branches per plant and number of fruits per plant.. The highest fruit yield of Jwala under T.O.3 (Triacontanol @5ppm) may be due to increase in uptake of nutrients and water that might have promoted the growth parameters, which would be resulted in more photosynthesis and more utilization of food materials to reproductive growth i.e higher fruit set percent, greater number of fruits/plant, number of seeds/fruit, seed weight/fruit and ultimately fruit yield. The beneficial effects

of triacontanol on chilli have been reported by several research workers (Joshi *et al.*, 1999; Balraj *et al.*, 2002 and Muralidharan *et al.*, 2002) [5, 1]. Improvement in yield and its component characters due to application triacontanol might be ascribed due to more efficient utilization of food for reproductive growth (flowering and fruit set), higher photosynthetic efficiency and enhanced source to sink relationship of the plant, increased uptake of nutrients and water, reduced transpiration and respiration, enhanced translocation and accumulation of sugar and other metabolites (Chaudhary *et al.*, 2006) [3]. On the basis of above findings it was noticed that the application of Triacontanol @ 5ppm is more effective over NAA @ 40ppm and farmer practice (No use of PGRs) in respect of growth and higher yield of chilli under Koshi region of Bihar.

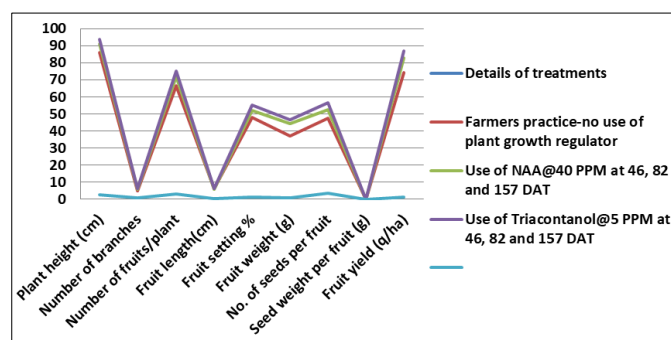


Fig 1: PGR effect on chilli

Table 1: Effect of plant growth regulators on the yield and yield attributes of chilli and their economics.

Sl No	Details of treatments	PH (cm)	NOB/P	NOF/P	PFL(cm)	FS %	F W(g)	NOS/F	SW/F (g)	FY (q/ha)	COC (Rs.)	GR (Rs.)	BCR
T.O.1	Farmers practice-no use of plant growth regulator	86.06	4.87	66.75	6.18	47.87	251.25	47.37	0.14	74.2	55445	148400	1:2.67
T.O.2	Use of NAA@40 PPM at 46, 82 and 157 DAT	91.16	5.87	72.00	6.0	51.87	320.62	52.62	0.17	82.6	56275	165200	1:2.93
T.O.3	Use of Triacontanol@5 PPM at 46, 82 and 157 DAT	93.60	6.25	75.25	6.25	55.00	339.5	56.75	0.19	86.8	56067	173600	1:3.09
SE(m)±		0.92	0.22	1.07	0.65	0.44	2.622	1.17	0.005	0.425			
C.D.(5%)		2.81	0.66	3.27	0.200	1.37	8.46	3.60	0.014	1.301			

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