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Effect of ethrel on growth and yield of black cumin (*Nigella sativa* L.) under gangetic alluvial soil of West Bengal

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ABSTRACT

An experiment was conducted to study the effect of different concentration of Ethrel in comparison with the commercial form of growth promoter ace in promoting growth and yield of black cumin during 2006 and 2007. The experiment was laid out in a Randomized Block Design having 6 treatments replicated thrice. In this experiment growth regulators were Ethrel (50 ppm, 75 ppm, 100 ppm and 125 ppm) along with ace (a commercial bioregulator @ 0.5 ml/lit). Further to get a comparison one untreated control treatment was included to have a clear picture of controlled plants as compared to growth regulator treatment. The results clearly indicated that there was increase in seed yield with all the treatments except the control (untreated) plot. Among all the treatments, Ethrel @ 75 ppm proved to be most effective in promoting growth and gave highest seed yield (6.03 q/ha), followed by Ethrel @ 100 ppm (5.59 q/ha) which was statistically at par.

Key Words : Ethrel, growth regulator, yield attributing characters.

Black cumin (*Nigella sativa* L.), an annual flowering plant, belongs to the family Ranunculaceae and native to southwest Asia. The seed is used as a spice. Because of number of factors viz. non availability of quality seeds for planting, improper crop management, pest and disease infestation and improper post harvest handling, the yield of the crop is not up to the mark (El Deen and Ahmed, 1997).

Among all the factors, the crop management is very much imperative to get a desired yield. Use of growth regulators in promoting flowers and seed yield was reported by many workers (Shah and Samiullah, 2006). Keeping the above idea in view, the present experiment was conducted to find out the suitable concentration of growth regulator Ethrel including a commercial form of growth promoter, ace.

MATERIAL AND METHODS

Good quality seeds of black cumin cv. Rajendra Shyama of duration 130 days were sown in typical Gangetic alluvial soil having sandy loam texture at the Horticultural Farm, Jaguli, Bidhan Chandra Krishi Viswavidyalaya, Nadia, West Bengal during 2006 and 2007. The experiment was laid out in a Randomized Block Design having 6 treatments replicated 3 times, where plot size were 1.2 x 1.2 m seeds were sown in 15 x 10 cm spacing on 17th November, 2006.

In this experiment growth regulators were Ethrel (50 ppm, 75 ppm, 100 ppm and 125 ppm) along with ace (a commercial bioregulator @ 0.5 ml/lit). Further to get a comparison, one untreated control treatment was included to have a clear picture of controlled plants as compare to growth regulator treatment. All the treatments were sprayed twice at 45 and 60 days after sowing (DAS).

So far as the manuring is concerned well rotten FYM @ 15 t/ha was broadcasted and mixed thoroughly with the soil during final land preparation. Out of recommended dose of N, P_2O_5 and K_2O @ 60:30:30 kg/ha respectively, half of the N and full P_2O_5 and K_2O were applied as basal dose, whereas rest 50% N was top dressed at 45 DAS. N, P and K were applied in the form of urea, single superphosphate and muriate of potash.

All the observations on growth were recorded at different times. Observation on yield and yield component of the crop were also taken. All the data were analyzed statistically.

RESULTS AND DISCUSSION

Considerable increment in growth was obtained with the treatment T_2 (Ethrel @ 75 ppm) and the treatment T_3 (Ethrel @ 100 ppm). Among all the treatments T_2 showed the best performance regarding crop growth resulting in highest yield (6.03 q/ha) (Table 1).

Regarding the vegetative growth parameter, it is clear from table that Ethrel @ 100 ppm was at par with the treatment T_2 (Ethrel @ 75 ppm). The better performance of T_2 (Ethrel @ 75 ppm) over the other doses viz. Ethrel @ 125 and 50 ppm and ace (commercial form) @ 0.5 ml/lit was possibly

because of its better efficacy in promoting the plant growth and increasing fruit number. Moreover the commercial form ace is a formulation which acts through surface transmission and imbibition into plant tissues (Table 1). Similar type of result was reported by Shah *et al*. (2006).

From the table it is clear that 1000 seed weight is more with the treatment T_2 (Ethrel @ 75 ppm) and T_3 (Ethrel @ 100 ppm) as compare to the other treatments. It is also evident from the table that Ethrel @ 75 ppm was found to produce the highest yield (6.03 q/ha) which was 30.8% higher over the control (4.61 q/ha) (Table 1). The other yield attributing characters like number of fruits/plant (38.13) and number of seeds/fruit (73.96) were also highest with the treatment T_2. The same trend was also reported by Shah *et al*. (2006).

Table 1. Effect of growth regulators on vegetative growth and yield of black cumin (Mean of 2 years).

Treatments	Plant height (cm)	Number of fruits/plant	Number of seeds/fruit	1000 seed weight	Yield/ plot (g)	Seed yield/ ha (q)
Ethrel @ 50 ppm	43.60	26.16	65.30	1.58	72.48	5.03
Ethrel @ 75 ppm	52.36	38.13	73.93	1.93	86.44	6.03
Ethrel @ 100 ppm	48.60	33.00	70.46	2.11	80.69	5.59
Ethrel @ 125 ppm	45.96	30.56	66.66	1.80	78.31	5.43
Ace @ 0.5 ml/lit	58.66	31.40	64.86	1.75	77.00	5.34
Untreated control	41.23	26.63	61.03	1.03	66.49	4.61
CD (P=0.05)	**2.71**	**2.35**	**2.77**	**0.35**	**2.89**	**0.20**

From the above findings it may be concluded that application of Ethrel is better in expressing vegetative growth and yield compared to the commercial bioregulator ace. Again among the different concentrations, Ethrel @ 75 ppm sprayed twice at 45 and 60 days after sowing proved best and further increase in the concentration of chemical is not effective in the new alluvial zones of West Bengal.

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