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SHORT COMMUNICATION

EFFECT OF BRASSINOSTEROIDS ON GROWTH AND YIELD OF TOMATO (*LYCOPERSICON ESCULENTUM* MILL.) UNDER FIELD CONDITIONS

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The effects of brassinolide, 28-homobrassinolide and 24-epibrassinolide were studied on growth and yield of tomato under field conditions. All the three brassinosteroids stimulated both growth and yield of tomato plants under field conditions.

Key words : **Brassinosteroids, growth, tomato, yield.**

Brassinosteroids are new group of naturally occurring phytohormones with growth promoting nature (Sasse 1999). Based on the fact that brassinosteroids are reported in all plants tested so far (9 monocots, 28 dicots, 5 gymnosperms, 1 pteridophyte and 1 alga), Sasse (1997) suggested that brassinosteroids are ubiquitous in plant kingdom. Recent work on brassinosteroid biosynthetic mutants in *Arabidopsis thaliana* (Li *et al.* 1996), *Pisum sativum* (Nomura *et al.* 1997) revealed that brassinosteroids are essential for plant growth and development. The application of brassinozole, a specific inhibitor of brassinosteroid synthesis, to cress (*Lepidium sativum*) plants resulted in dwarfism and application of brassinolide reversed this dwarfism, indicating the necessity of brassinosteroids for plant growth (Asami *et al.* 2000). The ability of exogenously applied brassinosteroids to improve crop yields of rice (Krishnan *et al.* 1999) and broad bean (Helmy *et al.* 1997) has been reported. Exogenous application of brassinosteroids was found to increase the growth and yield of groundnut (Vardhini and Rao 1998) and the growth promotion was associated with increase in nitrogen fixation (Vardhini and Rao 1999). The present work is designed to evaluate the influence of exogenously applied brassinosteroids on the growth and economic yield of tomato plants under field condition.

Brassinolide, 28-homobrassinolide and 24-epibrassinolide were purchased from M/s. Beak Technologies. Inc., Brampton, Ontario, Canada. Seeds of tomato (*Lycopersicon esculentum* Mill.) var. Pusa Early Dwarf (P.E.D.) were procured from National Seeds Corporation (NSC), Hyderabad.

The seeds were sown in the 4th week of July 2000 in 100 × 80 cm nursery beds. Twenty day old plants were transplanted in the early hours of the day in experimental plots at 30 × 30 cm spacing. One mg of brassinosteroid was initially dissolved in 1 ml of ethanol and made up to 100 ml with distilled water. From this stock solution, 0.5 μM, 1.0 μM and 3.0 μM dilutions were prepared using distilled water. Brassinosteroid solutions were applied to the plants as foliar spray on 35th, 45th and 55th day after sowing. On the 90th day the plots were watered adequately and 5 plants from each treatment were removed for recording growth in terms of shoot and root length and shoot and root fresh weights. On 120th day all the fruits which were in different stages of development from each plant were harvested. The yield parameters considered were number of fruits per plants and fresh weight of total fruits from each plant.

Exogenous application of brassinosteroids resulted in promotion of growth of tomato plants (Table 1). Altman (1998) expressed the view that brassinosteroids elicit strong growth responses when applied exogenously

Table 1. Effect of brassinosteroids on the growth and fruit yield of tomato

Parameters	Control	Brassinolide			28-Homobrassinolide			24-Epibrassinolide		
		0.5 µM	1.0 µM	3.0 µM	0.5 µM	1.0 µM	3.0 µM	0.5 µM	1.0 µM	3.0 µM
Shoot length (cm)	95.33±3.47	127.00±1.24	132.00±1.24	137.30±1.96	135.00±1.70	142.33±3.54	145.66±1.65	133.00±1.41	136.33±0.72	144.33±2.12
Root length (cm)	8.50±0.47	11.50±0.47	12.50±0.47	14.83±0.72	13.16±0.27	16.26±0.78	17.60±0.52	12.60±0.52	14.33±0.45	16.60±0.43
Shoot fr. wt. (g)	38.50±0.47	49.50±1.41	62.16±1.44	71.50±1.41	81.50±0.94	86.83±1.18	98.16±2.32	79.83±1.44	85.83±0.98	89.80±0.72
Root fr. wt. (g)	3.50±0.47	4.50±0.47	5.50±0.27	7.50±0.47	9.16±0.27	9.50±0.47	6.86±0.25	7.33±0.49	7.33±0.49	7.50±0.47
Number of fruits plant^{-1}	7.00±0.47	11.00±0.47	11.33±0.72	12.33±0.72	11.66±0.27	13.00±0.47	14.66±0.72	11.33±0.54	12.00±0.47	13.66±0.72
Total fruit weight plant^{-1}	86.66±4.32	167.00±1.24	173.00±2.49	188.31±2.84	254.00±4.55	262.66±4.58	290.33±2.37	232.66±0.72	260.00±8.61	265.66±6.69

to the plants. The growth promotion in tomato plants as influenced by brassinosteroid treatment was also found associated with enhancement in the yield of the plants (Table 1). Among the three, 28-homobrassinolide was most effective in accounting increase in the yield. The present study revealed the ability of brassinosterois in improving the yield of tomato plants under field conditions. Similar observations in improvement in the yield of wheat (Sairam 1994) and grapes (Xu *et al.* 1994) under field condition, have also been reported earlier. The three brassinosteroids have been selected as practical candidates for agricultural uses and their field tests are being extensively and intensively carried out in Japan and China (Kumaro and Takatsuto 1999). In Russia, 24-epibrassinolide has been officially registered as a seed treatment agent for various crops (Khripach *et al.* 1997).

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