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Effect of micronutrient on growth and yield of garlic (*Allium satvium* L.) var. G-41

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ABSTRACT

A field experiment was conducted during *Rabi*, 2006-2007 at Horticulture Research station (pomolgy) sub campus, Marathwada Agriculture University, Parbhani(M.S.). The result of the experiment revealed that application of micronutrient at various levels with recommended dose of fertilizers enhanced the growth and yield attributes in garlic over control. The Highest growth attributes like plant height, number of leaves per plant, bolting per cent, neck thickness, diameter (polar, equatorial) and shape index were obtained under the treatment T_3 (Zinc 4 ppm) which was statistically at par with treatment T_6(Boron 0.75 ppm). These treatments had significant difference over rest of the treatments including control. The treatment T_3 produced highest plant height (71.87 cm) and bulb yield (155.39 q ha^{-1}) which was statistically significant over rest of the treatments including control. The treatment next in order was the application of boron 0.75 ppm (T_6).

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Key words : Garlic, Micronutrient, Growth, Yield

INTRODUCTION

Garlic (*Allium sativum* L.) is one of the important bulb crop grown for its nutritive value, as a spice and in pharmaceutical throughout India. It is rich in proteins, phosphorus, potash, calcium, magnesium and amino acid allin. The micronutrient plays a vital role in enhancing crop productivity in addition to growth of plant. Application of micronutrient especially zinc, boron also increase yield of garlic. The micronutrients are those element that are essential for plant growth, but required in smaller amount. Keeping in view all above point, an investigation was conducted to evaluate the effect of micronutrient on growth and yield of garlic var. G-41.

MATERIALS AND METHODS

A field experiment was conducted during *Rabi*,2006-07 at Horticulture Research Station (Pomology) sub campus, Maathwada Agriculture University, Parbhani. (M.S). The experiment was laid out in Randomized Block Design having 10 treatments of application of micronutrient Zinc, boron, molybdenum at different levels including control with 3 replications. The treatments consisted of T_1(Zinc 2 ppm), T_2(Zinc 3 ppm), T_3(Zinc 4 ppm), T_4(Boron 0.25 ppm), T_5(Boron 0.50 ppm), T_6(Boron 0.75 ppm), T_7(Molybdenum 2.5 ppm), T_8(Molybdenum 5.0 ppm), T_9(Molybdenum 7.5 ppm), T_{10}(Control). G-41 variety was used in experiment. After preparation of flat bed and application of FYM planting of cloves was done 17th October, 2006. The distance between plant to plant was 7.5 cm as well as row to row was kept at 15 cm. NPK was applied at the rate of 100:50:50 kg ha^{-1} as per recommendation. A full dose of PK were applied at the time of planting, while urea was applied in two split doses *i.e.* half at the time of planting and remaining half dose nitrogen 30 days after planting. The various concentration of micronutrient applied after one month of planting of cloves. Five plants were randomly selected in each plot and tagged. Growth and yield contributing parameters were recorded from these plants.

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been summarized under following heads:

Effect on growth attributes:

Table 1 revealed that application of micronutrient in

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Table 1 : Growth attributes of garlic influenced by different treatments

Treatments	Symbol	Plant height (cm)	Number of leaves plant^{-1}	Bolting per cent	Neck thickness (cm)	Polar diameter (cm)	Equatorial diameter (cm)	Shape index
Zinc 2 ppm	T_1	71.62	10.27	20.00	1.24	4.4	5.1	0.86
Zinc 3 ppm	T_2	71.31	10.12	29.06	1.09	4.0	4.8	0.83
Zinc 4 ppm	T_3	71.87	10.85	17.42	1.05	4.7	5.2	0.90
Boron 0.25 ppm	T_4	71.00	10.25	27.36	1.15	3.8	4.4	0.86
Boron 0.50 ppm	T_5	71.29	10.26	24.01	1.13	4.2	4.8	0.87
Boron 0.75 ppm	T_6	70.91	10.41	20.66	0.94	4.6	5.1	0.90
Molybdenum 2.5 ppm	T_7	71.14	10.31	24.12	1.19	4.0	4.6	0.86
Molybdenum 5.0 ppm	T_8	71.01	10.23	27.37	1.16	3.8	4.4	0.86
Molybdenum 7.5 ppm	T_9	71.34	10.15	29.05	1.07	4.1	4.6	0.89
Control	T_{10}	70.07	9.73	40.70	1.20	3.6	4.4	0.81
S.E. (±)		0.26	0.10	0.82	0.030	0.15	0.15	0.04
C.D. (P=0.05)		0.79	0.30	2.44	0.090	0.46	0.45	0.14

Table 2 : Yield attributes of garlic influenced by different treatments

Treatments	Symbol	Fresh weight of bulb (g)	Cured weight of bulb (g)	Length of clove (cm)	Diameter of clove (cm)	Weight of clove (g)	Bulb yield (q ha^{-1})
Zinc 2 ppm	T_1	32.81	30.50	3.00	1.31	2.14	150.45
Zinc 3 ppm	T_2	30.93	28.45	2.79	1.23	1.65	143.61
Zinc 4 ppm	T_3	35.55	33.15	3.47	1.37	2.65	155.39
Boron 0.25 ppm	T_4	28.78	25.59	2.45	1.20	1.25	137.53
Boron 0.50 ppm	T_5	31.72	29.04	2.89	1.25	1.93	142.85
Boron 0.75 ppm	T_6	34.78	32.10	3.21	1.33	2.29	151.21
Molybdenum 2.5 ppm	T_7	27.69	26.91	2.60	1.21	1.38	142.85
Molybdenum 5.0 ppm	T_8	28.80	25.57	2.47	1.17	1.24	137.91
Molybdenum 7.5 ppm	T_9	30.92	28.46	2.78	1.24	2.63	143.23
Control	T_{10}	24.02	20.45	2.50	1.05	0.90	129.17
S.E. (±)		0.28	1.32	0.13	0.045	0.15	0.03
C.D. (P=0.05)		0.95	3.94	0.41	0.13	0.45	0.11

lower concentration, in general, significantly increased growth attributes over control. Highest growth attributes like plant height (71.87 cm), number of leaves per plant (10.85), bulb diameter (4.7 cm), equatorial diameter of bulb (5.2 cm), shape index (0.90 cm), minimum Bolting per cent (17.42) and neck thickness (1.05 cm), were obtained under the treatment T_3 (zinc 4 ppm). The effect of micronutrient along with recommended dose of fertilizer enhanced the growth of plant and reduced bolting and neck thickness significantly over control. The result indicated that application of micronutrient increased growth of plant in respect to height of plant, number of leaves due to that more carbohydrates accumulated which resulted in increased diameter (both polar and equatorial). Results are similar to findings of Srivastava *et al.* (2005), Fengjuan *et al.* (2005) in garlic.

Effect on yield attributes:

Data on various yield attributes revealed that application of micronutrient T_3 significantly increased mean fresh weight of bulb (35.55 g), cured weight (33.15 g), length of clove (3.47 cm), diameter of clove (1.37 cm), weight of clove (2.65 cm) and yield per hectare (155.39 q/ha) over control. Among all levels of micronutrient application, zinc 4 ppm was found best followed by T_6 Boron 7.5 ppm over control. The result indicated that healthy top growth might be responsible for higher rate of photosynthesis, might have been accumulated in bulb, therefore, it increased size and weight of bulb. The combined effect of treatment as discussed under growth parameters might be responsible for increase in yield with these treatments. These present results pertaining to yield attributes are in accordance with

finding of Rai *et al.* (2003)and Selvaraj *et al.* (2002)in garlic.

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