RESEARCH ARTICLE

INFLUANCE OF ZINC AND BORON ON GROWTH, UPTAKE AND YIELD OF BRINJAL (*SOLANUM MELONGENA* L.)

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Abstract: An experiment in pots was conducted to study Effect of Zinc and Boron on Growth, Yield and Quality of Brinjal (*Solanum melongena* L.). The experiment consisted of 9 treatments laid out in randomized block design with three replications 3 times the important finding of present investigation is given below. The individual treatment of 4 mg Zinc, 9 mg Zinc, 4 mg Boron and 9 mg Boron and treatments combination 4 mg Zn + 4 mg B, 4 mg Zn + 9 mg B, 9 mg Zn + 4 mg B and 9 mg Zn + 9 mg B per Kg soil was given in Brinjal pots the growth parameters like tallest plants, maximum number of plant, number of leafs, number of branches and tallest plant maximum number of flower per plant and yield parameters like maximum number of fruit per plant and maximum fresh weight and dry weight per fruit was obtained in yield Brinjal influenced by treatments T_8 (9 mg Zn + 9 mg B) and was significantly superior over rest of the treatments. The physiological parameters like the Chlorophyll a, b, carotenoid, anthocyanin and protein was recorded maximum in treatment T_8 (9 mg Zn + 9 mg B) and was significantly superior over rest of the treatment.

Keywords: Boron, Growth, *Solanum melongena*, Zinc

INTRODUCTION

Brinjal (*Solanum melongena* Linn.) is a popular vegetable and is native of India. It can be grown throughout the year in almost all the states of India except at higher altitudes. The important brinjal growing countries in the world are India, Bangladesh, Pakistan, China, Cyprus, Egypt, Japan, Philippines, Syria and Western Europe (Anon., 2001). Brinjal fruit contains high amount of carbohydrates (6.4%), protein (1.3%), fat (0.3%), calcium (0.02%), phosphorus (0.02%), iron (0.0013%) and other mineral matters. Apart from these, it also contains carotene (34 mg), riboflavin (0.05 mg), thiamine (0.05 mg), niacine (0.5 mg) and ascorbic acid (0.9 mg) per 100 g of fruit Brinjal is a staple vegetable in diet since ancient time and both poor and rich perish it. It is high in nutritive value and can be compared with tomato (Choudhary, 1976) Indian population being predominantly vegetarian, attributes a prominent position to vegetable in their diet to meet the protein, vitamin and carbohydrate requirements. India is the second largest producer of vegetables in the world about 4 million hectare of land is occupied by vegetable in India and approximately about 3.7 % of total cultivated land area is under Brinjal. Orissa is largest producer of Brinjal followed by West Bengal. Plant nutrition plays an important role for enhancing yield and quality in Brinjal.

Micronutrients like iron, zinc and boron are essential for plant growth and metabolism. Iron is necessary for the synthesis of chlorophyll, though it actually does not enter into its composition (Bid *et al* 1992**)**. Iron starved plants develop chlorosis in the young leaves and the veins remaining green. Zinc in the ionic form (Zn++) or in form of a complex with a chelating agent e.g., EDTA, is taken up by the plants. Salts or complexes of zinc be can easily absorbed directly through leaves. Hence, their foliar spray is used for correcting zinc deficiency. Therefore keeping the above points in view, the present study entitled "Effect of zinc and boron on growth, yield and quality of Brinjal (*Solanum melongena* L.) was undertaken with the following objectives: To determine the effect of zinc and boron on growth, yield and fruit quality of brinjal (Elabdeen, A. Z. And Metwally, A. M.1982**)**.

MATERIALS AND METHODS

The experiment was conducted at All India Coordinated Research Project for Dry Land Agriculture (ICAR) farm R. B. S. College, Bichpuri, Agra during 2006-07. The experiment consisted of 9 treatments laid out in randomized block design with three replications 3 times. The important finding of present investigation is given below. The individual treatment of 4 mg Zinc, 9 mg Zinc, 4 mg Boron and 9 mg Boron and treatments combination 4 mg Zn + 4 mg B, 4mg Zn + 9 mg B, 9 mg Zn + 4 mg B and 9 mg Zn + 9 mg B per Kg soil was given in brinjal pots. At the time of experiment, some growth parameters ware observed like plant height, no. of leaves, no. of branches, no. of flowers, no. of fruits, fruit length, fruit yield etc. The physiological

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parameters like Chlorophyll a b, Carotenoids, Anthocyanin, Protein were estimated. Estimation of chlorophyll was done by methods given by (Arnon 1949). Carotenoid was determined according to method of Lichtenthaler and Welburn (1983). The anthocyanin was determined according to the method of (Mirecki and Teramura1984). The Protein was determined according to the method of (Lowry *et al*.,1951). The protein content was determined by the standard curve prepare out the Bovin Serum Albumin (BSA) protein.

RESULTS

Data collected were subjected to statistical analysis based on mean values of three randomly selected plants in each plot of three replications. The salient features of various parameters studied one as under.

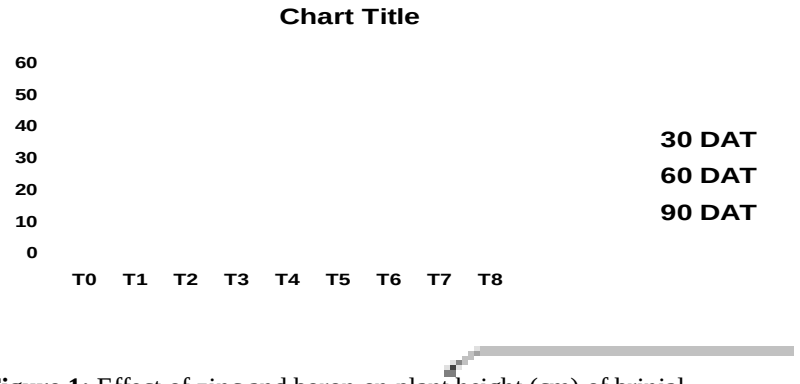

Figure 1: Effect of zinc and boron on plant height (cm) of brinjal

The data presented in figure 1 show a significant positive response of different levels of zinc and boron on brinjal. At 30 DAT, maximum plant height was found in T_8 (16.86 cm) and minimum was found in T_0 (11.76 cm). At 60 DAT maximum plant height was found in T_8 (26.93 cm) and minimum was recorded in T_0 (19.79 cm.) and maximum plant height at 90 DAT was recorded in T_8 (53.76 cm) and minimum was recorded in T_0 (22.73 cm). Similar results have been reported by Ingle *et al.* (1993). Combined application of the zinc and boron on tomato plant height (cm) by Bose and Tripathi (1996).

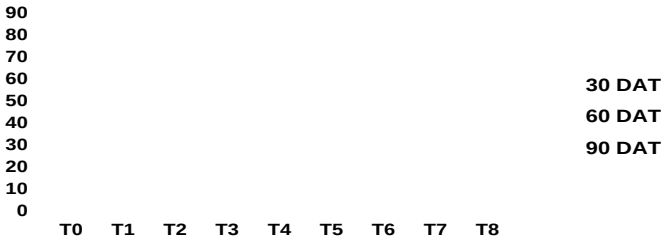

Figure 2: Effect of zinc and boron on number of leaves of brinjal

The figure 2 shows significant difference on number of leaves due to different levels of zinc and boron. At 30 DAT, maximum number of leaves was found in T_8 (16.32 cm) and minimum was found in T_0 (7.03 cm). At 60 DAT maximum number of leaves was found in T_8 (35.65 cm) and minimum was recorded in T_0 (22.51 cm.) and maximum number of leaves at 90 DAT was recorded in T_8 (87.71 cm) and minimum was recorded in T_0 (54.27 cm). Verma *et al.* (1973) reported that the application of boron resulted in increment of number leaves in tomato and similar result of increment of number of leaves application of boron in French bean was also reported by Padma *et al*., (1989).

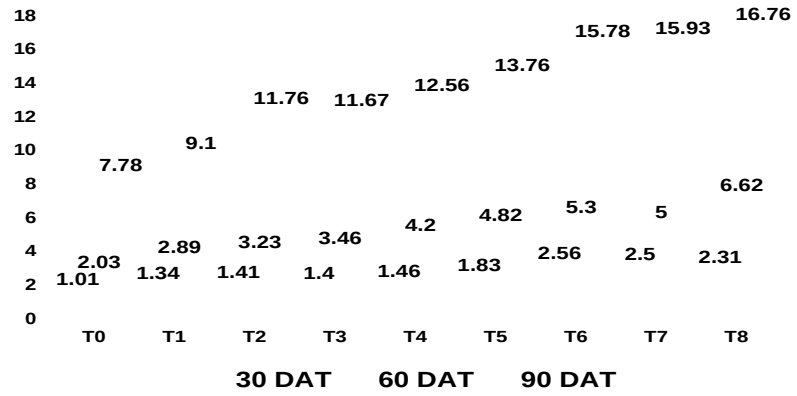

Figure 3: Effect of zinc and boron on number of branches of brinjal

The analysis of data presented in figure 3 revealed that different levels of zinc and boron had a significant effect on the number of branches. At 30 DAT, maximum number of branches was found in T_8 (2.31 cm) and minimum was found in T_0 (1.01 cm). At 60 DAT maximum number of branches was found in T_8 (6.62cm) and minimum was recorded in T_0 (2.03 cm.) and maximum number of branches at 90 DAT was recorded in T_8 (16.76 cm) and minimum was recorded in T_0 (7.78 cm).

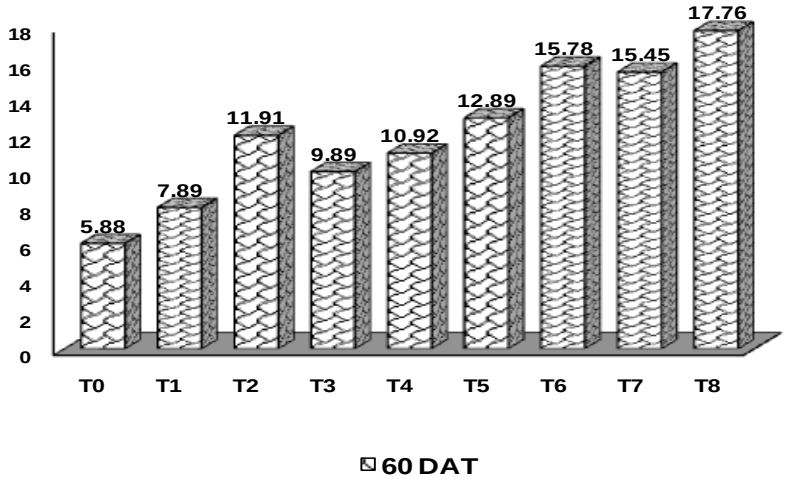

Figure 4: Effect of zinc and boron on number of flower of brinjal (*Solanum melongena* L.) cv. Rutika at 60 DAT.

The data presented in figure 4 show a significant positive response of different levels of zinc and boron on number of flowers. At 60 DAT maximum flowers per plant was found in T_8 (17.76) and minimum was found in T_0 (5.88).

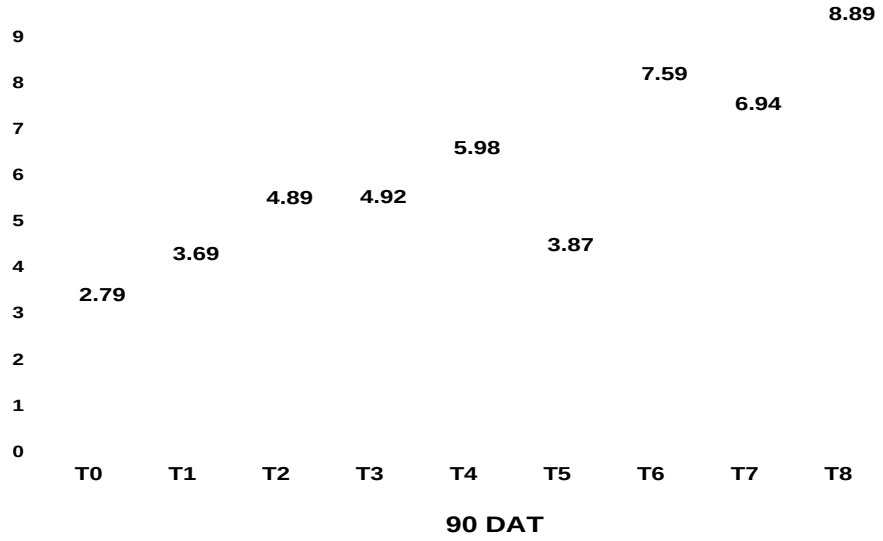

Figure 5: Effect of zinc and boron on total number of fruits of brinjal (*Solanum melongena* L.) at different growth stages at 90 DAT.

Figure 5 shows significant difference on total number of fruits of brinjal due to different levels of zinc and boron. At 90 DAT found in T_8 (8.89) and minimum was found in T_0 (2.79). Increment in number of fruits per plant in tomato application of zinc at 5 and 10 ppm has also been reported by (Mallick and Muthukrishnan 1980).

CONCLUSIONS

On the basis of the experiment comprising of 9 treatments combinations replicated thrice under randomized block design (RBD), it is effect of treatments on growth and yield of brinjal were independently determined. After that, it is concluded that the effect of zinc and boron on growth, yield, quality and physiological parameters of brinjal showed best performance with treatment T_8 (9 mg Zn kg-1 + 9 mg B kg-1).

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