

Response of nitrogen and pre-planting treatment of seedlings with the *azotobacter* on growth and productivity of broccoli (*Brassica oleracea* var. *italica*)

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ABSTRACT

An experiment was conducted at Horticulture Research Farm of Raja Balwant Singh College, Bichpuri, Agra, under the field conditions during the *rabi* of 2003-04 to find-out the response of doses of nitrogen and pre-planting treatment of seedlings with the *Azotobacter* on growth and yield of broccoli. Based on performance of crop it is inferred that broccoli cultivation may be an productive enterprize with the application of 75% of RDN (150 kg/ha) and 60 kg/ha, each of P₂O₅ and K₂O and pre-planting treatment of seedlings with the *Azotobacter*.

Key words : Nitrogen, Azotobacter, Broccoli.

Currently India is the 2nd largest producer of vegetable crops in the world. About 30 years ago the green revolution was witnessed by the systematic use of high yielding varieties (HYVs), chemicals and fertilizers. The population of beneficial micro-organisms present in the soil have been reduced due to excessive use of chemical fertilizers. Biological routes of improving soil health and fertility through the non-symbiotic free living bacteria (*Azotobacter*) it known for its broad spectrum utility for various vegetable crops. The beneficial effects of *Azotobacter* are related not only to their nitrogen-fixing-efficiency but also with ability to produce anti-bacterial and anti-fungal compounds and growth regulators (Pandey and Kumar, 1989; Narula *et al.*, 1980; Sharma *et al.*, 1986). Inoculation with *Azotobacter* has further exhibited increase in growth, yield land quality attributes of various vegetables such as cabbage, tomato and potato (Lehri and Mehrotra, 1972; Mohandas, 1987; Pandey and Kumar, 1989). However, such studies have not been carried out on broccoli, which is a cole crop of affluent class. The present investigation was, therefore, a planned endeavour on this crop.

MATERIALS AND METHODS

The experiment was carried out at R.B.S. College Horticulture Research Farm, Bichpuri, Agra. This farm is located at 27.10 north latitude and 70.50 east longitude at a height of 168 m above the mean sea level. The soil of the experimental field was typically sandy-loam with pH 7.0, 176.50 kg ha⁻¹ available nitrogen, 15 kg ha⁻¹

available potash and 0.41 dSm⁻¹ organic carbon.

The experimental treatments consisted of five doses of nitrogen viz. 0%, 25%, 50%, 75% and 100% of the recommended dose viz. 105 kg/ha symbolized as N₀, N₁, N₂, N₃ and N₄ respectively. The bio-fertilizer treatments interacting with the N treatments were B₀ (un-inoculated) and B₁ (inoculation with *Azotobacter*). These treatments of nitrogen and bio-fertilizer formed 10 treatment combinations which were tested in randomized block design with 3 replications. The doses of nitrogen were further collaborated with 60 kg each of P₂O₅ and K₂O. Full doses of phosphorus, potash and half of nitrogen were applied as basal dressing, while remaining half of nitrogen was applied as top-dressing at 30 days after transplanting. The carrier based *Azotobacter* was used as seedling treatment (2 kg/ha or 1 kg/10 lit. of water) wherever required. About 4 week old seedlings of variety CBH-1 were transplanted 45 cm x 45 cm apart on 16th November, 2003. All the post-transplanted operations like weeding, irrigation etc. were performed as requirement of crop. The curds were harvested in February, 2004.

RESULTS AND DISCUSSION

Table 1 reveals that the plant height increased significantly with the increasing level of nitrogen up to N₃ (75% of RD) whereas N₃ and N₄ treatments were at par with regard to this growth attribute. The results of experiment conducted by Singh and Singh (1994) also revealed that increase in the level of nitrogen up to a certain limit led to significant increase in plant height of cauliflower. The diameter of main stem, however, increased significantly by increasing the level of nitrogen