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Response of Mustard to Boron application in the soils of Tripura

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Abstract:

The experiment was conducted at the East Ramchandraghat village of Khowai district of Tripura during 2014-2015 to evaluate the response of mustard to boron application. Boron application was made at 2 kg/ha. The seed yield was positively and significantly correlated with the yield contributing characters viz. pods/plant, seeds/pod, and 1000-seed weight, but not with plant height and pod length. It is recommended that the farmers of Tripura can grow Mustard, var. Var. B-9 in Boron deficient soils with a dose (2kg/ha) of Boron application.

Introduction:

Among the oilseed crops, mustard is the major oilseed crop in Tripura.It is an important source of cooking oil in Tripura and it meets a large part of the edible oil requirement of the state. The average yield of the crop is very low compared to the yield of many mustard growing states of the country. There are several reasons that can explain this yield variation, which cover abiotic and biotic factors. Among the biotic and abiotic factors, unavailability of high yielding varieties and nutrient deficiency, acidic soil condition are responsible for lower productivity of mustard. The newly released high yielding potential varieties of mustard could not compensate the yield gap possibly due to B deficiency in soil. Mustard, is very responsive to B application (Mengel and Kirkby, 1987). Reproductive growth, especially flowering, fruit and seed set is more sensitive to B deficiency than vegetative growth (Dear and Lipsett, 1987). Boron requirement for root growth in B - in efficient rapeseed cultivars was higher than that in B efficient cultivars (Hu *et al.,* 1994; Xioug *et al.,* 1995). Availability of B to plants is affected by a variety of soil factors including soil solution, pH, texture, moisture, temperature, oxide content, carbonate content, organic matter content, and clay mineralogy (Goldberg *et al.,* 2000). Keeping the above points in view, the present study was undertaken to evaluate the response of mustard to B application.

Materials and Method:

The experiment was conducted in the acidic soil of East Ramchandraghat village of Khowai district during the year 2014-15 taking Mustard Var. B-9 as test crop to evaluate its response to B application (2 kg B/ha) in Boron deficient soil(8 mg/kg).The soil of the experimental site is

sandy loam is texture acidic with a P^H of 5.5 ,0.16% oxidizable organic carbon, available Nitrogen was found to be 307kg/ha, available phosphorus was 12.5kg/ha and available potassium was 113 kg/ha. The two treatments (T1: Soil application of Boron 2kg/ha, T2: Without Boron application) was selected and replicated three times. All the management practices were remain same and recommended dose of fertilizer were applied in all the plots and in the beginning and at the end soil samples was collected and analysed.

Results and Discussion:

Number of Pods/plant: Mustard variety: B-9 significantly influenced on the number of pods/plant due to B application. The number of pods/plant was found to be 127 to 139 in case of treated plot and whereas in case of control it found to be 82- 98. This findings are in agreement with the studies of Shen *et al.* (1993) who has reported that B application markedly increased the number of pods/plant in with rape cv. Ningyou No. 8 and Ningyou No.7.

Number of Seeds/pod: The number of seeds/pod also varied significantly due to B application. The average number of seeds/pod ranged from 11.00 to 19.57 and 12.22 to 26.44 in the B untreated and treated plots, respectively. This finding corroborate with the findings of Shen *et al.,* 1993; Islam and Sarker (1993), and Hu *et al.,* 1994.

Test Weight: In case of treated soil the weight of 1000 seed varied from 2.95g to 3.62 g whereas in case of untreated soil it is 2.39g to 2.98g.

Average Seed Yield: Response of mustard yield to boron application has been reported by many researchers in the past (Banuelos *et al.,* 1993; Shen *et al.,* 1993; Bora and Hazarika, 1997; Lu *et al.,* 2000; Xue *et al.,* 1998). Rashid *et al.* (1994) reported the maximum seed yield increase for *Brassica napus* (43%) is at 1 kg/ha B application and for *Brassica juncea* (36%) at 1.5 kg B/ha rate. Xue *et al.* (1998) reported that the significant differences were found among the cultivars in leaf boron concentration.In this case also soil application of boron increases the seed yield significantly, the average yield of treated plot was found to be 10.1q/ha whereas in case of control plot it is 7.3 q/ha.

Effect on post harvest soil properties after groundnut Cultivation: The post harvest soil properties indicated that the soils had the tendency of turning more deficient where boron were not applied, whereas The available boron status reached to the sufficient level(11 mg/kg) after application @2kg/ha..The available B status in soil declined significantly under non application of Boron which can be a serious problem because farmers hardly use any micronutrient at present in case of crops like mustard. This suggests that we need to critically

assess the B recommendations for oilseeds in this area of acid soils where recommendations often do not consider boron deficiency and their role in increasing the yield of oilseed crops.

Conclusion:

Based on the information mentioned above, it may be concluded that Mustard is well responsive to Boron application and it can be grown well in West Tripura condition by application of 2kg/ha, although the impact of B application on plant height of mustard was positive to some extent but not significant but its impact is quite significant on yield components and improving the Boron deficiency of the soil.

References:

Banuelos, G.S., G.E. Cardon, C.J. Phene, L. Wu, S. Akohoue and S.Zambrzuski. (1993). Soil boron and selenium removal by three plant species. *Plant and Soil.* **148**(2): 253-263.

Bora, P.C. and U. Hazarika. (1997). Effect of lime and boron on rainfed toria (*Brassica campestris subsp. Oleifera var. Toria*). Indian Journal of . Agronomy. **42** (2): 361-364

Dear, B.S. and J. Lipsett. (1987). The effect of boron supply on the growth and seed production of subterranean clover (*Trifolium subterraneum* L.). Australian Journal of Agriculture . Research. **38:** 537-546.

Goldberg, S., M.L. Scott and D.L. Suarez. (2000) . Predicting boron adsorption by soils using soil chemical parameters in the constant capacitance model. Soil Science. Society of America **64:** 1356-1363.

Hu, Y.S., Y.H. Ma, Y.L. Sun and G. Guo. (1994). Effect of B application on the agronomic traits, yield and oil content of a double-low rape (*Brassica napus* L.) cultivar. *Oil Crops* (China). **16**(3): 43-46.

Islam, M.B. and M.A.Z. Sarker. (1993) . Effects of different levels of boron on the yield of mustard. Research Report 1992-1993. Bangladesh Agricultural Research Institute, On-farm Research Division, Agricultural Research Station, Rangpur.

Lu, X., Y. Lu, D. Mao, Y.F. Lu. and D.M. Mao. (2000) . The levels of available boron in red earth in Central Zhejiang Provice and boron nutrition of rape. Institute of Soils and Fertilizers, Beijing. **5**(1): 30-31.

Mengel, K. and E.A. Kirkby(1987). Principles of Plant Nutrition. International Potash Institute, Switzerland.

Rashid, A., E.Rafique and N. Bughio (1994) . Diagnosing boron deficiency in rapeseed and mustard by plant analysis and soil testing. Communication of Soil Science. **25**(17/18): 2283-2897.

Shen, K., Z.G., Shen, H.Q. Xu and Q.Y. Huang. (1993) . A study of boron nutrition and seed setting in rape (*Brassica napus*). Acta Agronomica Sinica. **19** (6): 539-545.

Xiong, S., L. Wu, Y. Wang and L. Lan. (1995) . Absorption and distribution of boron of different rape cultivars. Journal of Huazhong Agril. University. **21:** 85-91

Xue, J., L. Minshu, W. Richard, R.D. Bell, X.Y. Graham and Y. Yuai. (1998). Deferential response of oilseed rape (*Brassica napus* L.) cultivars to low boron supply. Plant and Soil. **204**(2): 155-163.