Department of Soil Science,
CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur-176062

Title of the Thesis	:	Boron status and transformation in relation to cauliflower (*Brassica oleracea* L. var. *botrytis*) growth and yield in some soils of Himachal Pradesh
Name of the student	:	Girish Chander
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ABSTRACT

With a view to screen out the B-deficient soils, the composite surface (0 to 0.15m) soil samples collected from undisturbed soils adjascent to cauliflower growing fields in zone-II (Mid-hills, sub-humid) and zone-III (High-hills, wet-temperate) of Himachal Pradesh were analysed for available-B and some of the physical and chemical properties of the soils. The soils under study were medium to high in organic-carbon, acidic to neutral in reaction, medium in available-N, low to medium in available-P, medium to high in available-K, sufficient in available-B, exchangeable-Ca and DTPA extractable micronutrients and sandy loam to clay loam in texture. In general, 16% soils in zone-II and 14% in zone-III were found to be deficient in available-B. The available-B was found to correlate positively and significantly with clay as well as available-P and K contents.

To find out the effect of B levels and FYM application, laboratory-incubation and greenhouse studies were conducted with most B-deficient soil from each of the agroclimatic zone. Laboratory incubation study was conducted without cauliflower, whereas in greenhouse study, cauliflower was raised as a test crop. Twelve treatment combination of four levels of B (0, 1, 2 and 3 mg kg^{-1}) and three levels of FYM (0, 10 and 20 g kg^{-1}) with three replications were studied in two most B-deficient soils of Bajaura in zone-II and Junga in zone-III.

In Laboratory-incubation, the application of B increased the availability of B and P without having any effect on Ca, N and P. The incorporation of FYM maintained a higher availability of all the nutrients throughout the study in both the soils. With the advancement of incubation period, the available-B and P decreased, available-K and exchangeable-Ca increased while available-N increased upto 48 days and decreased thereafter.

In greenhouse study also, the available contents of B and P increased with B application, however, that of N and K decreased without having any significant effect on exchangeable-Ca. The incorporation of FYM increased the contents of all nutrients. The available nutrients under study were decreased at harvest in contrast to that observed at 48 days after transplanting in both the experimental soils.

Keeping in view the lower amounts of B and higher amounts of exchangeable-Ca in Bajaura soil in comparison to Junga soil, cauliflower responded beneficially upto 2 mg kg^{-1} B application in the former and only upto 1 mg kg^{-1} B application in the latter in terms of plant growth parameters such as curd compactness, curd depth, curd diameter, leaf size, and yield. The incorporation of FYM upto highest level of 20 g kg^{-1} proved beneficial in both the soils. Both B and FYM application enhanced quality of the produce in terms of nutrient content and uptake.

Further, the application of B and FYM increased the translocation of Ca, N, P and K from leaves+stalks to curd. The mobility of B from leaves+stalks to curd decreased with external B application and thus indicated circumstantial evidence for B retranslocation under conditions of low B supply. The incorporation of FYM showed an ameliorating effect on Ca:B ratio of plant tissue, an important parameter exhibiting B-deficiency or toxicity symptoms, in both the experimental soils.

Girish Chander
(Girish Chander)
Student

(Dr. T.S. Verma)
Major Advisor

Head, Department of Soil Science