Boron fertilizers borax and colemanite application on rice and their residual effect on the following crop cycle

ABSTRACT

Boron (B) is one of the essential micronutrients and its deficiencies occur over a range of soils and crops. The effectiveness of borax and colemanite as B sources for two seasons of rice crop under flooded acidic soil were evaluated in a field study. We studied the direct and residual effects of borax, powder colemanite (PC) and granular colemanite (GC) fertilizers which were applied to rice crop at the rates of 0, 1, 2, and 3 kg B ha−1. One application of B significantly increased the growth and yield of crop for two seasons. Results of the first season field experiment showed that application of borax and PC at 3 kg B ha−1 improved all plant growth parameters, B concentration in spikelet and rice yield over the control and other B rates. Residual B from borax and PC significantly increased the plant height, number of tillers and panicles per plant, number of grains per panicle and weight of 1000 grains compared to the control. However, the residual GC showed no significant effect on plant growth parameters. Residual borax and PC at 3 kg B ha−1 produced higher yield than the levels of 1 and 2 kg B ha−1. Yield difference between residual borax and PC was not significant at 3 kg B ha−1, although at 2 kg B ha−1, PC produced significantly higher yield than the borax. Both of these B sources were found to be equally effective in supplying B to rice crop for two seasons. The PC was more efficient than GC in supplying B to rice due to its finer particle size making it more water soluble.

Keyword: Boron; Rice; Borax; Colemanite