

USE OF ZINCATED AND BORONATED SUPERPHOSPHATES AND MYCORRHIZAE IN GROUNDNUT GROWN ON A CALCAREOUS SOIL

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ABSTRACT

Pot experiments with calcareous soil have shown that, application of zincated and boronated single superphosphate was more useful than single super phosphate (SSP) and increased the nodule biomass, pod number and pod and haulm yields in groundnut. The zincated SSP was more effective in increasing these parameters than both boronated and ordinary SSP. The plant culture of vesicular-arbuscular mycorrhizae (VAM) fungus *Glomus fasciculatus* when inoculated to groundnut with different doses of P did not influence the growth and yield of groundnut significantly. However, P doses significantly increased the nodule biomass upto 200 kg/ha of P and pod number and pod and haulm yields upto 100 kg P/ha in the calcareous soil.

Keywords: Boronated and zincated single superphosphate; Calcareous soil; Groundnut; Micronutrient; V.A.M.

INTRODUCTION

Groundnut, inspite of its high nutrient requirement, is cultivated mostly on light textured soils deficient in macro- and micro-nutrients (Kanwar *et al.*, 1983; Bell, 1985; Dwivedi, 1988; Singh *et al.*, 1991). The calcareous soils of Saurashtra have marginal available P and crops grown on this soil respond to P application. (Dwivedi, 1988; Singh *et al.*, 1991). Besides, the calcareous nature of soil also causes several other micro-nutrient deficiencies, particularly Zn and B, and yield reduction (Dwivedi, 1988; Singh *et al.*, 1990a, b, 1991, 1993). The P deficiency generally occurs late, on old leaves leaving less scope for its timely amelioration. The Zn and B deficiencies, which occur on young leaves, get intermingled with those of iron and sulphur and result in poor pod bearing and kernel filling. Moreover, by the time these deficiencies are diagnosed in the field, it is too late to rectify them in the standing crop to prevent the yield losses.

Prevention of these deficiencies with soil and foliar applications of P, Zn and B containing fertilizers are the main remedies and field

experiments to this affect have been conducted on many soils of India (Kanwar *et al.*, 1983; Dwivedi, 1988; Singh *et al.*, 1990, 1991). However, there is not much information on the use of zincated and boronated single super phosphates and utilization of mycorrhizae in increasing the availability of native and applied P to groundnut in calcareous soils. Mycorrhizal endophytes of vesicular-arbuscular type are the common root associations of most of the natural flora and crop plants. Of these, *Glomus fasciculatus* has been found to be beneficial to several crops (Suman Bala and Singh, 1983; Singh and Singh, 1988 and Bolan, 1991). As there is meagre information on the beneficial effects of this fungus on groundnut, pot experiments were conducted to understand the effects of zincated and boronated superphosphate and mycorrhizae on yields of groundnut crop.

MATERIALS AND METHODS

Pot experiments were conducted at the National Research Centre for groundnut, Junagadh, during the wet season of 1988 and dry and wet seasons of 1989 on a medium black calcareous (18.5% CaCO₃) clayey (58% clay and 12% sand) soil