

COMPARISON OF PHOSPHATE SOURCES ON GROWTH OF VEGETABLES ON AN ACIDIC SOIL

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Rock phosphates are expected to be more available to plants grown on acidic soils than on neutral and alkaline soils. They are often recommended to be applied to slow growing crops such as perennials on neutral and acidic soils. Under these conditions the rate at which phosphorus is supplied by the phosphate rock is usually sufficient to meet the requirements of these crops. Vegetables are different from most perennials in that they have a short growing period of about 2 to 3 months, generate very high quantity of biomass rapidly and take up large quantities of P. Furthermore, they are shallow rooted and have thus to obtain their phosphorus requirements from a small volume of soil. These considerations suggest that vegetables should receive a relatively large supply of P in a short time from the soil or added fertilizer for adequate growth.

Three phosphate fertilizers of differing solubilities are being evaluated at Bandarawela on a soil of pH 4.3 in a long term field experiment which began in 1987 Yala season. The fertilizers are triple super-phosphate (TSP), a high citric acid soluble rock phosphate (HCRP; 4.4% citric acid soluble P) and Eppawala rock phosphate (ERP; 1.5% citric acid soluble P). They are added at rates of 25, 50 and 100 kg P/ha per crop. Potato, cabbage, tomato and pole bean have been thus far cultivated in this sequence.

The highest crop yields were obtained with TSP and the lowest with ERP. Although addition of ERP increased yields of the above crops, in contrast to its relative ineffectiveness in flooded rice culture (Nagarajah *et al*, 1979), the increases are very small compared to those obtained from the addition of TSP. The chemical analyses of soil for available phosphorus content (Olsen) at the end of each crop season showed highest values for TSP treated plots, followed by HCRP and ERP. These findings demonstrate that HCRP and ERP are inferior to TSP as sources of P fertilizer for vegetables.

Although the experimental soil had a relatively low content of available phosphorus of 12 ppm P at the commencement of the experiment, values as high as 50-400 ppm P are found in most of the intensively cultivated vegetable tracts in Nuwara Eliya and Badulla districts, due to the continuous additions of large quantities of chemical and organic fertilizers. In such soils a mixture of TSP and ERP may be suitable, the former as a starter for the rapid initial growth of crop and the latter as a maintenance supplier that will enhance the available soil phosphorus pool over time. This idea needs field testing to determine the proper composition of the TSP-ERP mix to suit different crop soil situations.

Reference

Nagarajah, S., M.M.M. Jauffer and B.M. Nizar, 1979. Phosphorus studies in the lowland rice soils of the mid country wet zone. *Tropical Agriculturist*. 135 : 1-22.