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RESPONSE OF BLUEBERRY PLANTS TO PEAT, PHOSPHORUS, AND ALUMINUM ADDED TO THE POTTING MIX

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Background. Blueberry plants grow well in sandy soils that contain adequate levels of organic matter. Coastal Plains soils have a low level of organic matter. Addition of an acid peat to these sandy soils before transplanting bare-root blueberry plants is a recommended practice in the Coastal Plains. This study was initiated to evaluate the effect of added peat on plant response to increasing levels of phosphorus (P) and aluminum (Al) in the potting mix.

Five rates each of peat, P, and Al were added to Lilbert surface soil material in gallon-size pots for a glasshouse study. The volume difference in the pot due to lower rates of peat was filled by addition of polystyrene. Rates of peat were 0, 113.5, 280, 446.5, and 560 g/pot. Aluminum, as $AlCl_3$ anhydrate, was added to the potting soil at rates of 0, 131.3, 324.1, 516.4, and 647.5 mg/kg soil. Phosphorus rates, as H_3PO_4, were 0, 23.3, 57.2, 91.2, and 114.4 mg/kg soil. Five replications of 15 soil treatment combinations were added to pots according to the requirements of a central-composite, rotatable design experiment used to evaluate interactive effects of these additives on blueberry plant response. Two similar-sized, bare-root 'Tifblue' rabbiteye blueberry plants were transplanted into each pot. Soils were irrigated with deionized water and fertilized with adequate rates of nitrogen as nitroform. Plant growth response factors and leaf P concentrations were evaluated.

Research Findings. Stem fresh weight declined as P rates were increased when no peat was added (Figure 1). Without peat, increasing Al had no affect on fresh weight of stems. At

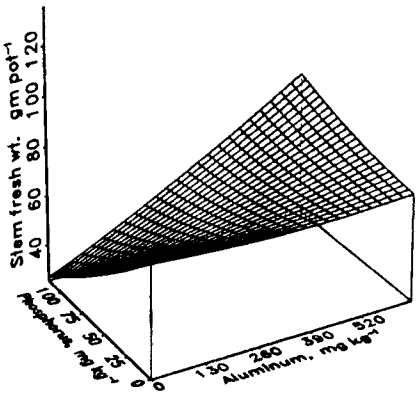

Fig. 1. Effect of P and Al on blueberry at zero peat.

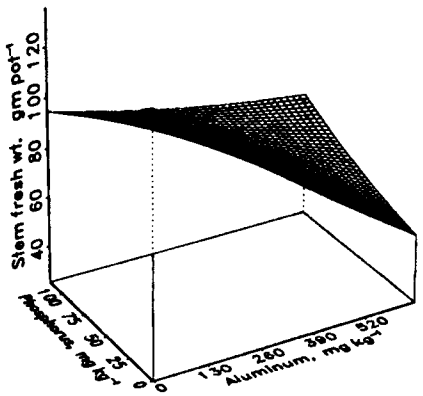

Fig. 2. Effect of P and Al on blueberry at 560 g peat/pot

the highest rate of peat (Figure 2), the detrimental effect of applied P was lessened, but increasing

rates of Al reduced stem fresh weight.

Blueberry stem fresh weight was increased by peat application (Figure 2). Stem fresh weight was unaffected by increasing Al when no P was applied. At the highest rate of P (Figure

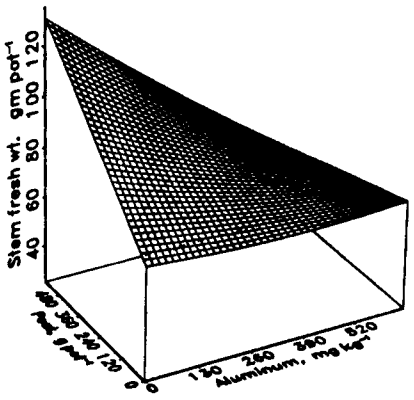

Fig. 3. Effect of Al and peat on blueberry at zero P.

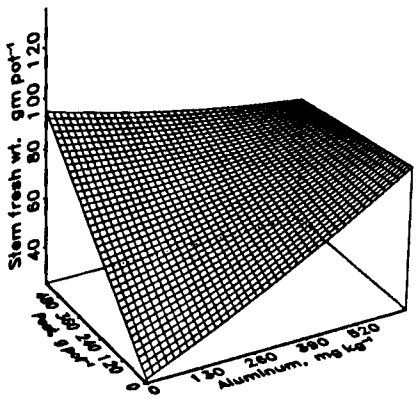

Fig. 4. Effect of Al and peat on blueberry at 114.4 g P/pot.

4), addition of Al or peat to the potting mix increased stem fresh weight.

Phosphorus in the blueberry leaf was increased to 0.18% at the high rate of P when no peat was added to the potting mix (Figure 5). Addition of 560 g of peat lowered the

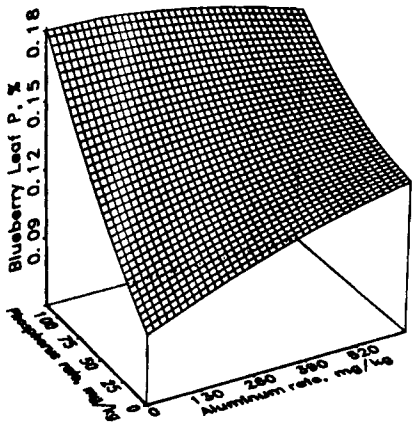

Fig. 5. Effect of applied Al and P on leaf % P at zero peat.

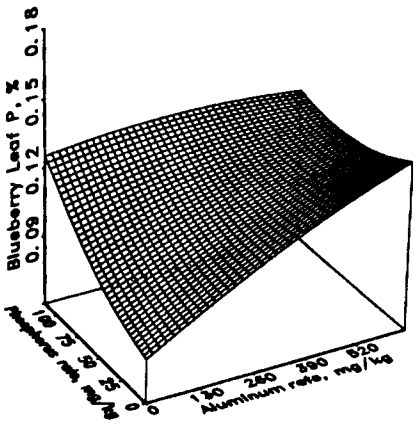

Fig. 6. Effect of applied Al and P on leaf %P at 560 g peat/pot

concentration of P in the leaves to 0.13% at the high rate of P and zero Al (Figure 6). At this high rate of peat, increasing Al allowed higher concentrations of P to accumulate in the leaves.

Application. Apparently, the blueberry plant does not have a high requirement for P. The most rapid growth of stems occurred when the leaf P concentration was lowest. The effect of Al on the blueberry plant is still uncertain, but the plant appears to tolerate high concentrations of this metal. Peat apparently benefits blueberry plant growth by lowering P uptake.