A RESPONSE OF ALFALFA TO BORAX

L. G. WILLIS AND J. R. PILAND

ONE of the greatest difficulties experienced in developing a well-balanced system of agriculture in the southeastern states is associated with a soil peculiarity that has heretofore made it impractical to use lime except at limited rates of application.

For some time liming has been known to promote a deficiency of available manganese on extensive areas, but the soils involved are generally relatively high in residual organic matter because of poor natural drainage. On the lighter sandy soils the characteristic symptoms of manganese deficiency have never been observed even with extremely heavy liming. Recently, a response to boron has been noted on several of the lighter soil types of the state where lime has been used liberally. Heavy applications of lime are also believed to promote a deficiency of potassium, particularly on sandy soils.

Contrary to all of the evidence indicative of adverse effects of heavy liming, one grower has succeeded for 15 years in producing alfalfa on a deep phase of Norfolk sand. Although the soil is extremely low in content of nutrient elements, no unusual fertilizer requirement has been evident. One outstanding peculiarity has been an apparently abnormal requirement for lime. With a weakly buffered soil, having a pH value well above 7.0 from prior liming, it has been necessary in many cases to apply ground limestone at rates up to 5 tons or more to the acre to insure a satisfactory stand with each new planting. While no formal experimental evidence has been obtained to demonstrate this need for lime, it has been observed that fields which have failed, supposedly from too light an application, have produced satisfactory growth where lime has been spilled in unloading from trucks to the distributor.

The grade of lime used was a ground dolomite by-product from a mining industry which contained appreciable amounts of heavy metallic elements such as copper, manganese, and zinc.

NEGATIVE EFFECT OF MINOR CONSTITUENTS OF LIMESTONE

The possibility that the apparent response to lime was actually due to an effect of these elements was tested experimentally on a field where a recent planting of alfalfa was failing presumably because too small an application of lime had been made. Amounts of copper, manganese, and zinc sulfates equivalent to the content of these elements in 10 tons of the grade of limestone used were applied to...