Molybdenum Status of Some New Jersey Soils\textsuperscript{1} with Respect to Alfalfa Production

H. J. Evans and E. R. Purvis\textsuperscript{2}

It has become increasingly difficult to maintain productive stands of alfalfa on some New Jersey soils. In many instances the failure of the crop is due to known factors, such as injury from disease or insects, lack of lime, or deficiencies of P, K, B (7), or Mn (4). In many instances, however, crop failure cannot be attributed to any of these causes, indicating that some unknown factor is responsible for reducing both yields and longevity of the alfalfa stand on these soils.

Investigators in Germany (3) and Australia (1) (5) have reported beneficial effects from applications of molybdenum salts upon the growth of alfalfa and other legumes. Accordingly, an investigation was undertaken to determine whether molybdenum deficiency is retarding the growth of alfalfa in this state.

Total Molybdenum Content of Some New Jersey Soils

Samples of 18 important New Jersey soils were selected for analysis. These soils have been described by Toth and Bear (9). For the determinations, 2-gram samples of soil were fused with sodium carbonate and extracted by the method employed by Robinson in determining the Mo content of phosphate rock (8). The Mo content of the solutions was determined by a modification of the Marmoy technique (6), which will be described in detail in a later paper. The results from the analyses are presented in Table 1.

The total Mo in the 18 soils was found to vary from 0.8 ppm in Lakewood sand to 3.3 ppm in Dutchess shale loam, with an average of 1.44 ppm. There was no correlation between the total Mo contents and the pH values of the soils.

Molybdenum Content of New Jersey Alfalfa

Twenty-four samples of alfalfa were collected from nine locations during July and August, 1948, and analyzed for Mo. Five-gram portions of the samples were prepared for analysis by the nitric and perchloric acid digestion procedure, and Mo was determined in the solution by the method employed for soils.

The Mo content of the alfalfa, on a dry weight basis, was found to vary from less than 0.1 ppm to 1.4 ppm, with an average for all samples of 0.88 ppm. No significant difference was found in the Mo content of four samples each of Atlantic, Buffalo, Kansas Common, and Ranger varieties of alfalfa grown under similar conditions at the same location.