COMPARISON OF LEGUME GROWTH IN DIFFERENT SOIL TYPES AT VARYING ACIDITY LEVELS

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THE use of legumes for maintaining soil fertility is generally accepted as being of considerable importance, although their use on acid soils has been somewhat limited due to the lack of adaptability of the more commonly used species to such conditions. Wheeler's (7) early study of plants tolerant to soils with low acidity readings and Coville's (1) emphasis on the need for legumes capable of thriving under such conditions have been partially responsible for the development of interest in "acid-tolerant" legumes. Although it is known that certain legumes are acid-tolerant, specific information is lacking on the response of the different species in respect to their tolerance to acid soils, indicated as such by relatively low pH readings.

The studies herein reported were conducted under greenhouse conditions at Arlington Experiment Farm, Arlington, Va., in 1934 and 1936 to determine the variation in growth response of specific legumes when grown in different soil types and at varying pH levels.

MATERIALS AND PROCEDURE

Korean lespedeza (Lespedeza stipulacea), sericea (Lespedeza sericea), crown vetch (Coronilla varia), and zigzag clover (Trifolium medium) were chosen for use in this experiment because of their ability to grow on poor unlimed soils when compared to red clover (Trifolium pratense) and sweet clover (Melilotus alba). Seedings of crown vetch, sericea, and zigzag clover in quadruplicate were made on December 18, 1933, and red clover and sweet clover on January 23, 1934, for the 1934 experiment. In 1936 all seedings were made on March 11 in triplicate.

One-gallon stone jars equipped with drains in 1934 and without in 1936 were used as soil containers. Artificial cultures were used in all cases for inoculating the seed. Subsequent thinning after germination reduced the number of plants per jar to 7 and 13 for the two years, respectively. All jars were arranged at random on the greenhouse bench.

Jars were weighed at frequent evenly spaced intervals and distilled water added to insure proper moisture conditions for optimum growth. Detailed records on growth and all changes in plant appearance were noted. The experiments terminated October 1, 1934, and June 30, 1936, respectively, at which time final growth notes and soil pH readings were taken.

Bladen fine silt loam with an original pH reading of 4.4 was used in 1934, and Ashe stony loam, DeKalb sandy clay loam, and Clement silt loam with original readings of 4.4, 4.8, and 5.1, respectively, were used in 1936. The pH levels of these soils were raised by adding calcium carbonate to the original soil. The "trial

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3Figures in parenthesis refer to "Literature Cited", p. 121.