THE EFFECT OF THE VETCH CROPPING HISTORY AND
CHEMICAL PROPERTIES OF THE SOIL ON THE LONGEVITY
OF VETCH NODULE BACTERIA, RHIZOBIIUM
LEGUMINOSARUM

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The longevity of soybean nodule bacteria (Rhizobium japonicum) in relation to the length of time since soybeans had been grown was studied by Wilson (3). He found that "there seemed to be no relationship between the frequency of the occurrence of the plant symbiont on the soil and the number of Rhizobium japonicum in the soil. There is no evidence that the reaction or the moisture content of the samples, or the influence of the crop on the soil when the samples were collected, exerted a dominating influence on the number of Rhizobium japonicum that were found in the soil samples."

Hawkins (2) found that the growth of vetch for one year on sandy soil did not supply sufficient nodule bacteria for vetch on the following year.

In 1897 Duggar (1) found that dipping vetch seed into muddy water made from soil which had grown wild vetch for several years increased the yield from 232 to 2,540 pounds of cured vetch hay per acre. He tested four soils which had not previously grown cultivated vetch or related crops. The increase in yield due to inoculation was 38, 38, 186, and 466% of the yield without inoculation for the four soils.

The purpose of the work reported in this paper was to determine the need of vetch for additional inoculation after growing vetch for one or more years on a soil and to determine the relation of chemical properties of the soil to the longevity of the nodule bacteria (Rhizobium leguminosarum), and the relation of one chemical property to another.

PROCEDURE

Composite samples of soil were obtained from fields with known vetch history. The surface inch of soil was removed before taking the soil to be used. A quart fruit jar full of soil was obtained from each field. A top without the rubber was put on the jar, which permitted the exchange of gases without a serious change in moisture content.

The presence of the vetch nodule bacteria was determined by inoculating vetch seed for 30 feet of row with a fruit jar top full of soil which is approximately 60 grams. The yield data are averages of four to six replications.

Available phosphorus was determined by the Truog method; soluble iron was determined by the Comber method combined with a photometer for taking the reading; and pH was determined by the use of a glass electrode. The data are reported in Table 1.

1Contribution from the Agronomy Department, Mississippi Agricultural Experiment Station, State College, Miss. Approved by the Director as Paper No. 21, new series. Received for publication November 8, 1939.
2Associate Agronomist.
3Figures in parenthesis refer to "Literature Cited", p. 47.