METHODS OF COUNTING THE NUMBER OF LEGUME BACTERIA IN THE SOIL

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It has been known for many years that certain legume bacteria may live in the soil for a long period of time after the particular legume crop has been grown. However, because of the difficulty of isolating these bacteria directly from the soil or of counting the number present, there is little definite information available along this line.

Beijerinck (4) in 1888 reported the isolation of the organism which he called Bacillus radicicola from a large number of soil and water samples. He used a legume extract medium for the isolation and the identification of the organisms was made by means of their colony characteristics on this medium. This was very difficult, however, because of the fact that certain other soil organisms have colony characteristics quite similar to those of the legume bacteria. Two years later Nobbe and his co-workers (11) used a similar method for counting the numbers of Rhizobium in soils on which inoculated legumes had been grown.

These investigators also found that the respective legumes were well inoculated when grown on these soils, but as they did not isolate pure cultures from the colonies appearing on the plates nor test their inoculating power, it is by no means certain that the colonies which they counted contained the legume bacteria.

Gage (6) attempted to isolate Rhizobium from the soil, and although he secured inoculation with some of his cultures, it is doubtful if they were pure.

Greig-Smith (7) reported that the number of legume bacteria in the soil varied from none to 5,500,000 per gram and that the numbers varied directly with the fertility of the soil. He used a medium containing levulose, asparagine, sodium citrate, and potassium citrate and identified by means of the colony characteristics. Then he picked colonies and determined nitrogen fixation in solution as further proof that the organisms were legume bacteria.

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4 Reference by number is to "Literature Cited," p. 77.