EFFECTS OF FERTILIZER TREATMENT ON THE FORMATION OF NODULES ON THE SOYBEAN

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In a study of the roots of leguminous plants under field conditions, cases were observed which indicated that fertilizers may have suppressed the normal formation of nodules. The contact of the fertilizers with the seed or its presence in too great a concentration near the seed apparently prevented nodule formation.

In crop rotations, inoculated legumes are often depended upon to supply in part the nitrogen for the other crops. There are certain legumes which are much benefited by fertilizer applications, especially on the soils deficient in potassium and phosphorus. If the roots are injured by any fertilizer, the effect of the natural or applied inoculation would be greatly reduced or entirely inhibited. The generally accepted results show that infection occurs through the root-hairs which, with injured roots, may be absent or too few to offer satisfactory chances for nodule formation. Certain constituents of fertilizers may increase soil acidity and thereby inhibit nodule formation. Others, used in a high concentration, cause a desiccation of the soil which would inhibit the action of the nodule bacteria. It is well known that certain salts decrease or totally inhibit the formation of root-hairs. Such a condition should decrease nodule formation and reduce the efficiency of the leguminous crop.

The literature dealing with the effects of fertilizers on seed germination, root development, and nodule formation is extensive. No attempt will be made to review it in detail. Truog recently made a review of the literature bearing on germination and root development and has studied the problem experimentally with beans, peas, cowpeas, and soybeans, as well as many other plants. He, in common with other workers, has found the germination of leguminous seeds to be markedly retarded by fertilizer applications in direct contact with the seed. Application of the fertilizer above or below the seed largely eliminated the detrimental effect.

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