EFFECT OF DDT UPON NODULATION OF LEGUMES

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Experimental trials indicate that DDT is effective in controlling some insects harmful to crop plants. While the methods of use are in early experimental stages, it has been suggested that direct application to the soil may be feasible in the control of certain organisms such as soil nematodes; and for this reason it is important to know what chemical and biological effects DDT will have on the soil. If prescribed amounts prove toxic to soil microorganisms, certain biological processes may be retarded or inhibited.

The following investigations with legume nodule bacteria were conducted to determine whether DDT applied to the soil will prevent nodulation of legumes. Although the amount needed for insect control in the soil is not clearly defined, rates of application from 10 to 100 pounds an acre have been used. The experiments reported here were carried out in the greenhouse with two preparations of DDT, one a technically pure compound which contained approximately 98% DDT and the other, Neocid A 10, which contained 10% DDT in pyrophyllite. The preparations and directions for their use were furnished by Ralph Blanchard and C. M. Packard, Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agriculture.

Experimental

One-gallon stoneware jars were filled with 5,500 grams of sand to which CaCO₃ was added at the rate of approximately 5.0 grams to each jar. The technical DDT was applied at rates which represent 10, 100, and 1,000 pounds an acre when the total weight of sand in the jar is used as a basis for calculations; however, the DDT was mixed with the surface 2 inches only. Consequently, concentrations of 50, 500, and 5,000 pounds an acre actually existed in the surface 2 inches. Five jars for each rate, including untreated check, were set up, one each being planted with inoculated seeds of soybeans, peas, red clover, sweetclover, and lespedeza.

The emergence of red clover, sweetclover, and lespedeza was retarded only slightly in the presence of 1,000 pounds of DDT, while that of soybeans was noticeably delayed during the first 7 days by all concentrations (Table 1).

The height of the plants of all species tested was inversely proportional to the concentration of DDT (Fig. 1). A type of leaf deformity of soybeans grown in the presence of 1,000 pounds an acre of DDT is shown in Figs. 2 and 3.

At the end of 1 month the plants were washed from the jars and the roots examined for nodules. Plants grown in untreated sand and in sand treated with 10 pounds an acre of DDT showed tap-root nodulation (Fig. 4). Those grown in the presence of 100 pounds an

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