Some Effects of 2,4-D in Representative Idaho Soils

GUY R. ANDERSON AND G. ORIEN BAKER

Combating weeds by the use of selective herbicides has become a standard practice on many farms. There still remains considerable question, however, as to the influence these herbicides have on the flora of the soil. Conversely, the action of the soil on the herbicide remains obscure.

A review of the literature on 2,4-dichlorophenoxyacetic acid, commonly referred to as 2,4-D, gives considerable information regarding its action and persistency in the soil (1, 3, 6, 7, 10, 11, 12, 15). Investigations show that the activity of 2,4-D salts disappears in most soils within 8 weeks. In some dry soils, however, their effect could still be detected 18 months after application.

Crafts (3) reported that in soils treated with 2,4-D, highly organic and sandy soils lost their toxicity much more rapidly than did heavy clay soils. Kries (7) noted that in acid soils the toxicity of 2,4-D was increased but that the action persisted longer in alkaline or limed soils. Kries also stated that toxic action remained strongly persistent in dry stored soils while limed soils retained a marked toxicity for 18 weeks in moist storage at 74°F. Cropping the soils reduced the period of toxicity 4 to 8 weeks, and increasing the moisture content of the soil further reduced the period of toxicity.

Lucas and Hamner (8) found that 2,4-D preparations were adsorbed and inactivated when mixed with charcoal and offered this as a possible explanation for the early inactivation of 2,4-D in muck soils.

Payne and Fults (13) have revealed that 2,4-D caused growth abnormalities and reduction in nodulation in bean plants. Carlyle and Thorpe (2) concluded that 2,4-D salts present in the “soil solution” at the rate of 0.5 ppm (0.21 pound per acre) would seriously restrict germination, limit growth, and practically inhibit nodulation of beans, peas, alfalfa, and red clover. They stated that the restricted nodulation was caused by the action of the 2,4-D on the plant rather than on the root nodule bacteria. Smith, Dawson, and Wenzel (15) noted a selective inhibitory action of 2,4-D for the nitrite and nitrate forming organisms in 100 ppm of the herbicide. They found this inhibition, however, to last only 10 to 14 days. Smith et al. (15) and Stevenson and Mitchell (16) found a greater toxicity existing for Gram positive organisms than for the Gram negative ones.

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Although the majority of reported investigations on the general effect of the 2,4-D salt in the Palouse and Portneuf soils was quite similar. Published September, 1950

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