CONTAMINATION OF COTTON FIELDS BY 2,4-D OR HORMONE-TYPE WEED SPRAYS

Glen Staten

In the spring of 1945, weed sprays commonly known as 2, 4-D or hormone sprays, containing an active ingredient of 2, 4-dichlorophenoxyacetic acid or a modification thereof, were made available to the New Mexico Agricultural Experiment Station for experimental purposes. At the same time certain commercial preparations containing 2,4-D were available to farmers in limited quantities. There was a great amount of interest in these sprays in the southern irrigated valleys of New Mexico, and all materials which could be secured by growers were being used before experimental results were obtained in the area.

Shortly after the sprays came into use, spots with very abnormal growth were observed in fields of cotton. Affected areas occurred adjacent to locations where weeds had been treated with the hormone-type sprays. Since cotton is a very important crop in this area, it seemed advisable to determine how the contaminating agent was carried to cotton fields and also how sensitive the cotton plant was to the materials.

SYMPTOMS OF CONTAMINATED COTTON PLANTS IN COMMERCIAL FIELDS

On exposure of cotton plants, the formative effect of the chemical is first noted near terminal growing points (Fig. 1). In commercial fields a time lag of 2 to 5 weeks occurred between exposure and first visible symptoms. First effects are rolling and ruffling of leaves at the outer margins. Observed at a distance, these symptoms may be confused with a need of water by the plants. As the injury develops, affected leaves are much modified, narrowed, closely veined, and deeply lobed, resembling somewhat the normal bract surrounding the flower. When the material is absorbed by the developing flower, it is modified similarly to the leaf, becoming elongated and narrowed. Bracts are also modified, being deeply lobed, elongated, and tending to form a sheath around the developing boll.

The degree of effect depends on amount of contamination. In young plants enough material may be absorbed to kill the terminal bud, in which case the plant becomes much branched, the effect resembling that resulting from topping. Branches may develop normally but on a greater degree of exposure also show a formative effect. When branches develop normally, the only injury is delayed maturity, which may cause a decrease in yield. If the exposure is very light, abnormal foliage may develop and gradually disappear, in which case the effect on crop yield is negligible. While the greater portion of affected bolls is lost, some continue to develop and produce open bolls.