Chemicals as Farming Tools

CHEMICALS are fast becoming as important to agriculture as the plow and hoe. Besides their time-honored use as fertilizers and insecticides, they are assuming a large place in farming operations as herbicides, fungicides, and soil fumigants, and for retaining and improving crop quality.

Federal and state agencies and private institutions are all conducting research, and progress has been most pronounced in weed control. As recently as 1945 very little use was made of herbicides in agriculture, but weed specialists estimate that last year farmers applied them to more than 30 million acres of cropland.

Current studies are concentrating on weed control in specific crops or under specific conditions. At the same time investigation of physiological effects and responses of plants from applications of chemicals is continuing. Particular attention is being given to time and method of application, such as pre-emergence herbicides, translocated herbicides, contact herbicides, and soil sterilants under specific conditions. Excellent control of weeds in cotton rows, for example, has been obtained by using pre-emergence applications of dinitro compounds, followed by postemergence applications of herbicidal oils. In one test last year this combination controlled in-the-row weeds at a cost of $6.55 compared with $14.00 per acre for hoeing.

The most important advance in fungicidal research has been the discovery that many complex organic materials, such as dithio carbamates, phenyl mercury compounds, and dichloro naphthoquinone, are effective fungicides. These chemicals—the result of a decade of close teamwork between the chemical industry and plant pathologists—are more specific in their action than the older fungicides and are often more effective. Copper and sulfur, for instance, control diseases of fruit trees, but they sometimes cause considerable injury to both the fruit and the leaves. Organic chemicals are giving as good control with less risk of plant injury. Their use has increased Anjou pear production 300,000 boxes annually. Efforts are now being made to find a fungicide that will protect wheat against the new race of stem rust that broke out last year.

A relatively new use for agricultural chemicals is as soil fumigants for controlling nematodes, insects, and other soil pests. The biggest problem is the high cost of application. Although the recent discovery of less expensive soil fumigants is encouraging, they are still too costly for field use, except for such high-value crops as tobacco, sugar beets, and vegetables. Even the cheaper ones cost $35.00–$40.00 per acre. A fumigant that can be applied for $20.00 an acre would probably be used extensively for cotton production in California. One that could be applied for $10.00 an acre would be economical over most of the cotton belt.

Chemicals for preserving crops and improving crop quality have received much scientific study during recent years. They are being used to protect fresh fruits and vegetables from disease damage during transit and storage, to prevent potatoes and onions from sprouting in storage, to hasten the ripening of several fruits, and to prevent preharvest drop of apples and pears. Experiments show that chemical apple-thinning gives a 15 per cent increase in yield for only a fraction of the cost of hand-thinning. Last year about 20,000 acres of apple orchards were thinned with dinitro sprays.

Science has barely scratched the surface in its exploration of chemicals as farming tools. In screening tests for plant growth-regulating activity, for example, the Department of Agriculture found more than a hundred new compounds sufficiently active to warrant further study. Thousands more are waiting to be tested, and even more are being compounded. Furthermore, research men are still finding new values in chemicals already in use.

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