

# Weeds are Costly

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IN FARM MANAGEMENT STUDIES it has been found that the cultivation of crops costs about 16% of the total value of the harvest; and that approximately one half of the cultivation is made necessary by the presence of weeds.

In California, in 1939, there were 4,545,000 acres of field and garden crops, valued at \$218,000,000. The cost of cultivation made necessary by weeds, figuring on 8% of the value of the crop, was \$17,440,000. Orchards and vineyards in 1939 produced crops valued at \$154,793,000. We have no studies which will enable us to estimate costs of cultivation for weed control among trees and vines, but it is safe to say that the total annual weed tax due to cultivation in California is several million dollars. We have a total here of not less than 30 million dollars. These are 1939 figures; the weed tax today is considerably more.

Some fifty thousand acres of citrus groves in California now operate under a noncultivation program; weed growth is held in check by oil sprays. More recently, olive growers have become interested in this method of orchard management.

## Losses From Weeds

There are, too, other losses brought about by weed infestations. Among these are reduced crop yields, increased cost of preparing crop products for consumption, and the losses due to insects and fungi which are harbored by weeds growing among crop plants, along fence lines, in corners hard to cultivate, and on roadsides and ditchbanks.

Weeds are natural breeding grounds for insects and fungus pests which attack crop plants. Here are some examples: leaf hoppers which carry curly top virus of sugar beets, garden beets, and western yellow blight of tomatoes, living on Russian thistle and other weeds; the fungus causing downy mildew of lettuce, harbored by prickly lettuce, sow thistle, and other members of the composite family; bean thrips which flourish on species of wild lettuce; insects living on a variety of weeds which carry the virus causing Pierce's disease of grapevines; the wee-

vil which infests peppers, living over winter on a species of nightshade. Many other examples could be cited, each of which causes a definite and serious monetary loss to the farmer.

The weeds of range lands in the Western States have seriously reduced the grazing capacity of these areas. Some 25 millions of acres of California range lands are dominated by introduced annuals, most of which are inferior in feeding value to the native grasses which once flourished there. The hypericum—known as Klamath weed or St. John's wort—which now infests well over a hundred thousand acres of grazing land in Humboldt County alone, has spread to 26 counties.

The California Agricultural Experiment Station has been studying the control of Klamath weed in three ways. First, with chemicals; second, with range management practices; and third, in cooperation with the United States Department of Agriculture, by means of biological control with three species of beetles introduced from Australia and France.

These are only a part of the losses which weeds cause. We must come to recognize weeds as being on a par with insects and fungus diseases as enemies of agricultural production. Success or failure of a crop often is related to the absence or presence of weeds. There is a close correlation between proper and timely farm practice and operation, and the degree of weed infestation.

Effective weed control stresses the necessity of crop seeds free of weed seeds, the value of crop rotation, the proper methods of soil management, the right use of farm implements, and the proper manner of handling manures and feedstuffs.

## Weed Control Measures

The shortage of labor and its high cost, the increasing prices of most farm crops, and a rather rapid spread of noxious weeds which occurred during the war period, created an urgent demand for improvements in practical weed control methods.

Concentrated research, coupled with field demonstrations and cooperation with all agencies concerned, brought into use from 1940 to the present time more revolutionary changes and improvements in chemical methods of weed control than had taken place in all agricultural history prior to that period. Here are a few of the most important of these developments:

1. Wide application of selective herbicides to control weeds in fields of small cereals, including rice, corn, milo, and flax, and in peas, alfalfa, onions, carrots, and celery.

2. The discovery of growth-regulating substances as weed killers, chiefly 2,4-D and its substitutes.

3. The use of dinitro compounds as general-contact herbicides, especially as fortifiers of oil.

4. Development of more effective soil sterilization methods available for ditchbanks, roadsides, fence lines, playgrounds, walks, and driveways and about buildings, signboards, and telephone and telegraph poles.

5. Marked progress in the knowledge of carbon disulphide as a soil sterilant, particularly the various field factors which influence its effectiveness.

6. General improvement in weed control machinery and equipment, including nozzle tops, pressures, and volumes. Here we must not overlook the use of the airplane in applying herbicides.

## Expanded Research

The farmers of California have expressed a desire for an expanded weed research program. More facts are needed on which to base control measures. Research on weeds cuts across every commodity group, and findings concerning the control or eradication of any particular weed apply to many agricultural situations.

The development of effective and practical weed control methods requires men trained in plant physiology, plant morphology, soils, chemistry, and agricultural engineering. Demanded is fundamental research, just as fundamental as is required of investigators in any other field of agriculture.

The phenomenal progress in weed control in the last few years has been possible only because of the research that has been directed at this problem.

In this basic weed research the College of Agriculture expects to continue, for through it we shall be able to make further important contributions to the welfare of agriculture and of the State.

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