

Insect Control With Sanitation and Cultural Practices

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In species, insects outnumber all other kinds of animals on the earth four to one. Almost half a million species have been named and described, and it is thought that there are at least a million species of insects present on the earth. Most insects, similar to other animals, feed on plants and plant materials, though some attack man and other animals, and some prey on other insects. It is estimated that insects comprise fully half of the total tonnage of animal life on the globe, and that they eat or destroy as much tonnage of plant materials every year as all other animals combined. This may not be true on individual farms and yet, some years, outbreaks of armyworms or grasshoppers may simply strip pastures under the very noses of the cattle and horses.

Insects were the dominant animals on the globe for millions of years prior to the time man and the higher animals first appeared to challenge their supremacy. Since that time, there has been continuous warfare between insects and man. They are man's greatest enemy today. In some cases, we have been able to overcome them, but never completely eliminate them. Chemical warfare, including the use of various insecticides, is the most potent weapon we have for controlling many major insect scourges, but the use of insecticides is largely limited to certain of the more profitable crops, such as orchard and garden crops and on livestock and man himself. To control most pests we must fall back on cultural practices, sanitation, and other similar means of checking their destructive work. Many major insect scourges cannot possibly be reached with chemicals. Now that the limited supply of

some of our most effective chemicals is so urgently needed for other purposes in winning the war, it becomes all the more important that we look to the possibility of controlling insects through the use of farm practices, including *sanitation, crop rotation, clean cultivation, plowing, planting, harvesting and storing crops*, and other farm operations. In fact, many of our worst insect scourges were formerly harmless creatures, but, due to our upsetting of Nature's balance by cutting down forests, draining swamps, and plowing the prairies and growing in their place large acreages of certain crops, we have forced them to turn to our crops for food.

Farm Sanitation

Farm sanitation is of far-reaching importance in modern agriculture. It is just as useful in keeping down insects as in preventing the spread of diseases of plants and animals. In its broader sense, it includes the proper disposal of stable manure, decomposing hay, straw, and other litter, carcasses of dead animals, and similar materials in which flies and other insect pests breed and harbor. It also includes the frequent cleaning of the hen house, hog houses, barn, sheds, and the thorough cleaning of cribs and granaries before the new crop is stored in them. In the same way, it includes the proper care of food in the home and the careful cleaning, fumigating and storing of winter woolens during the summer to prevent damage by clothes moths and carpet beetles. Careful handling of home-cured meats is of increasing importance in preventing losses due to the work of larder beetles, skippers, and similar insect pests. To control many of the garden insects and some of the field crop pests, the complete and prompt disposal of crop residues after the crop has been harvested by plowing, composting, or even burning may prove of special value. Keeping fence rows clean and the disposal of litter of all sorts will help eliminate insect harbors and reduce their numbers.

Crop Rotation

Some insect pests feed on a single crop only, or on a single group of crops such as the legumes or cereals. In such cases, crop rotation compels them to hunt for their chosen crop next year perhaps at a great distance from the field where they developed and spent the winter. In case of insects which require more than one year to develop or those which spend the winter in the egg or grub stage, as for example the western corn root worm, crop rotation will eliminate its food and, not being able to move far in search of its chosen food, it will starve. By alternating legume and cereal crops many of our worst

crop pests are unable to develop in sufficient numbers to do any serious damage to these crops. For controlling those insects which feed exclusively on one or, at most, a certain group of crops, rotation is the farmer's most practical weapon. It will also help with certain plant diseases and with the conservation of soil fertility.

Clean Cultivation

While some insect pests are restricted as to their choice of food crops, others may feed on many different crops and even on weeds. To control such pests, all weeds, volunteer wheat, oats, and other plants should be eliminated by mowing, cultivating, and preferably, where possible, followed by fallowing the land prior to planting the crop. Weeds, therefore, may not only rob the crop of moisture and fertility, and possibly react unfavorably on the soil, but they also menace the crop by serving as food and a breeding place for insect scourges. Much of the damage by flea beetles, stalk borers, hessian fly, aphids, cutworms, and many other insect pests can be prevented by clean cultivation or weed control. In fact, it is one of the farmer's most effective weapons in fighting various crop scourges.

Plowing and Tilling the Soil

Many important insect pests live underground where they attack the seeds, roots and crowns of plants, as for instance the wireworms and grubworms. Others, after eating on the crop above ground until full-fed, go into the ground to escape enemies and to transform to the full-grown adult stage. The corn ear worm and the plum curculio are familiar examples of this kind of insect pests. By knowing their habits and their life cycles, one can often reach and destroy such pests by simply plowing and tilling the soil at the right time and to the proper depth. The land must be plowed and tilled to provide a seed-bed for the next crop and often by simply knowing when to work the ground one can rid the soil of important pests with no added cost or labor. Frequently, a pest may withstand all other control practices but readily succumbs to ordinary soil tillage. By first knowing the habits of the different insect pests the farmer may be able to plan his regular farming operations so as to prevent any serious loss to crops by such pests.

Timing Seeding and Harvesting of Crops

In some cases, where the farmer has no other effective means of reaching and controlling a crop pest, he may be able to prevent losses by properly timing the seeding and harvesting of the crop and by properly curing and storing the crop he may help prevent much later damage to the crop in storage. For instance, the hessian fly losses

on wheat can be largely eliminated by delaying wheat seeding until the fly-free date for the region. Also, by seeding as early as possible and pushing the corn crop to early maturity one can escape much of the severe fall damage by earworm. On the other hand, the European corn borer attacks early plantings of corn worse than later plantings.

Again, to reduce loss to a crop of alfalfa or timothy by an invasion of armyworms or grasshoppers, one should cut the crop promptly even though it may not yet be fully ready for harvesting. By this means, one may save at least a partial crop where otherwise the pest might completely destroy it in a few days. Frequently, a crop of ripening wheat or barley may have the heads cut off by invading swarms of armyworms if the crop is not promptly harvested.

Curing and Storing Grain Crops

Frequently, much of the value of a crop may be lost to insect pests in storage by improperly curing and storing the crop. Stored grain pests, for instance, are sure to do more damage to grain stored alongside old weevily grain or in bins not properly cleaned before the new grain is stored. Also, grain stored with too high a moisture content is more severely attacked by different grain insects. Combined wheat usually has a higher moisture content and is more severely attacked by grain insects in storage than when threshed from the shocks or stack. Insect losses do not stop with the harvesting of the crop. Some of our most important insect losses occur on stored products.

These are only a few of the various ways in which the farmer and others can lessen their staggering insect losses where the use of insecticides is not practical, or where, as at present due to a shortage of chemicals, they must depend more on these methods of lessening insect damage to crops, livestock, man and stored products. Farmers, livestock men, and others can well afford to pay more attention to the use of these various natural methods of reducing insect abundance, since they cost but little to apply and when properly used they help greatly in rebalancing the upset in nature which intensive agriculture tends to cause.