INSECTICIDES AND METHODS FOR CONTROLLING COTTON INSECTS

Estimates indicate that insects in some years have destroyed one of every seven or eight bales of cotton produced in Texas, thus costing the State's farmers millions of dollars. Similar conditions have prevailed in other states. Believing that insects can be controlled and damage reduced greatly, agricultural experiment station workers, insecticide manufacturers, and others are endeavoring to develop new and to improve existing materials and methods for combating insects. To the extent that insect damage is reduced, yields per acre will be increased, costs of production lowered, and therefore, net income of growers increased.

A group of field tests have been conducted by the Louisiana, Oklahoma, and Texas Agricultural Experiment Stations during the last few years to determine the effectiveness of a number of the insecticides now being used for cotton insect control. The results of these tests, which are reported in various publications issued by the experiment stations, are particularly significant to cotton growers and should serve as guides to reduce insect losses.

These studies show that 5 percent DDT applied at a rate of 10 to 15 pounds per acre is effective against the cotton fleahopper and tarnished plant bug, but a concentration of 10 percent DDT applied at the same rate per acre is required for control of the bollworm and pink bollworm. DDT is not recommended for control of boll weevil, cotton leafworm, or cotton aphid. A mixture of 5 percent DDT and sulphur dust is effective against the red spider and both the adults and nymphs of the cotton fleahopper but is ineffective against the boll weevil and may contribute to aphid increases by destroying their natural enemies.

Benzene hexachloride (BHC) is effective against such pests as the boll weevil, cotton fleahopper, cotton leafworm, tarnished plant bug, cotton aphid, and fall army worm. BHC is sold on its gamma isomer content which does most of the killing of insects. Results of experiments show that a dust containing 3 percent gamma isomer applied at the rate of 10 to 12 pounds per acre will control the insects named above, although a heavier application is recommended for control of cotton aphids. BHC is ineffective against the bollworm and red spiders, and in some cases seems to favor multiplication of these pests. Furthermore, it sometimes causes leaf burning.

A mixture of 3 percent BHC, 5 percent DDT, and 40 percent sulphur is effective against fleahoppers, boll weevils, bollworms, and aphids when applied at the rate of 10 to 15 pounds per acre, depending on the size of the cotton and the severity of the insect infestation. Therefore, it is recommended that these compounds be combined where a treatment for the control of all of these cotton insects is desired.

About 10 pounds of 10 percent chlorinated camphene dust per acre is effective in controlling the cotton fleahopper and tarnished plant bug, and a 20 percent dust applied at the same rate per acre controls the boll weevil, bollworm, and cotton leafworm. Results of tests show that chlorinated camphene is not satisfactory for controlling heavy infestations of cotton aphids. It does not kill red spiders and may result in their increase unless the dust contains at least 40 percent sulphur. The addition of BHC to this mixture makes it effective against aphids.

Calcium arsenate used at the rate of 6 to 8 pounds per acre is very effective against the boll weevil and cotton leafworm. Application of 12 to 16 pounds per acre controls the boll-
worm. Calcium arsenate often causes a destructive increase in cotton aphids, however, by destroying their natural enemies. Cotton treated with calcium arsenate in the Texas experiments did not produce as good yield as did cotton treated with the organic insecticides such as the BHC-DDT-sulphur mixture. A mixture composed of one-third calcium arsenate and two-thirds sulphur at 15 pounds per acre will destroy the cotton fleahopper and tarnished plant bug.

A 10 percent chlordane dust applied at the rate of 10 pounds per acre gives approximately the same control of boll weevils as calcium arsenate, and also prevents aphid build-up and kills boll weevils developing in squares. Red spider and bollworm infestations may increase as a result of applications at this concentration. Concentrations of less than 10 percent are not recommended.

Parathion (3422) applied in concentrations as low as 1 percent has proved highly effective against cotton aphids and red spiders. In some tests at 4 percent, it was effective against the boll weevil and at 5 percent against the bollworm, but the Texas station does not recommend Parathion for use against either the boll weevil or bollworm.

Many of these compounds can be applied by spraying or by dusting. However, the results of experiment station studies indicate that dusting is the only method which gives good control of most insects with the materials and equipment now generally available. Dust applications may be made by ground machines or airplanes, and they should be made when the air is relatively calm, but the presence of dew is not necessary. Applications usually must be repeated if washed off within 24 hours.

Reports issued by experiment stations caution users of insecticides, however, that additional information is needed regarding their toxicity to animals and soils before they are used extensively. Such crops as peanuts and potatoes grown on soils following the use of BHC on other crops the previous year may smell and taste like the insecticide. Sulphur, which is frequently used in insecticide mixtures, is inflammable and should be kept away from tractor exhausts, sparks, or flames. Calcium arsenate is poisonous to livestock and will injure such crops as legumes and oats if allowed to drift to nearby fields. It is thought that Parathion concentrations above 2 percent would be very abnoxious and probably dangerous to the operator. DDT is safe when applied in recommended dosages, but care should be taken to avoid contamination of adjacent food or feed crops. The cumulative effect of BHC, chlordane, chlorinated camphene, DDT, and other compounds in soils or animals is not known, and, therefore, care must be exercised in using them continuously.

Bug-catching machines of various types have been developed, but according to federal and state investigators, mechanical devices have proven inferior to chemicals for controlling cotton insects. In tests these machines have caught many beneficial insects but only a few harmful to cotton.

In addition to the use of insecticides, a complete program of cotton insect control involves such cultural practices as early destruction of cotton stalks, planting of improved varieties of cotton, seed treatment, proper preparation of soil, use of recommended fertilizers, and frequent shallow cultivation. Some of these practices aid directly in reduction of insect infestations, while other practices aid in obtaining an early and vigorous cotton crop which is subject to relatively less insect damage.

Individual farmers using improved insecticides and cultural methods can obtain results in controlling cotton insects and reducing damage to their own cotton crops. It should be recognized, however, that the most effective, economical, and profitable results are obtained by community action. By working together, county agents, vocational teachers, businessmen, 4-H club members, Future Farmers, and other groups can develop programs that will reduce insect damage to a minimum and increase the community's income and production of cotton.

CHEMURGY AND FARM INCOME

The large expansion in industrial uses of farm products is one of the most significant developments in agriculture in recent years
and one which may help to cushion the expected return of farm commodity prices to lower levels, according to Richard R. Tryon, editor of the Chemurgic Digest. Writing in the March issue of this magazine, Mr. Tryon points out that the market for farm products is no longer limited to the traditional uses of a generation ago, but instead, there is an ever-increasing demand for these crops for industrial purposes. Many million bushels of grains and huge tonnages of other crops already are purchased annually by American industry, and there is good reason to believe that such purchases will increase substantially during the next few years, or at the very time that the demand from other sources may be declining. Says Mr. Tryon: “For millions of farmers, this supplementary demand from industry for the use of farm crops for chemurgic purposes will provide a source of cash income which will mark the margin between prosperity and hard times.” When the present large exports slacken, it will be necessary to have other outlets to support prices. The answer lies not in curtailing production or destroying crops and livestock, he says, for this lowers the Nation’s standard of living; but in continued high production, with an ever-increasing industrial use of farm products, which will bring additional income to the farmers and raise the living standards of the total population. Mr. Tryon believes that industry will rely more and more on farm products as essential raw materials and that chemurgic uses of these products will become increasingly important both as cushions and stimulants for farmers’ incomes and as an element of our general well-being in the future.

FARM MANAGEMENT

Treatment of Peanut Seed Urged

For better stands and bigger yields of peanuts, the Texas A. & M. College Extension Service advises farmers to treat shelled seed with two percent ceresan or a similar product. In six years of field tests at Stephenville, unshelled seed treated with three ounces of 2 percent ceresan per 100 pounds of peanuts came up to 71 percent of a perfect stand as compared with 31 percent for untreated seed. A three-year average yield at Stephenville was 26.8 bushels an acre for treated peanuts and only 16 bushels per acre for untreated seed. Other chemicals which have given good results are arasan, phygon, spergon, and tersan. Farmers are advised by the College not to treat peanuts with the new improved 5 percent ceresan, however, as it is not intended for peanuts.

Although inoculation of peanuts before planting is desirable, farmers are cautioned not to use both inoculation and chemical treatment, because the chemical will kill the nitrogen-bacteria just as it will kill the mold and fungi that would rot the seed. Research workers have found that chemical treatment pays off most on shelled peanuts, while unshelled seed respond more to inoculation than to chemical treatment.

Bindweed Control

A farmer can almost completely eradicate bindweed, known otherwise as morning glory, and still produce high crop yields by combining the use of 2,4-D with the correct cultural methods, according to a mimeographed report prepared by J. R. Spencer, agronomist, New Mexico Agricultural Experiment Station. The report, “Control of Bindweed by the Use of 2,4-D and Cultural Methods,” outlines the steps necessary for controlling the pest in various crops and on ditchbanks, right-of-ways, and watersheds which provide for irrigation. It states that application of 2,4-D will halt the spread of the plant as it prevents seeding and checks lateral spreading of rootstocks. Deep plowing of bindweed-infested land lowers root food reserves by breaking up many roots and also exposes numerous roots to drying and freezing. Also, grazing sheep on bindweed which grows in small grains and Sudan grass greatly weakens the plant as sheep will selectively choose bindweed, nipping it closely. Planting crops at heavier than normal rates shades and smothers bindweed and prevents its blooming and building up root food reserves. The report contains detailed directions for use of each of these practices on different types of land and crops. Copies of the report may be secured by request to the Director, New Mexico Agricultural Experiment Station, State College, New Mexico.
Alfalfa in Rotation Increases Income

Alfalfa rotated with cotton, grain sorghums, and oats will increase both the yields of the other crops and the average annual cash income per acre. This statement is based on the results of a 12-year experiment on irrigated land at the Wichita Valley Station (Texas Substation No. 16), according to Progress Report 1112 prepared by L. E. Brooks of the Texas Agricultural Experiment Station. Cotton had an average annual yield of 440 pounds of lint per acre in a 4-year rotation of cotton, grain sorghum and alfalfa (2 years), but only 320 pounds per acre in a 2-year rotation of cotton and grain sorghums. In the 4-year rotation, sorghum produced 2,072 pounds of threshed grain per acre but only 1,400 pounds per acre in the 2-year rotation. Cotton yielded 399 pounds of lint per acre in a 3-year rotation of cotton, oats, and alfalfa, but only 331 pounds of lint per acre in a 3-year rotation of cotton, oats, and sorghum.

On the basis of approximately average prices in 1947, the 4-year rotation which included alfalfa (2 years) increased the average annual gross income $23 per acre over that for the 2-year rotation which included only cotton and grain sorghum. Alfalfa used to replace grain sorghum in the 3-year rotation with cotton and oats gave an increase in the average annual gross income per acre of about $14.

FARM PRICES
New Support Prices Announced

The United States Department of Agriculture has adjusted prices for the 1948 wool clip to assure producers an average price equal to the 42.3 cents per pound received in 1946. The changes became effective April 1 and are designed to offset higher marketing costs and maintain normal differentials between graded wools. All wool appraised or reappraised for purchase on or after April 1 became subject to the new schedule.

The Department of Agriculture announced that it would support the price of hogs from April through September at levels ranging from a low of $16.50 per hundredweight in May to $18.50 per hundredweight, Chicago basis, at the end of the period. Differential schedules of prices are prepared for other markets. Prices during the period are not expected to fall to the support levels, which are based on the March 15 parity prices.

TECHNOLOGICAL DEVELOPMENTS
New Insecticide Highly Effective

A new and effective insecticide that combines high insecticidal efficiency, low toxicity to warm-blooded animals, and safety to plants is now being produced. Known as "Marlate" methoxychlor insecticide, this new product kills a wide variety of insects that come in contact with it or that eat it. "Marlate" can be used freely on livestock and on crops where certain residues would be undesirable. Against nuisance insects, such as flies and mosquitoes, that attack man and animals, "Marlate" has an advantage over DDT because of its fast knock-down or paralytic action.

Field tests show "Marlate" to be safe on such vegetables as cucumbers and beans, which are sensitive to certain other insecticides. Other crops on which it may be used include cabbage, peas, soybeans, peaches, early apples, and grapes. Specific insects against which "Marlate" can be used include Japanese beetle, asparagus beetle, bean leafhopper, codling moth, Colorado potato beetle, corn earworm, cucumber beetles, housefly, hornflies, imported cabbage worm, melon worms, Mexican bean beetle, and Oriental fruit moth. The compound may be applied either as a dust or spray.

PUBLICATIONS
Texas Agricultural Experiment Station, Texas Agricultural and Mechanical College, College Station:
The Composition and Utilization of Texas Feeding Stuffs; Bulletin No. 461, Revised, by G. S. Fraps.
Oat Production in Texas, Bulletin No. 691, by I. M. Atkins and E. S. McFadden.
Alfalfa Improves the Soil and Increases Cash Income in the Wichita Irrigated Valley, Progress Report 1112, by L. E. Brooks.