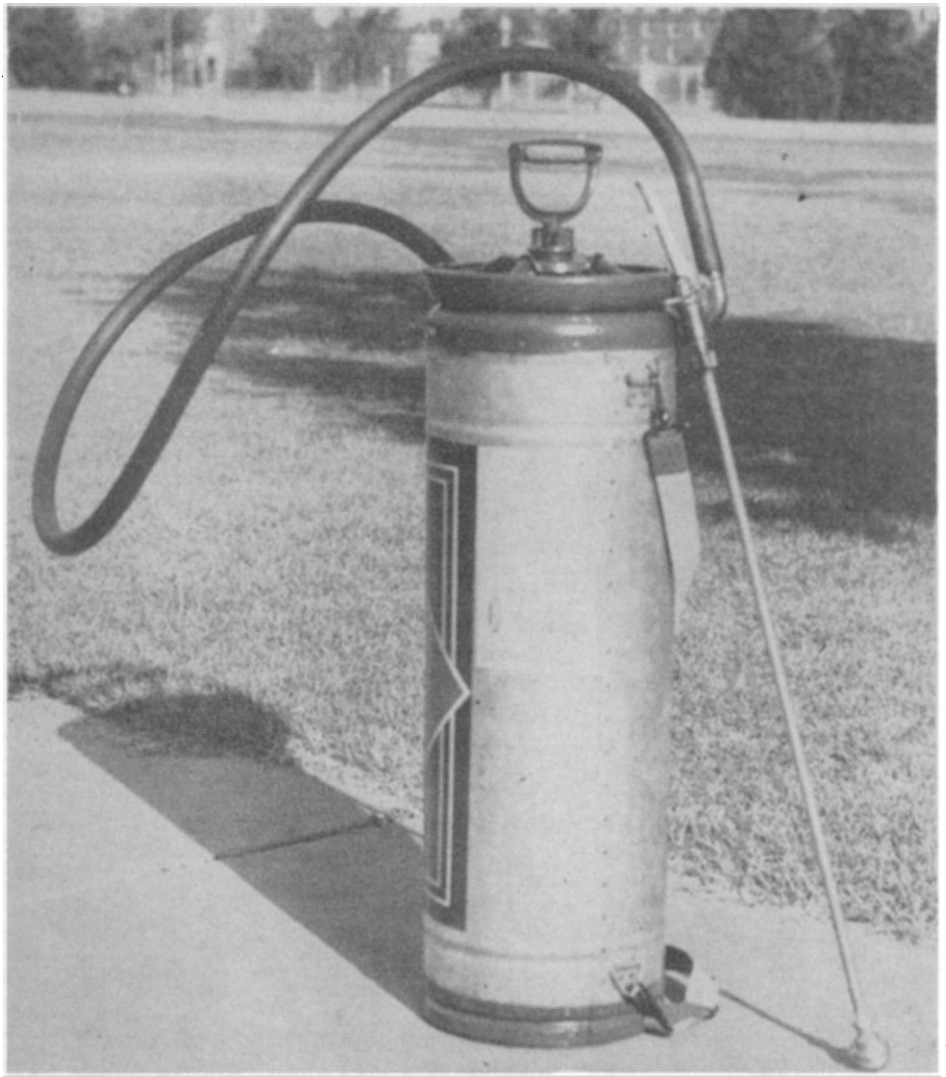
D D T



The smallest size sprayer suitable for applying DDT.

Circular No. 418

Extension Service, Oklahoma A. and M. College
Shawnee Brown, Director
Stillwater, Oklahoma

D D T

EPHRIAM HIXSON, Associate
Extension Entomologist

C. F. STILES
Extension Entomologist

Introduction

DDT has been proclaimed as the "cure-all," "magic killer," and the "last answer to all our insect problems." That, of course, is not the case. It not only has not solved all our problems but, in a few cases, has created new problems. It is a known killer of many beneficial insects, fish, and certain insect feeding birds.

DDT is not magic. It is an effective insecticide for controlling some insects better than any other known material; it is not better than other known insecticides against other insects, and it is absolutely worthless against still other insects.

DDT is a chemical known as dichloro diphenyl trichloroethane. It is made by combining chloral hydrate with monochlorobenzene in the presence of sulfuric acid. It is about 50 percent chlorine. Its reputation has been built upon the fact that it will last a considerable length of time and kill certain insects. It is more effective at low temperatures than at high temperatures and it will last longer as a residue at low temperatures. It appears that high humidity is also a factor in prolonging its effectiveness. DDT is still in the experimental stage and much more research is needed before final recommendations can be made. The following information is based upon published research and reports which are now available. As more information is received, no doubt many of the present recommendations will be changed.

Forms of DDT

1. DDT CRYSTALS, TECHNICAL GRADE: This is the basis for manufacturing the other forms which are sold in general to the public. The Technical grade is sold only to licensed processors.

2. OIL SOLUTIONS OF DDT: DDT will dissolve in various petroleum oils and other similar solvents, such as Xylene, kerosene, and pine oil. It is insoluble in water.

3. DDT DUST: This material is made from DDT concentrate which is mixed with various diluents, such as talc, pyrophyllite, and sulfur. Lime and other strong alkalies will destroy the toxicity of DDT. These dusts range in concentration from 2 to 15 percent and are used in the control of insects on general agricultural crops and in homes.

4. DDT WETTABLE POWDER CONCENTRATE: This material is similar to the dust, except it has a wetting agent added which will cause it to disperse in water. It is used as a spray. These wettable powders have 20, 25, 40, and 50 percent DDT. It should be remembered that this powder disperses in water, but it does not dissolve in water. It will settle out unless it is stirred or agitated.

How to Apply DDT

1. RESIDUE: DDT is a contact poison and must come in contact with the insect which you desire to kill. In using it as a residue, the spray should be so placed that the greatest population of insects will come in contact with it. In barns, that means beams, supports, wires, and other fixtures where flies habitually rest. The same practice should be followed around houses and, for that reason, it is necessary to know where insects normally stay. It is necessary that insects stay in contact with DDT residue for one to five minutes before they get a killing dose, and it takes them from one to two hours to die after they have gotten the killing dose.

In spraying where feed or food is present, they should either be covered so that DDT will not get on them or removed from the area where spraying is to be done. In this way possible poisoning of livestock or people can be avoided.

2. LIVESTOCK SPRAY: When spraying livestock for horn flies, particularly cattle, the back and sides should be wet, as well as the neck and head. It is not necessary to wet the under line to control this insect.

Where lice are to be controlled, the entire body must be wet so as to contact the lice. The same is true of other insects which infest the entire body.

3. CROP DUST: DDT is similar to other agricultural dusts and should be applied in the same manner, being sure that the insects are contacted with the dust. Usually, it takes from 20 to 40 pounds, per acre, of the dust to get the desirable coverage.

4. IN THE HOUSE: Insects that infest the house usually hide away in cracks and crevices and, for that reason, dust is

usually preferable to spray. It should be driven into the cracks and crevices with a dust gun. A spray may be used in laying down a residue under shelves, under the sink, or the under side of drawers, particularly for roaches, silverfish, and other similar insects.

It should be remembered in using DDT that it is a poison of a toxicity equal to many other poisons which we generally use. It should, therefore, be kept out of food and as much as possible from coming in contact with people. The oil type, of course, should not be used on any living thing, except those you want to kill.

Methods of Applying DDT

DDT may be applied either as a dry dust or a liquid spray.

DUST—DDT can be applied with any dust gun or dusting machine which is used for applying other insecticidal dusts to field crops, to vegetable crops, or in houses. No special equipment is necessary.

SPRAY—DDT in oil solutions, emulsions or wettable powder can be sprayed with any standard sprayer, ranging from the small three-gallon compressed air type to the largest orchard sprayer. Use the sprayer in the same manner that it is ordinarily used. The small household sprayer, such as is commonly used for fly spray, is not suitable for spraying DDT. In using the wettable powder, it is necessary to keep the liquid agitated to prevent settling. Oil solutions for residue can be put on screens with a paint brush.

Recommendations for Using DDT

1. Oil Solutions of DDT. (Not to be used on man, livestock, or plants.) Oil solutions of DDT are suitable for residue spraying only. These solutions should contain five percent DDT. That information should be on the label of the container. Less than five percent is not effective. Do not accept anything less.

Oil solutions of DDT are a fire hazard when sprayed and should, therefore, be handled with care. The oil penetrates porous surfaces and takes the DDT in with it, leaving only a thin residue on the surface and much of the toxic material is lost. For this reason, oil solutions of DDT are considerably less effective than the wettable powders. Oil solutions of DDT are readily absorbed through the skin and are considered by some to be dangerous to man and animals. However, there is much disagreement on this point. The 5 percent oil DDT solution should be used at the rate of one gallon per 1,000 cubic

feet. This requires seven ounces of Technical DDT and one gallon of kerosene.

2. WETTABLE POWDER. Wettable powder may be used either as a residue or for spraying livestock, dipping livestock or for control of various crop insects. This is probably the most suitable form of DDT considering all possibilities of its use. In using the wettable powder remember it does not dissolve in water and will settle out, therefore, continuous agitation is necessary to get uniform coverage of the animal or surface which is being sprayed. There is some controversy as to the best concentrations to use for various purposes. However, the concentrations given have been satisfactory. The 40 and 50 percent DDT are the most common concentrations on the market. Therefore, only these two will be discussed for making sprays.

50 percent DDT

Residue spray for barns and other buildings	1	pound in 2½ gallons of water
	40	pounds in 100 gallons of water (Makes a 2.5% DDT spray.)
Livestock spray	1	ounce in 1¾ gallons of water
	3½	pounds in 100 gallons of water (Makes a .2 of 1% DDT spray.)

40 percent DDT

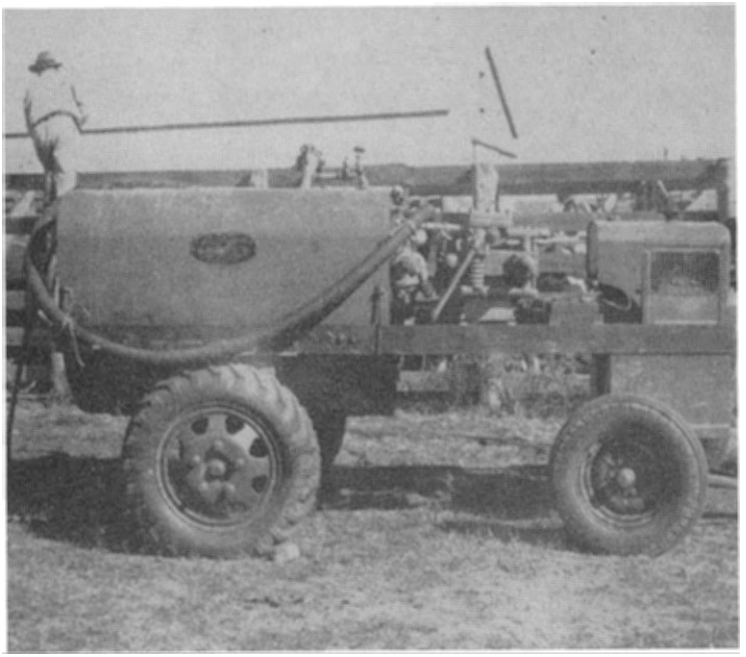
Residue spray for barns and other buildings	1	pound in 2 gallons of water
	50	pounds in 100 gallons of water (Makes a 2½% DDT spray.)
Livestock spray	1	ounce per 1¼ gallons of water
	5	pounds per 100 gallons of water (Makes a .2 of 1% DDT spray.)

A five percent residue spray is recommended for mid-summer when the temperature is high. Double the amount of DDT in the above formulae to make a five percent spray.

It requires one gallon of spray per 1,000 square feet for residue deposit. Cows require one to two quarts each, depending upon their size and length of hair.

For residue spraying, it is desirable to wet all surfaces uniformly, but avoid drip. Cattle should be wet completely, but avoid runoff. A residue type spray can be expected to last on cattle for 10 days to 2 weeks for horn flies.

In barns the residue will last for about the same length of time for house flies and stable flies. During hot weather, the residues will be effective for a shorter period than they will in cooler temperatures. Therefore, more frequent applications are necessary during mid-summer. Direct sunlight destroys the toxicity of DDT in a very few days.



A typical orchard sprayer suitable for spraying large areas.

3. DUSTING POWDER—Dusting powders are prepared with varying amounts of DDT to be used for a particular species of insect. Some insects require higher concentrations than others. It is therefore desirable to know what concentration is best to control a particular insect. Generally speaking, any concentration below 3 percent will not be very effective. The more common dusts available are 3, 5, and 10 percent. The usual rate of application is 20 to 40 pounds, per acre, depending upon the size of the plants.

DDT is known to be injurious to squash, cucumbers, melons, and cantaloupes.

Concentration of DDT to Control Certain Insects

Insect	Percent DDT	Form	Amount to Use
Alfalfa insects			
Lygus bugs	5	dust	30 pounds per acre
Grasshoppers	15	dust or spray	20 pounds per acre
Ants (not reliable for all ants)	5	spray	1 gallon per 1,000 sq. ft. as residue
Aphids		Not effective	
Bedbugs	5	spray	3 ounces per bed
	10	dust	1½ ounces per bed (treat entire bed)
Cabbage worms	2	dust	20 lbs. per acre at 10-day intervals
Cattle insects			
Grubs			Not effective
Lice	0.15	dip	16- to 20-day interval (No better than rotenone-sulfur combination)
Hornfly	0.2	spray	1 to 2 qts. of spray per animal
Mosquitoes	0.2	spray	
Horse fly	0.2	spray	(effectiveness doubtful.)
Stable fly	0.2	spray	(not effective)
Ticks (Lone star)	1.0	spray	No more effective than rotenone-wettable sulfur 1-10-100
Cotton Insects			
Boll weevil, Leafworm		Not effective	
Bollworm	5 to 10	dust	12 to 16 lbs. per acre
Lygus bugs, Stink bugs, Fleahopper	5	dust with sulfur diluent	20 lbs. per acre
Fleas	10	dust	½ lb. per 1,000 sq. ft.
	5	spray	1 gallon per 1,000 sq. ft.
House fly, Stable fly, Mosquitoes	5	spray	1 gallon per 1,000 sq. ft. as residue

Insect	Percent DDT	Form	Amount to Use
Roaches	10	dust	Cover all surfaces, drive into cracks and hiding places
		(about as good as sodium fluoride)	
Fruit Insects		Need more research before recommendations can be made. In tests, its use has caused a buildup of mites and aphids. Until this problem can be corrected, DDT cannot be recommended.	
Stored grain and Cereal Insects		DDT should not be used on products intended for feed or food for man or beast.	

DDT is of no value in the control of screwworms, heel fly, cattle grub, chiggers, poultry mite and plum curculio.

The practical value of DDT to control ants, roaches, spiders, mites, ticks and horse flies is doubtful.

Cooperative Extension Work in Agriculture and Home Economics
Oklahoma Agricultural and Mechanical College and Cooperative Extension Work in Agriculture and Home Economics

92045