

United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

THE USE OF DDT IN CONTROLLING FLEAS

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DDT, when properly formulated, has been found very effective in controlling several species of fleas. Its long-lasting or residual effectiveness is unique in the insecticidal field, and because of this property some flea infestations can be eradicated with one treatment. The number of treatments, however, depends upon the manner and thoroughness of the application.

Breeding Habits of Fleas

In order to understand how DDT should be applied for controlling fleas, the general breeding habits of these insects must be understood.^{1/} Adult fleas must have blood to complete their life cycle, although they may live without it for several weeks. There is no true "sand flea" breeding in the sand without animals upon which to feed. Rather, there are dog fleas, cat fleas, rat fleas, chicken fleas, and dozens of other species, most of which will feed on a number of different kinds of animals.

Most flea eggs are laid on the body of the host animal and are shaken off or fall to the floor or ground before the larvae hatch. During its larval stage the flea lives on the debris in which it is found. At this time the flea is particularly vulnerable to DDT sprays and dusts; therefore, any attempt at controlling the insect should exploit this fact. After about 15 days the immature flea completes its development and immediately attempts to obtain blood from a warm-blooded animal. An opportunity is thus provided for killing the adult flea with DDT powder applied to the infested animal.

^{1/} For a discussion of the habits and life history of fleas see "How to Control Fleas," U. S. Dept. Agr. Leaflet 152.

The simultaneous use of a DDT solution or suspension in all parts of an infested house or outbuilding and the dusting of all animals with a DDT powder should relieve a heavy infestation with one treatment. Although fleas may be noticed for several days after the treatment, the DDT eventually kills them.

Types of DDT Insecticides

DDT must be prepared in a suitable formulation before it can be used as an effective insecticide. Several types of DDT formulations are now on the market. These include aerosols, dusts or powders, solutions, emulsions, and water-dispersible powders. The quantity of DDT in various commercial preparations especially emulsions and water-dispersible powders varies widely, therefore for satisfactory results, the directions given on the container should be closely followed.

DDT is a slow-killing insecticide requiring in some instances several days to markedly reduce an infestation. Furthermore, DDT powders, when applied to a dog for example, will greatly stimulate activity of the fleas. Since all the fleas may not leave the animal immediately, for several hours it is very likely to show signs of greater discomfort than before the powder was applied.

Cautions

DDT should always be used with reasonable caution, because it is a poison. On the basis of the toxicity data presently available, however, it is believed that no appreciable risk is involved in the household use of preparations containing the amounts of DDT recommended in this circular, provided the users carefully observe the caution statements recommended by the Insecticide Division of the Production and Marketing Administration, which are as follows:

1. For straight DDT Technical.--DDT is toxic and when in solution can be absorbed through the skin. Avoid inhaling dusts and mist from spray. Avoid contamination of foodstuffs.
2. For petroleum oil solutions containing not more than 25 percent DDT Technical.--This solution if brought into repeated or prolonged contact with skin can cause toxic symptoms. Avoid excessive inhalation and skin contact. In case of spillage on the skin wash with soap and water. Avoid contamination of foodstuffs. Do not use on household pets or humans.
3. For combustible mixtures.--Same as No. 2 above. Do not spray near fire. Do not smoke while spraying.

4. For dust and powder formulations.--Avoid excessive inhalation. Avoid contamination of foodstuffs.

DDT in Aerosols

DDT in aerosols will give only partial and temporary relief from flea infestations in the house. The immature stages of the insect are not likely to be killed with one application, but daily applications for a week may do a fair job. A few seconds' release of the fog is sufficient for rooms containing a few thousand cubic feet of air space (see directions on containers). This method is not an economical one to use, however, and is therefore not recommended for the control of fleas.

DDT in Dusts

Dusts containing 10 percent of DDT in diluents such as talc or pyrophyllite may be used directly on dogs and other animals, except cats, for controlling adult fleas. These dusts are very effective also in killing fleas in rat burrows, in basements, in houses, on bare ground under buildings, and in lawns. DDT powders of this strength can be applied by means of hand dusters in the home or yard. If used directly on dogs, about 1 tablespoonful of the 10-percent powder to an average-size dog is dusted thoroughly in the hair along the back from the head to the tail. It is hazardous to use DDT powders on cats, because in their habit of cleaning themselves they might ingest enough to make them sick or kill them. In treating rat burrows or infested basements about 1 pound of the 10-percent DDT dust is used to each 1,000 square feet of floor space. It may be applied best by means of a hand duster.

DDT in Solutions

DDT can be dissolved in comparatively few readily available solvents which can be used with reasonable safety. The most convenient solvents are various grades of kerosene and fuel oil. For those who wish to make their solutions, 7 ounces of technical DDT can be dissolved in 1 gallon of kerosene to make a 5-percent DDT solution. Highly refined greaseless kerosene will not dissolve so much DDT, and the fuel oils will dissolve a little more than common kerosene. DDT should not be used in gasoline.

DDT in oil solutions is very effective against flea larvae, but should not be used on animals because of the danger of burning them. A 5-percent DDT solution applied by means of a small hand sprayer is recommended for treating flea-infested floors, rugs, overstuffed furniture, and basements. For use on delicate fabrics one should



make sure the solvent is a highly refined greaseless kerosene to avoid staining. Within homes sprays are applied lightly or at the rate of about 1 gallon per 4,000 square feet of surface. When used on a basement floor the application should be about four times heavier than when sprayed on a hardwood floor or rug. Spraying 5-percent DDT solutions to chicken runs and houses for control of sticktight fleas has given excellent results. Oil sprays, however, should not be used on lawns because they will burn the grass.

DDT in Emulsions

Emulsions containing DDT can be used in the same manner as the DDT solutions with equal effectiveness.

An emulsion concentrate is a liquid which on dilution with water gives a spray suitable for certain purposes. A very satisfactory concentrate for making DDT emulsions contains 25 percent of technical DDT, 65 percent of xylene, and about 10 percent of a wetting agent such as Triton X-100 (polyethylene glycol phenyl isooctyl ether). One part of this concentrate diluted with 4 parts of water makes a 5-percent DDT emulsion.

DDT in Suspensions

DDT suspensions are recommended for general use in and about farm buildings, in yards, in basements, and other similar situations where the unsightly white residue is not objectionable. A 2.5-percent DDT suspension is recommended, and it may be applied by means of an ordinary hand-operated pressure sprayer. DDT in these suspensions settles to the bottom of spray equipment, however, and they sometimes clog nozzles adjusted to even a coarse spray. Constant agitation will eliminate this trouble and provide for the delivery of a uniform concentration of spray material. DDT suspensions are used at the rate of about 1 gallon to each 1,000 square feet of basement floor, but a larger quantity is needed on lawns.

The most recent work on residual sprays has led to the development and use of water-dispersible DDT powders, which are now manufactured by several companies. A satisfactory DDT suspension can be made by mixing a water-dispersible powder containing 50 percent of DDT at the rate of 2 pounds to 5 gallons of water. This mixture contains about 2.5 percent of DDT. If a 25-percent DDT powder is used, 4 pounds of the powder should be mixed with 5 gallons of water to obtain the same concentration.