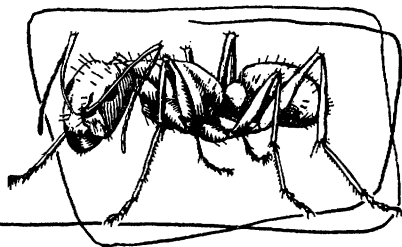


Warnings as to Insecticides



The Safe Use of Insecticides

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Insecticides kill insects because they affect a life process like respiration, digestion, circulation, and nerve reactions. A person also might experience some effect on his life processes if enough of the chemicals should get into the body by mouth, with or without food; through the nose, by breathing vapors or particles of dusts or liquids; or through the skin, by absorption.

Any person who plans to use an insecticide should inform himself therefore of its characteristics. What man, in his right mind, would attempt to fly an airplane without first learning how to do so?

Many sources give the characteristics of the various insecticides and directions for using them safely. The Department of Agriculture, county agricultural agents, most of the State agricultural colleges, agricultural experiment stations, and extension services can furnish, on request, printed matter that describes the characteristics of insecticides and the precautions to be observed in using them.

Another important source of information is the label on the container. Every user, before he opens the package, should read all the statements, directions, and warnings on it because it relates specifically to the material in the

package. The instructions are there for good reason—the user's safety.

The Insecticide, Fungicide, and Rodenticide Act requires that insecticides entering interstate commerce be registered and that labels on them carry information to safeguard the user and the public. The Food and Drug Administration, a unit of the Federal Security Agency, establishes tolerances; that is, levels of insecticidal residues that are safe on foods. Many States have laws requiring appropriate labels and controlling the application of pesticides by custom applicators.

INSECTICIDES differ in degree of toxicity—the amount that would harm livestock or man: Man could tolerate pyrethrum and sulfur in rather large quantities, but small amounts of calcium arsenate or sodium fluoride would be dangerous.

Insecticides differ also in the way they act. Some (like nicotine sulfate) may be very poisonous, but show little cumulative effect. Others (like lead arsenate) are less acutely poisonous but build up in the system and produce ill effects if they are taken repeatedly into the body.

Some insecticides (like hexacthyl tetraphosphate) may be poisonous to insects and higher animals when first applied but lose their strength quickly. Others (like DDT) are less poisonous but persist for considerable periods.

Thus very poisonous materials must be handled and applied carefully. In the use of the less toxic but more persistent materials the hazards from residues must receive the major attention.

The danger always exists that a per-

son may exercise great care when first using an insecticide and, experiencing no ill effects, may become more and more careless.

The home gardener who needs to control pests in his back yard would select insecticides from the group which need only a minimum of care in their use—pyrethrum and rotenone, for example. The main precautions for him are to avoid getting the insecticides into the eyes or mouth or on the skin. Like all other insecticides, they should be stored in a place where children cannot touch them and where they cannot contaminate food.

A NONHAZARDOUS COMPOUND usually does not carry a poison label. If it includes a compound in solution with a propellant and is to be applied as a fine mist or if it is dissolved in deodorized kerosene and is to be applied as a spray to control household pests, a precaution on the label would state that contamination of foods should be avoided. If the spray contains a kerosene solvent, it should not be applied near an open flame. It is harmful if swallowed.

Insecticides with limited hazards are used commercially and many are recommended for the home gardener. A person who uses them should avoid breathing dust or spray mist, avoid contamination of feed and foodstuffs, keep the insecticides away from children and domestic animals, and wash himself thoroughly after using the materials.

The home gardener who uses a hand duster or sprayer, by observing the wind direction, can avoid breathing the dust or mist. If he happens to be particularly susceptible to inhalation of dusts of any kind he can obtain protection by using an inexpensive respirator of the type having a cloth filter pad. A handkerchief tied over the nose and mouth will give some protection.

Commercial operators who are exposed to inhalation of spray mists or dusts day after day should use a simple pad respirator. The warning not to

contaminate feed and foodstuffs should make it obvious that this group of insecticides may leave residues on fruit and vegetables if they are used too near harvest.

Other insecticide formulations in this group may have vapors that should not be inhaled. They may have a slight hazard because of possible skin absorption or irritation. They may be harmful if swallowed.

If the label indicates a hazard from breathing the vapors, a respirator having a cartridge filter through which the air passes will furnish protection.

If danger of skin absorption is indicated on the label, contact with it should be avoided. Rubber gloves will be useful when handling it. Some solvents affect synthetic rubber quickly, and it is best to use gloves of natural rubber.

If the insecticide might harm the eyes, goggles should be worn. After spraying or dusting, clothing should be changed and the body carefully bathed. Clothing considerably contaminated should be laundered before being worn again.

Some of the insecticides of this class are used to control household pests. Even though the risk is not unduly great, the instructions on the labels should be followed.

HAZARDOUS COMPOUNDS may or may not bear the word "poison" on the label, depending on their concentration, but all are labeled to show that they are dangerous and may cause death if swallowed. Empty containers should be promptly destroyed or buried. They should never be left where children or domestic animals can get at them. Such insecticides should not be stored where contamination of food or feed can take place. The user should familiarize himself with the antidote mentioned on the label for accidental poisoning. Nearly all these insecticides, at the concentrations indicated, are used chiefly by commercial growers or those who apply insecticides on a contract basis.

Certain concentrated volatile insecticides are intended for mite control in chicken houses. Anyone using them should take special care to avoid breathing the vapors and letting them touch the skin.

Users of hazardous sprays should wash thoroughly and change clothing after working with the material for any length of time. A person who uses dusts day after day should use a good respirator and change the pads frequently.

Particular hazards are associated with the commercial use of organic phosphorus compounds. They are hazardous if swallowed, inhaled, or absorbed through the skin or eyes. Protective gloves, clothing, goggles, and a respirator with a special canister capable of absorbing the vapors should be worn. Users should wash thoroughly with soap and water after each day's operation.

AEROSOL BOMBS may contain pyrethrum, allethrin, or DDT as the insect-killing agent. The use of amounts indicated on the label creates no hazard, but it is best to close a treated room and remain outside for 15 minutes or more.

DDT solutions used in the form of thermal aerosols or fogs to control flies and mosquitoes over large areas cause practically no hazard to the operator or to persons in the fogged area who might breathe the mists for a short time. The air dilution and short exposure are protective factors. To remain in such aerosol clouds for long periods is inadvisable, however.

Aerosols are sometimes used to destroy insects on vegetation. The insecticide is dissolved in an organic solvent in the aerosol formulation. This may present some hazard from skin absorption, and care should be taken when handling such solutions. Gloves of natural rubber should be worn. Hands and skin should be washed if there is contact with the solution. Goggles and a respirator should be worn to avoid breathing the fumes.

Organic phosphorus insecticides are not recommended for use in these fogs

for outdoor-area treatment. Aerosols in which they are combined with a propellant are released from cylinders for controlling greenhouse pests. The operator should wear protective clothing, gloves, and a face mask equipped with a universal-type N-canister. Treated greenhouses should be posted and locked, and no one should enter them until they are thoroughly aired.

With the increased use of insecticides since 1945, however, more precautions have become necessary to protect pilots and flagmen as well as other people, livestock, and wildlife in the treated and adjacent areas.

SPECIAL CARE must be observed when pilots or helpers apply sprays or dusts containing organic phosphorus compounds. It is necessary to avoid breathing the dust, vapor, or spray mist and to avoid skin contact. Loaders must wear a full-face mask provided with a universal-type N-canister, because of their severe exposure to the insecticide concentrates. Pilots and helpers should wear respirators with a fume-type filter and chemical-absorbing cartridge. Freshly laundered, waterproof, or protective clothing that covers all exposed skin surfaces should be worn. The clothing should be changed daily. The equipment should be checked before loading to make sure all connections are tight and the system is functioning properly. The pilot should lay out his course so as to avoid flying back through an insecticide cloud.

Clean, natural-rubber or rubber-dipped gloves should be worn. They should be replaced frequently. The pilot and helpers should bathe thoroughly and change clothing after flying operations.

FUMIGANTS, which kill insects in more or less enclosed spaces, have different degrees of hazards. Fumigants that present minimum hazards, such as ethylene dichloride-carbon tetrachloride mixture, may be used safely by farmers to treat stored grain. Others, which require greater precautions, like

carbon disulfide, should be used only by commercial pest-control operators. The most hazardous fumigants, such as hydrocyanic acid gas, should never be used by the novice. The pest-control operator is trained to handle them and knows the proper precautions. Any fumigant that is toxic to insects is also toxic to human beings.

Before any fumigant is used, the various sources of information should be consulted and labels should be carefully read. Antidotes and first-aid treatments should be noted.

Two principal precautions that should be taken when a fumigant is used, regardless of its degree of toxicity, are to avoid exposure to a heavy concentration or inhalation of vapors for a long time and to avoid spilling the fumigant on the skin or clothing.

A farmer who may be using a limited amount to treat one or two grain bins and who is using a fumigant recommended for farm use is exposed to it only for a short time. Protection from breathing the fumes is usually not necessary, as he can avoid prolonged inhalation. When the fumigant is used repeatedly over a long period and in enclosed spaces, protection against inhalation is necessary. If there is exposure to high concentrations, a full-face mask should be worn. The mask should have a canister suitable for the fumigant used; not every canister will afford protection against all gases. Because the life of a canister is limited, new ones must be supplied whenever those in use show signs of weakness. Gas masks are not designed for protection against prolonged exposure to heavy gas concentrations, and exposure should be limited to the short period necessary to release the fumigant and to open the building for airing.

Many fumigants readily penetrate the skin and may be taken up by the blood stream. Gloves resistant to the fumigant should be worn, particularly if large quantities are involved. If material is spilled on the skin or work clothes, a bath with soap and water should be taken and the clothing

changed. This precaution should be followed immediately with the most dangerous fumigants.

Persons not actually engaged in applying the fumigant should be protected from drift or leakage or from gaining entrance to the enclosed space during the fumigation. The buildings should be locked and posted. Keeping watchmen on duty during the exposure period is desirable.

Some fumigants, such as carbon disulfide, have a fire or explosion hazard, and care should be taken to avoid any spark or flame near the vapors.

Contamination of food products being fumigated directly or when stored in warehouses receiving a general fumigation must be avoided. Certain fumigants, such as hydrocyanic acid gas and methyl bromide, are absorbed, especially in moist materials, and therefore such products should not be used as food until thoroughly aired and found to contain no appreciable residue. Damp mattresses and clothing may absorb the gas and thorough airing before they are used is important.

DRIFT OF INSECTICIDES outside of the area being treated may create a danger, especially if extremely poisonous materials are being applied. People living or working in the line of drift may be made seriously ill in extreme cases. A few insecticides, such as hexaethyl pyrophosphate and parathion, present hazards because of their vapors or dusts. They might cause serious consequences if large quantities drifted over areas where human beings, domestic animals, or fowl might be subjected to concentrations of the vapor or dusts for considerable time. Areas to be treated should be vacated until after the vapors or dusts have dissipated, unless one is certain that no hazard would exist.

Sprays are less likely to drift than dusts. Certain insecticides are stomach poisons of low solubility in water. If they should drift to gardens of leafy vegetables or small fruits the residue might be dangerous. Some insecticides might remain on the plants for some

time and be difficult to wash off. It would not be safe to eat products from such gardens soon afterwards. Drift of such insecticides over pastures might create a hazard to grazing stock—more because of the amount they take in with their food than because of actual contact of the material with their bodies. Similar drift to fields of hay crops may leave deposits sufficient to make the resulting hay injurious to livestock or indirectly to the public through the contamination of milk or meat.

Obviously one has to consider the general situation before starting to apply the insecticides. If possible, the application should be made at a time when hazards from drift will not be created, regardless of the kind of insecticide used. Applications from the air are more likely to contaminate adjacent fields, gardens, and pastures than ground applications. Therefore only competent and reliable pilots should be employed to do such work, fields should be posted, and the owner should be on hand to supervise the operation. Canopies or hoods on ground equipment help to keep the materials from drifting and so add to the effectiveness of the application.

INSECTICIDES OR REPELLENTS often are applied to livestock and household pets.

Pyrethrum and rotenone, for example, present no hazards if kept out of the animal's eyes, but solutions and emulsions containing toxaphene, benzene hexachloride, and chlordane may be harmful if the concentration is too high. Formulations containing parathion and hexaethyl pyrophosphate should never be used on animals, regardless of the formulation. Solvents such as oils and xylene in themselves are irritating and may cause loss of hair and scaling of the skin. They may also facilitate the penetration of the insecticide into the animal's body. For those reasons only insecticides and formulations recommended by proper authorities and labeled with specific in-

structions should be used on livestock or pets. Precautions on the label should be observed.

Because some crops may be injured by insecticides, labels should indicate susceptible crops and the insecticide concentration that should be employed against pests. Solvents or other ingredients may be safe on one crop but injure another. For example, it has been shown that cucumbers and squash are likely to be injured by DDT insecticides, although the same strength and dosage would be perfectly safe on most crops. Even certain varieties of a given vegetable may be easily injured by an insecticide that would not affect others.

SOME INSECTICIDES are poisonous to fish, toads, lizards, and snakes. For example, DDT and most of the new chlorinated materials, particularly toxaphene, kill fish at a very low concentration. Care must be taken to avoid insecticidal treatments or drift over open water, such as wide rivers and lakes, since wind may concentrate the material along a margin in sufficient quantity to kill fish. Remnants of spray from tanks and spray equipment should be drained and washed into a hole in the earth where they will not gain access to streams and ponds. Insecticides should never be mixed on or near wells.

Awareness of hazards and adoption of safeguards in using and storing pesticides are urgently needed. The object of instructions to that end is not to frighten people so that they will not use pesticides but to get them to observe proper precautions. The intelligent use of pesticides will enable users to derive the greatest good with the least chance of adverse effect.

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