PESTICIDES

FACTS ON THEIR USE IN NORTH CAROLINA

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Prepared by
Hugh M. Fields, Wildlife Specialist in Extension; G. C. Klingman, Professor, Crop Science (Weed Control); Clyde F. Smith, Professor and Head, Department of Entomology; C. N. Clayton, Professor, Department of Plant Pathology, N. C. State College.

In recent years and especially in recent months there has been much discussion and many articles concerning the use of pesticides (materials used to control undesirable plants, animals (rodents, insects, mites, etc.,) and diseases (plant and animal).

The following questions are the ones most commonly encountered. The answers are based on the best information available to the writers. In answering the questions we have assumed proper usage of the pesticides because it seems quite obvious to us that any chemical or anything if misused can be detrimental, whereas if used properly, it is beneficial, or in many cases even essential.

Question: Do we really need pesticides?

Answer: If we are to remain the best fed and best clothed nation in the world, the answer must be yes. Also, if diseases such as malaria, typhoid, yellow fever and typhus are to remain under control, the answer is yes.

Here are a few examples of what would happen if we stopped using pesticides. One of the most outstanding examples is the control of malaria in many countries of the world. What has happened in North Carolina will serve as a good example. During the ten-year period, from 1937-1946, there were 411 deaths due to malaria in North Carolina; however, in the ten-year period 1947-1956, there were only 13 deaths, and there has been only one death reported since 1955 due to malaria. The years 1945-46 are rather magic years in that these are the years when DDT was first used in treating for the control of Anopheles mosquitoes, carriers of malarial fever.

With our present knowledge it would be impossible to produce apples and peaches commercially without the use of pesticides. The fruit would be destroyed, deformed, or infested with various diseases and insects.

The alfalfa industry, which is so important to the North Carolina dairy industry, would be lost if it were not for the use of pesticides to control the alfalfa weevil.

The boll weevil is one of the major limiting factors in the production

of cotton, and the majority of our North Carolina growers would go out of the business if it were not for insecticides to control the boll weevil and other cotton insects.

You might be able to produce tobacco without insecticides if you had the help to pick the worms off by hand, as they used to do, but this is unlikely under our present standards of living.

Due to the ravages of insects and diseases, production of vegetables such as beans and cabbage would be reduced by at least 50 per cent, and it would be impossible to produce peanuts in many areas of North Carolina without the use of pesticides.

Certain chemicals, such as rotenone, are also used in connection with farm ponds, which play an important role in North Carolina today. The farm pond is used as a source of irrigation water and for recreation. And if we are going to have good fishing in the farm ponds, it is necessary to eliminate all of the undesirable varieties of fish, prior to the stocking of the pond. The use of certain chemicals is the answer to this problem. Pesticides (weed killers) are also used to control weeds in the farm pond.

Question: Are there satisfactory alternatives to chemicals for pest control?

Answer: In a limited number of cases, yes. One good example of this in North Carolina is the control of blackshank in tobacco. The use of resistant varieties is the only known method of controlling this disease.

There are very few cases where alternate methods other than chemicals have proved satisfactory for control of pests. In the case of weed control, of course, we could continue to use the hoe and the plow; however, in the case of most of our insects and diseases, it is necessary to rely on the use of chemicals for adequate control. This does not mean, however, that we are not looking for other means of controlling the pests.

As an example, in the case of the alfalfa weevil, we have been importing parasites into North Carolina. Last year we had one field that had 20 per cent of the weevils parasitized. This was not sufficient to give control, but it does show some promise. We are also looking into the possibility of developing strains of alfalfa which are resistant to the alfalfa weevil. Again, there are some promising leads, but nothing that is commercially feasible to date.

In fact, we are devoting much of our research effort to non-chemical means of controlling many of our insects and diseases. However, until such time as something satisfactory is found, it will be necessary for us to rely upon chemicals for control.

Question: Should "less toxic" pesticides be used?

Answer: In making recommendations we take into consideration the toxicity of the pesticide. If we have a choice between two materials, one of which is more toxic to warm-blooded animals than the other, then we will recommend the one which is less toxic.

Some materials such as rotenone may be relatively non-toxic to man, but toxic to some species of insects, and highly toxic to fish and pigs.

We are always looking for materials which are highly toxic to pests, but which are non-toxic to desirable forms of life, both animal and plant.

Question: Are pesticides a health hazard to consumers?

Answer: The major health hazard is from the careless applicator and to children who might get hold of stored pesticides. All pesticides have their safe and toxic levels.

Dr. F. J. Stare, Professor and Head of the Department of Nutrition, Harvard School of Medicine, stated: "As a physician and student of nutrition for the last 25 years, let me state categorically that I do not know, nor have I ever heard, of one single case of ill health in man shown to be due to adding approved additional chemicals to food."

Failure to use pesticides is far more serious than their proper usage. Rodent urine and excrement carry disease. Salmonellis, a form of food poisoning is a common disease spead in rodent feces. Twenty-five years ago rats, mice, cockroaches, and all sorts of vermin were an expected part of food storage. This is not so today, thanks to pesticides!

Question: Are pesticides upsetting the balance of nature?

Answer: In order to answer this, we must define "Balance of Nature" and determine where man fits into the picture.

The balance of nature is not a condition where all creatures live in close harmony--where disease, hunger, and predation are nonexistent. It is not the Utopia where the bunnies and butterflies, the lions and lambs, the tigers and titmice live peacefully together dining on milk and honey.

Instead, it is a constantly changing, dynamic condition in which each species of plant and animals is competing for dominance over all others. It is a struggle for survival in which an animal or a plant species depends on "safety in numbers."

The "balance" lies not in the status quo where a species becomes dominant and remains so. Instead, the balance lies in the fact that when a species gets the upper hand and becomes overly abundant it is set back by pestilence, depleted food supply, or some other destructive force. However, it is not completely destroyed and the survivors begin striving for dominance again.

In other words, nature is a dynamic community of plants and animals in which all the inhabitants are influenced by both constructive and destructive forces.

Man is a part of the natural community and he must fit into the community and be exposed to constructive and destructive forces, much as the rabbit or deer.

Man has, through the constructive force of superior brainpower, become the dominant species on earth. He has used his intelligence to bend nature to his advantage. He has completely changed the face of the earth. He has domesticated many of his once wild competitors and has conquered many of the diseases that once held him in check. He has altered land, that was once a barrier, to land that now produces the food and fiber necessary for his progress.

In the United States, man has developed a freedom from hunger and a standard of living that has never been equalled in the history of the earth. Perhaps these advances will continue throughout the world.

The big question is--Can man maintain his dominance? Or at some time in the future will man have to face a destructive force of hunger and disease brought on by his own overpopulation? Or a destructive force conceived by his superior brain that his avarice will make him unable to control?

If we consider man's progress as being made despite nature we mean that man upsets nature's balance in his every act. When we go to a doctor we are seeking to upset the balance of nature. When we plow a field and plant a crop, when we build a city, a road, a dam, we are upsetting things.

In this light pesticides are upsetting the balance of nature. We are using them as a weapon to overcome pestilence, disease, and hunger. We use pesticides to destroy the unwanted and to safeguard the desired, possibly at the expense of the total plant and animal community.

Question: Do pesticides pose a serious threat to wildlife?

Answer: When applied properly and in recommended amounts to most crops,

chemicals do not usually pose a serious threat. If applied improperly, they may affect reproduction of certain species, they may cause direct kills, or they may affect populations due to depleted food supplies.

Pesticides are generally applied to large, pure-stand, cropfields that are already poor wildlife habitat. Wildlife damage may have already taken place because of drainage and intensive clean-farming.

Eradication programs are a serious threat if they are large-scale operations involving tremendous areas in which pesticides are indiscriminately distributed in heavy doses.

The causes of major kills by pesticides as used in agriculture can be traced to misuse or accidents. A typical example is a hedgerow or woodlot between two fields that are being treated. Unless extreme care is taken, the woodlot will receive a dose of pesticide from both treatments, or will get a double dose. This may result in unnecessary wildlife kill.

Widespread fish kills have been caused by misuse and carelessness. Fish are highly susceptible to most insecticides. Chemicals carried to streams and lakes by runoff from treated crops are a problem. So is the individual who washes out his spray equipment in the creek or in a pond.

There is another side to pesticides and wildlife. Pesticides are used in fish and game management. However, they are usually short-lived chemicals and are applied on limited areas. Example: Rotenone is used to destroy undesirable fish and herbicides may be used in aiding the production of desirable food plants for wildlife.

Question: How much are pesticides misused?

Answer: To some extent, of course. But such misuse is apparently no higher than occurs in any human endeavor. The number of cases is small for three reasons. 1) Pesticides cost money and the farmer is anxious to use the smallest amount possible - and get the desired effect. 2) Where pesticides are highly toxic, they are so labeled. The applicator knows that misuse may result in sickness to himself. 3) Over application of a pesticide may result in serious crop injury, even though none of the pesticide will be in the crop at harvest time. Therefore, misuse may result in financial loss to the farmer.

Where farmers do fail to follow recommendations and they do contaminate food, we have very effective laws for confiscating contaminated food. Also, the person responsible for negligence is subject to legal proceedings.

It is interesting to note trends in poisonings in the United States.

1900 to 1909 3.4 to 5.2 poison deaths per 100,000 people
1946 to 1955 0.8 to 1.2 poison deaths per 100,000 people
1955 to present No apparent increase

The year 1942 was essentially the first year of the synthetic agricultural chemical age.

It is also interesting to compare the causes and respective number of deaths in the United States in 1959:

Cause	Number of Deaths
Automobile accidents	36,962
Wrong kind of alcohol	360
Aspirins and similar products	149
Venomous insect and animal bites	62
Pesticides[a, b]	152

It is regretted that there were 152 deaths due to pesticides, of which about 2/3 were children under 9 years of age. These deaths to children were almost entirely due to various forms of carelessness. Even then this is a remarkable record of safety when we consider that nearly every homeowner sooner or later uses pesticides. Nearly all gardeners use pesticides, and all modern farmers use the products.

Question: Can pesticides induce cancer or cause gene mutations?

Answer: Many things, taken in excess, can cause cancer or induce gene mutations. In excess, sunlight, the X-ray, caffeine in coffee, tar, or other petroleum products, burned foods such as burned toast and eggs. Yes, even eggs. Dr. Josel Szepsenwol of the University of Puerto Rico and formerly of Emory University reported to the American Association for Cancer Research in 1961 that a diet consisting solely of whole eggs did increase cancer in chickens and mice. In one experiment 77 out of 108 mice eating nothing but eggs developed cancer. However, we do not fear the eating of eggs.

It is not surprising to hear that some materials used at rates several hundred times that of normal usage can and do cause cancer-like growths. Often these growths disappear when a normal diet is restored.

None of the synthetic pesticides in use on food crops today, however, leaves residues which cause cancer. If massive doses of the pesticide

a. 2/3 of these were children under 9 years of age.
b. 2/3 were with materials in use prior to 1962.

have ever caused cancer, by present law, a zero tolerance in food crops is assigned to that pesticide.

Question: What is behind a recommendation of a pesticide?

Answer: Suppose a serious pest problem exists - for which we have no practical control. Some chemical company may decide to attempt to find a control. This is a serious decision because it will likely cost the company a minimum of a million dollars before they can sell their first pound of pesticide. In some cases it has cost 5 million dollars. Present laws require them to demonstrate the effectiveness of the material, how much residue, if any, will remain in or on a food crop after application, the toxicity of the chemical to warm-blooded animals - data obtained through the life span of white rats, guinea pigs, rabbits, dogs, etc. Also breakdown products in the plant and soil must be determined. Directions on the label must be sufficiently specific to guarantee safe and effective use when properly used.

Usually the company will start its screening program using thousands of chemical compounds. If lucky, they may find a group of compounds that gives some selective control of the pest. If so, they will immediately start toxicological studies. They may feed large quantities of the chemical to animals, shave off the fur and place the chemical in direct contact with the skin, and place the chemical directly in the animals' eyes to determine irritation. Long-term studies may be started. In their old age after a lifetime of eating the pesticide (a rat 2 to 3 years old is equivalent to a 70-year-old man) the animals may be sacrificed and their vital organs examined for abnormalities. During all this time the animals' general state of health, gain or loss of weight, and other abnormalities are noted. Also, during this time the pesticide is being tested in the field. If a food crop is involved, the most effective date and rate of application, effect on the crop yield, quality, and chemical residues are determined. Experiments are conducted under widely varying soil and climatic conditions. Also, work is started to determine the length of time that the material can be expected to remain in the soil. In addition, studies are probably initiated to determine just how it is killing the pest - without injury to other living things subject to simultaneous treatment.

These studies are conducted by many people using expensive equipment in their work. The chemical company does most of the work. However, Agricultural Experiment Stations may cooperate, or see other possible uses of a material which would be advantageous to the farmer or public. The Food and Drug Administration and U. S. Department of Agriculture may initiate their own studies to determine the safety and effectiveness of the material. After perhaps 5 years and the expenditure of the million dollars, if lucky, a new pesticide may be born. It is now available for the benefit of mankind.

If all goes well, a label is produced and approved that gives information for safe use. If these instructions are followed there is no known hazard to the applicator or to the public consumer. This label is expensive reading. It may have cost over a million dollars. READ IT CAREFULLY, AND FOLLOW THE INSTRUCTIONS!

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