Principal Crop Insect Threats Based On 1953

	Ariz	Del	Ga	Ind	Kans	La	Mass	Miss	Mo	Mont	Nev	N. J.	New Mex	N. Car	Ohio	Ore	Pa	S. Dak	Tenn	Wash	W. Va
Aphids	X	X			X	X	X					X	X			X			X		
Armyworms		X	X	X	X	X		X	X								X		X		X
Bollworm			X					X					X	X							
Boll Weevil			X			X		X											X		
Codling Moth					X		X		X			X				X				X	X
Cornborer			X		X		X								X		X	X	X		
Corn Earworm		X		X	X	X	X		X			X		X	X				X	X	X
Cutworm				X					X	X							X	X			
Grasshoppers				X					X	X	X		X					X			
Leafhopper	X	X		X								X			X		X	X			X
Lygus Bug	X									X	X		X			X	X			X	
Mites	X				X			X				X	X			X	X			X	
Plum Curculio			X				X	X									X				
Spittle Bug				X								X			X		X				X
Weevils			R			R				A				R		P		A		P	
Alfalfa A																					
Pea P																					
Rice R																					

Incomplete results of USDA survey

Systemics Promising but Not Likely to Take Big Markets This Year

Among new insecticide developments of the past few years, the systemic insecticides seem to be the most revolutionary and those which show most promise of developing a new type of approach to the battle against insects. But the systemics are not yet ready for the large scale markets. At present they have only specific or specialty uses and are not to be considered threats to the markets of the well known insecticides such as DDT, BHC, toxaphene, and others.

While the systemics are not yet really well developed, being only recently out of the research laboratory, there is another big barrier to be overcome before they gain major importance. They must overcome the legal restrictions regarding their use. They promise to reduce or eliminate outside hazards to harmless insects and to animals, thus offering a maximum of efficiency, with a minimum of hazard. However, to date they have been approved only for use on fruit trees, cotton, and certain other uses, but not for food crops. They are also being used with considerable success on ornamental plants.

Opinions vary on the trend in the markets for systemics this year. Some say that they will not increase this year. This idea appears to prevail in the East and in the Midwest. However from the far West there is considerable opinion that there will be an expanded use of systemic insecticides in 1954. It was reported that systemics were used almost to the limit of their demand on cotton in California last year, and there was an excess supply. The heavy demand is only in cotton and it depends on mite infestations and to a smaller extent on aphids.

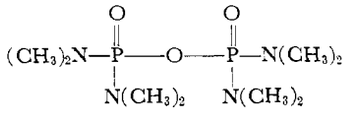
In the Southwest the greatest reported demand for systemics is in the irrigated sections. There it is predicted that consumption of Systox may increase by something up to one third during the current season.

Current Development Promises Specialty Growth

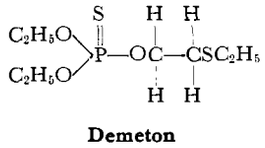
Extensive data now are being accumulated on the effectiveness of the systemics for the control of certain pests not otherwise controllable and also on the degree of hazard associated with their use on various crops. It seems likely that these data will probably justify a number of valuable agricultural uses by showing that the major amount of the residue in food crops does not present a hazard to public health. The high prices of systemics also retards their increase as does the lack of wide spectrum of activity against chewing insects. The development of the newer products, the collection of information as to their activity and toxicity seems to support the rather general opinion that while systemics may not advance greatly in markets in 1954, they are likely to be a considerable factor by 1955 in special uses, particularly against mites, aphids, and certain mealy bugs.

A great deal of the basic work in systemics research came out of Europe, particularly from the laboratory of Gerhard Schrader of Farbenfabriken Bayer. The compound schradan has been named for him. Much development work has been done in Great Britain. Pest Control, Ltd., where development has been under the leadership of Dr. Ripper and I.C.I.'s Plant Protection, Ltd., are among leaders.

The two most promising systemics for



Schradan



Demeton

early use are Systox, the active ingredient of which is demeton (O,O-diethyl-O-ethyl-β-mercaptoethyl thiophosphate) and schradan or OMPA (octamethyl-pyrophosphoramide). The dimethyl analog of demeton also is included. The demeton product seems to be the leader at present, with OMPA also developing commercial significance.

The most promising feature of the systemics is their specificity, their ability to control certain pests without injuring predatory insects, or honey bees, where they are properly applied. However, there still are problems with their application, and systemics which are less toxic to humans seem to be needed. Research and development of new products is leading in this direction.

Absorption, translocation, and distribution in the plant need study. The major problems that must be satisfactorily met include the necessity for adequate education, the methods of applications, and the precautions that must be observed to secure satisfactory control without undue hazards to the applicators and to the consumers of the protected crops.

While it is generally agreed that systemics are showing a great deal of promise and may expect to find an appreciable market by 1955, there seems to be almost no expectation that they will replace any of the existing insecticides to a serious extent. The insecticide people no longer feel that the appearance of new and valuable insecticides on the market is something unusual. It has been happening frequently in the past years but has not resulted in the extensive supplanting of an earlier pesticide. Rather it has meant a continued market for both for the purpose for which each is best suited. This is particularly true when a new product provides an economical control of some pests for which former products were not satisfactory. One sales manager puts it this way: "I doubt if more than 25% of the farmers in the Southwest use any kind of insecticide." It is quite obvious that the general opinion is that the total market for insecticides is so seriously underdeveloped that there is no reason for any existing highly effective insecticide to lose its position.

Animal Applications

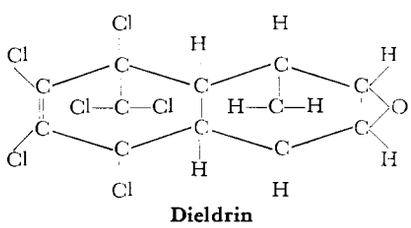
Systemic insecticides are not exclusively plant protectants. Significant work is being done in systemic protection of animals. As the term systemic refers to the action of the agent in the host rather than against the insect, it should be pointed out that compounds not systemic in the mode of action on plants are showing promising results as animal systemics. While a smaller amount of work has been done in that field than with plants, the relative amount of progress is comparable. Destruction of cattle grubs has been very effective and to date no harm to the host has been observed. Chlorinated organics, including lindane, dieldrin, and aldrin have been studied, as have organic phosphorus compounds including diazinon and chlorthion. L-13/59, also has been found effective against cattle grubs. Both oral administration and subcutaneous injections in peanut oil have been effective without observed harm to the animals. These products and techniques are equally effective against the screw worm and some destroy blood-sucking insects. The problem of residues in meat and milk is clearly recognized and because of this no recommendations are being made as yet.

Nonsystemics Progress

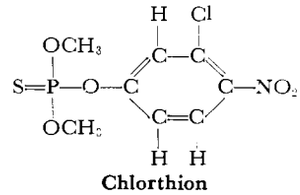
Systemics are not the only type products showing promise for the future. During the past few years several new and particularly effective materials, not systemics, have been introduced and are now finding a popular market. Aldrin, dieldrin, and heptachlor, for example, have proved very effective and during the past year have been going especially well, one of the more interesting new markets being that for the inclusion with fertilizer (see next page).

Among the phosphorus insecticides, both parathion and TEPP have proved very useful in controlling certain insect pests, but both compounds are highly toxic to higher animals. Malathion is a newly developed phosphorus compound which has a relatively lower mammalian toxicity than parathion and has been successful in the past year. Tests indicate that it is effective for the control of a large number of insects. Chlorthion seems to be the newest of the highly promising phosphorus containing insecticides. Its toxicity to rats for example is about 1/500 that of parathion. Diazinon has been mentioned earlier. Its propyl analog also is attracting interest.

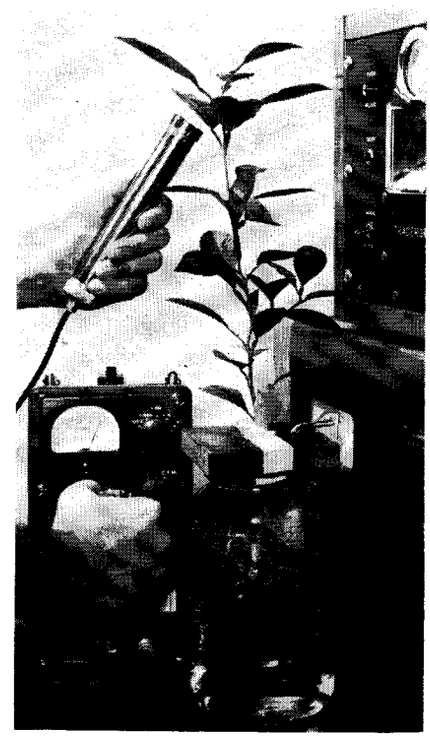
Malathion is being recommended with sugar baits, both liquid and dry, for controlling house flies in dairy barns and other establishments. L-13/59 and diazinon have also given good results when used in this manner. L-13/59, a product developed by Farbenfabriken Bayer, in Germany, probably will be on the market in the U. S. within a few weeks as a relatively low cost material. It has relatively low mammalian toxicity.



Dieldrin



Chlorthion



A Geiger counter is used to trace the movement of radioactive systemics through a plant in the laboratory of the Citrus Experiment Station of the University of California

A relatively new chlorinated product in semicommercial production is endrin, which is a stereoisomer of the better known dieldrin. It has shown exceptional promise for the control of several major agricultural pests, particularly those which are commonly spoken of as leaf-eating worms or caterpillars. This group includes such pests as the bollworm, corn earworm, fall army worm, tomato and tobacco horn worms. It is also effective against such pests as flea beetles, grasshoppers, bollweevils, and many species of aphids.

Synergists

Relatively recent work on synergists at Orlando, Fla., in connection with the armed forces, may have some significance for agricultural chemicals. In connection with louse control, some pyrethrin synergists have shown remarkable effect on certain phosphorus compounds. Not only is initial toxicity increased, but length of effectiveness is increased. A small amount of work against flies shows a similar effect applying to a smaller degree. It is still too early to say how far this effect may extend beyond louse control, but it is now being studied.