

# Disappearing pesticides

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structurally similar to the carbamates.

In laboratory flasks containing a variety of soil types, he duplicates all chemicals used on corn and soybeans in many of their various combinations, and records changes in the types and population density of the microflora. The experimental design also allows him to keep a constant fix on changes in the rate of pesticide breakdown.

### Crop effect

Another factor further complicates the microbial-pesticide picture — the crop itself. In a preliminary study, Kaufman compared the rate at which pesticides broke down in soil samples taken from grassland, corn, and soybean fields — each with no history of pesticide use. In fact, all samples came from the same acreage: the grassland was subsequently planted to corn and soybeans. Soil from the soybean field degraded pesticides far more rapidly than grassland soils, whereas soil from the corn field degraded pesticides more slowly than grassland soil.

It appears that each cropping sequence of the crop itself has its own complement of microflora, Kaufman said, and that certain crops encourage the growth of active pesticide degraders.

Kaufman hopes that he and other researchers will be able to devise both a cropping sequence and a chemical sequence that takes the bite out of the degraders, but he predicts that manufacturers will ultimately have to change pesticide chemistry.

To date, Kaufman has had reports of an efficacy problem with four insecticides, four herbicides, three fungicides, and one nematocide, encompassing 10 major pesticide producers. He has confirmed the link with microbial degradation for half of the pesticides so far. He speculates that the fertilizer, urea, may also be contributing to the problem, indicating that its chemical structure is similar to the core structure of the carbamates.

### Problem soils

During the last four years, Kaufman has studied numerous problem and non-problem soils and found that populations of known pesticide-degrading microorganisms are higher in problem soils — sometimes several times higher. When he mixed structurally similar pesticides into the two soils, the pesticides generally broke down more rapidly in the problem soils.

Although these soils have elevated populations of a variety of known degraders, Kaufman says he consistently finds two classes of soil fungi and several bacterial species that are the most active degraders. The bacteria have not yet been identified, but the fungi are from two well-known disease-producing genera — the *Verticillia* and the *Fusaria* — which cause root rots and wilts. In a few instances, farmers have reported an increase in these diseases along with a decrease in the pesticide's effectiveness.

Getting a handle on the microbial-pesticide picture will not be easy. The relationships are complicated. For instance whereas some pesticides enhance the breakdown of similar compounds, others are known to block it. "Like pharmaceuticals," says Tollefson, "we need to understand how the application of one affects the application of others." Kaufman explains that he and other scientists have paid considerable attention to the fate of individual pesticides in the soil microbial environment, but not to the effect of multiple applications of individual pesticides or combinations of pesticides. To fill the gap, he is creating complete soil histories in a telescoped time frame.

### Rotate pesticides

For the present, farmers can prevent or at least delay the loss of pest control by rotating both crops and pesticides, although the long-range effects of these procedures are not currently known. Further, they should make sure they indeed have a pest problem serious enough to warrant applying

pesticides, and not use the chemicals as preventive medicine.

In the case of pesticides, an ounce of prevention may provoke the need for a pound of cure. Kaufman has found that soils with a short history of pesticide use harbor two or three microorganisms capable of degrading the pesticide. After a long history of pesticide use, however, "almost any microorganism can degrade the compound," he says. "They may be doing their own genetic engineering."

Another phenomenon associated with continuous use may cause problems not only in the root zone but also far below, in the water table. Organic matter in the soil actually impounds pesticide molecules by providing sites to which they adhere. The process, called adsorption, makes the molecules unavailable to microorganisms and also prevents them from leaching into the water table.

With a long history of use, the organic matter becomes saturated with pesticide molecules. (This can occur rather rapidly in soils with a small amount of organic matter.) Because molecules with a similar structure compete for the same adsorption sites, pesticides, having a stronger attraction can bump, or desorb, the predecessors off the organic matter and into the microorganisms' mess hall. Those molecules that are not dismantled for "food" could be carried away with moving water.

According to Kaufman, early findings show that repeated use of similar pesticides increases the rate of desorption. If the findings are confirmed in subsequent studies, they could have serious implications for pesticide leaching, he says.

# Farm Show music slated

HARRISBURG — Music will fill the air at Pennsylvania's largest family affair — the 68th Pennsylvania Farm Show, Sunday, January 8, at the Farm Show Complex in Harrisburg.

According to State Agriculture Secretary Penrose Hallowell, a variety of musical talent is scheduled to perform at the show's Youth Benefit Concert at 6:30 p.m. on the opening day of the annual event.

The Ink Spots, one of the top acts of the 1950's and early 60's, Miss Pennsylvania Jennifer Lynn Eshelman, and the sounds of Al Raymond's "Big Band" share the spotlight in an effort to support agricultural youth programs and improvements at the Farm Show.

General admission tickets are \$4.50 (\$3.50 in advance) and \$6 reserved. Tickets may be ordered

by writing: Farm Show Youth Benefit Concert, P.O. Box 15724, Harrisburg, PA 17105-5724. All mail orders must be postmarked by Dec. 27 and should include a self-addressed, stamped envelope. Checks should be made payable to the Pennsylvania Department of Agriculture.

Ticket order postmarked after Dec. 27 will be held at the door in the purchaser's name on the night of the concert. Tickets may also be purchased at the Farm Show Ticket Office on North Cameron Street beginning Dec. 27. Hours are from 10 a.m. to 6 p.m. or phone 717-783-6513 after Dec. 12.

The Youth Benefit Concert is one of many special attractions at the 1984 Farm Show which runs January 8-13. There is no admission fee for the show, but parking at the complex is \$2.

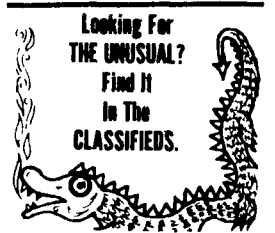
# Red meat data up

HARRISBURG — Pennsylvania's commercial red meat production for October 1983 totaled 99.0 million pounds, up 14 percent from the previous month according to the Pennsylvania Crop and Livestock Reporting Service.

January-October accumulated red meat production totaled 808.5 million pounds. Cattle slaughter was 87,100 head with an average live weight of 1,125 pounds. Calf slaughter was 25,500 head with an average liveweight of 166 pounds. The number of sheep and lambs slaughtered totaled 10,800 head with an average liveweight of 99 pounds. There were 272,100 hogs slaughtered, averaging 232 pounds.

Nationally, commercial red meat production during October 1983 totaled 3.53 billion pounds, up three percent from the previous month. Beef production totaled 2.07 billion pounds. Total head

killed was 3.28 million and liveweight averaged 1,070 pounds. Veal production was 41 million pounds. Calf slaughter of 290,000 head averaged 239 pounds liveweight. Pork production during the month totaled 1.39 billion pounds. Hog kill totaled 8.09 million head, with an average liveweight of 243 pounds. Lamb and mutton production was 32 million pounds. Head kill of 600,000 averaged 109 pounds liveweight.



# Md. Ag Commission holds reunion

ANNAPOLIS, Md. — Twenty-nine members and former members of the Maryland Agricultural Commission recently assembled in Annapolis for their first reunion ever. Twenty of those in attendance were accompanied by their wives.

The group was hosted by the Maryland Department of Agriculture (MDA) at its new headquarters facility. In his welcoming remarks MDA Secretary of Agriculture, Wayne A. Cawley, Jr., expressed his appreciation to the group for its years of service to the Department and especially for their assistance and support during his five years in office.

The Commission was created in 1969 to serve as an advisory group to the Maryland State Board of Agriculture. It became an advisory group to the Secretary when MDA was established in 1973.

Among those past members in attendance were Edward Covell of Easton and Y.D. Hance of Prince Frederick. Covell chaired the first meeting of the Commission in 1969. At that meeting Hance was elected as the first permanent Commission Chairman. He later became

Maryland's first Secretary of Agriculture and served in that capacity for six years.

There are 17 members of the Commission representing almost every commodity group in the State. They are appointed by the Governor for a three year term and cannot serve more than two consecutive terms. The current Chairman is Mr. George Kemp of Princess Anne, Maryland. Meetings are held the second Thursday of each month. During these meetings each member presents a commodity report to inform the Secretary, and other members, of current happenings and concerns within the industry.

The Commission is most active during the time when the Maryland Legislature is in session. During that period it regularly advises the Secretary on proposed legislation which will affect the agricultural industry of the State. It employs a full-time Executive Secretary, Mrs. Lynne Hoot, who handles all staff work and speaks on behalf of the Commission before the legislature.

Since its establishment 14 years ago, a total of 59 members have served on the Commission.

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