

granules in pesticide-fertilizer mixtures is growing. The reduced load factor and drift factor offer advantages to airplane applications. For many reasons the immediate future looks interesting for granulated insecticides.

Insect Control in Food Packages

Synergized pyrethrum is effective but costs bar wider use in food industry

INSECT DAMAGE is a problem in food production that begins on the farm and in the orchard and extends right through to the final stage of packaging. Prevention of damage and infestation in this last phase is probably the most difficult because of toxicity hazards and limitations placed upon the chemicals and quantities that can be utilized.

Only one compound, Pyrenone, has found acceptance in coating paper bags and cartons against the inroads of boring beetles and other pests. It is a synergized form of pyrethrum, and may consist of one part pyrethrum combined with 10 parts of piperonyl butoxide, the latter acting as both stabilizer and activator.

Knockdown and kill with pyrenone-treated bags is quite high for the first few months. The repellency of the compound, however, has been shown in storage tests to continue for as much as nine months or more, indicating the line of research taken recently. In this work allethrin, lindane, and methoxychlor have shown encouraging results but these materials also have their drawbacks. They are among the insecticides which "migrate" into the inner plies of multi-wall paper bags.

Results of this research were described earlier this year before a meeting of the Technical Association of the Pulp and Paper Industry in New York by Hamilton Laudani and Dean F. Davis, Marketing Research Division, USDA. The work has been conducted jointly by the Stored-Product Insects Laboratory and the Quartermaster Corps.

Extended Protection Obtained

An important finding was that treatment of the just outer ply of multiwall paper bags with synergized pyrethrum would give protection for up to 12 months. Bags made of textile materials will require more effective treatment, and a suitable compound has yet to be found for rendering paper shipping boxes insect-repellent.

On the other hand, investigation con-

ducted by Robert Gair Co. researchers has indicated that infestation of stored products is reduced through the use of a pyrenone-treated, clay-coated folding carton. Richard I. Rice, technical director of its American Coating Mills at Elkhart, Ind., contends that most folding cartons are entered through their closures and not through the boxboard.

From the West Coast comes the objection that pyrenone treatment for food containers is costly, and the same criticism is voiced elsewhere in the industry. Production of flour bags involves a manufacturing cost of from 9 to 12 cents per bag, depending on size and type according to a container interest in California. Treatment of these bags with pyrenone will cost an additional 2 to 4 cents per bag. At the TAPPI meeting, Rice declared that cost has been a deterrent to widespread use of the insect-resistant carton. Synergized pyrethrins, he said, cost 0.7 mill per sq. foot of boxboard. Others make it one tenth of a cent.

This brings the outlay for treatment of cartons close to \$2.00 per 1000 cartons, and for a company employing up to 20 million cartons a year the added cost would be in the neighborhood of \$40,000. The point made is that the cost of infestation would be less in this instance. In most branches of the food industry, certainly in production, processing, and packaging, manufacturers are dealing with very small profit margins necessitating large volume for profitable business.

The use of insecticides therefore in insect-repellent packages will have to be confined to specialized uses. The procedure is being followed on packages intended for export, and some use of it is being made also in drugs and pharmaceuticals, where the profits per package justify the added expenditure. The treated area in this case amounts to only a few square inches.

Pyrenone is a product developed by the Fairfield Division, Food Machinery & Chemical Corp., which recently has located its activities in Baltimore. The company designates the product as an insecticide, although its outstanding characteristics are its repellency to insects and its lack of toxicity to humans in packaging applications. It is used by the Quartermaster Corps, and as a contact insecticide government specifications call for its surface application.

Toughies of the Insect World

The insects which attack food packages are mostly beetles and borers although moths and caterpillars can also ruin food supplies. The confused flour beetle thrives on cereal products. The cadelle is a very tough boring insect who prefers flour, and the saw-tooth grain beetle is only less menacing than the cadelle.

The particular problem in the West appears to be the Khapra beetle against which nothing has been effective in the past except methyl bromide fumigation. More recently paper manufacturers there have been running tests against the Khapra with Pyrenone-treated bags.

Some package experts contend that there is no defense against these pests other than a well designed and constructed package. But this view is not fully shared in the paper and container industries. Besides, some beetles have shown that they can bore through almost any type of paper carton regardless of its construction.

Pyrethrum Progress

Special characteristics and improvement by synergists are pushing up use and encouraging production

PYRETHRUM demand is steadily increasing. This year, U. S. usage of pyrethrins (the general name for the active ingredients in pyrethrum) is expected to reach about 100,000 pounds, as compared to about 80,000 pounds in 1950. U. S. consumption estimates are about 120,000 pounds in 1956 and 200,000 by 1960.

There are a number of reasons, in addition to the general increase in pesticide use for pyrethrum's rise. New government regulations and increasing sensitivity to safety are focussing attention on

Demand for pyrethrum flowers rising

