

Pest Control

IT'S YOUR BUSINESS

S T O R E D P R O D U C T P E S T S

It's in the Detail for Retail

BY DR. BHADRIRAJU SUBRAMANYAM,
DR. JAMES CAMPBELL AND KIM KEMP
Contributors

A study is under way to determine the best management methods in the retail environment.

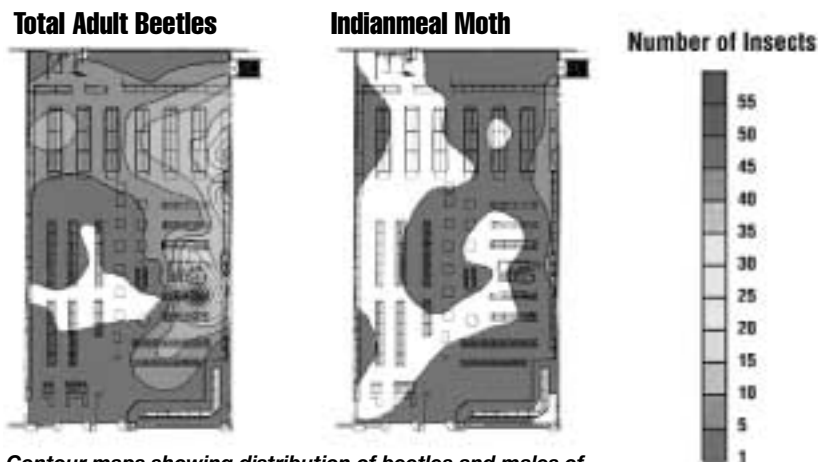


Insects in packaging material can become a source of infestation at the retail level.

Retail grocery and pet stores provide ample opportunities for supporting stored product insect populations. The consequences of these insect infestations to product manufacturers and retail stores can be major, through product losses due to pest damage, removing and discarding infested product from the shelves and the return of infested product—not to mention the corresponding loss of decreased consumer confidence, good will and increased potential risk for allergic reactions to insect fragments by sensitive individuals. The economic impact of infestations to the retail industry is difficult to measure, but annual losses to manufacturers is likely to be millions of dollars.

At the retail level, the potential sources of stored product insects are incoming products that are already infested, insects present outdoors entering the stores through open doors, docks and windows, and insects that are

Figure One



Contour maps showing distribution of beetles and males of Indianmeal moths in a pet store. Sixty traps were used to generate the maps.

already established within the store from previous infestations. Newly stocked products on the shelf could become infested from these sources. Stored product insects, both beetles and moths, are highly mobile, and infestations could spread rapidly from a source to other susceptible products within the store. Thus, finding the major sources of pests is a critical step in their management.

Retail Store Program

Kansas State University and the United States Department of Agriculture's (USDA's) Grain Marketing and Production Research Center, Manhattan, Kans., scientists (Drs. Bhadriraju Subramanyam and James Campbell) have embarked on a research project, with the objective of developing an integrated pest

management (IPM) program for retail stores to benefit both the store managers and pest management professionals (PMPs). Beetle and moth traps, well-placed throughout the store, are being used in several grocery and retail stores in Kansas and neighboring states. This trap data is being used to develop contour maps to help visualize where insects are present (see Figure One).

Contour maps are generated by computer programs that estimate the number of insects that would be captured at unsampled points. Based on a preliminary test in a pet store, we have decided to use 30 pheromone and food-baited traps for capturing beetles and 30 pheromone-baited traps for capturing male Indianmeal moths. Trap location is important, and a preliminary trapping program

showed greater captures of beetles in traps placed underneath shelves, when compared with traps placed under kickplates and on or above shelves (see table below). Spilled material under shelves may explain the large number of beetles captured in traps. However, the capture of Indianmeal moths was similar among the three locations.

In selected retail stores, traps are checked bi-monthly, and contour maps are generated to identify focal points of infestations. A handheld barcode scanner with a touch pad is being tested for quicker trap catch data acquisition, as is a program written for transferring data to a computer for generating contour maps. This should enable contour maps to be generated soon after making trap counts, so that maps can be viewed and pest management measures initiated without delay.

Besides trapping, infested products on shelves are also being discarded. In addition, products near the infestation are sampled to estimate insect numbers. After four to six trapping occasions, management measures will be employed only near the focal points of infestations to determine the impact of the treatment measures. The trapping campaign will resume for another four to six times after an intervention to determine treatment effectiveness.

In different stores, different management schemes are being tested, ranging from simple sanitation to the use of inert dusts, insect growth

Insects	Location	Number of traps	Mean \pm SE insects/trap/four days
Beetles^a	On or above shelves	16	2.56 \pm 0.58
	Underneath shelves	15	12.40 \pm 2.56
	Below kickplates	23	9.43 \pm 3.11
Indianmeal moths	On or above shelves	31	1.94 \pm 0.45
	Underneath shelves	15	1.07 \pm 0.28
	Below kickplates	3	1.00 \pm 1.00

^aAdults of rice weevil, red-legged ham beetle, rusty grain beetle, saw-toothed grain beetle and cigarette beetle.

regulators (IGRs), residual sprays or a combination of sanitation and chemicals. Both the store managers and PMPs are actively involved in this research, to increase their awareness and to show the impact of various management tactics on insect distribution and abundance.

Good IPM

The scope of pest management services is based on a common sense approach, rather than on the actual level and distribution of insect pests within the store. Development of IPM programs for retail stores involves a thorough understanding of pest abundance and distribution, product movement into and out of the store, tracking infestations and the impact of sanitation and pest management methods on the degree and duration of pest suppression.

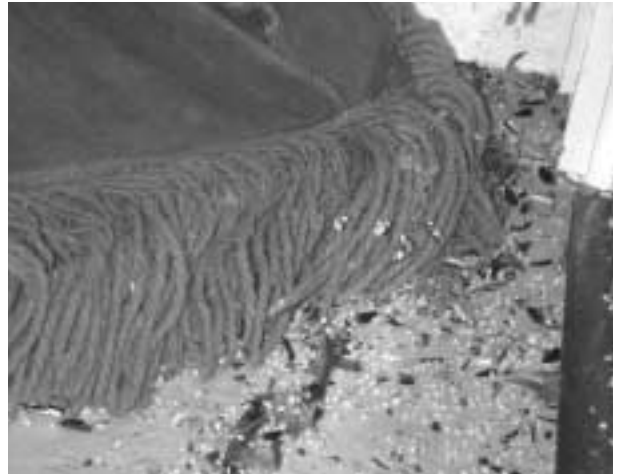
A detailed IPM program for retail stores was published in *Pest Control's* May 1996 issue (pages 44-48). However, a typical pest management program in retail stores involves sanitation, stock rotation and the use of traps, especially for rodents. The use of traps for insect monitoring typically involves using very few traps, placing them only in areas that are perceived to be problematic. Such an example would be in and near the pet food aisle.

Using a limited number of traps does not indicate where insect infestations are originating and how they

are spreading within the store. Traps are generally checked by PMPs on a monthly basis. However, daily or weekly trap inspections are better than monthly inspections, because emerging insect infestations may be important for quick identification and treatment. Traps should be placed

in a grid pattern throughout the store, and contour maps of trap catches should be generated. This helps to identify infestation focal points, precisely target treatment, and evaluate the effectiveness of sanitation and pest management.

An excellent paper by Dr. Terry Arbogast and co-workers (published in the *Journal of Economic Entomology*, Volume 93, pages 531-542), showed the use of contour analysis of trap catches in grocery and pet stores, and its importance in selecting, timing and targeting pest management measures. Generally, the types of insect species found were greater in pet than grocery stores. Indianmeal moths were the most common and abundant insect species found in retail stores. Other species found included the cigarette



Food and debris collecting underneath the shelves at retail accounts can be an open invitation for stored product pests.

beetle, merchant grain beetle, red flour beetle and flat grain beetle.

The amount of time spent placing traps within a store, counting insects and conducting various management tactics is being recorded to show cost/benefit ratios. Educational materials will be developed and produced at the conclusion of the project to help retail store managers develop a better scope of pest management services, and for PMPs to better use their time in pest management during their scheduled visits. **PC**

Dr. Bhadriraju Subramanyam is an associate professor in the Department of Grain Science and Industry, Kansas State University, Manhattan, Kans. Dr. James Campbell is a research entomologist in the Grain Marketing and Production Research Center (USDA), Manhattan, Kans. Kim Kemp is division manager, product safety, pet products, Ralston-Purina Co., St. Louis, Mo.

Department of Grain Science

201 Shellenberger Hall

Manhattan, KS 66506-2201

705-532-6161 Phone

705-532-7010 Fax