Integrated Pest Management Technology Update

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ABSTRACT

The old expression about building a better mousetrap has never been more true than it is in the 1990s. Today’s pest control industry has an ever expanding arsenal of weapons to use in our battle against pests. This presentation will provide an overview of some of the “better mousetraps” also known as “new technologies” which have recently become available.

In general, topics will include: Insect Growth Regulators, Pheromones, Biological Control Agents, Chemical Control Agents, Mechanical Control Devices, Pest Proofing Materials, Training and Reference Materials, Fumigation Alternatives, Application Equipment and Inspection Equipment.

INSECT GROWTH REGULATORS

Insect Growth Regulators, also known as “IGRs,” are chemicals which interfere with an insect’s normal development. Usually this means the insect can’t reproduce. IGRs are very low in odor and mammalian toxicity, and they last for a long time. However, because they usually don’t kill the insects, they work slowly unless combined with other materials and/or techniques. Gentrol has recently received approval from EPA allowing it to be used as a space treatment in food processing areas. Gentrol’s manufacturer has announced a “point source” dispensing system, which will release hydroprene into the air in a way similar to pheromone lures.

PHEROMONES

Pheromones are chemical scents which are emitted by insects to communicate. They may say “I’ve found food,” or “an enemy is coming,” or “this is a good place to live.” However, the most powerful pheromone is the “sex pheromone,” which insects use to attract a mate. Pheromones are used in several ways in an insect control program. The most common use is as an attractant to lure insects to a trap to determine if they are present and in what numbers. Recently, however, we have been using pheromones to lure insects to a small surface treated with an insecticide. This “attracticide” panel enables us to reduce the amount of insecticide used by increasing the percentage of the insect population which dies after contacting a relatively small treated surface.

BIOLOGICAL CONTROL AGENTS

All living creatures have natural enemies. Our industry is exploring ways in which we can use a pest’s natural enemies in our control programs. For example, certain microscopic nematodes, when applied to fly breeding sites, seek out the larvae, infect them and eventually kill them. Tiny parasitic wasps attack and feed on certain species of stored product pests. Neither of these technologies is a magic wand, primarily because predators, other than man, will not totally eliminate their source of food.

CHEMICAL CONTROL AGENTS

A number of improvements to our chemical control methods have been developed in recent months. The days of highly toxic...
and smelly insecticides are gone. The public will no longer tolerate their use.

The pest control industry has rediscovered the value of insecticide baits in our efforts to control numerous pests, most notably cockroaches, ants and termites. Several cockroach or ant baits are formulated as pastes or gels. They are applied with a spatula, syringe or applicator gun. Other ant or cockroach baits are packaged in tamper-resistant bait containers. Avert is a powdered formulation of an insecticide derived from a naturally occurring soil fungus. Granular ant baits are proving very effective in controlling many ant species, most notably, fire ants and argentine ants.

Historically, termite control required the application of large quantities of liquid insecticides to the soil under and around a structure. This treatment only repels termites from the treated structure and since the demise of chlordane provides relatively short-lived control. The Sentricon System is designed to actually kill enough termites to eliminate the colony, or at least suppress it enough that it cannot do significant damage. This is accomplished by attracting them to wood treated with an insect growth regulator. This system may prove particularly valuable when “spot treating” small areas in large food processing facilities and warehouses where treatments with conventional materials may simply cause the termites to find a new entry point.

All of these insecticide baits share the benefits of very low odor and hazard and when applied properly, they can be very effective.

Synthetic pyrethroids are THE insecticide class of the 1990s. Every pesticide manufacturer has marketed at least one. As a group they are low in odor, except when misapplied, low in mammalian toxicity and they are very effective. I should note, however, we are seeing significant resistance to the synthetic pyrethroids, in short life cycle insects such as house flies.

Micro-encapsulation of pesticide active ingredients provides several benefits: Synthetic pyrethroids tend to irritate human skin, so manufacturers are encapsulating the active ingredients to minimize dermal contact. Micro-encapsulation also extends the life of an insecticide in an environment subjected to moisture, such as outdoors. When microcapsules are wetted they close up and hold the active ingredient until dry conditions return. Micro-encapsulation also reduces the effective toxicity of a chemical to a non-target animal, such as a human, by delaying the release of the active ingredient while the chemical passes through the “wet” conditions found within the body.

There are also several significant changes in the area of rodent control.

New EPA mandated label wording states that under certain circumstances, rodenticide bait must be secured in the bait station to prevent it from being shaken out. This station uses a wire skewer to comply with the requirement.

Lipha Tech has just introduced a new anticoagulant rodenticide based on a new active ingredient “difethialone.”

At least two manufacturers are producing non-toxic rodent baits which are useful in monitoring and trapping programs.

APPLICATION EQUIPMENT

No so long ago, the compressed air sprayer was about the only application device a pest control operator used. That is no longer true. The modern pest control expert will use crack and crevice injection systems, bait applicators, brushes and rollers, and some rather “high tech” equipment.

Within the past few years, the most significant improvement in application equipment is the foam generator. This device takes a conventional insecticide and turns it into a foam the consistency of shave cream. The material is injected into a void and, as it dissipates, leaves an insecticide residue on all surfaces within the void.

The Actisol machine is used to inject an insecticide mist into potential insect harborages. A stream of plain air can be used to force the insecticide mist even deeper into voids. In some cases material is applied to an opening in a wall void and a few minutes later it can be seen coming out of another opening in the wall ten or twenty feet away.

MECHANICAL CONTROL DEVICES

Mechanical control devices play an important role in an Integrated Pest Management program.

Vacuum cleaners, fitted with HEPA filters and crevice tools, have found favor with a number of pest control companies as a non-toxic control technique for serious cockroach infestations or those in sensitive environments. After removing as many cockroaches as possible, their harborages are treated with low environmental impact insecticides, such as baits.

PEST PROOFING MATERIALS

A few people will object to the killing of any pest, but because killing birds is particularly objectionable to many people, many repellent devices have been developed recently to drive them from areas in which they cause problems. Bird Spikes, Coils and Pin and Wire Systems are all useful in keeping birds from nesting or roosting on flat surfaces such as ledges and architectural trim work. Net systems are very effective in keeping them out of overhangs such as truck docks.

Rejexit is a natural bird repellent derived from grapes. It is used to keep birds such as geese from congregating on turf areas.

Sentinel Swans are plastic replicas of this natural enemy of the Canadian goose. They are used to discourage these pest birds from visiting ponds and other small bodies of water. It is important to note that the system is most effective when both adult and cygnet swan replicas are used, as geese will have learned that adults with young are particularly aggressive.

The Silent Sentry bird dispersal system uses a network of speakers and a variety of distress and disturbing sounds to drive large flocks of birds from their roosts. One unique sound this system produces is the sound of a helicopter flying right through the trees, from speaker to speaker.

At one brewery our company services we are currently cooperating with local raptor experts in an attempt to attract owls which may discourage starlings from inhabiting the same area. This approach could, however, bring with it concerns for the owls’ risk of secondary poisoning due to eating rodents that have fed on rodenticide from our bait stations.

Caulking to control crawling insects has also gone “high tech.” Todol IPM Foam is a system which assures precise and
neat placement of caulking compound in cracks and crevices which might otherwise be inhabited by insects.

And an oriental firm is producing a stainless steel mesh blanket similar to chain-mail armor, which is used to protect commodities from attack by rodents.

TRAINING AND REFERENCE MATERIALS

Without education and training, all of the new technologies are useless. There are numerous excellent reference materials on the market. I’d like to highlight a few of the best here.

One of Copesan’s Technical Experts, Dr. Eric Smith, is the principal author of the NPCA Field Guide and the recently published supplement. This reference manual should be in every pest control expert’s office or vehicle.

The Mallis Handbook of Pest Control and Purdue’s Scientific Guide to Pest Control have both been revised in the past few years.

Thomas Imholte’s Engineering for Food Safety and Sanitation is not new, but it contains a great deal of useful information about constructing and equipping food plants in ways which prevent pest problems. It should also be part of every pest control expert’s library.

INSPECTION EQUIPMENT

Before you can control pests, you have to find them. In addition to the traditional inspection tools such as flashlight and mirror, a number of technologies have been adapted to our industry.

The Borscope is a device which enables an inspector to see through a small hole into an otherwise inaccessible void. It is very useful in locating pests and conditions which are conducive to their development.

The Methane Detector senses the minute quantities of methane gas given off by certain colonial insects such as termites. It is too time consuming to search large areas, but it is useful in pinpointing infestations.

A moisture meter is very useful in pinpointing the conditions which may be causing a particular pest problem. For example, a leak in a wall or ceiling void may contribute to a growth of fungus which in turn feeds an infestation of fungus beetles or flies.

UPDATES

Much of the change in our industry is due to the regulations produced by a myriad of government agencies.

Even though recent research indicates methyl bromide is not the bad actor it has been portrayed to be by certain environmental activists, it is still scheduled for elimination in the year 2001. As far as a replacement is concerned, the only thing that is certain is it will take many different materials and a lot more of them to fill the gap. In the eyes of some that is environmental progress.

Heat is a viable alternative to fumigation for certain commodities, structures and pests. We have found that it is possible to achieve lethal temperatures under a tarp, except within a few inches of the floor. However, fast moving pests such as cockroaches may be able to find and move to cool areas quickly enough to survive a heat treatment.

Extreme cold will also kill insects, provided the temperature is dropped low enough and quickly enough to counteract their ability to “cold harden” themselves by producing enzymes which act as anti-freeze.

Combinations of carbon dioxide and phosphine are proving to be very effective in controlling stored product pests in much less time than required to control them with either material alone. We have used this treatment successfully in breweries to treat grain handling equipment, dust collectors and mills.

Amvac, the base manufacturer of vapona, has recently stated they will voluntarily withdraw many of the food area registrations for their product. The final text is not out yet, so stay tuned.

DOT, EPA, USDA and OSHA regulations are growing at a frenetic pace and are increasing the costs associated with providing pest control services. To protect themselves from regulatory action, buyers of pest control services should make sure contractors are in compliance.

In 1993 Hantavirus caused quite a stir in the pest control and food processing industries. While caution is still a good idea, it appears people performing routine rodent control work are at minimal risk of infection. We have advised our service personnel to:

- wear protective gloves when handling rodent control equipment or materials contaminated with droppings or urine;
- wear a respirator fitted with HEPA filters when working in dusty, potentially rodent infected areas; and
- disinfect dead rodents, nesting material or soiled control equipment with Lysol.

I realize I have crammed many topics into this short presentation. My intent was to illustrate my opening statement that our industry is changing dramatically. If you saw something you would like to discuss in more detail, you can contact me at your convenience.