



# Pest Notes

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## Successful Bird Control Strategies

*Pest bird species are not just a problem in "big cities."*

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Successful bird control strategies is an intimidating topic for an article. This entire issue of PCT could be dedicated to the subject and we would only scratch the surface. In this article, I will relate the principles and concepts upon which successful bird control programs are founded.

One of the most overlooked, but fastest growing, segments of the pest control industry are bird control. Long an important and significant service in cities like New York, Chicago and Los Angeles, bird control is capturing markets in fast-growing cities such as Las Vegas and Phoenix. As these cities grow, eating up natural habitats and creating ideal habitats for commensal birds, the tolerance for the damage they cause, diseases they carry and the nuisance they become declines. The trend to incorporate lavish landscaping, complex architecture and outdoor urban recreational areas increases the carrying capacity of each acre of city for pest bird species.

Problem birds fall into two categories: commensal birds (pigeons, crows, sparrows and starlings) and nuisance wild birds (seagulls, doves, grackles, swallows, woodpeckers and others). Controls fall into five categories (from most passive to most aggressive): exclusion/relocation, repelling, trapping, suppression and poisoning/killing. When developing a control strategy, it is important to understand the offending bird's category, its biology and habits. It is also

(Continued on page 2)

## Holistic Pest Identification

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Developing a proper pest management program depends upon correctly identifying the pest involved. By asking the right questions about the habits and/or habitat of a pest, you can often make a correct identification without ever seeing an actual specimen.

Before an effective integrated pest management program can be developed, it is necessary to know the pest or pests with which we are dealing. And identification is an integral part of any IPM program. This knowledge enables us to determine which control measures to employ and when, where and how to employ them. In addition, several states require that any chemical applications performed be for a specific pest and that this pest be listed on the treatment record.

While customers can often identify many pests by general categories such as cockroach, fly or rodent; they are seldom able to make a more specific identification. Such specific information is necessary so that the proper management program can be developed. Even though two pests may be of the same group or family, their food, shelter and habitat requirements may be quite different. In addition, the damage they may cause can vary greatly. Similar-looking beetles, for example, may damage wood members, stored products, carpets and houseplants. Each requires a different control method. It is important, therefore, to be sure that the pest is properly identified.

**A HOLISTIC APPROACH.** The need to be effective,

(Continued on page 8)

Successful Bird Control...Continued from page 1)

necessary to analyze what is going on, what are the birds doing, what the client's goal is and determine the client's tolerance. Your goal, as it is in all Integrated Pest Management programs, is to use the least aggressive strategy that will meet the client's needs.

**STEP 1: IDENTIFY THE BIRD SPECIES.** Commensal birds, also known as pest birds, are unprotected species. Legally, they may be controlled by any method appropriate, provided non-target species (birds, animals or people) are not injured. It may not be politically correct to use aggressive methods and, in fact, their use may result in bad press for both the client and the pest control company.

While most pest control operators may consider pigeons "sky carp" or "flying rats," there are many people who think these birds are beautiful wildlife to be fed and nurtured. Nuisance wild birds can only be controlled using some exclusion and repelling techniques. These birds are protected and must not be harmed.

Of course, as with most pest management programs, the first thing that should be considered is sanitation. Can resources such as food and water be eliminated or made unavailable to the birds? Knowing the bird species and its behavior will help identify these resources so that they may be addressed, often making additional controls unnecessary. Making food inaccessible may be as simple as closing the lid on dumpsters and grease traps, or it may be extremely difficult for birds like woodpeckers or situations in which people feed the birds daily. Also, water can be a difficult issue to address. In some cases, depressions in the ground may be filled to prevent water collection, but it may also be that irrigation, fountains and other water features are providing a virtually limitless source of water.

Finally, guano or bird droppings must often be addressed. Accumulations of more than 6 inches are not uncommon. The work must be performed with safety equipment and the area must be sanitized. If bird pressure is high, controls must begin as soon as clean up is completed to prevent additional guano build-up.

**STEP 2: CONTROL.** Exclusion is almost always the control method of choice once sanitation is addressed. How exclusion is accomplished is limited only by the imagination of the PCO. The goal is to exclude the birds without damaging the aesthetics of the structure to be protected — and to come in under budget. This last item is one of the biggest pitfalls of bird control. It is too easy to misjudge the number of hours necessary to perform a job (and don't forget to include clean-up), unforeseen delays and the volume of materials and equipment needed. Bird exclusion is an art. It must be thorough and complete as well as "beautiful" to look at. Neatness counts. Often, this means less is more.

For example, say there are pigeons nesting and loafing on a deep ledge, high on a building. Your first instinct may be to net off the ledge, excluding the birds from the area. A simple pin and wire system near the edge of the ledge will prevent pigeons from staging on the edge before flying off. Birds do this to check for predators, looking before they leap. Without access to this ledge, birds will be too nervous to continue nesting. If the birds are persistent or long-time residents, electrified wire or track systems will typically repel them quickly.

If power is available, pigeons may be "excluded and repelled" by eliminating the crevice shadow that attracted them in the first place with a flood lamp. Pigeons are rock doves, native to cliffs in Europe. They will automatically inspect any crevice-like pattern on the side of a structure. In fact, if one was to paint a flat black triangle of suitable size on the side of a building, doves would attempt to land in it.

Knowing the biology and habits of the bird species is critical in providing effective control. Seagulls, a protected species, are generally excluded from areas in other ways. Rotating rods, spider-like spring wires with weighted tips and spikes are often used to keep these large birds from settling on boats, signs, piers and roofs. Plastic owls are not to

(Continued on page 3

(Successful Bird Control...Continued from page 2)

be included in a professional program (besides, owls don't typically prey on gulls).

A network of stainless steel cables strung across open spaces will prevent seagulls from diving on public areas where they compete with humans for burgers and fries. A real problem exists with gulls at seaside airports where birds drop clams and other shellfish on the runways to break the shells. In one instance the birds stopped dropping their clams at one airport when a clever PCO painted seagulls flying in a search pattern (as seen from the top) on the runways. The flying birds were afraid to drop their shellfish, lest the "other seagulls" get to it before they do.

Suppression, trapping and killing birds are generally unpopular methods of control. Reducing the carrying capacity of the environment best carries out suppression of nearly any species of bird. This may involve removing or severely pruning trees and eliminating food sources. A regular program of cleaning out nests and eggs can be effective in reducing and eventually eliminating a bird population.

In the case of pigeons, actual sterilants are available to end reproduction in the flock. Trapping is an effective way to harvest and remove pigeons. It should be done out of the public eye and in a manner that is humane. Food, water and shade should be provided to keep birds from dying of starvation and exposure. The birds should not be released because they will finally find a way to return. Killing them quickly, usually by drowning or breaking their necks, is the most humane way of dispatching the harvested birds. Bird roosts containing a toxicant can be secured to vantage points about the area to be protected. These typically contain an avicide that is absorbed through the feet. The problem with these roosts is that they are not selective and non-target birds can be killed. Most people will include Avitrol as a method of killing birds, but that is not the intent of the product. Every now and then, a story makes the papers where some PCO used Avitrol, resulting in sick and half-crazed pigeons flying upside down and dive bombing a parking lot in a shopping mall. This would be an example of misuse of the product and poor judgement on behalf of the PCO. Properly used, this avicide is a

repellant. Mixed with untreated corn, diluted product is fed to a bird population resulting in one or two birds becoming intoxicated. The dying birds put out a distress call to the flock, scaring them off. Properly used, a huge flock of birds can be moved with only a few fatalities, making this a fairly humane (though sometimes unpopular) method of control.

Today, the variety and ingenuity of the bird control products available is staggering. New and innovative products are being developed every day. The manufacturers and distributors of these products are only too eager to provide training on the sales and installation of their various systems and will often accompany a work crew to the account to provide on-the-job training. Bird control is not for the meek and conservative at heart. If a PCO is creative, open-minded and a little adventuresome, then bird control can become an exciting and profitable add-on service that can help differentiate a pest control company from its competition.

## Bird Management

By David Fincannon  
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*Bird control problems are more varied and numerous than most people would imagine, and the number of techniques and products available to solve them is equally mind-boggling. Here are a number of excellent ideas and suggestions to make bird-fighting PCOs' lives a lot easier.*

Shakespeare once wrote that we should first kill all the lawyers. Had he been a property manager rather than a playwright, he might instead have written that we should first kill all the architects. It's architects, after all, who keep bird control companies in business. I really like these professionals, and pest control operators should, too. Architects' unfortunate short-term visualization of a building in regard to future problems that might be caused by birds and other pests definitely causes a lot of headaches for building owners.

This article deals with two aspects of bird control. The first part, "The Birds," discusses bird-proofing products I have used in the past and have found to be effective.

(Continued on page 4)

Bird Management... Continued from page 3)

The second part, "The Birds, Unplugged," is aimed primarily at pest control professionals who have done little or no bird control. In it, I explain some methods that can get you involved in bird control immediately with simple supplies and tools from the hardware store.

**THE BIRDS.** You may want to review an article I wrote for *PCT* that appeared in the May 1992 issue, "Bird Control Using Electric Fence Technology," if you are not familiar with this particular bird control technique. My company uses electric fence technology on approximately 90% of the bird jobs we do. However, I look at a project with my client's best interests in mind, and sometimes the electric fence may not be the most appropriate method to solve the problem.

The first approach to bird control is to inspect the property. Sometimes with birds such as starlings, sparrows and pigeons, inspecting the property a short while before the sun sets gives you a better idea of the type of birds involved, how they are approaching the building, and how they are roosting on the building. This inspection may be done after the initial walk-through of the property, when you discuss the concerns and needs of the customer.

The next step is to develop a proposal to solve the problem that fits the customer's budget and desires. Sometimes the customer may just want one doorway cleared of roosting pigeons; or they may want pigeons eliminated from the entire building. Your contract needs to clearly specify the customer's objectives.

The next step is to select and install the appropriate bird control product. With most urban bird problems, you are being contacted because of roosting and nesting on the building.

I once bid a bird control job giving the product option of either the electric fence or Nixalite. The architect wanted us to use Nixalite because he was familiar with the product. Nixalite has worked well in this area for more than two years. We have not even had to clean out the Nixalite spines, because the pigeons have never returned to this location, even though pigeons do roost in the vicinity. I have also installed Nixalite on a home that had sparrows landing on a ledge on top of

a window. The product worked well, and the client, after six months, remains satisfied. The product is not very noticeable in this location, which pleases the customer.

Nixalite is stainless steel, "porcupine-like" wire, and will last forever. Some hints to make your installation go faster:

- The small Phillips head metal fastening screws provided with the Nixalite product may not attach to your application surface. You may have to be creative and find a better screw that is self-drilling for metal surfaces, or that can be used in stone if a guide-hole is pre-drilled. It needs to work with the brackets that are available in the Nixalite package.
- It is a good idea to pre-drill some holes in the area to determine what fastening devices are appropriate before you rent boom lifts or scaffolds. One job necessitated our building a scaffold. It was performed on one of the coldest days of the winter. The metal was very difficult to drill. It was a project that I thought would take one day, but lasted two. We had to use a stubby metal bit to pre-drill the holes, and then a self-drilling hex-head screw to rotate and secure the brackets into place.

On the home sparrow job mentioned earlier, I used 3-inch #10 hex-head metal screws and pre-drilled the holes horizontally in between the mortar on the bricks. I did not even use the brackets. The screws held the Nixalite in place.

I have not worked with other porcupine wire-type materials. I imagine that with most of them, attachment is again one of the most labor-intensive aspects of the jobs. Another difficulty would be getting to the ledge where the product needs to be applied. If the ledge is more than 35 feet high, you should seek the advice of your local scaffold or boom lift company. They will come out to the property and assess the best method to do the job.

It's important to understand that installation takes patience, and on big projects you have to expect problems. Bid the job so that your profit margin is

(Continued on page 5)

(Bird Management...Continued from page 4)

greater than that of your pest control work, because this is a specialization, and most likely there is less competition in this sector of the market.

**BIRD NETTING EXAMPLE 1.** I have done a variety of jobs with InterNet products. The first was a YMCA playground area that had two live oak trees that were great homes for a couple hundred sparrows. The building has a functioning 10-year-old electric fence system for pigeons. This job was quite a learning experience in netting installation.

**Problems Before the Installation:** The technician who bid on this netting job made some errors that had to be solved in the process of starting the job.

- After a phone conversation with a representative of InterNet, I decided that the sun inhibitor product Cintoflex Type E should be used versus industrial netting, because of the Texas sun and the trees involved. (Of course, this cost more.)
- The technician did not measure properly, and we ended up with too much netting.
- A support post that the technician thought we could purchase easily from a lumberyard could not be placed into the courtyard without a crane, so we used a more expensive beam but a less expensive method of installation. The beam had to be specially designed to hold a cable across the walled courtyard so the netting could be laid across it and over the trees. The beam was designed to be attached on top of the building supported by anchored bolts and anchored cables. The total support cost was more than what we had projected in the bid.

**BIRD NETTING EXAMPLE 2.** Another netting job we have done was at the air cargo building at Love Field Airport in Dallas (see photo on page 34). This was a unique job, in that we combined the netting product and our electric fence product in the same area. If you are familiar with prefabricated metal buildings, and can see the shadowed vertical lines in the photo, you will probably think to yourself that if a netting job is done in this area, these voids will have to be closed off, or crackles. starlings or sparrows will get into this area.

We set up our cable system around the entire building, and then on a few Saturdays, we installed the netting. We used a 14-gauge galvanized wire (less expensive than cable) along the front to give the netting better support at the end of the one-foot I-beams. We were fortunate that the rolls were the right width across, and we ordered the product at a predetermined length.

There are drawbacks with netting. I have recently pulled down netting that was installed improperly by another individual. Gaps had allowed pigeons to get above the netting, where they made a bigger mess than usual. Droppings and feathers ended up on top of the netting, as well as dead birds. The health department wanted something done quickly. We replaced it with our electric fence, and the area looks great. The property manager can now live with the architect's wood-beamed stairwell ceiling.

**TACTILE SUBSTANCES.** I have used tactile substances such as Roost No More on small jobs around homes where the nuisance was not that great and a temporary behavior modification all that was necessary. The product worked well enough at one home that the customer did not have birds reappear for three years. At that point, we had to reapply the product.

**HALLUCINOGENIC BAITS.** For products such as Avitrol, the PCO should take extreme care to follow the label. Some states (Illinois, for example) now require some form of environmental impact statement when these types of products are used.

When we were doing an airport job, we witnessed a technician from another pest control company throwing bird bait around the outside and inside of one of the warehouses as if it was chicken feed. This was a clear misuse of the label.

The correct steps are to pre-bait to see whether you can get the pest species to feed at that location, and to determine whether nontarget birds are feeding at that location. Once you know it is only targeted birds, you mix Avitrol at the labeled rate to get the birds to move out of the area.

(Continued on page 6)

Bird Management...Continued from page 5)

Bird control in the U.S. is hard work and labor-intensive, no matter what method you use. Shortcuts such as killing birds are not going to be accepted by the public anymore, and if you include bird control in your regular pest control contracts and cannot commit to doing it right, then you should remove it from the contract.

**TREE-BIRD PROBLEMS.** My company has received calls a few times to solve problems with grackles up in trees. Generally, if the area cannot be enclosed, I would rather not risk my reputation as a bird problem-solver.

However, we have used our electric fence technique on trees in such situations, and each time it has worked. Control has continued in following years when the birds come back to the location.

**THE BIRDS, UNPLUGGED.** PCOs who have little or no experience with this specialized branch of pest management can start bird control tomorrow with some tin cutters, ¼ inch and/or ½ inch galvanized hardware cloth, metal flashing, a portable drill, #10 hex-head metal screws, a hex-head adapter for the drill, and washers for the screws.

A majority of bird problems can be done with these products from the hardware store. In one job we did, a strip shopping center had 20 recessed areas where four floodlights were hanging. The mesh that was originally installed vertically along the backside of the recessed area kept the birds out of the building but not off the ledges and the tops of the lights.

We used ¼ inch mesh to enclose this area, and it worked great. We cut a section that was long enough to fit the entire area. It was secured by stuffing it up in the area after we cut four holes to fit snugly around the four lights that dropped down. We did use an electric fence on top of this building and on the signs for the pigeon problem, but the electric fence was impractical for the other areas described.

**NEST CLEANUP.** Another interesting job we did in

1994 was a starling and sparrow problem at an apartment complex. It was very difficult to bid on because it was unclear what to expect in the process of cleaning out the nests. The problem was that the birds were nesting in the dryer vent airflow lines. In some cases, we found starling nests that ran for 15 linear feet. We developed a simple technique to clean out the nests on this job. We used an industrial vacuum and a flexible copper pipe to slowly pull out the nesting material. Then, we closed the openings with ½ inch hardware cloth.

We charged \$30 to \$40 per vent, but in hindsight we should have charged more. The work was very labor-intensive. It did, however, solve the problem.

Hardware cloth and flashing were the main tools used to solve a problem at an oriental food warehouse in Dallas. The health department warned that they would close the warehouse down if the sparrow problem inside was not solved. I worked out a contract to solve the bird problem and take over the pest control contract from the previous company, which was unable to solve the problem.

We succeeded by closing off vents with hardware cloth on top of the roof and placing flashing around some of the damaged dock doors that were not in use. Once all the holes were fixed, the birds no longer came into the warehouse. I also had the supervisor install plastic curtains on a few of the doors that were open all day. The secret to finding the problem was the top of the dock doors. If there was a one-inch gap, the sparrows were able to fly into the warehouse.

**SAFETY EQUIPMENT.** We take bird cleanup seriously enough to wear protective gear. One government contract we were going to bid on required that a manager have hazardous material cleanup training. I sent my father to take one of the courses given at various colleges throughout the nation.

The proper equipment includes coveralls, dust and vapor masks, goggles, gloves (it's a good idea to tape the gloves and boots to your coveralls, and to spray yourself with an insect repellent to prevent ectoparasites from the nests crawling on your body), and a good

(Continued on page 7)

(Bird Management...Continued from page 6)

heavy-duty vacuum. A few years ago it cost around \$500 for the vacuum, and we use the same one after a thorough cleaning to vacuum up the dust as we are drilling holes on termite treatments.

We did another job at Love Field in Dallas to solve a pigeon problem under a passenger walkway. After repelling the pigeons with an electric fence, it took three people seven hours one night to clean up the remaining mess. We rolled up the existing insulation and disposed of it in plastic bags. We then vacuumed up the pigeon droppings. The vacuum was outside, and the hose was brought into the crawl space. If we did not do this, we would have had to modify the vacuum to prevent dust particles from entering the indoor atmosphere. For safety and aesthetic concerns, the job had to be done when the number of passengers we might contact was at a minimum.

I realize there are many other bird control products on the market. The most recent is the Bird Barrier coil-type product and the pin-and-wire systems. They both make it uncomfortable for pigeons to land on ledges. A Terminix branch in Dallas has successfully used the Bird Barrier to get pigeons out of chimneys in an apartment complex, and many government contracts are asking for pin-and-wire systems. I did a patent search this summer on pigeon control, and even found another form of electric fence for pigeons.

The survival of any commercial bird product will be based on the ability of the PCO to sell the product to the property manager. The installation may be tough, but the hardest part of the job is convincing the property manager to spend somewhere between \$10,000 and \$20,000 on bird control. The reason, many times, is that their bonuses depend on how efficiently they run their properties. Therefore, many have their own people attempt to do the installations.

Anyone can do bird control. As I have mentioned before, it is hard work, and is not as profitable as you might think, especially if you make that one mistake. To me, the intensity of the project is like a termite job. However, unlike termite work, the results of control are usually

immediate, and the satisfaction of solving someone's problem is felt soon after the job is completed.

#### **THE 'NET' EFFECT: PLASTIC VS. TWINE**

Several brands of bird netting are now available to PCOs. Generally speaking, they can be divided into two categories: plastic molded netting (e.g. BirdNet, from InterNet) and knotted twine netting (e.g. StealthNet, from Bird Barrier).

Bird netting feet) and its mesh size (the size of each hole in inches; the holes are usually square-shaped). InterNet's plastic molded netting is the netting of choice for many PCOs doing bird control jobs. One of the main reasons: it is generally much less expensive than knotted twine netting.

On the other hand, in instances where durability and strength are of primary importance to a customer, and price is a much less significant factor, the knotted twine variety of netting should certainly be considered as an option.

Bird Barrier stocks 2-inch netting for pigeons, 1-inch netting for starlings, and ¾-inch netting for sparrows and swallows. (Custom mesh sizes are available for gulls and other large birds.) StealthNet is available in various dimensions, from 25 feet x 25 feet up to 50 feet x 100 feet.

StealthNet's twine is made from six strands of polyethylene (each strand of twine has a breaking strength in excess of 40 pounds) wrapped into three strands, and then wrapped again. This lends each strand a rope-like strength, according to the manufacturer. The netting is pre-stretched, UV protected, and able to withstand heat of up to 600°F. StealthNet carries a five-year guarantee. The manufacturer asserts it will last more than 10 years if installed properly, using the professional array of installation hardware available. It is sold through most pest control distributors, with pricing starting at about 16¢ per square foot.

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(Holistic Pest Identification...Continued from page 1)

and in many states to remain within the law, requires that the pest control professional devote the time necessary to properly identify the pest or pests involved. This can often be accomplished by employing a "holistic approach to pest identification." Simply put, this approach considers where, how and under what conditions the pest lives. By considering factors such as where it was found; what it was doing; its nest, web or lair; associated damage; and even how it moves, we can often tell what the pest is even before we see a specimen.

We learn this information by playing detective; by combining a thorough inspection with the right questions. And customers are often the best source of a great deal of helpful information. If we ask the right questions, they can often help us narrow our search and identify the pest. Sometimes, however, the customer is unable to provide all the answers. This is where the thorough inspection becomes crucial. It will provide evidence of the pest itself, as well as where it lives, how it lives and what conditions are enabling it to survive.

The holistic approach can be effective in enabling us to identify a pest long before we see an actual specimen. By developing a series of questions, we may use the customer's observations to our advantage. For example, let's assume that a customer calls to tell us they have found several small beetles. At this point they may be wood-destroying beetles, stored product beetles, hide beetles or an occasional invader. By asking where they were found, what they were doing, what they were feeding upon and if any damage was found, we can narrow down the possibilities. The presence of these beetles inside an old bag of flour, for example, quickly points toward a stored product pest and most likely a confused flour beetle. In cases where the customer does not know all of answers, we can often derive sufficient information from them to point us in the right direction. A thorough inspection will then help confirm our preliminary determination.

In addition, we often find that even though we have a specimen, identification is made easier when we've asked the right questions. Many pests look similar even though their habits, habitats and life cycles are vastly different. There are many species of dermestid beetles,

for example. Depending upon the species, they may attack carpets, hides, stuffed birds, etc. The species determines the management program.

**ASKING THE RIGHT QUESTIONS.** The key to the success of a holistic approach to pest identification is asking the right questions. Initial questions should be general and the answers to these will determine subsequent questions. Then, a thorough inspection will confirm the initial diagnosis. There are 10 basic questions we should ask that will greatly increase the likelihood of a successful pest identification. The answers may be followed up with more specific questions to "fine-tune" the identification.

**1. Where did you find or see the pest?** The location of the pest is a critical first step. Was it indoors or outdoors? If outdoors, was it in close proximity to the building, in the lawn, near or in outbuildings? Was it in a tree or shrub? Location within the structure leads to the question of where inside it was found.

**2. Was it on a surface, inside an item or piece of furniture, or in a food item?** Where exactly was the pest? Although its specific location doesn't necessarily imply its habitat, it can often be an effective inspection point. Obviously, a pest in a cabinet or more specifically, in a food item, can generally be expected to be living or feeding there. We can then thoroughly inspect this site and expand from there. If it was on a surface, ask if it was attached to the surface in any way, such as with silk or a sticky substance. It may be a web, cocoon, egg case or some other item.

**3. What was it doing and when?** Was it moving? Resting? Feeding? Emerging from a hole, a cocoon or other structure? Was it alone or were there others nearby? Did you see it during the daylight hours or at night? These questions can help determine the extent of the infestation. Cockroaches and/or rodents feeding during daylight hours, for example, indicate a heavy population that is well-established.

**4. Did it have a nest, web, lair, or other abode, resting or hiding place?** Often, although we don't see an actual specimen, we see the nest, web or resting

(Continued on page 9)

(Holistic Pest Identification...Continued from page 8)

place. Just as a web immediately identifies the pest as a spider, other materials can help to identify pests. For example, mice will fashion bits of thread, cotton, insulation, grass and even shredded newspaper into a nest. Rats often create tell-tale burrows. Some pests, such as cockroaches indoors or earwigs outdoors, cluster into groups which, when located, can be eliminated.

**5. Did it cause any damage to food, feed, furniture or structure?** During the course of the inspection we can determine whether the pest has caused any damage. Frequently, the damage itself is a giveaway. Who wouldn't be able to identify a pest that damages wood and fills the damaged galleries with mud? Or what about the pest that produces perfectly round ½-inch holes in decks and soffits? If the damage was to food, determine whether the pest consumed large amounts or small amounts, or if it damaged the box, bag or container. Were there exit holes? And what did they look like?

**6. Did you find any fecal deposits, pellets, piles, residue or stains?** Pests often leave various tell-tale signs of their presence in the form of deposits or stains. Droppings from rats, mice, squirrels, birds and bats can be identified easily. Rats also leave rub marks along frequently used runways. Piles of dust with dead insect parts can be readily identified as carpenter ant frass. Cockroaches leave easily recognizable fecal deposits. Ask the customer if they found any such evidence.

**7. How did it move?** How the pest moves can be an effective identifying characteristic. Ask if the customer saw it moving, and if so, how. Did it crawl, slither, walk, run, hop or move in some other fashion? Mites, ticks, bedbugs, carpet beetle larvae and many spiders crawl. Snails, slugs, snakes and larvae of many moths slither. Rodents, cockroaches, silverfish, ants and many others walk or run. Crickets and fleas hop or jump. If the pest flew, ask if it was a good flier or poor. Did it fly fast or slow? Could it hover, back-up, land on the ceiling or a smooth vertical surface? All of these movement patterns can help you narrow down the possible pest.

**8. How many were there?** Sighting only a single pest does not necessarily mean that others are present. It

may have been a single individual that entered the structure in search of food or a place to "set up housekeeping." The sighting of several individuals, however, usually indicates that they have established themselves. Notable exceptions to this are overwintering pests such as cluster flies, boxelder bugs and ladybird beetles. Asking the customer how many they've seen and whether they were all together or spread out over a great distance can indicate the degree of the infestation and the extent of its dispersal.

**9. Did it bite, sting or pinch, or cause harm to persons or pets in any way?** Ask the customer if anyone has been bitten, stung or pinched by the pest. Bites may be from mosquitoes, bedbugs, fleas, ticks, lice, spiders, ants and even rodents. Stings may be from bees, wasps, hornets and some ants. Insects that can pinch include large ants (such as carpenter ants) and beetles.

**10. Do you have a specimen or can you give a brief description of the pest?** The final question to be asked is whether the customer has a specimen of the pest in question or if they can at least provide a brief description. Be aware, though, that specimens provided by customers may be missing vital parts or be crushed or decayed. The presence of a specimen, however, should not replace asking the foregoing questions and performing the accompanying inspection. What a customer provides as a specimen may not be the actual culprit. Even if the customer provides an accurate specimen, it is still necessary to proceed with these questions to confirm the pest and identify its location, the size of the infestation, and any damage or injury it caused.

Pest identification, at best, can be a difficult task. A small moth missing its antennae, a few legs and most of its scales is tough to identify. But if we find out that it was on the floor of the closet and an article of clothing was found with holes in it, we might conclude it was a clothes moth. The same specimen found in the kitchen cabinet might be an Angoumois grain moth. Asking the right questions can provide us with the information necessary to properly identify the pest. Effective pest

(Continued on page 10)

(Holistic Pest Identification...Continued from page 9)

management is dependent, after all, upon proper identification.

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## IPM in Restaurants

Jennifer Richter  
PCT-Online

**Progressive PCOs are turning to abatement strips to solve a variety of fly problems in commercial accounts.**

Sunshine. Sizzling temperatures. Swarms of filthy flies. In July, summer is in full swing, and perhaps more important for pest management professionals, summer is peak fly control season. As temperatures soar, so do the number of nuisance flies, including house flies (*Musca domestica* L.) and lesser house flies (*Fannia* spp.), PCOs say.

“Effective fly control is critical for businesses, especially food processing and handling establishments,” says Jim Kallam, president of Kallam Exterminators, Stokesdale, N.C. “Flies can carry diseases, they’re a nuisance and the public despises them.”

**BAD FOR BUSINESS.** Nothing ruins a good appetite more than the sight of flies near food. It’s no wonder, therefore, why restaurants are considered one of the hottest fly control markets in the pest control industry. “When people see flies swarming around a restaurant dumpster, they don’t want to eat at the establishment,” says Mike Fletcher, sales manager for Lesco Inc., Gainesville, Fla., who has sold pest control products for seven years.

Not only can fly control problems result in fewer customers for restaurant owners, but also fines or more severe penalties in the event of a failed health inspection, notes Kallam. Nuisance flies and poor sanitary conditions often go hand in hand. That’s where the PCO comes in, ensuring that flies are controlled in their most sensitive commercial accounts where the stakes are high. But serving the fly control market isn’t easy. PCOs are expected to generate results — fast. “Customers are more demanding than ever,” emphasizes Kallam. “They want fly control and, if possible, elimination.” They also desire a fly control product with minimal odor, he adds.

In recent years, industry professionals say they’ve seen a

shift from pest control sprays to pest control abatement strips and other IPM tools. Customers often prefer abatement strips because they’re easy to apply and less conspicuous, especially during product application. “The industry will see a tremendous change in pest control application in the next five years,” says Kallam. Eventually, he predicts that all pest control products will be sold in abatement form.

**A SIMPLE SOLUTION.** The key to effective fly control is simple: sanitary practices supported by superior fly control products, according to industry professionals.

Kallam and Fletcher rely on QuikStrike™ Fly Abatement Strips for effective fly control. Available from Zoëcon, QuikStrike is a unique, self-contained product that targets and controls nuisance flies within seconds. The product, which contains nithiazine as its active ingredient, draws flies with two feeding attractants and a fly sex pheromone.

QuikStrike can be placed near a variety of fly feeding sites including walls, grease pits, compactor chutes, trash receptacles, outdated food bins and recycling areas. The product is designed for outdoor use, but it can be applied in and around partially enclosed or protected areas, such as loading docks and parking garages.

For best results, place QuikStrike near ground level where flies feed. Placing the traps higher than 3 feet isn’t recommended since flies above this level are resting rather than feeding. The abatement strips can be placed in any position by pest control operators. However, they work best when applied vertically. In addition, avoid exposing QuikStrike to moisture and sunlight, which can reduce the length of residual. Never place the product in windy areas, especially in front of fans and blowers. Flies won’t land on moving surfaces.

**OUT OF SIGHT, OUT OF MIND.** QuikStrike has “worked wonders” for several of Fletcher’s customers, including a local restaurant. Located a mile from a large dairy, the partially screened-in restaurant had attracted hordes of nuisance flies (Continued on page 11)

(IPM in Restaurants...Continued from page 10)

until the owner placed a QuikStrike fly abatement strip near a fly-infested trash receptacle. Two days later, the fly population had decreased by half, he says.

"The flies were terrible," Fletcher recalls. "But once QuikStrike was applied, the population diminished quickly."

Kallam shares a similar success story. Prior to using QuikStrike, the owner of a service station and restaurant had tried three different brands of fly control products, all of which failed. Three days after Kallam applied QuikStrike around the restaurant's trash receptacles, the fly population had decreased by 80%; within 10 days of application, the fly infestation was completely under control, he reports.

**PCOs ON THE FLY.** As summer progresses, customers will rely on PCOs for superior fly control. Pest management professionals who work "on the fly" (i.e., respond quickly to customer needs) and provide an effective IPM program will help ensure end users' success as well as their own.

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## Animal Scats And Exterior Bait Stations

Dr. Rodent Corrigan  
PCT-Online

Recently, a large food plant flew me to their site to solve a rat problem. It seems a good pest control company had been recording rat activity in six exterior bait stations for several months. Despite using good baits and good placement, the activity persisted. After inspecting just a few of the stations, I knew immediately it was not rats visiting them, but rather toads. I came to this conclusion because of the animal scat (feces) around the stations.

Because of cases such as this one, it is important for pest management professionals to know basic, "on-the-job" aspects of scatology (the study and identification of feces), at least for those animals that commonly interact with exterior bait stations. The case above is not an everyday occurrence, but it is not rare either. Periodically, thousands of dollars and man-hours are

wasted in chasing either the wrong rodent species or rodents that do not exist.

**SCATOLOGY 101.** Let's take a look at scatology as it applies to properly identifying different yet similar looking animal scats commonly found in exterior stations or along foundation walls. These include mice, rats, toads, bats, crickets, large cockroaches and snakes.

First, professionals often rely only on size and/or color to identify scats. But used exclusively, these qualities are misleading. Large cockroach and cricket scats may be similar in size and shape to mouse scats, and thus are sometimes mistaken for them in exterior stations. To distinguish between large insect and mouse scats, first note the general shape of the scats. Mouse scats are typically about ¼ inch long and pointed at one or both ends. Often the mouse's scat is black or dark in color, but the color can vary significantly from light brown to blue-green (as a result of feeding on dyed rodenticide bait). Rodent scats more than a few hours old are usually hard and compressed and do not easily disintegrate when pressed with a stick or other object (do not use your pencil, pen or fingers). When viewed beneath a hand lens or microscope, mouse and rat scats will reveal hair fragments, which are a result of the coat hairs being passed through the rodent during the grooming process.

The scats of large insects, on the other hand, are usually blunt on both ends resembling a box-shaped pellet. This is because insects do not possess a sphincter muscle. Insect scats range from yellow to black in color. Cricket scats are often tan and usually disintegrate easily when pressed. Other identifying characteristics may also be involved. For example, American cockroach scats contain distinct ridges.

**BAT AND RAT SCAT.** Bat scats are also commonly misidentified for mouse scats. Although bats do not interact around our bait stations, they commonly hang on the outside walls of commercial structures. This results in bat scats being found on the ground b

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(Animal Scats...Continued from page 11)

below, which is incorrectly interpreted as mouse activity. Bat scats are similar in size, shape and color to mouse and young rat scats, but the bat scats are made up of mostly shiny insect fragments that are clearly visible to the naked eye. Because of these fragments, bat scats easily disintegrate when pressed.

The two animals most often confused with rats around building exteriors because of their scats are toads and certain snakes — especially some of the larger toads, as they produce scats the same size and shape as rats. Again, it is fairly easy to distinguish toad and snake scats from rat scats. The Norway rat produces scats that are the largest of the commensal rodents, ranging up to  $\frac{3}{4}$  inch long and  $\frac{1}{4}$  inch in diameter. Most Norway rat scats are rectangular shaped with either blunt ends, or they contain a slight point. The roof rat produces scats similar to that of the Norway rat, but they generally are a more curved, sausage-shape scat, measuring about  $\frac{1}{2}$  inch in length and less than  $\frac{1}{4}$  inch in diameter.

The larger toads and smaller snakes that visit our bait stations feed on insects, resulting in scats resembling large bat scats — they contain insect fragments and easily disintegrate when pressed. Snake scats are typically elongated and very narrow, and may be twisted at some point.

**CHECK YOUR SURROUNDINGS.** Keep in mind that many anomalies may exist in feeding and thus in scats. Therefore, analyze scats in groups as opposed to studying just one. Also consider the location. Is there abundant vegetation concealing toads or snakes nearby? Are sewers, foundation cracks, expansion joints and voids harboring large cockroaches or crickets nearby?

When identifying scats inside bait stations, always inspect the bait for feeding patterns. When fed upon by rodents, bait blocks usually exhibit the impressions made by the rodent's incisor teeth. Insects however, nibble away at bait blocks, resulting in only a general depression into the block or block corners. Finally, when still in doubt, collect the scats and have them confirmed by a specialist.

## Abandoned Baits in Buildings

Dr. Robert Corrigan  
PCT-Online

In commercial and residential buildings rodents sometimes infest difficult-to-access areas. Such areas include suspended ceilings, attics, wall voids, suspended floor voids, crawl spaces, utility chases, equipment voids and even beneath low-lying shelving in various types of food storerooms. These difficult-to-access populations can sometimes be both persistent and large in size. This is particularly true of commercial remodeled buildings within major cities, such as health care facilities, large office complexes, restaurants, high-rise condo-minimum complexes and schools. These types of structures often contain multitudes of labyrinths within the walls, ceiling and floor voids, many of which are difficult or nearly impossible for people to access. In addition, the rodents often have many "secret" entryways into these buildings from beneath, within and above the actual building due to the "interconnectedness" of inner city environments.

In efforts to control these difficult-to-access populations, baiting programs involve applying either packets or bait blocks into the "inaccessible areas." Unfortunately, because accessing these areas can be time consuming, frustrated technicians sometimes toss the baits into the various voids, apparently with no concern for retrieving the baits.

But an important question arises here: Should baits that cannot be retrieved inside occupied buildings be applied? Probably not. Let's examine why.

First, of course, is the pesticide label and thus the law. Nearly every rodenticide label states "collect and discard of all leftover bait." Moreover, most labels also state that broadcasting the bait is not allowed. These label directions are based on important concerns. There are potentially hazardous consequences to abandoning baits in buildings. Loose baits that have been placed, dropped or tossed (i.e., broadcast) into building spaces, may be

(Continued on page 13)

(Baits...Continued from page 12)

picked up by rodents and moved or carried to areas where they may in one way or another later become accessible to people and pets.

In some situations this can have serious implications. Consider the long-term potential hazards of abandoned baits in schools, health care facilities, restaurants and other types of accounts where sensitive situations exist, or where food may be stored, prepared or served. Many real world case histories exist. However, one case of an unprotected bait packet that found its way onto a child's lunch tray in an elementary school should suffice.

Too, it is not a rare occurrence for repair personnel and homeowners to have had baits literally drop on their heads when removing suspended ceiling panels. There are also repeated cases of remodelers and construction crews collecting up to 40 pounds and more of packet and block baits that were applied, re-applied and re-applied on top of previously abandoned baits in ceilings, attics, walls and floors. It may be a stretch to assume these personnel dispose of the rodent bait in a manner approved by the labels, or, in fact, in any manner which would not present a hazard to non-target animals or the general environment.

Abandoning rodent baits in buildings also presents an ethical concern. Because rodent baits are made of food quality grains, flavor attractants, seeds, etc., there are many cases of "mysterious" stored product pests (e.g., Indian meal moths, cigarette beetles, black carpet beetles and others) suddenly erupting within homes, high-rise complexes, shopping malls, restaurants and office complexes. A common source of stored product infestations are loose bait packets that were carried off by a rodent to an inaccessible void, or from baits tossed and abandoned by a homeowner, PCO or janitor.

In one home I investigated, black carpet beetles were repeatedly attacking valuable woolen clothes and rugs throughout the bedrooms and closets of the upstairs bedrooms. Upon inspecting a difficult-to-access attic, I discovered about 25 packets of partially consumed rodent meal baits applied by a previous PCO. Most of the packets contained black carpet beetles. Hmmm.

Smart Solutions. Controlling mice and rats in difficult-to-access areas can be challenging — no doubt about it. But there are better strategies than tossing baits to these areas and then abandoning them. When infestations are occurring in large commercial situations, the large structural voids (e.g., crawl spaces, suspended ceilings) are rarely uniformly infested. Usually infestations concentrate along specific runways and around certain pockets nearby areas where rodents have easy access to food or other resources. Based on the results of a good inspection, these high-activity areas should be specifically targeted for baiting.

Ideally, baits should be installed within numbered bait stations which will contain a bait block (of which there are several on the market). Simply take a moment to record the number of the stations in a room or area on a sheet. For example: "Stations Nos. 1-6 along perimeter of suspended ceiling in break room." Upon program completion, consult the location guide and remove the pesticides. Noting which rooms do not contain stations e.g., "No stations located in any of the ceilings in rooms 14-17," is also a valuable timesaver.

Loose baiting programs per se are not necessarily wrong, if applied to label directions. In fact, in cases where severe infestations of large voids are occurring (attics and crawl spaces) and it is not practical to install bait stations, baits can be installed in a loose bulk format. But here too, a location sketch map, or simply just keeping records of the numbers of the blocks or packets applied should be made, and the baits retrieved when the program is completed. In rodent-active areas where physical access or installing bait boxes is impossible, block baits can be strung on a fishing line or wire, and dropped or tossed into infested areas. The wire can be nailed or tied near the point of access for the professional, and used to retrieve, or replenish the baits as needed. For buildings where infestations are persistent due to incoming rodents from surrounding areas or buildings (as with inner-city areas), follow the label and establish permanent bait stations, or permanent secured bait, i.e., wired bait.

(Continued on page 14)

(Baits...Continued from page 13)

Retrieving baits from buildings upon program completion extends courtesy to those pest management professionals whom you may at a later time follow. Inheriting liability from a previous "professional's" misuse of a pesticide has been a concern of our industry for many years.

Be courteous. Be professional. Don't abandon rodenticide baits

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## The Baiting Game

Stoy Hedges  
PCT-Online

*For a cockroach baiting program to succeed, the 'baiter' must know which baits are most likely to work, how many placements are needed, and where to put them.*

Most people feel cockroaches are the least acceptable pest to have in one's home or business. The reasons for these feelings primarily involve the unsanitary nature of a cockroach's activities. At first glance, a single cockroach may pose little real threat; yet the *perceived* threat proves very real to many people, and millions of dollars are spent each year in control efforts directed at this pest..

The pest management professional has many tools to use in eliminating and preventing cockroach infestations, including both insecticides and non-chemical control measures. Of the treatment techniques available, cockroach baits have become the "in thing" for controlling these pests.

Considerable effort is being expended by manufacturers to develop new baits as well as new methods for delivering those baits to the cockroach. As the basic strategy used to control cockroaches moves from one primarily of insecticide applications to a more varied approach, baits will gain in their use and importance in cockroach control programs.

Still, a bait only works if the cockroach eats it, and elimination is only achieved if all of the cockroaches feed on the bait. For these reasons, baits usually do not provide complete control on their own, but they can be very effective when used in conjunction with other

control methods and treatments.

In some situations, however, cockroach baits may be the only insecticidal method that can be used. This article will examine some of the factors that affect the success of cockroach baiting programs and will provide tips that may improve the results achieved when using baits.

**DEFINING THE TARGET.** No single bait product is right for every type of cockroach. For purposes of this discussion, two basic types of cockroaches will be examined: the German cockroach and the "peridomestic" cockroaches. Which cockroach is present will be an important factor to consider in determining which bait product to use.

German cockroaches historically have been difficult to control successfully using baits. That situation changed about 12 years ago when Maxforce bait was introduced. German cockroaches tend to be picky about what they eat, and finding attractive food bases for cockroach baits has been difficult. In recent years, much research has been performed to find food attractants that will consistently entice the German cockroach to feed. Maxforce, Avert, and Blue Diamond baits have been successfully used for several years in controlling German cockroaches, and new bait formulations are in development that will be introduced in the near future.

Peridomestic cockroaches, such as the American, oriental, and smoky brown, are larger cockroaches and have consistently been attracted to many types of bait products over the years. These cockroaches seem to be less finicky about what they eat and can be controlled using just about any of the bait products labeled for cockroach control.

On the other hand, American, smoky brown, and other large cockroaches must consume more bait to be killed, so some bait products may not be the best choice for situations involving these pests. For example, Avert Cockroach Bait may be used successfully when a few large cockroaches are involved; but with larger infestations, the amount of

(Continued on page 15)

(The Baiting Game...Continued from page 14)

Avert needed to achieve satisfactory results may be cost-prohibitive.

Additionally, a number of less expensive cockroach baits are available for outdoor use; therefore Avert may not be the best choice for outdoor baiting situations.

**WHERE TO PUT IT.** Placement is critical in successful use of baits for any pest, especially for cockroaches. Generally, the closer the bait is placed to the harborage, the more readily it will be accepted. For German cockroaches, placement of food right next to or into active harborages is ideal.

When using bait stations, it is important to attach them or place them against an edge such as the corner of a cabinet. Cockroaches prefer to follow edges, and these will lead the cockroach to the station. An even better approach is to place the station in a corner at the top or bottom where three edges converge. Placing the station close to active harborages is also preferred.

Baits for peridomestic cockroach species are best applied directly into harborages, both in doors and out. These baits are usually in a granular or flake form and can be injected into voids or sprinkled into firewood piles or tree holes. In attics, these cockroaches are generally found in soffits, so bait should be scattered into these areas.

**THE MORE THE MERRIER.** As with any baiting program, the best results are achieved using numerous placements of small amounts of bait. Applying only a few bait placements lessens the chances that most of the cockroach population will encounter any bait. More placements increase these encounters and increase the odds that bait will be consumed.

**HOW BAD IS IT?** The more cockroaches present, the more bait placements that will be necessary. In many cases, bait stations are more expensive to use because of the number of stations needed. Granular baits, aerosol baits, gel baits, and paste baits are easier to apply to more locations while maintaining low overall cost.

Maxforce bait stations, however, are one of only two baits labeled for use in commercial food areas, and should be used in restaurants and similar areas. In addition, stations are more easily attached to or used around electronic equipment that may be infested than would be gel, aerosol, or dry baits.

**CHOICES, CHOICES.** Any bait will be less effective when applied in an area that has numerous alternate food sources. The poorer the sanitation, the harder it will be to get most or all of the cockroaches to feed on the bait. Removing alternate food sources by cleaning activity will greatly enhance results.

**DON'T LET IT GET WET.** Excess moisture can greatly affect cockroach baits and render them ineffective. For example, the heat and humidity found in a restaurant dishwashing room can cause the bait in cockroach bait stations to quickly mold. Granular baits applied in wet crawl spaces and basements can also mold. Moldy baits are generally avoided by cockroaches.

Outside, cockroach baits need to be frequently reapplied to areas that have been contacted by rainfall, lawn watering and dew. For these reasons, outdoor cockroach baits are best applied into voids, tree holes, crotches of tree limbs, piles of debris in other words, places where the bait will be somewhat protected.

Avoid applying outdoor baits to exposed areas that may soon become wet.

**POOR MIXERS.** Application of other insecticide formulations can also affect bait performance. Applying a spot treatment over a bait station may make it repellent to cockroaches. Application of dust insecticides and baits into the same cracks and voids is also not advised. Bait placements should stand alone where they are applied. Other formulations should not be used in harborages where baits are used.

**NOT A MAGIC BULLET.** Cockroach baits, by themselves, are not a "magic bullet" and are best

(Continued on page 16)

(The Baiting Game...Continued from page 15)

choice.

One strategy that works well is to remove as many cockroaches as possible by vacuuming and then to use bait for the remaining cockroaches. This approach is likely to become the standard strategy used in the 21st century for controlling German roaches in most situations.

As stated earlier, infested electronic equipment cannot be treated with insecticides. Cockroach baits need to be used outside these devices so the cockroaches will feed on it as they leave in search of food. Bait stations work well in this situation because they can be attached next to openings into the machine. If cockroach bait stations are not available, gel baits, dry baits, aerosol baits, or paste baits can be applied into cracks next to the electronic device.

Another situation where baits are ideal involves the presence of lobster tanks, aquariums, and animals that cannot be removed pets, for example. In these cases, residual insecticides cannot be used. Be sure to place cockroach baits as close to active harborages as possible. Removal of as many cockroaches as possible using a vacuum cleaner prior to bait application is the preferable strategy.

**CONCLUSION.** Cockroach baits are effective tools that will continue to increase in importance. Understanding where to use them, which ones to use, and proper placement are the keys to successful use of baits. Small amounts placed next to or near as many active harborages as possible yields the best results. Having the proper application equipment is also critical to success. Practice "Situational Pest Management" using baits in combination with other control measures as dictated by the situation.

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## **Insect ID Made Easy**

Doug Seemann  
PCT-Online

One of the greatest challenges facing pest management professionals (PMPs) today is insect identification, a crucial initial step in solving any pest

problem.

Twenty or 30 years ago, insect identification might not have seemed as important because it didn't seem as if there were as many types of pests. In a sense, this was true. People didn't travel as much in year's past. Today, pests have been relocated and now drywood termites from Mexico can be found in New York, scorpions can be found in Chicago, Formosan termites in New Orleans and Asian cockroaches and red imported fire ants in Arizona. None of these pests belong in these places, but they are there now.

Years ago, the type of insect didn't matter much because DDT and chlordane could kill most anything. For hard to reach pests there was Cyan-o-gas and Vapo bombs. I once used Vapo bombs in an old home I purchased. The home was a "fixer-upper" and I was planing on gutting it. Forty-eight hours after setting off a few bombs, I returned to the home to find the mice in the dishwasher dead. Also dead were the carpet beetles in the kitchen, the clothes moths in the carpet, the carpenter ants in the attic and the wasps in the dryer vents. Good stuff, but not terribly selective.

Today, pest elimination is more sophisticated. With the advent of integrated pest management (IPM), less toxic materials are used to control pests with precision. To do this effectively, the PMP needs to understand the biology and behavior of the pest adversary. To know these pest traits, one must know the type of pest present, and the key to this knowledge is pest identification. Identification is the first and most important step in a modern integrated pest management program (IPM).

**HELPFUL TOOLS.** There are a number of tools necessary to properly identify insect pests. The minimum should include a flashlight with a focusing beam, a magnifying glass, tweezers, vials, alcohol, plastic Ziploc bags, sticky monitor traps and a notebook. The magnifying glass should be a 10X loupe or pocket lens. Higher magnifications are available, but the field of view shrinks and image distortion increases with higher magnifications.

(Continued on page 17)

Insect ID...Continued from page 16)

Insects to be preserved should be transported alive in vials, or preserved in vials of alcohol. Tweezers and monitors are necessary to collect specimens for identification at a later date. To assist in determining the identity of an insect, it is sometimes necessary to collect the frass (droppings, sawdust and debris) left behind by the pest. This is where the Ziploc bags come in handy.

Notes should always be taken as to where the insect was found and the circumstances under which it was found. For those serious about identification, inexpensive pocket microscopes are available from Radio Shack. A paintbrush should be added to the toolbox for picking up small delicate specimens, and sharp probes can be used for manipulating specimens under a lens. The entire tool kit, with a professional-looking pouch should cost under \$50.00.

**EDUCATION.** In any given market, there are only about 20 insect pests that make up about 95 percent of the species commonly encountered. Each PMP should learn the insects they will most commonly encounter. Some of these are obvious, like field crickets and centipedes; others can be more difficult. Ants and flies can be among the most difficult insects to identify. Cockroaches can be very difficult too.

It helps to stay up on what is happening in the world of pest control. Read Pest Control technology (PCT) magazine and Service Technician magazine. Also visit [www.pctonline.com](http://www.pctonline.com) and other pest control related Web sites.

Attending conferences and state association meetings can also be helpful. These resources will give you a window into the latest pest invasions in your region.

Earlier this year I received a telephone call from Doug Gardner, an entomologist from Ecolab Pest Elimination in Phoenix, AZ. He came across Asian cockroaches on the exterior of a home. Asian cockroaches are virtually identical to German

Identify which species is present is to flip a few specimens into the air. If they keep going, they're Asian cockroaches, but if they hit the ground they are German cockroaches (PEST NOTES: ...or sick, dead, etc.). Typically, Asian cockroaches are only found in the southeastern United States.

Learning of these recently introduced species comes in handy when they are found in a part of the country where they normally would not occur. It is also important to learn some basic insect morphology, biology and vocabulary. It is virtually impossible to identify pests from the literature without knowing words like pronotum, tarsi, filliform, antennae, ocelli and clavate.

**RESOURCES.** The Scientific Guide to Pest Control Operations from Purdue University is probably one of the best sources for easy-to-use identification keys. Keys are written devices that help the user sort out the significant attributes of a specimen so that the user is led to the written identity of the subject in question.

By examining the specimen, a simple question is answered, selected from a pair (couplet) of choices. For example, "Os it fat or skinny, are there seven segments in the antennae or eight?" After making each selection, the user is led through a maze of couplets until a logical conclusion is reached. The PCT Field Guide Series by Dr. Mark Lacey and Stoy Hedges are must-have editions for field identification. The NPMA Field Guide is another strongly recommended reference.

With the tools outlined above, the competent PMP will be able to identify nearly all of the arthropod pests encountered in the field. For the remaining few insects that are difficult to identify or to confirm through field identification, there is relatively easy access to entomologists. University cooperative extension offices typically have a number of entomologists who are happy to help (PEST NOTES: We're one bug bunch of happy campers).

If there is a United States Department of Agriculture (USDA) office in your area, they can also be helpful. Many universities have an entomology department (Continued on page 18)

Insect ID...Continued from page 18)

or a number of entomologists in the biology department. Some state associations have entomologists on retainer and the National Pest Management Association (NPMA) is always available to help. NPMA's web site, [www.pestworld.com](http://www.pestworld.com), is also filled with helpful information. Phi Chi Omega is a national association of Board Certified Entomologists (BCEs) working in the pest control industry and can be contacted at their web site.

The Entomological Society of America has a registry of BCEs catalogued by state and by specialty. Some larger pest control companies also have staff entomologists that may be willing to assist (as long as the help isn't requested too often).

The best way to utilize these resources is to establish a rapport with them before they are needed. How quickly these typically very busy people respond is a function of their personal-professional relationship with the pest management professional needing help. Networking is a valuable tool in insect identification, and the time invested often pays off in big dividends.

**CONCLUSION.** Pest identification is one of the most important steps in the pest control process. Once correct identification is made, information regarding the pest's biology and behavior can then be reviewed and potential pest control solutions can be studied for feasibility.

Pest identification does not have to be a daunting task. Like other aspects of pest control it requires pest management professionals to do a little "detective work." It requires PMPs to collect and carefully examine pests, then use their available resources to confirm their findings.

To most pest management professionals, discovering a previously unknown (to them) arthropod pest is one of the most exciting and interesting parts of the job. After all, didn't most of us get into this business because we thought bugs were cool? I did!

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## The Eight-Legged Health Threat

Stoy Hedges  
PCT-Online

Certain spider species, such as the infamous black widow, are classified dangerous to human health. To control them, thorough inspections, followed by careful management tactics, are required.

Spiders can affect man's health in three ways: annoyance or fear, allergic reaction, and envenomization. Although each varies in its degree of seriousness and medical effects, man's health may be affected by each. Interestingly, spiders and their venom have long been used for medicinal purposes as well.

The success of the movie Arachnophobia was due in no small part to the "fear factor" — that strange but not uncommon characteristic of man that leads him to the brink of sheer terror only to be able to step back in relief with the realization that no true harm has befallen him. Some people may see a spider and not be bothered. Others see a spider and get heebie-jeebies. To a few, however, the sight of a spider induces fear to the extent that it results in a debilitating malady that can render them both physically and psychologically ill.

Certain spiders are considered dangerous to human health. Such spider species, including the black widow, the brown recluse and the hobo (aggressive house), are officially classified as "dangerous" by the Centers for Disease Control. Other spiders can and do fight — more than 50 species have been identified as having bitten people, although most of these bites result only in localized swelling and pain. The sighting of a single black widow or brown recluse in a building, however, is cause for concern and triggers an immediate need for action. This article will deal with the control of four types of dangerous spiders and provides procedures that are helpful in successful remediation of infestations when they occur.

**IDENTIFICATION IS CRITICAL.** It is imperative that

(Continued on page 20)

(Eight-legged...Continued from page18)

the spider(s) involved in an infestation are positively identified prior to instituting the often-intense procedures required to control a dangerous species.

Misidentification often plays a role in cases involving the brown recluse spider. Frequently, people claim to have been bitten by the brown recluse spider at work and efforts are directed at treating the building only to find out that brown recluse spiders are not present in that building. In other cases, people claim to have seen brown recluse spiders or have them identified by a "credible" source, and upon further investigation, the spiders actually seen turned out to be wolf spiders or grass spiders.

It is important when dealing with dangerous spider cases that the exact species involved be investigated. A lot of different factors may cause symptoms that are diagnosed as a "spider" bite, and physicians are often quick to blame spiders in the absence of other clues. Such occurrences generate panicked and upset customers who demand action. Yet, if the "feared" spider species is not actually present, whose time and effort get wasted?

Always take the time to find and identify whether dangerous spiders are actually present in or around the building in question. For brown recluse and yellow sac spiders, the placement of numerous insect monitoring traps is the best course of action. Left out several nights, these traps will reveal whether such spiders are present. Male and immature hobo spiders will also wander into monitoring traps.

For web-building spiders, such as the black widow and the hobo spider, one has to look for the webs, and from there, find the females residing within them. Both spiders tend to construct their webs near ground level and usually in some type of sheltered location. Black widows spin scaffold-type webs in which they hang upside down. A hobo spider's web consists of a flat, horizontal sheet at the one end of which a funnel is located. The funnel often disappears into a hole in the wall or into a hole in the wall or into a large crack, such as that formed

by two closely placed boxes.

Yellow sac spiders spin ½-inch long silken retreats that are usually located in corners, especially at the ceiling/wall juncture, and beneath furniture. Once the presence of dangerous species has been confirmed within the home or building, steps can then be implemented to eliminate, where possible, the infestation. (In cases involving brown recluse spiders, total elimination is often not possible, especially in older structures and in homes with cedar shake roofs.)

**COMMON CONTROL PROBLEMS.** Certain procedures are useful in controlling the most dangerous spider species. As with most pests that invade from the exterior, achieving long-term relief from infestations of these spiders requires a focus on the outside of the building.

As much potential harborage as possible needs to be removed from next to and near the foundation. Such efforts should extend to all parts of the property where possible.

Heavy vegetation, especially ground covers, plays a role in attracting the insects used as food by the spiders. Clutter, formed by piles of items or debris, provides the shelter desired by species such as the brown recluse, black widow and hobo spiders. When searching for black widow spiders around buildings, the author has found that these spiders will mostly be found in association with firewood and piles of items. Vegetation lying against foundations or landscape timbers also provides a protected site for black widows. Eliminating piles of lumber, bricks and debris limits the number of sites dangerous spiders can use. Firewood should also be moved away from the home and stacked off the ground. Always wear heavy gloves when moving items to inspect for spiders.

Cracks and holes in the building's exterior need to be sealed. Even cracks up to the roofline need to

(Continued on page 20)

(Egg-legged...Continued from page 19)

be sealed, particularly when the brown recluse spider is involved. Weep holes, when present, should have screening pushed inside them to prevent spiders and larger insects from entering. Exterior lights should be changed to sodium vapor lamps (commercial buildings) or yellow "bug" lights (homes) to attract fewer flying insects.

Vacuuming is important for removing spiders, webs and egg sacs. This technique is especially beneficial for web-builders, such as the hobo and black widow spiders. A vacuum is very handy for removing brown recluse spiders as they are uncovered during inspection, such as from inside boxes, behind furniture or beneath attic insulation. Care should be taken when removing the vacuum bag for disposal.

Placement of monitoring traps is critical in cases where the brown recluse, yellow sac or hobo spider is involved. These should be located along walls in protected sites. Spot treatments are applied to web-building sites, particularly on the building exterior. Such treatments are also useful when applied to the floor/wall juncture behind furniture and other items in areas where brown recluse spiders are active. Microencapsulated pyrethroids (e.g. Demand CS) seem to be especially effective against spiders; however, wettable powder formulations will also work. Perimeter treatments are often necessary where the threat of spider reinfestation is possible. These may need to be regularly reapplied.

**SPECIFIC CONTROL PROCEDURES.** The following details procedures that are used for each type of dangerous spider that may be encountered:

*Brown Recluse Spiders*

1. Confirm that brown recluse spiders are actually involved by examining a specimen provided by the customer or by placing monitoring traps.
2. All cracks behind baseboards, window and door frames, inside furniture, beneath and between cabinets, etc., should be lightly treated with a dust

insecticide, such as Drione or DeltaDust.

3. All electric outlet and switch plates should be removed and the wall void behind treated with a dust insecticide.
4. All plumbing voids need to be treated with a dust insecticide.
5. In the attic, insulation should be lifted to check for spiders. Any found should be removed by vacuuming. The area under the insulation where spiders are active should be treated with dust insecticide.
6. Prior to the service, the customer should be instructed to remove all boxes from the attic, garage and/or basement, take them to the driveway and go through them. Spiders found should be vacuumed. If the customer prefers not to do this, then the professional should include a cost for doing so in the price of the service. Once the boxes have been searched, they should have all openings securely sealed with tape to prevent spiders from re-entering the boxes.
7. In basements, crawlspaces and/or the garage, all accessible cracks and voids should be treated with dust insecticide.
8. Spot treatments can be applied to floor/wall junctures in all areas where spiders may be active.
9. As many monitoring traps as possible should be placed in all areas of activity. You cannot use too many traps because each spider captured is one that cannot bite someone.
10. Outside, all exterior cracks should be treated with a dust insecticide. For moderately to severely infested structures with brick veneer and weep holes, it may be necessary to drill through the brick veneer around the perimeter of the building and treat the void behind. A dust insecticide can be used; however, better penetration may be possible using Conquer and Kicker

(Continued on page 21)

(Egg-legged...Continued from page 20)

applied using an Actisol or Micro-Injector machine. In addition, a perimeter treatment may need to be applied where the threat of reinfestation is possible.

#### *Yellow Sac Spiders*

1. Confirm that yellow sac spiders are actually involved by examining a specimen provided by the customer or by placing monitoring traps.
2. Inspect corners and under furniture for the silken retreats used by these spiders. Remove these by scraping and vacuuming.
3. Spot treatments can be applied to floor/wall and ceiling/wall junctures in all areas where spiders may be active.
4. Numerous monitoring traps should be placed in all areas of activity.
5. Outside, all exterior cracks should be treated with a dust insecticide. A perimeter treatment may need to be applied where the threat of reinfestation is possible.

#### *Hobo Spiders*

1. Confirm that hobo spiders are actually involved by examining a specimen provided by the customer or by placing monitoring traps.
2. Search for the flat webs with a funnel at one end that may be present under furniture, in the garage, basement and/or crawlspace. Remove these by vacuuming. Remember that a hobo spider's web often has the funnel located into a hole in the wall or some other opening, such as that formed by boxes stopped close together. In such cases, the spider might escape back in the void or between the boxes. Be sure to treat inside the void with a dust insecticide or to move boxes, etc., to find and kill the spider.
3. In basements, crawlspaces and/or garages, all accessible large cracks and voids should be treated with dust insecticide.

4. Spot treatments can be applied to floor/wall junctures in all areas where spiders may be active.

5. As many monitoring traps as possible should be placed in all areas of activity.

6. Outside, all exterior cracks should be treated with a dust insecticide. For moderately to severely infested structures with brick veneer and weep holes, it may be necessary to drill through the brick veneer around the perimeter of the building and treat the void behind. A dust insecticide can be used; however, better penetration may be possible using Conquer and Kicker applied using an Actisol or Micro-Injector machine. In addition, a perimeter treatment may need to be applied where the threat of reinfestation is possible.

#### *Black Widow Spiders*

1. Confirm that black widow spiders are actually involved by examining a specimen provided by the customer or by searching for a spider in its web.
2. Find and remove as many spiders, their webs and egg sacs as possible using a vacuum. Be sure to wear heavy gloves when moving items under which spiders might be residing.
3. Spot treatments can be applied to corners and other potential web-building sites where spiders may be active, especially in the garage and basement.
4. In crawlspaces, a space treatment can be applied to kill as many spiders as possible. Be sure to close all foundation vents and to extinguish the furnace pilot light if it is located there. A dust insecticide may also be applied to the sill plate areas and other sites in the crawlspace where spiders are seen.
5. Outside, a microencapsulated or wettable powder pyrethroid works well as a spot treat to potential web-building sites. In addition, all items around and under which spiders might reside should be inspected and the spiders treated directly.

## IN THE NEWS.....

### **Dwelling Explodes, Bugs Live 18 Insect Bombs Destroy Apartment During Attempt To Eliminate Roaches**

Joe Hughes  
UNION-TRIBUNE, San Diego/12 April 2001  
Submitted by LT Tracy Negus, MSC, USNR-EPMU5

The cockroaches survived, but a small 34<sup>th</sup> Street apartment was blown apart yesterday when residents fed up with an infestation set off 18 bug bombs.

A pilot light in the 700-square-foot apartment ignited the fumes and led to an explosion that ripped open the ceiling, shattered windows and tore cabinets from kitchen walls.

Fire officials said residents were lucky they weren't injured. Three residents were in a bedroom when the 8:09 am blast occurred near Monroe Avenue in Normal Heights. (PEST NOTES: Isn't the street name quite ironic?)

"What may have saved the lives or serious injury was the door to the bedroom," said San Diego Fire Department Engineer Dean Cherry. "It was closed, which shielded people inside from the force of the blast."

Residents said they didn't know what was going on. (PEST NOTES: Why isn't that hard to believe?)

"I was half a sleep and heard this loud 'bang, bang!'" said Endo Beneberu, 17. "That got me awake."

The cockroaches didn't appear to be bugged by the blast.

"Some of them are special, I guess," said Beneberu, looking at the roaches still crawling in what was left of his apartment, which officials condemned later in the day.

Beneberu said the infestation was so severe that "it got old after a while."

But Cherry said using 18 bug bombs in a 700-square-foot apartment was overkill (PEST NOTES: Apparently not.)

He warned people who are thinking about using the devices to make sure all appliances are shut off before the bombs are activated.

The Red Cross was working with the displaced residents to put them up at a motel. Damage was estimated at more than \$50,000.

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### **DDT, PCBS NOT LINKED TO BREAST CANCER WASHINGTON, DC**

Environmental News Service/May 2001

Scientists who combined data from five large breast cancer studies have found no link to the pesticide DDT or to PCBs, a widespread industrial chemical.

Both were suspect because they are chemicals in the environment with similarities to estrogen, the hormone associated with an increased risk of breast cancer.

The five studies were funded in 1993 by the National Cancer Institute and the National Institute of Environmental Health Sciences among women in the northeastern United States. None had shown a link between either DDT or PCBs and the Northeast's elevated rates of breast cancer.

But some scientists thought the studies might have been too small and that their combined data might reveal such associations, at least for some subgroups of women.

That explanation was dashed as scientists analyzing the combined data also concluded that neither exposure explains the high rates of breast cancer in the Northeast. Their results appear in today's issue of the "Journal of the National Cancer Institute."

In each of the studies, blood was drawn and tested for DDE, the major break down product of DDT, and for PCBs. DDT and PCBs were used in the U.S. until the 1970s and accumulate in the body's fatty tissues, and can be found in human blood and breast milk many years after exposures.

(Continued on page 23)

(In the news...Continued from page 22)

The women in the five studies totaled 1,400 breast cancer patients and 1,642 controls.

"We found that the combined results from these five studies do not support an association between plasma or serum concentrations of DDE and PCBs and an increased risk of breast cancer," said the principal author of the analysis, Dr. Francine Laden of Brigham and Women's Hospital.

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### **Tick-borne diseases at record levels in Minnesota**

Jill Burcum/Star Tribune May 2001

Two diseases spread by deer ticks struck a record number of Minnesotans last year, prompting state health officials to warn that it is critical for people to guard against tick bites this summer.

Doctors diagnosed 465 cases of Lyme disease in the state last year, up 64 percent from 1999. Cases of a potentially fatal but less well-known tick condition called human granulocytic ehrlichiosis (HGE) more than doubled to 79 last year.

Both diseases are transmitted by the sesame-seed-sized deer tick.

If left untreated, Lyme disease can cause heart damage, neurological problems and arthritis. Two to 3 percent of those with HGE die of complications, according to the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta.

"That's a pretty substantial increase," said Dave Neitzel, a specialist in tick-borne diseases at the state Health Department.

Dr. David Persing, a former Mayo Clinic tick researcher now with a Seattle biotechnology company, described the increase as massive.

About 12,500 cases of Lyme disease are reported each year in the United States, according to the CDC. About

1,000 cases of HGE have been reported in the United States since the disease first was reported by Duluth Dr. Johan Bakken in 1994.

National figures for both conditions aren't available for 2000, but Russell Johnson, a tick-disease expert at the University of Minnesota, said it appears that Lyme disease cases are dropping nationally. Experts are still trying to figure out why the Minnesota numbers rose. Several factors may be at work, experts said.

Because both physicians and the public are becoming more aware of tick diseases, it could be that more cases are being reported, according to Johnson and Bakken.

Another factor is that more Minnesotans are moving into wooded housing developments, Neitzel said, which explains Lyme increases in Anoka and Washington counties.

Many people spend vacations in northern and north-central Minnesota counties where the state's deer tick populations are highest.

"You got a cabin ... you got a problem," Persing said.

Some experts believe there are simply more deer ticks in Minnesota. Neitzel said last year's warm, humid conditions allowed them to thrive and reproduce in large numbers.

Another possibility is that more ticks in Minnesota are infected with the bacteria that cause Lyme disease or HGE in humans. Ticks are thought to pick up the bacteria when they feed on mice and other small mammals. The bacteria enter a person's bloodstream when a tick bites.

About 20 percent of ticks in Minnesota are infected with the Lyme bacteria, Neitzel said. In other areas of the country, particularly the Northeast, up to 50 percent of ticks are affected.

(Continued on page 24)

(In the news...Continued from page 23)

Ticks from these areas could be migrating into Minnesota by hitching a ride on a bird or another animal moving into the area, Persing said. Or, an animal carrying the Lyme or HGE bacteria could move into the area and then infect the local ticks.

"The reality is that it's all really complicated," Persing said.

The good news is that preventing tick bites is straightforward, experts said. The tips -- stay out of the brushy wooded areas ticks prefer, use tick repellent, check often for bites -- remain the same from year to year.

So have guidelines about the Lyme disease vaccine -- the CDC recommends it for people ages 15 to 70 who work or spend a significant amount of time in tick-infested areas. The vaccine, Lymerix, is widely available at clinics.

Although experts generally aren't willing to predict what the tick season will be like, the increase in disease reported last year should serve notice to Minnesotans heading into the great outdoors.

"This is a tricky business, but I haven't seen anything to indicate that this year will be different from the last," said Neitzel, noting that mid-May to mid-July is prime bite time for deer ticks.

When warm, humid weather comes, "the ticks will be out there," he said.

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### **New Borrelia Species Identified in Deer Ticks**

Reuters/May 2001

A previously unrecognized *Borrelia* species has been found in deer ticks, making it the fifth transmissible agent linked to the insect responsible for transmitting Lyme disease, according to an article from *Reuters*.

Dr. Durland Fish and colleagues, from the Yale School Of Medicine in New Haven, Connecticut, found the

organism during a routine experiment investigating transmissible agents in a tick/rodent model. The researchers observed the organism in tick nymphs that fed upon mice that were not infected with *Borrelia burgdorferi*, the Lyme disease-causing spirochete.

The unnamed organism resembles the tick-borne spirochete *Borrelia miyamotoi*, found in Japan. "We sequenced a portion of the DNA to determine what it was and it turned out to be a spirochete that is related to relapsing fever spirochetes rather than the Lyme disease spirochete," Dr. Fish noted in a statement released by Yale.

"It is not yet known if the bacteria can infect humans, but we do know that all the other organisms that this tick transmits to mice can also infect people," Dr. Fish pointed out.

Approximately 2 percent of the ticks tested in Rhode Island; Lyme, Connecticut; Westchester County, New York; and northern New Jersey harbored the newly identified organism, Dr. Fish noted. It was previously thought that *Borrelia burgdorferi* was the only spirochete carried by the tick, but the new findings indicate that up to 20% of infected ticks may carry the newly identified organism.

"None of the Lyme disease tests would detect an infection by this organism," Dr. Fish stated. "We're anxiously studying this organism to develop diagnostic techniques and to determine whether or not it infects people. If it does, it's likely that the same treatment for Lyme disease would be effective against this organism."

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### **Canker town meeting today in Miramar as state issues warrants to cut down citrus trees in Miami-Dade**

Associated Press/May 2001

As state officials prepared to hold a citrus canker town meeting at the Miramar Civic Center this morning, the Florida Department of Agriculture

(Continued on page 25)

(In the news...Continued from page 24)

gave a Miami-Dade judge 311 search warrants to be signed so state workers can resume cutting down residential citrus trees infected with the disease.

The agriculture department gave Circuit Judge Ronald Friedman the warrants Wednesday.

Last month, Friedman ruled the state needed the warrants to enter homeowners' properties in Miami-Dade because of constitutional protections against illegal searches and seizures.

Friedman ordered the tree-cutting stopped in November after attorneys for the county and North Miami filed lawsuits against the state to try to halt the campaign. The judge will hear arguments from both sides on the issue Friday.

The state wants 6,500 citrus trees in Miami-Dade and Broward counties destroyed. It says citrus canker, a disease that does not affect humans but scars fruit and causes it to fall prematurely, is a threat to its \$8 billion citrus industry.

Also Wednesday, Agriculture Commissioner Charlie Bronson called for local law enforcement authorities to work with federal agencies to keep illegal agricultural products from entering Florida. He made the comments at an agricultural crime unit seminar in Cocoa Beach.

Bronson, a former state senator who was named to his position by Gov. Jeb Bush last week, will be holding a citrus canker town meeting at the Miramar Civic Center on Thursday morning.

Bronson cited the introduction of citrus canker as an example of agricultural crime. Canker entered South Florida through plants that were illegally brought into the Miami area six years ago.

Since 1996, state and federal officials have spent \$200 million to eradicate the disease in an effort to protect Florida's \$8.5 billion citrus industry. More than 830,000 trees have been removed, mostly from homes.

## Bees lock up invaders and throw away the key

James Randerson/New Scientist May 2001

African honeybees have devised a bizarre but highly effective tactic for dealing with unwanted guests-- they lock them up in prison cells inside their hives. This penal policy keeps a lid on the parasites and, if necessary, buys the colony time to escape.

Peter Neumann of the University of Halle-Wittenberg in Germany and colleagues studied how bees in South Africa defend themselves against the small hive beetle *Aethina tumida*, which is about half the size of a bee. The beetle raids the bees' food reserves and eats their larvae.

The beetle is "built like a tank", and the bees have little success tackling invaders directly, says Neumann. Instead, they literally imprison the beetles in small cracks within the hive, a tactic involving sophisticated teamwork called "social encapsulation". "While some bees build the prison, others continuously guard the beetles to prevent escape," says Neumann. The jailhouse is made from tree-resin collected by the bees, and building can take up to four days.

Hive beetles are rarely a serious threat to African honeybees because they deal with them so efficiently. In one instance, Neumann found that a colony of bees managed to imprison over 200 beetles, although the colony did eventually abandon its nest after the heavy infestation. The results will be published in a future issue of *Naturwissenschaften*.

In the US, however, honeybees are at the mercy of the beetle invaders, which were accidentally introduced to the country 3 to 5 years ago. "It has become a major honeybee pest in the US," says Neumann. "Once colonies from European stock are infested they are basically doomed, because these bees lack the behavioral resistance mechanisms of African honeybees."

## On The Web

### Giant Insects

A collection of large insects, including an 11- inch long winged walking stick, and a New Guinea Katydid with a 9- inch wingspan. One can only imagine how spectacular the creatures would look in flight. The photos are large as well, and nicely done. Elsewhere on the site are an assortment of morpho and other butterflies and a selection of moths, some enormous, some not. Under the heading of not-so-giant insects, you will find the frog-legged beetles of the family Sagrinae from Thailand.

<http://community-2.webtv.net/bugguy2/GIANTINSECTS/>

### [Stein's Virtual Insectary](#)

Kenneth Stein is an entomologist at Virginia Tech. His virtual insectary provides pictures of common insects and includes information on the foods they eat as well as the habitats where they can be found, so you know where not to go if you want to avoid them. Splendid for those with a penchant for creepy crawlies. One to miss if you don't like the look of our grubby friends with the exoskeletons.

Some lovely photography by Stein himself.

<http://fbox.vt.edu:10021/forestry/wildlife/stein/insects.html>

### [Myrmecology](#)

Ants are marvelous creatures - they are farmers, hunters, collectors and sometimes even slaves. They operate in social groups with up to a million members and build huge underground nests out of leaves or even their own bodies. From nest building and the different nest types to foraging most aspects of the ant's life is covered here and, as the main activity of the myrmecologist is to observe ants in the open countryside, advice on observation given.

<http://www.myrmecology.org/>

## Vector-borne Disease Of The Month

CDC Health Information

### Health Information for Travelers to Tropical South America

**Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Venezuela**

Currently, there is increased yellow fever activity in Brazil in the states of Minas Gerais, Rondonia, Goias, and Bahaia. For more information and recommendations, see the following websites:

- [Yellow Fever Disease and Vaccine Information](#)
- [World Health Organization Disease Outbreak News](#)

Food and waterborne diseases are the number one cause of illness in travelers. [Travelers' diarrhea](#) can be caused by viruses, bacteria, or parasites, which are found universally throughout the region and can contaminate food or water. Infections may cause diarrhea and vomiting (*E. coli*, *Salmonella*, *cholera*, and parasites), fever ([typhoid fever](#) and toxoplasmosis), or liver damage (hepatitis). Make sure your food and drinking water are safe ([see below](#)).

[Malaria](#) is a preventable infection that can be fatal if left untreated. Prevent infection by taking [prescription antimalarial drugs](#) and protecting yourself against mosquito bites (see next page). Malaria risk in this region exists in some urban and many rural areas, depending on elevation. For additional information on malaria risk and prevention, see [Malaria Information for Travelers to Tropical South America](#).

A certificate of [yellow fever](#) vaccination may be **required** for entry into certain of these countries.

For detailed information, see [Comprehensive Yellow Fever Vaccination Requirements](#).

(Continued on page 27)

(Vector-borne disease...Continued from page 26)

If you visit the Andes Mountains, ascend gradually to allow time for your body to adjust to the high altitude, which can cause insomnia, headaches, nausea, and altitude sickness. In addition, use sunblock rated at least 15 SPF, because the risk of sunburn is greater at high altitudes.

[Dengue](#), [filariasis](#), [leishmaniasis](#), [onchocerciasis](#), and [American trypanosomiasis \(Chagas disease\)](#) are other diseases carried by insects that also occur in this region. Protecting yourself against insect bites ([see below](#)) will help to prevent these diseases.

**CDC recommends the following vaccines (as appropriate for age):**

See your doctor at least 4–6 weeks before your trip to allow time for immunizations to take effect.

- [Hepatitis A or immune globulin \(IG\)](#).
- [Hepatitis B](#), if you might be exposed to blood (for example, health-care workers), have sexual contact with the local population, stay >6 months in the region, or be exposed through medical treatment.
- [Rabies](#), if you might be exposed to wild or domestic animals through your work or recreation.
- [Typhoid](#), particularly if you are visiting developing countries in this region.
- [Yellow fever](#) vaccination, if you will be traveling outside urban areas.
- As needed, booster doses for [tetanus-diphtheria](#) and [measles](#). [Hepatitis B](#) vaccine is now recommended for all infants and for children ages 11–12 years who did not complete the series as infants.

**To stay healthy, do...**

-Wash hands frequently with soap and water.

- Drink only bottled or boiled water, or carbonated (bubbly) drinks in cans or bottles. Avoid tap water, fountain drinks, and ice cubes. If this is not possible, make water safer by BOTH filtering through an “absolute 1-micron or less” filter AND adding iodine tablets to the filtered water. “Absolute 1-micron filters” are found in camping/outdoor supply stores.

- Eat only thoroughly cooked food or fruits and vegetables you have peeled yourself. Remember: **boil it, cook it, peel it, or forget it.**
- If you will be visiting an area where there is risk for [malaria](#), take your [malaria prevention medication](#) before, during, and after travel, as directed. (See your doctor for a prescription.)
- Protect yourself from insects by remaining in well-screened areas, using repellents (applied sparingly at  $\geq 4$ -hour intervals) and permethrin-impregnated mosquito nets, and wearing long-sleeved shirts and long pants from dusk through dawn.
- To prevent fungal and parasitic infections, keep feet clean and dry, and do not go barefoot.
- Always use condoms to reduce the risk of HIV and other sexually transmitted diseases.

**To avoid getting sick...**

- Don't eat food purchased from street vendors.
- Don't drink beverages with ice.
- Don't eat dairy products unless you know they have been pasteurized.
- Don't share needles with anyone.
- Don't handle animals (especially monkeys, dogs, and cats), to avoid bites and serious diseases (including [rabies](#) and [plague](#)). (For more information, please see the [Animal-Associated Hazards](#) on the [Making Travel Safe](#) page.)
- Don't swim in fresh water. Salt water is usually safer. (For more information, please see the [Swimming Precautions](#) on the [Making Travel Safe](#) page.)

(Continued on page 28)

(Vector-borne disease...Continued from page 27)

**What you need to bring with you:**

- Long-sleeved shirt and long pants to wear while outside whenever possible, to prevent illnesses carried by insects (e.g., [malaria](#), [dengue](#), [filariasis](#), [leishmaniasis](#), and [onchocerciasis](#)).
- Insect repellent containing DEET (diethylmethytluamide), in 30%–35% strength for adults and 6%–10% for children, as well as a bed net impregnated with the insecticide permethrin. (Bed nets can be purchased in camping or military supply stores.) Bed nets may also protect against insect bites that transmit [Chagas disease](#).
- Over-the-counter antidiarrheal medicine to take if you have diarrhea.
- Iodine tablets and water filters to purify water if bottled water is not available. See [Do's](#) above for more detailed information about water filters.
- [Sunblock](#), [sunglasses](#), [hat](#).
- Prescription medications: make sure you have enough to last during your trip, as well as a copy of the prescription(s).
- 

**After you return home:**

If you have visited a malaria-risk area, continue taking your antimalarial drug for 4 weeks (chloroquine, Lariam®, doxycycline) or seven days (Malarone™) after leaving the risk area. Travelers who become ill with a fever or flu-like illness while traveling in a malaria-risk area and up to 1 year after returning home should seek prompt medical attention and should tell the physician their travel history.

**Parting Shots.....**

That's all for now. Remember we are here to address your pest management concerns. Give us a call at DSN 686-8122, commercial (510) 337-8122 or drop us a line at paa5245@exmail.dscp.dla.mil.

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**Pests of the Month**

See if you can identify the following pests. Last month's pests: A) Pigeon, B) Warehouse beetle, C) Red-legged ham beetle.

