Pest Notes

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"The Dirty Dozen, Plus"

Medically important arthropod groups

To start off the New Year right (at least in our opinion), we have put together a short quiz. Ready? O.K. What do malaria, West Nile virus, eastern equine encephalitis, plague, Rocky Mountain spotted fever, ehrlichiosis, and Lyme disease have in common?

A) They have catchy names.

B) They sound really disgusting.

C) All are vectored by arthropods.

D) Nothing

If you answered C, congratulations. If not, the following PCT-Online article by Dr. Jerome Goddard will help you review. Remember, although the majority of arthropod pests you will encounter are considered merely annoying to humans, a few medically important groups require accurate identification and successful management.

Most Wanted

I'm in a little different line of work than most of the readers of this magazine. Instead of termite and pest control issues, I deal with human health issues--whether or not someone will get sick or die from exposure to an insect, spider, tick or mite. Although morbid and sometimes disgusting, the area of public health entomology is quite fascinating. It's hard to believe that a tiny tick (about the size of your fingernail) can kill a 200-pound adult! It's the same for a tiny mosquito or flea. It certainly makes you respect (or maybe fear?) the little creatures. I have personally seen an adult human in a severe medical crisis due to two--only two--fire ant stings. He could have easily died without treatment. Fire ants are so small that they surely can't inject much venom--maybe a hundredth of

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"Well We're Movin' On Up, To The East Side....."

Effective rodent management in urban/suburban areas

While commensal rodents have shared resources with humans in rural and urban settings throughout history, interaction in suburban areas has often been limited. However, recently (past 20 years), requests for rodent management services have increased in suburban areas primarily due to an expanding resource base. Therefore, developing an effective rodent management program becomes exceedingly important to reduce facility and product damage as well as potential disease transmission in suburban areas.

The following PCT-Online article by Dr. Bruce Colvin, reviews the factors which encourage rodent infestations and discusses the components of a successful management program. If you are experiencing rodent problems, give us a call. We would be happy to assist you in developing an effective program for your particular situation.

Strategies For Urban Rodent Control

Urban and suburban rodent problems appear to be increasing nationwide and business owners, residents and politicians are all wondering why. There are several contributing factors: infrastructure is aging, the number of food establishments (restaurants) is increasing, congestion is becoming greater, refuse containment commonly is inadequate (plastic bags) and urban sprawl is occurring at a rapid rate. At the same time, leadership and funding for commensal rodent control has been declining for 20 years.

Commensal rodents are "indicator species" of environmental integrity or decay. Their presence reflects a quality-of-life issue that can be described in terms of economics, public health or aesthetics. However, the focus should not be on the existence of the rat or mouse, but rather why the rodent exists at the

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a drop-- yet they can kill a person with a venom allergy.

But not all arthropods are dangerous. Only a few species can be considered harmful to human health. Most are harmless and are extremely important in the food chain and "web of life." So, we don't need to adopt a "the only good bug is a dead bug" attitude. Instead, we should learn which species are harmful and target control efforts only toward them. Below is an annotated list of arthropods I would consider the "most wanted" list, ranked roughly from most important to the least important. It only concerns arthropod pests (no rodents or birds) in the United States and should not be considered to be exhaustive or conclusive. Since the list is restricted to the United States, some of the most famous disease vectors are obviously absent--such as tsetse flies and kissing bugs (kissing bugs do occur in the southern United States, but apparently are not often responsible for cases of Chagas' disease like they are in Mexico and Central America). In addition, lice and scabies mites are omitted because they constitute a medical problem and generally do not fall within the realm of the pest control industry. PCOs should take their time to familiarize themselves with the following pests and current strategies for their control.

Ticks

The deer tick, *Ixodes scapularis,* is notorious as a vector of Lyme disease, ehrlichiosis and babesiosis in the eastern United States. Making matters worse, this species has been found to be infected with more than one of these disease agents at the same time. Theoretically, you could be bitten by this tick and get all three diseases.

The American dog tick, *Dermacentor variabilis*, is the main vector of Rocky Mountain spotted fever (RMSF) in the central and eastern United States. These ticks are also known to carry the agent of tularemia and to cause tick paralysis in pets and humans.

The Rocky Mountain wood tick, *Dermacentor andersoni*, is known to transmit RMSF in the western states as well as Colorado tick fever.

The brown dog tick, *Rhipicephalus sanguineus*, although probably not involved in disease transmission in the United States, is often found both indoors and outdoors at residences with pet dogs. I have seen literally thousands of these nuisance ticks inside homes, characteristically crawling up the walls.

Mosquitoes

The house mosquito, *Culex pipiens* (including the southern United States form *C. quinquefasciatus)*, is a major vector of encephalitis viruses, such as St. Louis encephalitis and the new West Nile encephalitis, in the United States.

The encephalitis mosquito, *Culex tarsalis*, is an abundant and widespread species throughout the western United States that is known to be a vector of western equine encephalitis and St. Louis encephalitis.

The Asian tiger mosquito*, Aedes albopictus*, although not currently thought to be involved in disease transmission in the United States, is one of the most abundant and annoying urban mosquitoes. In infested areas, literally hundreds of these mosquitoes swarm you during the daytime, biting relentlessly.

Salt marsh mosquitoes (several species), notorious for their nuisance effects and long migratory flights, pose a tremendous pest problem along the United States coasts. Without organized mosquito control (and sometimes even with it!) outdoor activity along vast areas of seacoasts becomes unbearable.

Fleas

The cat flea, *Ctenocephalides felis*, although only rarely involved in disease transmission in the United States, is notorious as a nuisance and fierce biter, causing many thousands of cases of skin rashes and infections (resulting from scratching). It is probably the most common flea encountered by PCOs.

The Oriental rat flea, *Xenopsylla cheopis*, is the famous flea vector of bubonic plague (plague still occurs in the western United States) and also transmits murine typhus organisms in parts of south Texas and Southern California. It is primarily associated with rats.

Spiders

The brown recluse spider, Loxosceles reclusa, and related species, are notorious for causing necrotic skin lesions. Spots of rotting out human tissue are caused by the spider's venom.

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Depending upon several factors, these spots can range from the size of a dime to the size of a pie plate.

The black widow, *Latrodectus mactans* and other related "widow" spiders-- are known to cause severe systemic illness in humans due to the neurological effects of their venom. People only rarely die from widow spider bites, but may experience severe pain, nausea, vomiting, chills, sweats and muscle cramps.

Yellowjackets

Of the stinging insects, yellowjackets (several species in at least three genera) are perhaps the most notorious offenders, causing multiple painful stings and sometimes allergic reactions. Yellowjackets generally nest underground and will fly out aggressively pursuing anyone or anything disturbing their nest.

Cockroaches

The German cockroach, *Blatella germanica*, is probably the most important overall pest in human habitats worldwide. This cockroach has an extremely short period from hatching until sexual maturity, leading to a high reproductive potential. Although German cockroaches don't bite or sting (occasionally cockroaches feebly bite or nibble, but generally to no ill effect), they are responsible for contaminating food and food processing areas. They also are increasingly being implicated as a cause of allergy and asthma.

The American cockroach, *Periplaneta americana,* is a large, common species in the warmer regions of the United States. It is common in urban alleys and sewer/drain systems. This species is a frequent culprit in contaminating food and food-processing areas.

The smoky-brown cockroach, *Periplaneta fuliginosa*, surpasses the American cockroach as a peridomestic pest in much of the southern United States. These cockroaches live outside, feeding on vegetation and other organic matter, but enter homes and food establishments freely.

Fire Ants

The imported fire ant, *Solenopsis invicta*, is famous for boiling out of earthen mounds and stinging aggressively. In addition to a painful sting, some people are highly allergic to fire ant venom. Fire ants have increasingly been reported to enter buildings, stinging inhabitants. They now inhabit more than 300 million acres in at least 13 states.

Flies

Biting midges (many species), also known as no-see-ums, punkies or biting gnats, are generally not involved in disease transmission, but are vicious and persistent biters. These tiny, almost invisible gnats often make outdoor activity on the coast impossible.

The housefly, *Musca domestica*, and related filth fly species, are famous for both nuisance effects and contamination of food and food processing areas. Flies may carry disease germs on their mouthparts, body hairs or sticky pads of their feet.

Black flies (many species) occur in enormous swarms mostly in the northern U.S. Their bites may bleed profusely and even sometimes cause an overall reaction consisting of itching, burning, fever and inflamed lymph nodes.

Horse and deer flies (many species) can be extremely annoying to people in the outdoors during summer months. Their scissors-like mouthparts inflict painful bites.

The stable fly, *Stomoxys calcitrans*, is a fierce people-biter year round, but especially on the Gulf Coast in the fall. This fly looks similar to the housefly, though it is more robust and had piercing, rather than sponging, mouthparts.

SIDE BAR: OPINION

Could We Have Changed History?

PCT-Online
Dr. Richard Kramer

Arthropods (bugs) have been associated with disease since the beginning of recorded time and have had a profound effect on shaping world history. The oldest and perhaps most well-known sequence of ecological events involving pests and disease were the 10 plagues of Egypt and the survival of the Israelites who were led by Moses in the desert for 40 years.

First Plague--Blood. That the Nile River ran red, like blood, has two possible explanations: washing of red sand into the river along its upper origin or the red protozoa known today as the red tide. In either case, the water was unfit to drink and the oxygen in the water was severely diminished, causing massive fish

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kills. This probably led to hordes of flies that exploited the situation in little more than a week.

Second Plague--Frogs. The plague of frogs was probably the result of water being unfit for habitation. Eventually, without a place to live and breed, massive numbers of frogs died on the land, leading to more flies.

Third Plague--Lice (or Mosquitoes). Scholars are split on whether it was lice or mosquitoes that caused the third plague. Both were present in Egypt and the consequence of either being present in large numbers is equally devastating. Body lice are known vectors of epidemic typhus and the inability of people to properly bathe and launder clothing could have led to significant mortality rates. Considering the water conditions with large amounts of organic matter, *Aedes aegypti* mosquitoes were probably present in large numbers and could have been involved in the transmission of yellow fever, another disease with high mortality rates.

Fourth Plague--Flies. Many believe that the fourth plague was flies, which included house flies, blow flies, flesh flies, stable flies and many other species of filth-breeding flies that took advantage of the decaying fish, frogs and by this time, human corpses. Today, scientists are aware of the many diseases carried by flies and how they contaminate food, water, wounds, etc. by walking, vomiting and defecating on these surfaces. Moses' intuitive nature probably saved the Israelites from this plague by moving them away from this area of Egypt and instructing the people to thoroughly roast meat and to burn all that was not consumed.

Fifth Plague--Anthrax. This is a serious fly-borne disease that can cause significant mortality in domestic animals, e.g., sheep, cattle, camels, etc.

Sixth Plague--Boils. The anthrax being spread among domestic animals subsequently was spread by flies to the human population.

Seventh Plague--Hail and Lightening. In addition to killing people and animals, this initiated the physical destruction of the crops and the beginning of starvation among the survivors.

Eighth Plague--Locusts. Hordes of migratory locusts descended on the remaining crops and devoured them.

Ninth Plague--Shutting Off the Light of the Sun and Moon. The swarms of locusts were so huge that they literally darkened the skies, causing a wave of panic.

Tenth Plague--Death of the Egyptians. The catastrophic consequences of all these events were high mortality rates among the Egyptians. Besides starvation the most plausible explanation for the high mortality rates are dysentery, cholera, typhus and yellow fever--all insect-borne diseases.

The black death or plague has been the scourge of humankind since before the beginning of the Christian era. This bacterial disease is transmitted from rodents to humans through flea bites. The first great plagues occurred between 430 B.C.E. and 690 A.C. The second plague pandemic occurred between 1050 and 1200 A.C. This episode affected parts of Asia, Africa and Europe. In Europe, more than 25 million people died- one quarter of the population. This led Europe into the despair of the Middle Ages. The plague destroyed entire cities and all trade was brought to a halt. One more major outbreak of plague would devastate the world from 1346-1349 and it is estimated that this plague pandemic killed more people than the casualties of World Wars I and II combined.

Napoleon Bonaparte suffered two major defeats as the result of arthropod-borne diseases that undoubtedly changed the course of history. In 1802, yellow fever, a mosquito-borne disease, decimated Napoleon's fleet and troops that landed in Haiti and attempted to force the native islanders into submission. The French intended to use Haiti as their base of operations to support colonization of Louisiana. The disease caused significant losses and the armada sailed back to France, abandoning thoughts of occupying Louisiana.

Ten years later, in June 1812, Napoleon set his sights on Russia. He began this conquest with more than 420,000 men. By December the force consisted of 3,400 men. His forces obviously suffered the casualties of combat, but more significant losses were the result of starvation, cold and louse-borne typhus. The latter was suspected to be the major cause of Napoleon's defeat in Russia, however, this disease was not actually identified for another 100 years.

These diseases have changed history and while many of them are not as problematic as they were in days gone by, new diseases, are filling their niche.

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particular location. Such an assessment begins the process of shifting from a reactionary approach to a proactive (preventive) approach.

Today in the United States, rodent control at the municipal level typically consists of an assortment of efforts by pest control companies, municipal workers and homeowners. If a municipality has a program, it generally is implemented in a limited or disjointed (piecemeal) fashion and commonly without effective staffing, planning, funding or technical skills. The goals when designing an effective rodent control program is to establish a comprehensive and sustainable plan. Municipalities (and others) commonly focus on short-term (political "quick-fix") efforts without looking forward and thus remain in a cyclical pattern of intensive efforts followed by inattention. Within a few weeks or months of reduced efforts, rat outbreaks can occur and municipalities (or building owners) once again respond in a reactionary way. Over time, this cyclical approach is expensive, inefficient and reduces the ability to sustain public participation. Programs that focus solely on poison baiting or trapping, or that are implemented for political reasons, are destined to waste money and fail.

HISTORY. The future success of rodent control can be best assured by understanding the history and politics of it. The "Modern Rodent Control Era" began with World War II, since there was concern about food protection and urban destruction. Research in the 1940s was centered at Johns Hopkins University in Baltimore, led by Dr. David E. Davis. That team of researchers evaluated and documented for the first time numerous aspects of the behavior and ecology or Norway rats (*Rattus norvegicus*). Work by Davis and his colleagues subsequently became the foundation for future rodent control programs and strategies worldwide.

By the late 1950s, the research program at Johns Hopkins University had ended; however, the important principles of rodent control and rat behavior had been established. For example, the researchers were able to show that rat populations grew at a relatively predictable rate, following a logistical growth curve (a sigmoid or s-shaped curve). Understanding of that mathematical expression could be used to help strategically manage rodent control programs.

The sigmoid curve shows how populations change in size over time. The rate of population change is initially slow but becomes rapid once the population passes an inflection point in the growth curve. Population growth then slows (plateaus) as the population reaches carrying capacity, which is the maximum number of animals that can be supported by available food and harborage. When carrying capacity is lowered through good sanitation practices, the rate of population growth is slowed, the s-curve flattens and opportunity to manage the rodent population is greatly improved.

Davis sought to demonstrate these principles in the field. Rat numbers were monitored in a Baltimore neighborhood during poisoning campaigns in 1943-47 and subsequently during an intensive sanitation program in 1947-50. Numbers were substantially lower during the sanitation period, except in late 1948, apparently because of a strike by refuse workers. The results demonstrated that rat populations could be managed through habitat modification.

After the Johns Hopkins program ended, Dr. William Jackson, a student of Dr. Davis, continued the legacy of research at Bowling Green State University in Ohio. During the 1960s to 1980s, that work included rodent behavior but also rodenticide development, genetic research to anticoagulants and other technical aspects of rodent control.

During that same time period the federal government was actively involved supporting research, developing education and training materials and providing millions of dollars annually to municipalities for control programs. For example, Washington, D.C. alone received $1.1 million in 1968. However, by the mid-1980s, federal involvement and technical leadership ended and municipalities were left on own to deal with the problem. At about the same time, the research program at Bowling Green State University (and a parallel one at the University of California, Davis) ended with faculty retirements.

Today, most states and municipalities have limited understanding of commensal rodent control or expertise in program development. Unfortunately, it is rare to find a mammalogist interested in commensal rodents or urban environments, and thus by default, entomologists commonly have become sources of information. University research and federal leadership in the United States is largely non-existent at this time.

STRATEGY. The term "strategy," when used in context of pest control, should commit the user to a comprehensive or holistic approach that is tailored to

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the particular situation. It also reflects the intent to win. A dictionary definition of strategy reads: "the science and art of employing the political, economic, psychological and technical resources to meet an enemy in combat with the greatest advantage." At the same time that a pest control program must have a strategy, realize that rodents have a "life-history strategy" that is a combination of behaviors and traits that allow them to leave offspring (genetically succeed). The program strategy must be designed and implemented to overcome that life-history strategy (high reproductive rate, adaptive behaviors, colonizing ability), while using more than just technical resources.

In wildlife management for game species, the strategy is to sustain (conserve) the population while implementing annual harvesting through hunting/trapping. Habitats are protected or enhanced as part of game management. In contrast, rodent control is not about establishing a sustainable yield of animals. It is about sustainable reduction in rodent numbers through elimination (destruction) of habitat features that are important to commensal rats and mice. Many rodent control programs are simply a haphazard harvesting of the "standing crop" of rodents, just as a farmer harvests a hay crop multiple times each year.

It is most economical (and strategic) to manage a rodent population at the low end of the sigmoid curve under reduced carrying capacity. At the low end of the curve, a population shows modest change over time. In contrast, the population can increase rapidly during the same amount of time farther along the growth curve. Simply stated, it is much more work to control a rodent population once it is reproducing at the rate reflected by the steep part of the sigmoid curve. Intensive monitoring for rodent activity and continued environmental management when a population is low is the best economic strategy for minimizing rodent impacts and long-term costs.

Many efforts to control rodents simply reduce the population from carrying capacity to a level at the mid-point of the sigmoid curve. The extra efforts to solve the problem are not deployed, assuring a wasted use of resources. The population begins a rapid reproductive surge under reduced competition and may actually reach numbers greater than before, within three to six months.

PROGRAMS. Rodent control is a topic that requires broad understanding of urban and suburban complexities. This includes the behavior or people; aesthetic and economic aspects of rodent impacts; political agendas; engineering and repair of infrastructure; codes and regulations; and sanitation measures.

The urban-suburban gradient is becoming increasingly blurred as suburbia of the 1950s ages and is engulfed by urbanization. The primary difference between urban and suburban rodent control is the intensity resulting from differences in the abundance of structures (buildings, utilities) and human population density (sanitation issues). The basic program elements, however, apply to both environments.

For any program, whether a single location or an entire city, there must be an "action plan" with an inherent IPM strategy. The plan must be flexible and be designed to solve the problem rather than to delay its resurgence. The primary focus must be on communication, partnering, teamwork and scheduling rather than blame casting.

The key to an effective municipal program is centralized management, leadership and accountability. Work tasks must be defined, contract specifications written, competent and skilled personnel hired and administrative principles established. Administration is rarely mentioned as a component of IPM, but it is in fact the most important aspect. The science of rodent control has been well established, however the failure of programs appears most evident because of a lack of competent administrators, training and planning.

Numerous groups and agencies must participate for a municipal program to be successful, but one group (or person) must ultimately be accountable for program coordination. Municipal participants should include the Water and Sewer Authority, Public Works Department, Parks and Recreation Department, Planning and Zoning, Community Liaisons, Food Protection Division, Housing Authority, Solid Waste Division, Health Department, Code Enforcement and others. Private industry must be a part of the extended team, including the pest control industry, waste haulers and professional associations (building managers, restaurants). Community activists and groups must be recruited and a grass-roots capability established for program sustainability.

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KEY PROGRAM ELEMENTS. There are numerous and interrelated elements of an urban (or suburban) rodent control program. Examples are described below.

-Initiate education and outreach using diverse, creative and quality (non-bureaucratic) materials to change the behavior of people. Use a marketing style and target residents and businesses. Public participation is key to management of program costs. The more the public participates, the fewer problems requiring chronic resolution and expenditures. Commensal rodent control is not a spectator sport and community outreach must be far-reaching and credible.

-Establish up-to-date codes that identify requirements for sanitary conditions and structural maintenance. Topics can include keeping residential and commercial properties free of rats and mice, debris, weeds, junk, and abandoned cars. Codes also should include proper storage and disposal of refuse, garbage and grease. There must be written procedures for enforcement, including hearings and a schedule of fines. Enforcement is the ultimate public education tools and must be implemented professionally for the program to succeed. Enforcement must include the ability to collect fines and the potential to bring criminal charges for serious offenses (e.g., illegal dumping or refusing to close a rat-infested restaurant).

-Effectively target trapping and baiting campaigns so they are complimentary to other program elements. Avoid declaring victory when a carcass is found' redirect the enthusiasm to environmental modifications and intensive monitoring that ensures population control to a non-detectable level. Widespread and random baiting alone will not achieve a sustainable result. Divide baiting into an initial strategy to achieve control and a maintenance strategy to intensely monitor and protect against re-colonization. Consider both surface and subsurface (sewers, utilities) environments.

-Enhance sanitation through education and enforcement. Ensure that refuse containers are not accessible to rats and mice and that the proper types of containers and compactors are used and properly maintained. Use neighborhood cleanup days to enlist public participation and establish the capacity to cleanup abandoned properties and lots. Inadequate containment of grease and illegal disposal of it into sewerage systems can be a major contributor to rat problems. Emphasis on the sue of grease traps and rat-proof grease containers or storage sheds must be established.

-Ensure effective inspection, monitoring and data management. Use standardized urban survey methods and mapping. A rodent control program can not be sustained or cost-effectively implemented without the ability to track events, target control resources to the need, or demonstrate accomplishments to the public and policy makers. Management of a program requires the capacity for quick assessment and adjustments to match environmental conditions. Strategic elements of a program must be integrated based on field data and predictions of population trends and future needs. A predictive (economical) program keeps resources and personnel ahead of rodent population growth and sanitation problems.

-Include infrastructure design and land-use planning as a critical front-end method of rodent control. This includes planning urban environments so they are not intrinsically conducive to rodent activity. For example, restaurants should have adequate storage space for refuse containment and a sanitation plan before being permitted to operate. Landscape designs should include rodent-proofing principles; for example, massed planting of needled evergreens should not be located near potential food sources and refuse containers and benches should not be placed next to dense shrubbery.

Construction and demolition are becoming increasingly common with aging infrastructure and urban sprawl. Major construction projects should be requires having rodent control and sanitation programs that begin before construction mobilization and that continue until construction is finished. Maintenance of sidewalks, sewerage systems and other structures is essential for rodent control and must be factored as part of a comprehensive program. This means working with engineers, architects and maintenance personnel.

CONCLUSION. The need for effective rodent control programs will become even greater in the 21st century with expectations of residents and businesses for quality-of-life improvements and effective public health management. However, substantial changes must be made in the way that programs are designed and managed, whether for a single building or an entire city

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Reactionary approaches must be replaced with proactive (preventive) programs in which environmental management is the central theme. The environmental and political arenas of the urban environment are complex and both subjects must be mastered for successful implementation of a rodent control program.

SIDEBAR:
SNAP TRAP BAITING TIPS

Having trouble with bait being stolen with no dead or captures rodents to show for your trouble? The following tips may help solve the problem.

-Make sure that rodents are the culprit taking the bait from your trap. Many times the thief is actually not a rodent; cockroaches, crickets and even ants could be making off with your bait. Try dusting the area around the trap with a non-repellent material such as flour; this will reveal footprints to identify the pest. Also, glue boards located next to your traps will capture insects and mice.

-**Are you using the correct trap?** A rat trap does not often capture a mouse, and a mouse trap will only irritate an adult rat! Make sure that your trap matches your rodent.

-**Expanded trigger snap traps catch more mice than a conventional metal trigger trap.** The expanded trigger snap traps are effective simply because the larger trigger provides a bigger surface for the rodent to step on. An expanded trigger also provides more leverage, which means it takes less pressure to spring the trap. Some traps even allow you to set the pressure of the trigger from soft to firm.

-**The ultimate bait is one that is accepted by the rodents and not easily removed from the trigger.** Try a variety of baits to find what works best in your situation. In sites where food is abundant but nesting material is scarce, soft string, cotton balls, or strips of cloth are attractive to female mice and rats. To enhance the material, try applying one or tow drops of vanilla extract as an added lure.

-**Tie the bait down to the trap or use a sticky bait, like peanut butter, that can not be carried away.** When using a sticky bait, smear a small amount on the top and bottom of the expanded trigger. Some solid baits, like cheese, marshmallows or chocolate, can be melted onto the trigger with a match. Use a piece of thread or dental floss to tie down solid baits.

Inspect your trap. Whether or not a mouse or rat gets caught depends on the sensitivity of the trigger, the size of the trigger and the speed at which the kill bar flips over. If a trap is old and slow, it can be improved by simply applying a small amount of vegetable oil or bacon grease to the spring. Do not use machine oil, as this would repel rodents. Although dirty traps that small "mousy" catch more mice, do not let your traps get so gummy that the action of the trigger or the bar is slowed down. Do not attempt to clean a filthy trap with soap and water. Not only will the soap tend to repel rats and mice, the water will warp the soft pine base of the trap, making it unstable and ineffective and rust the metal components. Once a trap becomes too gummy to use, toss it and replace with a new trap. Snap traps are not very expensive and your time is important.

MYSTERIOUS ITCHES AND BITES REQUIRE CAUTION

Pest Control Magazine, October 2000

Larry Pinto

Most pest management professionals (PMPs) have had to deal with the dreaded "mystery bug" infestation. A customer reports chronic "bug" bites or a "personal" infestation, but you can't find any pests. He or she insists that you treat the area with insecticide. You do so, but the treatment doesn't work, or else works only briefly. The customer demands re-treatment-again and again.

Repeated treatments, of course, bring their own potential problems. In fact, many government regulators consider such treatments without verification of existing pests to be illegal.

In perhaps one out of 10 mystery bug cases, pests are the problem. They were simply overlooked. The rest of the time, biting and itching is caused by environmental, medical or psychological factors. The symptoms and suffering are real, they are just caused by something other than biting pests.

Create an Action Plan

People affected by mystery bugs become desperate, angry and convincing. When faced with reports of mysterious itches, bites or delusions, but no pests are apparent, proceed with care.

1. Do not apply a pesticide unless you confirm an infestation- It may be illegal. Certain pesticides may increase skin irritation in sensitized individuals. In addition, if you treat and the problem is not pest-related, you may even provide temporary relief. This is bad, not good. The "placebo effect," for example, provides improvement in a condition simply because a person expects it. If dryness and static electricity are contributing to the bites and itches, spraying liquid insecticide might provide relief, but only for a day or so. In either case, you will be asked to treat again to maintain the improvement.

2. Make a reasonable effort to find pests that could be causing the problem- If you don't, and it turns out later that you missed an infestation, you'll feel pretty foolish. Your "negligence" may even have legal consequences.

Visually inspect the area for common biting pests, such as fleas and spiders. Also make sure that biting midges or thrips aren't flying in through damaged screens. Check windowsills and light fixtures. Inspect for bed bugs and their blood spots near bedding and drapes, as well as cracks and crevices near beds. Look for evidence of rodents, nesting birds and other wildlife that could be contributing mites, lice or fleas.

Place sticky traps by windows and doors, around the bed and in any likely areas identified by your customer. Use a lot of traps, say, a dozen or more. Ask the customer to collect pests with alcohol and cotton balls or tape.

Then, come back in a week and collect the traps and sample. Examine them with a hand lens or microscope back at the office. Do not check the sufferer's body-you are not a health care professional.

3. Provide written information on mystery bugs- There are numerous handouts and articles on the possible causes of mysterious itches and bites that are suitable for customers. In your written information, include without comment a reference to the University of California delusional parasitosis Web page at cbshome.ucdavis.edu/delusion/index.html. This site also provides analysis of samples for a fee.

4. Write a report of your findings- Document the details of your inspection and what you found. If environmental conditions might be a factor, make simple recommendations (removing an old carpet, anti-static spray, etc.) or suggest that the customer contact an environmental hygienist.

If you suspect your customer is suffering from delusional parasitosis, do not say so. Simple report your negative findings and suggest that the customer forward the copy of the report to their physician, or offer to send one yourself.

Another strategy is to tell the customer that it is company policy is cases of "personal infestations" that the report be sent directly to their personal physician. This gets a delusional parasitosis case in the hands of a health care provider, where it belongs.

Sometimes the solution to a mystery bug problem is obvious. Even so, it can be difficult to convince people that what they perceive as bug bites or infestations are not, in fact, caused by insects, mites or other pests.

Most people are at least willing to listen when you explain that environmental conditions, such as static electricity combined with synthetic fibers in the air, might be causing them to feel pin prick "bites" on their skin, or paresthesia, a sensation of prickling, tingling, or creeping on the skin. Few, however, will even entertain the though that they might be suffering from a mental disorder.

CONTROLLING SMALL FLIES

PCT-Online, October 200

Stoy Hedges

Phorid flies, fruit flies and moth flies, oh my! If you've been in the pest control industry for a while, the most frustrating hours--maybe even days-- have likely been spent attempting to solve a problem with one of these small flies. I know I have. I once spent nearly three days wandering a hospital in Houston looking for the source of the fruit flies that were appearing in a cardiac catheter unit. To make a long story short, the source turned out to be no more than 20 feet from the unit, in a forgotten trash can hidden behind a column in a corner. Have you ever had a day like that?

IDENTIFYING THE INSECTS. I'm asked a lot about small flies. The first question I always ask is, "What kind of fly is it?" Too many times, the answer I get is, "I don't know." Well, I have to know if I'm going to be able to provide useful advice to the customer.

To narrow the possible identity of the fly, a serious of questions need to be asked:

1. What color is the fly? If it's light brown it is probably a fruit fly or phorid fly.

2. Does the fly have red eyes? If so, it's a fruit fly.

3. If the eyes are not red, is the fly's thorax severely arched and the head small? If so, it is likely a phorid fly.

4. If it's a brown fly without red eyes or a severely arched thorax, are the fly's body and wings covered with hairs, looking like a small moth? If so, then a moth fly is involved.

5. If the fly is black, is it thin bodied and fairly tiny? If so, it's probably a fungus gnat.

6. Does the black fly resemble a small moth? If so, it's a moth fly.

FINDING THE SOURCE. Of course, the offending fly could be another species or type of fly, such as a cheese skipper of a sphaerocerid fly. It is always best to consult a reference like the PCT Field Guide to the Management of Structure-Infesting Flies to be sure. The identity of the fly involved is critical to finding the source(s) because the identity provides the conditions in which the fly prefers to breed. Fruit flies, phorid flies and moth flies all breed in moist, decaying organic matter.

Fruit flies are partial to freshly decaying organic matter. They are found in fresh fruits and vegetables, garbage containers, in containers holding recyclable cans and bottles and in moist food trapped under equipment, in corners or in cracks.

Phorid flies can be found in similar areas to fruit flies but typically are discovered breeding in organic materials in a more advanced state of decay. Phorid flies can breed in more types of organic matter than any other type of fly. Although most often detected in drains, debris trapped in cracks and under equipment, phorid flies will breed in dead animals, organic glues, even organically based paints! This fly is the most difficult to control because of its varied breeding habits.

Moth flies are known commonly as drain flies because they usually are found in drains. They can survive in wetter environments than other types of flies, including where water stands for an extended period of time. The key to surviving in such an environment is the presence of organic matter.

Fungus gnats may be the easiest to pinpoint--in most situations. The larvae feed on fungi and molds, usually found in overly wet soil of potted plants and atriums. In the absence of plants, the fungi providing the food source will be a water leak of some type. A good question to ask is where any leaks have been repaired in the past two years. Often, the leak is repaired but the area is not dried out, this permitting mold growth and providing a base for fungus gnat development. Occasionally, the gnats are breeding outside and entering through doorways or cracks around windows.

As with any pest, experience brings a number of lessons.

Lesson #1: With small flies, you'll usually find more than one breeding source.

Take for example, a phorid fly infestation in a bakery. The professional assumed the flies were breeding in the drains and suggested the owner clean them. He did so using bleach and hot water which, if the flies had been breeding there anyway, would not solve the problem. Bleach doesn't remove organic matter where the larvae live from the sides of the drain.

A close inspection of the drains by scraping with a screwdriver confirmed no fly larvae in the drains. By taking a putty knife, however, an scraping inside

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cracks under kitchen equipment where they met the floor, innumerable fly larvae were discovered. When the kitchen was cleaned using a water hose, flour would be washed into floor-level cracks. In fact, nearly every such crack in this bakery contained phorid fly larvae. Flies were even breeding underneath pallets of flour bags lying on the floor. The solution involved cleaning every crack, drying it and then sealing it. In this example, more than three dozen "sources" of fly larvae were discovered. Although not common, such cases will be encountered. Only a few breeding sites will be discovered for most infestations, but usually if the flies have been present for any length of time, more than one source is present.

Lesson #2: Flies fly, so don't look for the source to necessarily be near where they're seen.

Because most flies are active fliers, they can be found anywhere in an infested building. In one case, fruit flies being seen in an office building were traced to a dumpster in a sub-level loading dock. The flies were accessing the building by riding on the shipping elevator. In another situation, fruit flies were attracted by nighttime lights to the entry door of a hospital from their breeding site in a trash compactor/dumpster more than 50 feet from the doorway. The exception to this rule is moth flies--they are poor fliers and are usually present near the breeding source.

Lesson #3: Focus on areas where moisture remains constant.

All small fly species require constant moisture for larvae to survive. Investigate all such areas where organic matter is also present. Moth flies can survive in wet environments.

Lesson #4: A knife or small, flat spatula will be the best inspection tool when searching for breeding sites.

The breeding sites for most small flies will usually involve a comparatively small amount of organic matter typically trapped inside a crack, under equipment of the sides of drain. A knife or spatula is needed to scrape out this debris to look for fly larvae--and that will confirm the area as a breeding site. Any moist or wet crack at floor level is a potential source.

Lesson #5: You can narrow the search area using traps.

A number of fly traps can be spaced throughout the infested rooms/building to pinpoint the area where the breeding sources are most likely to be found. Typically, the more flies found in a trap, the closer the trap is to the breeding site. This technique is used when the breeding sources have been difficult to locate. For fruit flies, a few ounces of fruit juice or vinegar will work well, as will a piece of banana with water.

Lesson #6: To confirm that flies are breeding in a drain or under a slab, use a clear plastic cup.

A clear plastic cup taped over a drain can trap emerging adult flies. With this technique, one can leave for a period of time, e.g., overnight, and then check for flies. When you suspect that phorid or moth flies are breeding beneath a slab, holes must be drilled through the slab and a cup taped over each hole. A clear cup is needed because the flies can be attracted to the light above the slab or the drain.

Lesson #7: Unless all breeding sites are found and removed, the infestation will continue.

The key to small fly infestation elimination is sanitation and repair of conducive conditions-both of which are the customer's responsibility. The professional's job is to point out areas requiring attention. It is common for a professional to identify a number of sites, have the customer clean them but the problem still persists. This means breeding sources have been overlooked and additional investigation is required. It will be impossible to solve the infestation without the customer's help.

Lesson #8: Bacterial drain products, regularly applied, can provide long-term relief from flies breeding in drains.

Several bacterial drain products are available to apply to control phorid, fruit and moth flies. Properly used and regularly applied, such products have demonstrated success in eliminating flies breeding in the drains and in preventing infestations. Pest control companies are adding drain services to their commercial services and acquiring additional revenue from restaurants, schools and similar facilities that have experienced fly problems.

Some bacterial products can be applied into areas where moisture and organic matter collect such as under dishwashing machines and ice makers. regular applications can help control breeding until

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the areas can be repaired to eliminate them as potential breeding sites.

Conclusion. Controlling small flies takes persistence, time and attention to detail. The amount of organic matter needed to sustain a light infestation can be remarkably little, so it is easy to overlook breeding sites. The key is finding and eliminating these areas. If necessary, a space treatment can be used to kill any remaining adult flies. Use a process of elimination to narrow your search and pinpoint breeding sources. Start with the most obvious sites. In most situations, you'll solve the infestation quickly, but don't be surprised of the solution takes a little time. These little flies can be frustrating.

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PEST MANAGEMENT OPINIONS

The Pesticide Debate: It's Not About Good vs. Evil

PCT-Online, January 1998
Dan Moreland

I'm always a bit leery of people who paint corporate America as evil, while extolling the virtues of a more pristine way of life. This is particularly apparent in the debate over pesticides. In a book from Harvard University Press titles, Nature Wars: People Vs. Pests, author Mark L. Winston contends that our ongoing commitment to pesticides reflects our sense of place in nature: embattled, beleaguered and driven to aggression.

Further, in a letter to magazine and newspaper editors accompanying a review copy of the book, Liz Pelton of Harvard University Press writes that Winston "objects to our unshaken commitment to chemicals, nurtured by powerful chemical companies, when science has shown there are better ways." The problem with those "better ways" is that more often than not they are too costly to implement or inadequate to maintain pest populations at threshold levels acceptable to most Americans.

And while I don't disagree with the basic premise of Winston's book--that a more measured approach to controlling pests (i.e., IPM) is the most responsible approach to pest control--I'm disturbed the book is being marketed as the second coming of Silent Spring, the publication which ushered in the environmental movement.

If pesticide manufacturers learned anything from this period of American history, it is that it is in their own best interest to promote the responsible use of pesticides, not the indiscriminate use of these materials. To do anything less would be to invite greater government regulatory action and imperil the future use of their products, not to mention be morally irresponsible.

It has been my experience that chemical suppliers serving the pest control industry have acted responsibly in promoting the merits of IPM and embarked instead upon a campaign to expand the market for professional pest control services, thereby ensuring that their products will be applied judiciously by those most qualified to perform this important service. Unfortunately, their story doesn't often make it into the pages of the mainstream media, including books like Nature Wars, a noble attempt to examine the pesticide debate in a cultural and historical framework, but one which once again overlooks the important role the structural pest control industry has played in protecting the public's health and property, the ultimate goal of responsible pesticide use.

Nature Wars: People Vs. Pests is a book PCOs should read if for no other reason than to better understand the complex social, economic and political factors impacting the ongoing debate over pesticide use in the United States and throughout the world. In addition, a number of well-known pest control industry representatives are quoted in the book, including Bobby Corrigan, Harold S. Stein, Jr., Bob Berns, Robert Snetsinger and Harry Katz.

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TECHNICALLY SPEAKING

Water's Importance

PCT-Online October 2000
Richard Kramer

Most of us recall the story of Noah and the Ark: It rained for 40 days and 40 nights. Noah was instructed to take the animals two by two into the ark, thus saving the animals (insects too) from the flood that covered the earth. Just as there have been times when there is more water than we know what to do with, there have been droughts that have ravaged the earth. Despite these extreme conditions, insects and other pests have survived and, in some cases, even flourished.

During the past six months, climatic conditions throughout the United States have been extreme with prolonged periods of high temperatures and drought

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seen in the South and Southwest and an exceptionally cool and wet summer in the Northeast. Unusual weather conditions result in significant changes in pest problems--particularly their activity, survival and reproduction.

Water is the essential ingredient to insect survival because it accounts for 50 to 90 percent of their body weight. Small changes, e.g., a decrease of 15 percent, in body water can cause death in some insects. Water loss in insects naturally occurs through the cuticle and respiratory and excretory systems, and in most insects loss is accelerated by increased temperatures. Water also affects the availability of other resources, such as food and breeding habitats, which are essential to survival.

INSECT SURVIVAL. To survive, most insects must obtain water from other sources. Water can be obtained through several processes. In some insects, e.g. cockroaches, direct absorption of water occurs through the cuticle. Many inscets obtain water from food and the amount of moisture in the food may affect consumption, i.e. more food is consumed if the water content is low. A few insects, e.g., mealworms, regulate their water loss and are able to survive on food with a moisture content of around 1 percent.

It is obvious that water is a significant factor in insect survival. It is the most vulnerable resource associated with insect behavior. An insect's need for water provides us insight into pest behavior and an opportunity to anticipate pest problems. Most importantly, it provides us a tool for dealing with pest problems. Astute pest management professionals (PMPs) will use this information in developing pest management strategies.

It is interesting to read in the trade journals and hear PMPs discuss the most significant pest problems during the year as well as the profitability (or nonprofitability) of business. In this regard, the weather is predictive.

Last summer, I had the opportunity to see the effect of drought and high temperatures on pest activity; this summer, I have observed the other extreme, i.e. cool temperatures and exceptional amounts of water. Pest species and activity differed significantly from one summer to the next.

During the drought of 1999, the most significant pest problems in the District of Columbia area were ants and springtails, whereas other outdoor pests, such as clover mites, lady bird beetles and cluster flies, were rarely a problem. The cool and wet weather this summer has precipitated an unprecedented number of calls regarding earwigs and mosquitoes, but ant calls have been practically nonexistent. IN addition, termite-swarming season stretched from January through June.

While there may be numerous environmental conditions affecting these observations, the following comments focus on issues related to moisture:

Ants: Customers rarely complain about ant problems unless they are found indoors. During dry weather, ants have a difficult time obtaining water outdoors due to less availability. In addition, there are fewer aphids producing honeydew and insects commonly eaten by ants are less abundant. Water is readily available in structures, so when it is dry outside, ants are more likely to forage indoors.

Ant baiting strategies should be adjusted to the weather conditions and the foraging area. During dry weather, ants foraging indoors will be attracted almost exclusively to gel and liquid baits. However, during periods of abundant moisture, ants are rarely found indoors and gel and liquid baits are less desirable. Dry baits typically are more effective when applied outdoors.

Springtails: As a result of their susceptibility to dry conditions, these insects are continuously seeking areas with high moisture content. Their activity is more apparent during dry conditions when they enter structures to seek moisture. I have observed structural invasions when new mulch infested with springtails is spread out and begins to dry.

The need for moisture makes it easy to pinpoint where springtails can be found in structures. Typically, they are found in kitchens and bathrooms, but as with carpenter ants, their presence can be indicative of a structural moisture problem, e.g. leaking roof, pipe or drain.

Clover mites, cluster flies and lady bird beetles: Although this diverse group of pests is not directly affected by the amount of environmental moisture, their food sources are. The abundance and subsequent problems associated with these pests are directly correlated to their food supply, i.e. clover mites: grasses, clover and algae; cluster flies: earthworms; and lady bird beetles: aphids. Dry weather significantly reduces the availability of these food sources as well as the subsequent seasonal abundance of these pests. On the other hand, average rainfall can lead to a proliferation of food sources (and these pests).

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Awareness of weather conditions preceding the fall invasion of these overwintering pests can be useful in determining the need for perimeter pesticide applications and for preparing customers for problems associated with these structural invaders.

Earwigs: These occasional invaders have moisture requirements similar to springtails, i.e. they are unable to tolerate dry conditions. They become more apparent during wet and cool weather because their populations increase exponentially, whereas, during drought conditions, their presence typically goes undetected. While they pose no threat to human health, their pincers appear ominous to uninformed customers. This, coupled with massive numbers, precipitates panic calls.

Elimination of moisture conditions around structures and removal of clutter and debris that provides harborage can reduce earwig populations. Perimeter sprays should be used to prevent earwigs from entering structures and to treat localized nesting areas.

Termites: Termites build mud tubes to protect themselves from adverse environmental conditions and the loss of water; they do not forage in the open. Moisture around structures is the most significant factor that attracts termites to structures and is the major cause of termite-control failures with soil-applied termiticides.

Moisture within the structural foundation can lead to the formation of isolated colonies of subterranean termites that no longer maintain contact with the soil. Eliminating the moisture minimizes the termite problem.

CONCLUSION. All pests rely on moisture for survival. By eliminating moisture problems, pest populations become stressed and decline, thus making it much easier to solve the customer's problem.

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PEST BIRDS AND ASSOCIATED HYGIENE PROBLEMS

PCT-Online
Roger Shaw

Bird watching is a sport and recreational activity involving more than 10 million people and as such, it is hardly surprising that birds are the subject of a number of Federal and State laws, and generate such wide public opinion and support.

The most commonly encountered pest birds are swallows, gulls, pigeons, starlings and sparrows. Swallows and gulls are the only two of these pest birds protected by Federal and State laws, and technicians trying to control pigeons, starlings and sparrows may come up against strict state and/or local regulations.

Public opinion is usually strongly against any control measures involving killing when toxins are used, since there exists the possibility of affecting non-target birds and animals with the poison. Also, any control or repelling measures which conjure images of injury or inhumane treatment may also be expected to evoke such a negative public reaction.

HEALTH HAZARDS AND DISEASES OF BIRDS. There are more than40 known viruses and 60 transmittable diseases directly attributed to birds and their droppings. Let's review some of these in more detail and look at examples of diseases known to have been contracted by humans from birds.

Histoplasmosis. Pigeon droppings carry spores of the systemic fungal disease called histoplasmosis, which can be contracted by breathing dusty pigeon droppings or soil contaminated by pigeon and/or starling droppings. Pigeons are known to transmit ornithosis, encephalitis, Newcastle disease, cryptococcosis, salmonella food poisoning and other diseases.

Pest management professionals who are performing site cleanup to remove bird droppings and nesting material are particularly vulnerable to these diseases and should take great care to wear adequate protective clothing. Chemical pre-treatment of sites should also be conducted to kill bacteria and viruses. The spores of histoplasmosis are inhaled typically when dried or when old roosts have been disturbed, as occurs during cleanings carried out prior to bird control applications.

Cryptococcosis. Another fungal disease found primarily in pigeon droppings is cryptococcosis. More than 80% of established pigeon roosts have been found to contain this organism. When the dried droppings are inhaled, a respiratory disease usually occurs commencing with a lung infection which then spreads to the rest of the body, especially the nervous system.

Psittacosis. A local California newspaper reported

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that a window cleaner with 30 years experience had 40% of his lung tissue destroyed after inhaling the bacteria psittacosis. The victim in this case was a fit, 55-year old man who awoke one morning unable to breathe.

The bacteria that causes psittacosis is found in the droppings of pigeons, parrots and other birds and can be inhaled by breathing the air introduced by air conditioning systems which carry the organism from a bird roost. Pigeons most frequently roost on and around air conditioning systems on roofs of city buildings, domestic houses and other structures, which leads to the transmittal of this bacteria.

PERSONAL PROTECTION IS ESSENTIAL. The most susceptible to these diseases are people who breathe the air in buildings which have old and established bird roosts. While on-site, technicians are continuously exposed to air containing these microorganisms which have a proven likelihood of infection.

Apart from wearing appropriate protective clothing, chemicals are now available to combat the disease and odor problems associated with bird infestations and these should be an essential prerequisite to any bird or bat exclusion project.

The problem of accumulated or residual bird droppings located in voids which cannot be reached with extraction equipment can, in fact, be solved simply by "digesting" the droppings with enzymes.

Digest-it, a chemical introduced in late 1996 by Hot Foot America, contains a mixture of three enzymes which are activated by the addition of water. The chemical is sprayed onto bird or bat droppings and is designed to digest the feces while neutralizing odors. This may be a solution to the problem of drains and downspouts blocked by an accumulation of bird droppings. The product also digests other solids such as grease and can be applied using the spray equipment typically carried by pest control technicians on their routes. To protect PCOs against bacteria and viruses, a sterilizing solution with odor neutralizer should be sprayed onto droppings to the point of saturation.

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IN THE NEWS.....

MALARIA-INFECTED MOSQUITOES ON AIRPLANES SPREAD HARSH DISEASE.

Sing Hanyona/Earth Times News Service

LUSAKA, Zambia--Health authorities in many countries are becoming increasingly concerned about the spread of malaria into their territory by "jet-setting," mosquitoes infected by the disease that travel on international flights.

According to the latest study by the World Health Organization (WHO), 12 countries have reported 87 cases of malaria in people living near airports. France heads the list with 26 cases, followed by Belgium, 16 and the United Kingdom, 14 cases.

Airport malaria is particularly dangerous in that physicians generally have little reason to expect it. Therefore, diagnosis may be protracted and death may occur before a correct diagnosis is made and adequate treatment can be provided.

"There is an important need for the disinfection of aircraft coming from airports in tropical disease endemic areas into non-endemic areas," says the study. "Malaria-carrying mosquitoes may enter the passenger cabin before take-off or during stopovers or may survive the trip in the luggage hold. Whatever its mode of travel, imported malaria is frequently fatal due to late diagnosis by physicians not primed to the risk of malaria."

The authors of the study were Dr. Norman Gratz, former Director of the Division of Vector Biology and Control at WHO, Dr. Robert Steffen of the University Travel Clinic, Institute for Social and Preventive Medicine, Zurich University and Dr. William Cocksedge, a Communicable Diseases Specialist at WHO.

These "airport malaria" cases, occurring in or near airports are distinguished from other cases of imported malaria among persons who contact the infection during a stay in a malarious area and subsequently fall ill.

The occurrence of a relatively large number of cases or airport malaria in Paris and Brussels reflects the large number of flights arriving from Central and West Africa, according to the study. At least five deaths have occurred.

Long delays in achieving the correct diagnosis frequently resulted in patients developing severe or complicated malaria. Five cases of airport malaria occurred in Switzerland in 1990. In at least one case, 31 days elapsed before a correct

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diagnosis was made, says the study.

In some instances, mosquito species have been established in countries in which they have not previously been reported. The study cites the introduction of malaria into Brazil--believed to be caused by disease carrying mosquitoes that arrived on a cargo ship in 1930. "The importation and subsequent establishment of this highly efficient vector led to an epidemic of malaria involving some 300,000 cases and 16,000 deaths," says the study.

A costly campaign was successfully conducted to eradicate the disease from Brazil. The cost of treating it can exceed $2,700 per case, which far outweighs the cost of disinfection of aircraft with periodic application of a residual insecticide such as permethrin, plus aerosol spraying with just before passengers board or just before take-off, say the authors of the study.

The first reported occurrence of insects in an aircraft was in 1928 when a quarantine inspector boarded the dirigible Graf Zeppelin on its arrival in the United States. Ten species of insects were discovered on plants carried by passengers.

Many countries already insist that arriving aircraft be disinfected, especially if they have come from areas where vector-borne disease are endemic.

"It is common for an arriving aircraft to be sprayed by the health services of the country of destination if there is any doubt as to whether or not treatment has been applied earlier in the flight, " says the report.

WHO most recently published recommendations for aircraft disinfection in 1998.

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BEIJING INVADED BY COCKROACHES

GUO NEI, China Daily staff
December 2000

Cockroaches, long the bane of southerners, have begun to haunt Beijingers in recent years.

Before the 1990s, cockroaches did not present much of a problem in the capital, said experts, but this winter they are expected to run rampant.

The Beijing Patriotic Health Committee (BPHC) has taken actions to eradicate the insects. Two campaigns, on November 16-20 and December 11-15, asked residents to help kill as many roaches as possible.

The committee blamed the growing infestation on a lack of public awareness.

Cockroaches multiply and thrive so easily that unless sufficient precautions are made they will spread into every area at a rapid speed, said BPHC experts.

For most people, roaches only look scary, but the experts warn they also carry over 40 kinds of bacteria, some of which are fatal. They can squeeze into opening only 1.6 mm wide and reproduce one generation every 10 days. Their ability to spoil food is even greater than that of flies, experts said.

Committee statistics indicate that 87 percent of Beijing's restaurants and hotels, 88 percent of clinics and hospitals and 75 percent of residential houses have already been invaded by cockroaches.

To meet the challenge, the committee has asked neighborhood committees to organize residents to put insecticide where the roaches usually stay and breed, and also invited entomologists to give public lectures. (Pest Notes: If this isn't an accident waiting to happen, nothing is.).

After two campaigns, 95% of city residents said in a survey that the pests need to be killed and 70% were willing to help. (Pest Notes: I wonder what the other 5% thought?)

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MOSQUITO PESTICIDE TAKES TOLL ON BIRDS

Environmental News Network-December 2000
Margot Higgins

Thousands of birds are dropping dead in Florida, and conservation groups are citing fenthion, a pesticide used to control mosquitoes, as the cause.

Millions of migratory birds that rely on habitat in Florida as breeding or resting grounds are at risk, the groups claim.

"As the Environmental Protection Agency reviews its regulations for fenthion, the American Bird Conservancy is fighting for the cancellation of all fenthion uses in the U.S. except for public health emergencies during disease outbreaks," said Linda Farley, a science officer for the organization's Pesticides and Birds Campaign.

Most states have banned fenthion, but Florida continues to spray 222,400 to 333,600 pounds of the pesticide over 2 million acres each year.

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The U.S Fish and Wildlife Service recently reported the mortality of 16 bird species to the EPA's Office of Prevention Pesticides following a two year study. Among the casualties are sanderlings, dunlin, black skimmers and endangered piping plovers, all from areas in where fenthion had been applied. (Pest Notes: Before cause and effect can be determined, it is necessary to have more information including toxicology studies).

Although most organophosphate pesticides harm birds through their intake of food and water, fenthion is highly toxic to birds when absorbed through their skin or inhaled. The pesticide is usually distributed by helicopter using a method that allows it to remain in the air for long periods of time.

The duration increases exposure and allows the pesticide to travel farther across the landscape. If rain falls shortly after the application of fenthion, the risk of contact rises significantly, scientists note, as birds forage in contaminated, wet foliage and bathe in or drink puddles of toxic water.

Most birds killed in the wild go unnoticed, conservation groups not, because scavengers quickly remove their carcasses.

Similar to DDT, a pesticide that was banned in the early 1970s, fenthion accumulated in the fatty tissue of animals and can be passed on through the food chain to concentrate in top-level consumers.

The pesticide may pose health problems to humans as well.

According to the EPA, current applications of fenthion might endanger children because they wash their hands less frequently than adults and have greater contact with grass and other vegetation containing the pesticide.

While profit in fenthion dales is minimal in the United States, the international market for the pesticide is extremely lucrative. Fenthion is recommended by Bayer as an insecticide for coffee and citrus, vital crops for Latin America and habitat for many species of birds.

"The U.S. provides the regulatory standard for other nations with limited resources devoted to scientific testing of the environmental and human health impacts of pesticides," Farley said. "A primary reason the American Bird Conservancy wants to see fenthion cancelled in the U.S. is to set an example for other nations." (Pest Notes: What this article fails to recognize is the importance of responsible insecticide use.)

VECTOR-BORNE DISEASE OF THE MONTH

Leishmaniasis
National Center for Infectious Diseases

Description: Leishmaniasis is a parasitic disease transmitted by the bite of some species of sand flies. The disease most commonly manifests either in a cutaneous (skin) form or in a visceral (internal organ) form. Cutaneous leishmaniasis is characterized by one of more skin sores (either open or closed) that develop weeks to months after a person is bitten by infected sand flies. The manifestations of visceral leishmaniasis, such as fever, enlargement of the spleen and liver, and anemia, typically develop months, but sometimes years, after a person becomes infected.

Occurrence: Tropical and subtropical areas of the world. The infection usually is acquired in rural areas but may be acquired in some urban areas as well.

Risk for Travelers: Risk is highest for persons who are outside in leishmaniasis-endemic areas between dusk and dawn.

Preventive Measures: Preventive measures for the individual traveler are aimed at reducing contact with sand flies. Outdoor activities should be avoided when sand flies are most active (dusk to dawn). Although sand flies are primarily nighttime biters, infection may be acquired during daytime if resting sand flies are disturbed. San fly activity in an area may easily be underestimated because sand flies are noiseless fliers and rare bites may go unnoticed.

Protective clothing and insect repellent should be used for supplementary protection. Clothing should cover as much of the body as possible and tolerable in climate. Repellent with DEET should be applied to exposed skin and under the edges of clothing, such as under the ends of sleeves and pant legs. It should be applied according to the manufacturer's instructions; repeated applications may be necessary under conditions of excessive perspiration, wiping and washing. Although impregnation of clothing with permethrin may provide additional protection, it does not eliminate the need for repellent on exposed skin and should be repeated after every five washings.

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Contact with sand flies can be reduced by mechanical means, such as bed nets and screening of doors and windows. Fine-mesh netting (at least 18 holes to the linear inch; some sources say even finer) is required for an effective barrier against sand flies, which are about one-third the size of mosquitoes. However, such closely woven bed nets may be difficult to tolerate in hot climates. Impregnating bed nets and window screens with permethrin aerosol may provide some protection, as may spraying dwellings with insecticides.

PEST OF THE MONTH

Can you identify the following pests? Last month's pests were: A) German cockroach, B) Fungus fly, C) Psocids

Parting Shots.....

That's all for now. Remember that 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

A)

B)

C)