UT Youth Environment and Health

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Pests and Pesticides in Child-serving Facilities: An IPM Newsletter

Urban Ecology and Pest Management

by Robert Corrigan, PhD RMC Pest Management Consulting

It is not difficult to deny pests entry to most of our city buildings such as restaurants, schools, work places, etc. Yet, urbanites often inadvertently grant pests easy entry beneath everyday doors. Healthy urban ecosystems include buildings healthy from a lack of health pests. Note the mouse-chewed door threshold of this restaurant.

In his textbook on subject, the urban ecologist Dr. Jari Niemela, defines urban ecology as "the scientific study of the relation of living organisms with each other and their surroundings in the context of an urban environment. The urban environment refers to environments dominated by high-density residential and commercial buildings, paved surfaces, and other urban-related factors that create a unique landscape dissimilar to most previously studied environments in the field of ecology."

Within the context of this definition, other related factors addresses the myriad of building operations, (residential and commercial housing, mega shopping malls, school campuses, etc.), and or more important, an urban system's infrastructures (e.g., railroads, sewers, subways, highways, parks, waterways, and so on). Accordingly, for those involved in any facet of urban pest management, it is likely to be clear how urban ecology and urban pest management are fundamentally linked. Because as everyone learns in grade school, most animals, whether coyote, moth, whale, or human, require food, water and shelter to proliferate and spread.

The urban invasive species such as pigeons, cockroaches, rats, filth flies, house mice, and sparrows, (to name but a few) have adapted well to opportunistically utilizing human food and the food discards (refuse streams). They have also adapted towards invading portions of our built environment for their shelter –often times in an all-too-close proximity to us humans.

Special Points of Interest

- Urban Ecology & Pest Management
- Nonvenomous Snakes
- Welcome New Pilot Schools

Gray Rat Snake

This issue

The basic tenet of urban pest management is that an integrated approach is essential (i.e. Integrated Pest Management). The foundation of impactful urban IPM programs is to suppress pest populations on a sustainable basis via three paths:

1. Maintaining healthy urban ecosystems (e.g., refuse stream management, infrastructural maintenance, community involvement, etc.);

2. Formal structural pest exclusion designs for city structures to minimize pest entry and direct human interactions, and,

3. The use of chemical and mechanical approaches to supplement (i.e., not substitute for) Nos. 1 and 2 above.

Healthy Urban Ecosystems

By maintaining healthy urban ecosystems, pest populations are minimized in numbers both on private properties (yards, around foundations, garages, alleys, etc.) and city properties (parks, subways, street areas, sewers, large construction projects, etc.). But relative to urban pest management –and more desirable still—pest prevention, which facets of urban ecology among the many are most important?

It is no surprise that a city's urban refuse stream and management comes to the forefront. Unquestionably, refuse management on a city scale is multi-facet and highly complex. Consider just one week's refuse stream of the dumpsters of a city's restaurants, or that of a modern-day mega mall, all the supermarkets, hotels, hi rise condos, large multifamily housing complexes, schools, and so on. To this add the food refuse litter stream from the city's citizens such as street, park and road litter.

Equal to the refuse itself, are the operational aspects of refuse containerization and collection. The details of these two aspects of "garbage removal" are typically not thought about much by the average urbanite, but play strongly in the health of urban ecosystems. An important decision that any city must address relative to health threatening pests is an overlooked but elemental detail such as which styles and models of containers will be used for litter baskets, the thousands of commercial food dumpsters and compactors, and the millions of pounds generated by private household use. Precise calculations of container installments to match the citizen density use of an area and collection schedules are obviously also critical.

Moreover is the question as to whether or not a city will (or even can) elect to use structural containers for trash at all? For instance, is an "extra thick" plastic bag containing food waste placed out on the curb on a nightly basis of a city with established rats, raccoons and pigeon populations an acceptable food trash container?

What an insightful metric it would be if a city's (or neighborhood's) daily, weekly, and annual refuse output could be graded via a "pest conducive report card" as to an area's refuse contribution towards attracting, supporting and growing important urban health pests populations such as filth flies, rats, pigeons, cockroaches, raccoons and the like.

Pest Exclusion Programs

Following alongside a city's refuse stream, is the concern as to how much harborage is rendered available to city pests along the planes of structures, open spaces, and a city's infrastructure? Even if a pest species exists at some level within the urban environment, they are likely to be of significantly less importance and threat if they cannot gain entry into homes, food stores, eateries, schools, work places and the like .

Paradoxically, it is not typically difficult nor financially exorbitant to pest-proof the types of structures listed earlier (e.g., houses, apartment buildings, malls, etc.). Nevertheless it remains all too common to find such structures with most of their doors not pest-proofed or containing numerous unrepaired holes and penetrations through foundations walls, windows, garage doors and the like.

It is short sighted for property owners to allow the doors of a supermarket, office building, or private home for example to contain threshold gaps allowing pests entry and to repeatedly hire pest professionals to treat with a pesticide or to install traps or poison baits to kill the mice that repeatedly enter the structure year after year.

The urban entomologist Hugo Hartnack in 1939 emphasized in his classic textbook on city pests how pest prevention *via* pest *exclusion* -- not pesticides or traps--- within the built environment are the cornerstones of urban pest management: "***We should have little trouble with vermin if our builders would hear and understand the "language" of vermin and would do a better job in eliminating entrances and hiding places for them.***"

City properties such as sidewalks, curbs, rail lines and sewers often go unrepaired for years allowing for pest harborage, when simple repairs can help to minimize the occurrences of important health pests/ risks within neighborhoods. For instance, just one unrepaired hole in a busy pedestrian city sidewalk containing a litter basket nearby can support several families of rats.

New buildings — especially those of significant size and complexity -- can be pest-proofed concurrently as they are constructed. This is the most efficient (and thus the smartest) approach to take in designing this critical portion of a healthy ecosystem. But rarely is this done because building professionals are not usually cognizant of future pest issues post completion or trained in even a modicum of pest biology. There is a presents an obvious gap in urban ecology—and its not a new gap.

Even earlier than Hartnack's comment in 1939, the German entomologist F. Zacher in a 1927 publication addressing keeping structures healthy via denying pests entry, wisely advised: "*From the very start of a building's construction, an experienced biologist should be consulted*."

Many segments of the public often inquire of pest companies: "How much will you charge to treat my property (home, store, etc.) on a monthly basis to keep pests away?". The better question of any commercial or residential property owner in the context of healthy urban ecosystems is: "How much will you charge to pest proof my building and to then inspect each month to monitor and possibly treat for pests?"

Chemical and Non-Chemical Pest Management

Even with well-maintained urban ecosystems and the most carefully thought out structural exclusion designs, urban pests remain extremely impressive in their abilities to adapt and persist. What's more, several of the more important health-related urban pests are simply delivered in goods within boxes and supplies even into the cleanest, most pest-proofed building in the city.

So, there can be little doubt. Pesticides and a wide range of additional pest management technologies are essential tools in maintaining healthy ecosystems via progressive urban pest management programs. But a simple understanding of the most elemental biological principals of pests clearly demonstrates that chemicals and traps rarely are the most appropriate first response to pests.

Urban ecological maintenance comes not only first, but also as the larger potion of the solutions to nearly every urban pest infestation. It's a clear case of the 80/20 rule. A quality pest brush (vs. a weather strip) is pest management technology. So is smart purchasing of the most appropriate refuse dumpster and dumpster placement by any town's average eatery.

Conclusion

The origins of the word ecology comes from the Greek "oikos" which means "house". Of course, our cities and towns as complex and integrated systems provide the house for not only each of our own individual houses, but for our daily lives outside of our houses in our work and recreational spaces, and our (all too taken for granted) food production, gathering, and food consumption lives.

Homo sapiens is our genus and species name. It means "wise man". When it comes to urban pest management, we must put first things first. It is time to do it right. Global population statistics show that most humans (3.9 billion) now live in urban areas. Our numbers are expected to reach 6.4 billion by 2050.

The most effective, most commonsensical, and most sustainable efforts lie with healthy and maintained urban ecosystems which then results in more natural suppression of urban pest populations. These natural systems can then be supplemented with chemical and non-chemical tools as necessary. That means we live up to our scientific name in the use of our one and our only "house".

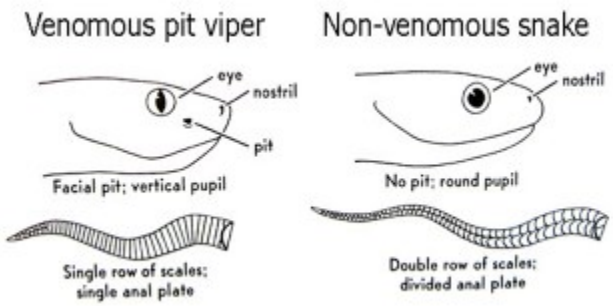
Dr. Robert Corrigan has been working in urban IPM programs for over 25 years. He is an urban entomologist, an urban rodentologist, and president of RMC Pest Management Consulting.

Reprinted from PESPWire, Fall 2015, http://www3.epa.gov/pestwise/news/pesp/pespwire-2015-10.pdf

Non-venomous Snakes

Pat Barnwell and Karen Vail

Snakes are valuable predators that keep the populations of small rodents, slugs, and insects, among other creatures, in check. Occasionally snakes will wander into schools. We have never had a report of a venomous snake entering a school. Still, it is good to know how to distinguish venomous from non-venomous snakes. The four venomous snakes found in Tennessee are pit vipers (http://www.tnwatchablewildlife.org/reptiles.cfm) and include copperhead (highland moccasin), cottonmouth (water moccasin), timber rattlesnake and pygmy rattlesnake. Pit vipers have elliptical pupils and a pit or opening on the side of the head midway between the eye and the nostril. These snakes also have a single row of scales on the underside of the tail except at the very tip where there may be two rows.



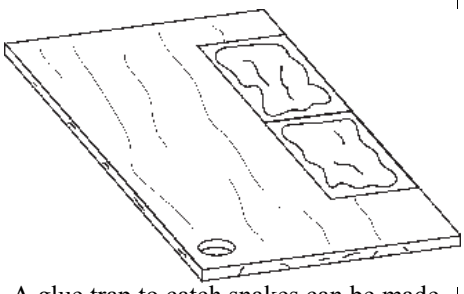
http://buckeyeherps.blogspot.com/2011/09/ohio-snake-identification-venomous-or.html

Gray rat snake. Wendy VanDyk Evans, Bugwood.org

Snakes prefer damp, cool, dark places. Heavily mulched landscapes, dense shrubbery surrounding a structure , as well as materials piled against a structure are attractive habitats for some snakes. Ridding a site of rodents and rodent burrows renders a site less inviting to snakes. Keep vegetation around the structure closely mowed. So try to modify the habitat by removing shelter and reduce food sources by controlling rodents.

Snakes can enter through any gap over ¼". Vents can be screened with ¼" hardware cloth and gaps filled with mortar or sealant to keep snakes out. Trim tree branches back four feet from the structure to prevent tree climbers such as black racers from gaining access. Avoid leaving doors propped open.

Indoor glue boards will trap small snakes that can be released from the boards by applying vegetable oil. Larger traps can be made by attaching several glue boards on a piece of plywood. Drill a hole in the plywood so that it can be removed with a hook. Glue traps should be kept out of the reach of children. Place a pile of damp towels covered with a dry towel in places where snakes have been seen. After a couple of weeks, the pile can be removed with a scoop shovel in the middle of the day when the snakes are likely to be present.



A glue trap to catch snakes can be made by attaching several rodent glue traps to a wooden board. Vail et al. 2006

Since non-venomous snakes are harmless there is no reason to kill them. Someone knowledgeable and fearless can capture, remove and release them into the surrounding woodlands, fields, pastures, or along water courses where they can perform their ecological services.

References:

Byford, James. Nonpoisonous Snakes. http://icwdm.org/Handbook/reptiles/repf15.pdf

Vail, K., G. Burgess, R. Gerhardt and C. Harper. 2006. General Rodent and Pest Control Licensing Manual. UT Extension. pp. 127.

Welcome New Pilot Schools

Bolivar Middle School in Hardeman County and E. A. Cox Middle School in Maury County are participating in the school IPM program as pilot schools for the 2015-2016 school year. We look forward to working with these school communities and their PMPs. Both of these systems had logbooks in the office before we started the pilot program and were using glue boards to monitor. Hats off to these schools! We hope those of you in counties surrounding either Hardeman or Maury County will join us to see IPM in action at one of these schools at the end of the school year.

Logbooks facilitate communication between the PMP and the school community. Personalize your logbook by including pest action plans that can be found at: http://articles.extension.org/pages/20295/using-integrated-pest-management-action-plans-for-schools#.Vk-H83arTcs. Good IPM practice involves inspection and monitoring.

EPA webinar: Bed Bugs in Schools
Tuesday, December 15, 2015
02:00:00 PM EST - 03:30:00 PM EST
Register at **https://epawebconferencing.acms.com/sipm_bedbugs/event/event_info.html**

UT YEAH Contact Information:

Karen Vail, Ph.D., Professor,
Urban IPM Specialist, UT Extension
370 Plant Biotechnology Bldg.
2505 E J Chapman Drive
Knoxville, TN 37996-4560
ph: (865) 974-7138
fax: (865) 974-4744
email: kvail@utk.edu
web: http://schoolipm.utk.edu
http://eppserver.ag.utk.edu/personnel/Vail/vail.htm

Martha Keel, Ph.D., Professor
Housing & Environmental Health Specialist,
UT Extension
218 Morgan Hall
ph: (865) 974-8197
fax: (865) 974-5370
email: mkeel@utk.edu
web http://utyeah.utk.edu

James P. Parkman, Ph.D.
Former UTIA IPM Coordinator
370 Plant Biotechnology Bldg.
2505 E J Chapman Drive
ph: (865) 974-7135
fax: (865) 974-4744
email: jparkman@utk.edu

Mary Rogge, Ph.D., Assc. Professor
UT College of Social Work
225 Henson Hall
ph: (865) 974-7500

Comments or questions on this newsletter? Contact kvail@utk.edu

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http://tinyurl.com/UrbanIPMTN

UT Extension

For more information about IPM in Tennessee schools and other facilities, or to view past issues of *Pests and Pesticides in Child-serving Facilities*, please visit schoolipm.utk.edu.

NATIONAL IPM INFORMATION

eXtension's Pest Management In and Around Structures: Urban Integrated Pest Management
http://articles.extension.org/urban_integrated_pest_management

National School IPM
schoolipm.ifas.ufl.edu/

IPM in Schools Texas
http://schoolipm.tamu.edu/

IPM Institute of North America
http://ipminstitute.org/school_ipm_2020/index.htm

National Pest Management Association IPM
http://www.whatisipm.org/schools_IPM.asp

EPA schools
http://www2.epa.gov/managing-pests-schools

For further information about the IPM program at your school or in your county, contact your county Extension Agent or the school IPM Coordinator. For county agent contact information, please visit https://extension.tennessee.edu/Pages/Office-Locations.aspx

Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

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