



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

Nine-Banded Armadillo *Dasypus novemcinctus*

Nine-banded armadillos are spreading across Tennessee faster than expected. Because they do not hibernate or have a protective fat layer, expansion is predicted to be limited to areas with averages of January temperatures greater than 28 degrees F and yearly rainfall of at least 15 inches.

Armadillos have several unusual features for mammals: peg-like teeth restricted to the rear of the mouth, extra articulations between vertebrae and an external shell of bony plates with hairs in between. Sight and hearing are poor. Food is located by a keen sense of smell. Sharp claws dig into the earth to uncover insects and other invertebrates that are flicked into the mouth with a long, sticky tongue. Occasionally fungi and fruits are eaten.



Nine-banded Armadillo. Photo: <https://commons.wikimedia.org/wiki/File:Armadillo2.jpg>

Length	23-31 inches
Weight	5 1/4 –17 1/4
Color	Yellowish white to mottled dark-brown
No. of young/ year	4 of identical sex in Feb. or March
Average life span	7-10 yrs.

Habitats with loose, soft soils are preferred. Armadillos dig burrows for protection, rearing young and escaping cold. Dens are constructed in soil under sites such as oak/hickory forest; brushy areas; fields with ground cover; exposed tree roots; rocky shelters and concrete drives, patios, and foundations. Burrows are 7-8 inches in diameter and 15 inches deep. Several burrows are excavated within a territory but only one for rearing young.

Armadillos are nocturnal foragers, but during the winter may forage for scarce resources during the day. Damaged lawns and gardens are

Special Points of Interest

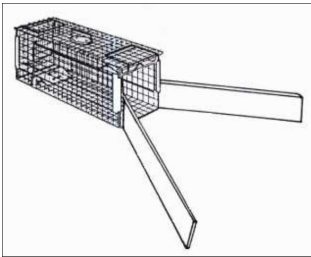
- > Nine-banded Armadillo
- > IPM Basics
- > Applying Fire Ant Bait
- > Zika Virus
- > Air Curtains

This issue

Nine-banded Armadillo	1
IPM Basics	3
Applying Fire Ant Bait	5
Zika Virus	5
Air Curtains	6
UT YEAH Contacts	7
Links	7

punctuated with shallow holes 1-3 inches deep and 3-5 inches wide. Plants can be uprooted and underground wires and pipes punctured from rooting. Structural damage to foundations and driveways occurs when armadillos find these sites suitable for burrowing.

Natural populations are limited by cold weather, scarcity of food, available burrowing sites, predators, and highway accidents. The best method of control is trapping. Winged live traps can be placed near burrow entrances. Trapping is best left to professionals who know how to protect themselves and are trained in wildlife damage management. Fencing and exclusion are other options. Fences must be buried to a depth of 18 inches and slanted outward to 40 degree angle to be effective. Laying chicken wire along the perimeter of driveways, patios, and foundations discourages burrowing. Cost vs benefit must be considered.



Cage traps for armadillos are more effective when "wings" are added to direct the armadillo into the trap. Photo: <http://icwdm.org/handbook/allPDF/complete%20Handbook.pdf>

Armadillos do carry the bacterium, *Mycobacterium leprae*, that causes leprosy. However, it is very rare for them to transmit leprosy to humans. Fortunately 95% of human adults are genetically resistant to leprosy, and those that aren't can be treated. See Facts about Wildlife Diseases: Leprosy, <http://edis.ifas.ufl.edu/uw408>, for more information.

References

- Hawthorne, Donald. Armadillos. http://icwdm.org/handbook/mammals/mam_d1.pdf
- Schaefer, J.M. and M.E. Hostetler. The Nine-Banded Armadillo (*Dasypus novemcinctus*). <http://edis.ifas.ufl.edu/pdf/FILES/UW/UW08200.pdf>
- Schwartz, C.W. and E.R. Schwartz. 2001. The Wild Mammals of Missouri, 2nd Edition. University of Missouri Press and Missouri Department of Conservation, Columbia, MO
- Sharma, Rahul et als. 2015. Zoonotic Leprosy in the Southeastern United States. Emerging Infectious Diseases 12: 2127-2134. <http://wwwnc.cdc.gov/eid/content/21/12/pdfs/v21-n12.pdf>
- Taulman, J.F. and L.W. Robbins. 1996. Recent range expansion and distributional limits of the nine-banded armadillo (*Dasypus novemcinctus*) in the United States. Journal of Biogeography 23: 635-648.

IPM BASICS



- **Education and Communication:** As the pyramid illustrates communication and education form the basis of an IPM program. Communication and education are essential to the success of an IPM program. Information distributed to each member of the school community ensures that they understand their role in the program. Knowledge about protocols to follow and how various behaviors, practices and procedures can either attract or discourage pests contributes to better pest management. IPM relies on the cooperation and participation of the people who inhabit and maintain the school building, not just the pest management professional.
- **Cultural and Sanitation:** Habitat modification includes altering the environment to make it unfavorable for pests. Good sanitation contributes substantially to this goal. Sanitation removes sources of food, water and shelter denying pests the elements that they need to survive. Pest exclusion begins with a thorough inspection to locate possible points of entry, both on the interior and the exterior of the building. Once entry points are identified, steps are taken to make it more difficult for pests to enter.
- **Physical and Mechanical Control:** Nonchemical control tactics, such as sticky traps and vacuuming, should be the first methods tried. With individual pests (such as a lone wasp, spider, or ant), capture and removal is a quick, effective, and nonlethal method of control. A lethal alternative is to swat a pest with rolled newspaper or a fly swatter and discard.

The vacuum cleaner is one of the most effective pest management tools. It can be used to remove live and dead pests, fecal droppings, and food particles on which pests may feed. Some vacuums have special attachments for pest management and can pull cockroaches out of hiding places or collect spiders. Specialty vacuums equipped with HEPA filters prevent pests and other allergens from being recirculated in the building.

Traps play an important role in pest management, and a wide variety of traps are available. Traps are mechanical devices that often use an attractant (food, food odors, or pheromones) to draw the pest to the trap. Some traps, including cockroach traps and various pheromone traps, are used mainly for monitoring pest presence, although they may be able to control small pest infestations in some situations. Other traps include the familiar snap traps and glue boards for mouse

and rat control, and black light traps and flypaper for flies. Traps can also be an option for invasive wildlife, such as raccoons, opossums, and even some bird species.

- **Pesticides:** Pesticides should be applied selectively and judiciously according to need, not on a routine or predetermined calendar schedule, and only when an action threshold has been exceeded. When chemical controls are needed, select reduced-risk formulations such as baits, and use placements that will minimize exposure to occupants (e.g., crack-and-crevice or void treatments). Treat when students are not present.

<https://www.epa.gov/sites/production/files/2015-05/documents/basics-webinar-presentation-2014-10.pdf>

Quotes from New EPA Document

Making Pests a Thing of the Past

- Schools implementing IPM practices reported decreased pest presence compared to those implementing conventional calendar-based pest management practices.
- In schools with IPM programs, 14 percent of dust samples had detectable pest allergens compared to 44 percent of dust samples from schools with conventional pest management programs.
- Schools implementing IPM methods used 99.9 percent less active pesticide ingredient than schools using conventional pest management methods.

<https://www.epa.gov/sites/production/files/2016-04/documents/making-pests-a-thing-of-the-past.pdf>



Tip: Use copper or stainless steel exclusion fabric to seal holes around pipes penetrations in drop ceilings.



Back to School Webinar



Kick-off the School Year with Smart,
Sensible and Sustainable Pest
Management



EPA Webinar: Kick-off the School Year With Smart, Sensible and Sustainable Pest Management
Wednesday, August 17, 2016 at 2:00 –3:15 p.m. Eastern Time. For information and registration:

https://epawebconferencing-events.acms.com/content/connect/c1/7/en/events/event/shared/104593573/event_landing.html?sco-id=104602106

Who Can Apply Fire Ant Bait on School Grounds?



Imported fire ants on school grounds can be a threat to children. Use of insecticides in these areas must comply with state regulations. Photo credit Bart Drees, <http://bugmugs.org/2012/12/imported-fire-ant-mounds-on-school-grounds/>

School grounds crew can apply fire ant products in the landscape even though they are not certified applicators as long as the directions on the pesticide label are followed. Remember the label is the law, and school grounds must be listed as a site where the product can be applied. If a fee is charged for fire ant management services, a category 3 certified applicator would be appropriate for turf away from structures and a category 7 certified applicator for turf around structures. A charter including bond, insurance and a license is required for commercial applicators. Indoors, only category 7 certified applicators are permitted to apply pesticides.

Zika Virus

CDC has developed interim guidance for kindergarten through grade 12 (K–12) district and school administrators for public health actions pertaining to Zika virus infection. This guidance is intended to address concerns about the risk for Zika virus infection in K–12 schools in the continental United States and Hawaii, provide school districts with information for planning school-related activities. Recommended actions can be taken, in consultation with local public health authorities and government officials, to reduce the potential risk for Zika virus transmission on school premises and among students. This guidance provides an overview of the potential roles and responsibilities of public health authorities and school officials, describes prevention measures that schools can take to reduce mosquito exposure, and provides information on responding to a case of travel-associated Zika virus infection or confirmed local mosquito-borne transmission. Considerations for child care, camp, and higher education settings also are addressed. This guidance will be updated as needed when new information becomes available. To access the material go to:

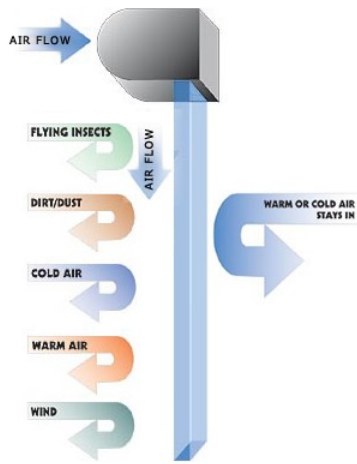
<http://www.cdc.gov/zika/schools.html>.

Tips from Marcia Anderson, EPA Clogged gutters and flat roof tops with poor drainage are commonly overlooked mosquito breeding sites that require regular maintenance. Improperly discarded plastic bags and food/drink containers can become pest breeding sites as can dumpsters without lids or drains.

Air Curtains or Doors

Seldom do we think of using air as a pest management tool, but air can be very effective in discouraging pests from entering or remaining in an area. Using strategically directed fans on patios can discourage mosquitoes and flies from aggravating diners and leisure seekers. Restauranters have deterred fruit flies from landing on salad bars with oscillating fans. Pest management professionals flush cockroaches from harborages with compressed air. Air curtains use air flow to keep pests from entering.

An air curtain is simply a metal box with directional louvers, nozzles, a blower and a motor activated by a limit switch. The device creates a thin, non-turbulent, high velocity air stream from the top of the door to the threshold that prevents air, dust, fumes and flying insects from entering a structure when the door is opened. When mounted horizontally on the exterior of a service delivery door, an air curtain will block the attempts of 80–90 percent of flying insects to infiltrate. Another advantage of the air curtain is energy savings; heated or cooled air on the inside is not lost to the outside. An air curtain may be a good investment when dumpsters, recycling bins and trash compacters are located less than 50 feet from kitchen service delivery doors or when spillage from these containers attracts many insects. Periodic cleaning and maintenance are required to remove dust and grease, to change filters and check that air flow is reaching the threshold at the proper angle and velocity.



Air flow can be used to advantage to keep out pollutants and flying insects, and maintain in door temperatures. Photo credit: <http://www.gmp.co.in/NEWSITE/AIR1.jpg>



Mount an air curtain over the kitchen service door to keep flying insects out. Photo credit: U T EP&P

References

Air Curtains: Energy Saving and Occupant Comfort online course

https://www.aecdaily.com/sc.php?node_id=1482822&tabidx=education&subtabidx=osp&company=Berner+International+Corp.

Kolbe, W. A. 2013. Air Currents and Fly Management, PCT Magazine <http://www.pctonline.com/article/pct0613-fly-management-air-currents/>

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) 974-8868
email: kvail@utk.edu
web: <http://schoolipm.utk.edu>
<https://ag.tennessee.edu/EPP/Pages/Vail.aspx>



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>

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

Mary Rogge, Ph.D., Assc. Pro-
fessor
UT College of Social Work
225 Henson Hall
ph: (865) 974-7500
fax: (865) 974-4803

Follow us on
Facebook at
[http://tinyurl.com/
UrbanIPMTN](http://tinyurl.com/UrbanIPMTN)



The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA institution in the provision of its education and employment programs and services. All qualified applicants will receive equal consideration for employment without regard to race, color, national origin, religion, sex, pregnancy, marital status, sexual orientation, gender identity, age, physical or mental disability, or covered veteran status.

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 <http://schoolipm.utk.edu>

NATIONAL IPM INFORMATION

eXtension's Pest Management In and Around Structures: Urban Integrated Pest Management http://www.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
www.ipminstitute.org/

School IPM PMSP—all schools IPM by 2020 <https://ipminstitute.org/projects/school-ipm-2020/>

National Pest Management Association IPM
www.whatisipm.org/

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.

Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The author(s), the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.

Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development. University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating. UT Extension provides equal opportunities in programs and employment.