

Armadillos and Their Control in Arkansas

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One of the more unusual creatures found in Arkansas is the nine-banded armadillo, locally known as 'dillos. **Nine-banded armadillos** (*Dasypus novemcinctus*) (Figure 1) are in the Dasypodidae family, along with sloths and anteaters. Originally from South America, armadillos have expanded their range northward into Mexico, Texas and Arkansas. Armadillos are currently found even in Missouri.

Nine-banded armadillos were first officially reported in north Arkansas in 1921, though they were believed to have been translocated there by people and failed to become an established population. By 1944, armadillos were well established in southwestern Arkansas, presumably naturally expanding from Texas and Louisiana. By 1990, armadillos were reported statewide.

Description and Life History

This unique, unusual-looking mammal has an armor shell of bony scutes with a long tail covered by 12 bony rings. Their mature length from head to tail ranges from 20 to 32 inches. Scutes and tough skin protect their legs and feet, which have curved pointed claws suitable for digging (Figure 2). They have a long, narrow snout with peg-like teeth for consuming invertebrates.

Armadillos have poor eyesight but a keen sense of smell used to hunt their prey. Seventy-five to ninety percent of their diet is invertebrates, primarily beetles and their larvae.



Figure 1. Armadillos are protected by armored scutes that cover most of their body.



Figure 2. Armadillos have a keen sense of smell to detect underground invertebrates and dig with specialized claws.

In every season except winter, they consume beetles, grubs, spiders, centipedes, millipedes and earthworms. In winter, their diet shifts to fly larvae. They occasionally consume fleshy fruits or vertebrates (mostly small reptiles and amphibians), eggs of ground nesting birds and maggots and pupae in carrion.

Armadillos burrow underground to escape temperature extremes. At the end of an armadillo tunnel is a slight enlargement made for building a nest of grass or leaves where they sleep for up to 16 hours a day. Armadillos are

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unable to regulate their body temperature. They cannot survive freezing temperatures very long without their underground nests. Armadillos in their northernmost range may exhibit tattered ears or none at all, presumably because their ears were frozen off.

Armadillos prefer soils that provide easy digging, as found in wooded bottomlands, pine forests, brushy areas and fields. Armadillos live in areas with dense ground cover, stumps, stream banks, old levees, hillsides or similar places. They may inhabit several burrows for escape. Armadillo tunnels are 6 to 26 feet in length. Abandoned tunnels are used by other mammals – woodchucks (i.e., groundhogs), foxes, opossums or skunks.

Although armadillos run when necessary, they move slowly with their noses to the ground in search of prey. Armadillos can cross rivers and streams by paddling their legs or by inflating their stomach and intestines with air and floating across. Several sources report armadillos can hold their breath (some indicating for 6 minutes or longer) and walk across on the bottom; however, it appears this activity has been observed only experimentally.

Armadillos typically mate in midsummer or fall. Young are born mostly from late March through April. Females produce a litter of four genetically identical young of the same gender. The young resemble miniature adult armadillos and are born with their eyes open. Their outer shell is soft and slowly hardens as they age. Newborn armadillos are able to walk within a few hours. The young remain with their mother and nurse until they are several months old.

Identifying Armadillo Signs

Small holes. Typically, small surface holes 1 to 3 inches deep and 3 to 5 inches wide are characteristic of armadillo activity (Figure 3). These can be found in open or wooded areas.

Burrows. Armadillo burrows are typically 7 to 8 inches in diameter (Figure 4) around rock piles, stumps, brush piles or terraces near brush or dense woodlands. Evidence of soil excavation can be present in newly dug burrows.

Tracks. Armadillo tracks are somewhat easy to distinguish from other Arkansas wildlife (Figure 5). Their front feet have four toes and hind feet have five toes. Often their dragging tail will obscure their tracks. Sand or flour can be spread along pathways or in front of a burrow to detect tracks and determine whether the animal is an armadillo.

Visual confirmation. Armadillos can be spotted visually during the time of day they are most active, depending on seasonal temperatures. Trail cameras can be set to determine if armadillos are causing

damage (Figure 6). Typically, armadillos are nocturnal during warmer temperatures and crepuscular (active in early morning and late evening) during moderate temperatures. They shift to daytime foraging during the warmest part of the day in midwinter.



Figure 3. A small hole 1 to 3 inches deep and 3 to 5 inches wide is evidence of armadillo activity. (Photo courtesy of Karan A. Rawlins, University of Georgia, Bugwood.org.)



Figure 4. Burrow entries for armadillos are typically 7 to 8 inches in diameter. (Photo courtesy of Karan A. Rawlins, University of Georgia, Bugwood.org.)

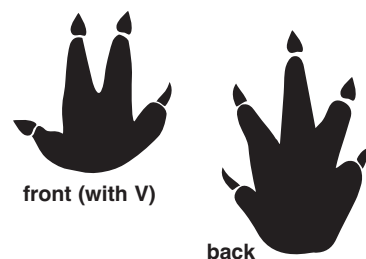


Figure 5. Armadillo tracks are unique, but most are obscured by their dragging tail.



Figure 6. Trail cameras can help determine what creature might be digging holes. (Photo courtesy of Becky McPeake and Jon Barry, University of Arkansas.)

Encountering Armadillos

Most problems associated with armadillos are attributed to their digging (Figure 7). Lawns, vegetable gardens and flowerbeds maintained with fertilizers can provide ideal living conditions for soil invertebrates that armadillos consume. Lawns, pastures, turfgrasses and golf courses are damaged by armadillo holes. Armadillos can also uproot flowers and other ornamental plants. Armadillo burrows are a problem in several circumstances, including when they dig:

- under foundations, driveways and other structures.
- in pastures where cattle and horses may step into holes and injure themselves.
- through levees along rivers and streams, which weakens the ability of the levee to retain water and places communities or farmland at risk of flooding.



Figure 7. Armadillos dig for food, much to the consternation of those striving for a perfect lawn or garden.

Armadillos can keep people awake at night when rubbing their shells against houses or other structures.

Nine-banded armadillos will occasionally consume eggs of domestic poultry and native ground nesting birds, such as bobwhite quail (*Colinus virginianus*) and the eastern wild turkey (*Meleagris gallopavo*). Whether their predation significantly impacts wild bird populations is unclear. Studies of stomach contents of armadillos in Arkansas, Alabama, Louisiana, Texas, Georgia and Florida indicated eggs were not a major portion of their diet. However, armadillos typically break open eggs and lick the insides, leaving little evidence when assessing stomach contents. A study at the Tall Timbers Research Station in Florida used surveillance cameras positioned over bobwhite nests and found armadillos were responsible for destroying up to 25 percent of all nests. In contrast, a recent study in southeastern Arkansas (Brautigam et. al., 2016) used trail cameras to determine which species first destroyed and/or took a chicken egg from artificial ground nests. Of 190 observations, the top predator

was the raccoon (64 percent), with armadillos damaging eggs in only 12 nests (6 percent). Brautigam noted, in most instances, armadillos seemed unimpressed by the eggs, even foraging for grubs and insects underneath the eggs.

Armadillos are prone to vehicle collisions because of their poor mobility and eyesight. In woods and pastures, armadillos move slowly in search of prey and appear to pay little attention to their surroundings. Their armored shell affords protection against potential predators, such as coyotes, but is no match for a vehicle. An armadillo's natural reflex when frightened is to jump vertically 3 to 4 feet. This behavior may startle a potential predator but is fatal to armadillos when hitting a moving vehicle.

Armadillos have been used as laboratory animals for studying *Mycobacterium leprae*, the causative agent of Hansen's disease, also known as leprosy. Hansen's disease is a chronic bacterial disease that primarily affects the skin, peripheral nerves and upper airway. A genetic study at the National Hansen's Disease Program reported armadillos could be a source of this infection in the southern United States. Hansen's disease is very treatable with antibiotics and is rarely disabling when detected early. The first signs of Hansen's disease are usually pale or slightly red areas of skin or a rash on the trunk or extremities. Often there is a decrease in the ability to sense a light touch in the area of the rash. A loss of feeling in the hands or feet may also occur. People with compromised immune systems are more at risk of catching Hansen's disease. When seeking medical advice, inform your physician of any contact with armadillos.

Control Methods

Habitat modification. Armadillos prefer to burrow in areas with escape cover, so removing brush, stumps or other cover will discourage them from becoming established. Some armadillos may be discouraged by filling their burrow entry with a mix of soil and mothballs containing odiferous naphthalene.

Exclusion. Armadillos have the ability to climb and to burrow. Fencing or barriers may exclude armadillos under certain conditions. A fence slanted outward at a 40-degree angle, with the bottom portion buried, can be effective. If armadillos are digging under a foundation, try staking chicken wire flat on the ground around the foundation to discourage further digging. If covering a burrow entry, make sure no armadillos remain in the burrow. Place a live trap in front of the burrow and close the entry only when no armadillos are removed after several days.

Live Trapping. It is legal to live trap and relocate armadillos by state law, but check city, county, and local ordinances. For example, a city or homeowner's association may have rules or ordinances about

setting live traps. The Arkansas Game and Fish Commission (www.agfc.com, 800-364-4263) has specific regulations about live trapping nuisance animals. The trapper must label the trap with one of the following: (a) name and address, (b) vehicle operator's license number, (c) current vehicle license number registered to the trap user or (d) Arkansas Game and Fish Commission customer identification number. The trapped animal must be released unharmed within 24 hours of capture outside the municipality's boundaries on land where permission has been given to release them. Armadillos are not aggressive and are easy to relocate. Experts recommend releasing an armadillo more than 5 miles from the trap location.

Armadillos can be captured in rectangular cage (wire) or box (wooden) trap from 10 height × 12 width × 32 length to 12 height × 14 width × 42 length in inches with two doors allowing entry from either direction. If given an option, a larger trap size is preferable. A larger armadillo's tail could catch the trap door, possibly allowing it to back out of the trap and escape.

Trap placement is key. Place a trap in an armadillo's natural pathway or burrow entrance. A trap's effectiveness can be enhanced by placing "wings" of 1 × 4 inch or 1 × 6 inch boards about 6 feet long (or other old boards, garden fencing, cinder blocks or other repurposed barriers) to funnel the animal into the trap entry (Figure 8). Permanent barriers such as an existing fence or edge of a building can also guide the armadillo into the trap.



Figure 8. Boards can be used to funnel armadillos into cage traps. (Photo courtesy of ICWDM.org and USDA/WS.)

Armadillos can be trapped successfully without bait. Using bait increases the chance of capturing nontarget animals. Gammons et al. (2012) conducted an armadillo trapping trial in Georgia using live nightcrawlers, live crickets, rotten chicken feed, whole eggs, rotten eggs, bananas, marshmallows, sardines, vanilla wafers, moistened soil and a commercially available lure. They found no difference in capture rates for baited and unbaited traps. Another study by Ober et al. (2014) reported baits eliciting the highest attraction were pond worms, crickets, red worms and wigglers; however, they determined these live baits were unlikely to lure

armadillos from great distances. Regardless, if bait is desired, overripe or spoiled fruit can be used to limit capture of nontarget species.

Vendors of a commercially-sold armadillo trap claim more captures in wooden box traps with armadillo scent than unscented wire traps. A university study reported scented wooden traps caught significantly more armadillos than wire traps, while wire traps caught four times as many unwanted species compared to wooden traps. However, because of a flawed study design, the authors could not determine whether the armadillo scent or trap design improved capture rates (Martin et al., 2014). A previous study indicated armadillo scent did not improve capture rates significantly (Ober et al., 2011).

Armadillos are a known carrier of Hansen's disease, also called leprosy. The National Hansen's Disease Program and the Centers for Disease Control and Prevention report the risk of acquiring leprosy from armadillos is extremely low. Despite the low risk, it is advisable to wear disposable gloves when in contact with armadillos and traps. To further reduce the risk of infection, disinfect the trap with diluted chlorine after use.

Shooting. Depending on safety considerations and local regulations, it may be legal to shoot armadillos if causing damage to your property in Arkansas, but only during daylight hours. To shoot armadillos at night, obtain a depredation permit by contacting your local wildlife officer with the Arkansas Game and Fish Commission (www.agfc.com, 800-364-4263).

Toxins, poisons or fumigants. Currently, it is illegal in Arkansas to kill any wildlife with poisons, toxins or fumigants, including armadillos. The exceptions are rats and mice around homes and buildings where human health issues are of concern. Toxins and poisons can harm or cause death in nontarget species (such as your pet or other wildlife) that come into contact with the poison and/or consume a poisoned animal. No fumigants are labeled for armadillo control and are likely not effective anyway, because of the armadillo's underground adaptations.

Insecticide application to lawns. Application of insecticides as indirect control to reduce an armadillo's food source is not recommended. First, there are no known insecticides labeled for armadillo control; therefore, applying insecticides for this purpose is an illegal use of the product. Second, anecdotal evidence suggests reducing an armadillo's food supply in this manner will not guarantee a reduction in digging. In some experimental demonstrations, an increase in digging activity has been reported, presumably as armadillos search more diligently for a limited food supply.

Summary

Nine-banded armadillos are unique in appearance and behavior compared to other Arkansas mammals. Their burrowing and digging activities occasionally cause problems around homes, pastures, golf courses and levees. Several options for reducing damage are available; live trapping and relocation are often recommended. A funnel trap design without bait can be used to successfully capture armadillos. Live trapping and relocation are allowed under state law, but check city, county and local ordinances. Although the likelihood of contracting Hansen's disease from trapping armadillos is low, take precautions and wear disposable gloves when in contact with armadillos to further minimize this risk.

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ACKNOWLEDGEMENT: I am grateful to Blake Sasse, nongame mammal biologist at the Arkansas Game and Fish Commission, for his review of this manuscript. Special thanks to Kathryn Brautigam, graduate student at the University of Arkansas at Monticello, for insights regarding armadillos and nest predation.

Printed by University of Arkansas Cooperative Extension Service Printing Services.

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