

Illustrations BY Taina Litwak

Go Eat WORMS!

Slithery critters mean mealtime for **SHREWS**, the ferocious pint-sized predators that inhabit the spaces under your feet.

BY Jason Abraham


EVER BEEN UP CLOSE to a bug or a worm? Maybe you were carefully watching its writhing flesh, whirling legs, or glistening slime, only to have an adventurous friend or sibling take one look and say, “Dare you to eat it!”

Gross! Probably not much of a decision—a fast reply of “you go first.” But for shrews, the intense *predators* that feast on all things slithery, grubs and worms mean supptime!

Minnesota is home to eight species of shrews, each marked

by a pointy snout, short ears, and inconspicuous but visible eyes. The largest are about the size of a mouse, and some weigh less than a penny—so tiny that biologists have trouble weighing them.

As one of the oldest mammals in Minnesota, shrews have ancestors that probably dodged dinosaurs in their long-ago pursuits of bugs, beetles, and other *prey*. Although all eight of the state’s shrews belong to the same family of mammals, they are uniquely adapted to their specific place in nature.

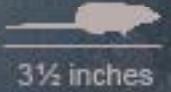
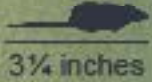


Shrews have the fangs and strong jaws of a predator and can eat several times their own weight in prey every day.



Some shrews have red teeth caused by iron in the tooth enamel. It is thought to reinforce those surfaces, helping to prolong the life of the tooth.

The pygmy shrew is the second-smallest mammal in the world and weighs about as much as a penny.



The prairie shrew and masked shrew are slightly larger.

The masked shrew is nocturnal.

MASKED SHREW, PRAIRIE SHREW, AND PYGMY SHREW

SMALL BUT MIGHTY. Remember when you were small enough to crawl behind the couch and hide in the back of the closet? You had something in common with masked shrews, prairie shrews, and pygmy shrews, the smallest mammals in North America. These tiny shrews weigh just 2 to 4 grams—about the same as a penny—and they use their small size as a mighty advantage.

Creeping through tiny tunnels between

roots, soil, and grass, masked shrews (*Sorex cinereus*), prairie shrews (*Sorex haydeni*), and pygmy shrews (*Sorex hoyi*) specialize in hunting and eating the smallest prey. Their size also allows them to take shelter in cracks and crevices that can't be reached by other predators who'd like to eat them. Even in the coldest winter months, these tiny shrews are running beneath the snow and ice to munch insects and insect carcasses, eggs, larvae, fungus, and

chunks of flesh they find in the leaf litter.

BIG EATERS. That miniature muscle comes with a downside—masked and pygmy shrews must eat their own weight every day just to survive. For a full-sized person, that would be more hamburgers than they could possibly eat—but being voracious is how masked and pygmy shrews maintain their body temperature and stay hydrated. Without constant food, these species of

shrews quickly succumb to the elements.

While masked, prairie, and pygmy shrews are all found in Minnesota, masked shrews are much more common and have been spotted in most counties across the state. The pygmy shrew has been found in only a few locations, mostly in north-central counties. Masked shrews and prairie shrews look so much alike that it's difficult for biologists to tell them apart without comparing genetic material from each species.

NORTHERN SHORT-TAILED SHREW

NINJA SHREW. Wouldn't it be cool to be able to sneak through your home without turning on the lights? Maybe grab a midnight snack without waking anyone up? Minnesota's largest shrew, the northern short-tailed shrew (*Blarina brevicauda*), has adapted the ability to do just that and more.

This shrew is often confused with a mouse because it's about the same size and color, and its tail even resembles a stubby mouse tail. But its ninja-like abilities set it apart from mice and most other animals in Minnesota.

ECHOLOCATOR. The northern short-tailed shrew spends more time underground than any of the other species of shrew. To help it navigate these small, dark spaces, it uses *echolocation*. Like bats, dolphins, and some species of whales, the northern short-tailed shrew can emit high-frequency clicks that bounce off tunnel walls, revealing the location of corners and openings. While bats and other animals use echolocation both to reveal their surroundings and locate prey, northern short-tailed shrews use it only for navigation.

VENOM PRODUCER. As if their echolocating abilities weren't enough, northern short-tailed shrews are also one of only two North American mammals that produce a poisonous substance called *venom*. (The other is the solenodon, a rare mammal that also lives mainly on insects and small mammals found on islands in the Caribbean.)

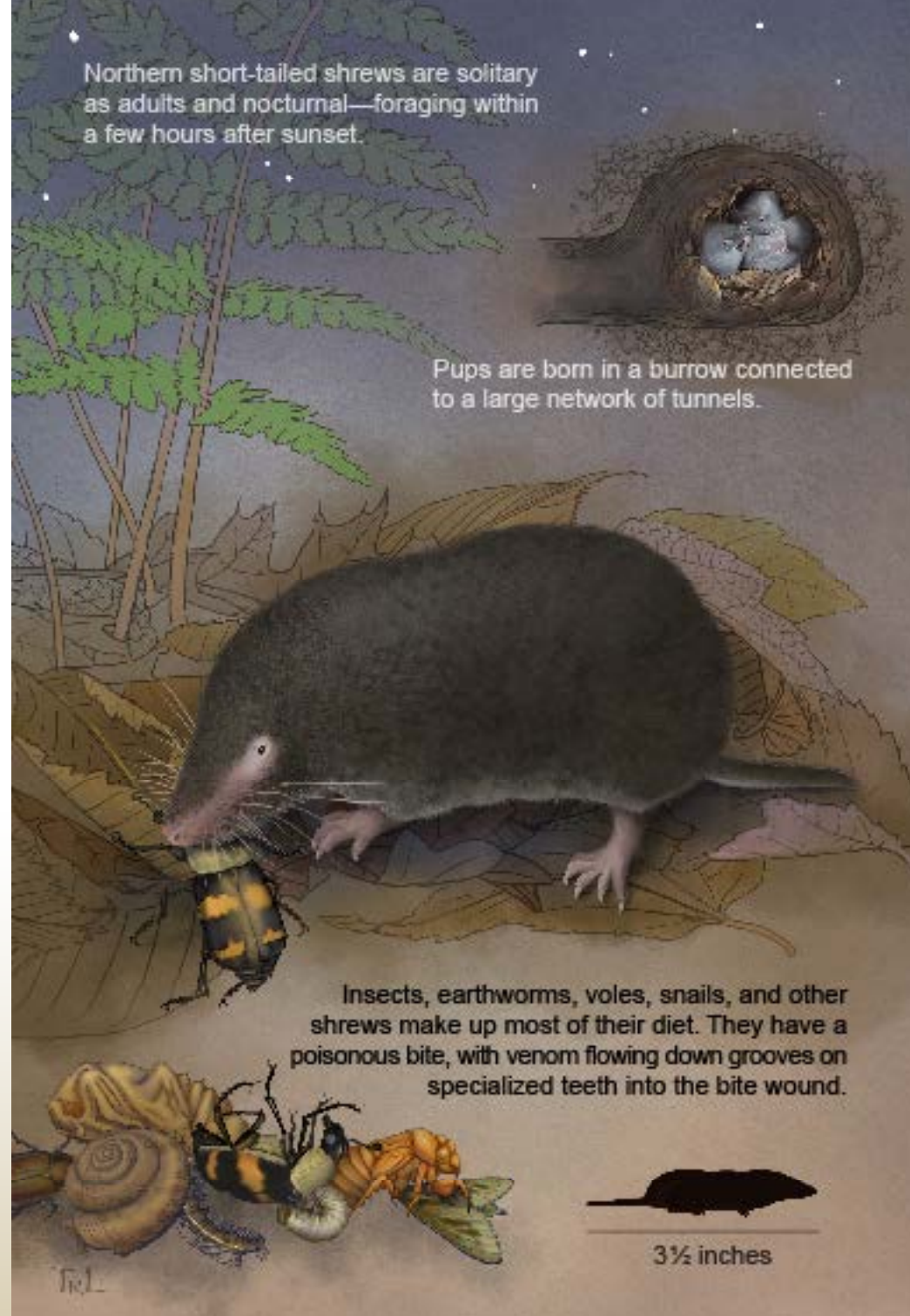
The northern short-tailed shrew produces venom from glands located in its lower jaw that some biologists say is like that from venomous snakes.

SLEEPY SNACKS. Despite this powerful venom, bites from northern short-tailed shrews rarely killed mice in studies with captive animals. Instead, prey animals were often just stunned, becoming groggy and sleepy. One function of these nonlethal bites may be to weaken the prey animal so much that it can't move. This allows the northern short-tailed shrew to store the unconsumed animal so that it doesn't rot and can be eaten later. This behavior is known as *food caching*. Most other shrew species cache the carcasses of dead insects or animals for later consumption.

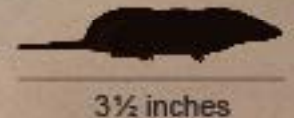
Northern short-tailed shrews are solitary as adults and nocturnal—foraging within a few hours after sunset.



Pups are born in a burrow connected to a large network of tunnels.



Insects, earthworms, voles, snails, and other shrews make up most of their diet. They have a poisonous bite, with venom flowing down grooves on specialized teeth into the bite wound.



LEAST SHREW, ARCTIC SHREW, AND SMOKY SHREW

NOT LEAST. You know how names sometimes just don't fit a personality? That's the case for the least shrew (*Cryptotis parva*), a small species that, despite its name, is larger than the state's smallest shrews—the masked and pygmy shrews. When it comes to unhinged eating behavior, it's anything but least when compared to other shrews.

Weighing about 5 grams, the same as a U.S. nickel, least shrews have been shown to be gluttonous. In one study, a captive least shrew consumed 21 mealworms, 2 beetles, and a cockroach within an hour after it was caught. One biologist in the late 1800s referred to this species as the “bee shrew” after seeing a least shrew feed on bees while living in a nest it had built inside the beehive.

SELDOM SEEN. The least shrew inhabits open grassy and shrubby areas. In Minnesota, the only known records of least shrews are from Winona County, in the blufflands of the southeast. But the lack of records might not mean that least shrews are uncommon. Despite their absence in live traps set by biologists, abundant remains of least shrews are sometimes found nearby in owl pellets. This might indicate that least shrews are better at avoiding biologists' traps than they are at avoiding predators.

NORTHERN NEIGHBOR. Arctic shrews (*Sorex arcticus*) that live in Minnesota are

on the southern end of their species' range. Most arctic shrews live in the wintry boreal forests just south of the Arctic Circle. Their range stretches from Canada's border with Alaska to the Atlantic Coast.

Because they live in dense cover at the edges of bogs and in swampy areas, arctic shrews are rarely seen, and little is known about their habits. In Minnesota, they have been found in cedar, tamarack, and spruce swamps north of the Twin Cities.

IN BETWEEN. In size, arctic shrews are an in-between species, noticeably larger than masked and pygmy shrews but smaller than water shrews. They live on land and are known for eating large numbers of larch sawflies, an invasive insect that can damage tamarack trees, also known as larches.

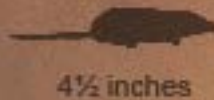
A SPECIAL SHREW. The smoky shrew (*Sorex fumeus*) is the most recently discovered Minnesota shrew species, having first been documented in the state 35 years ago. It is about the same size as the arctic shrew and it is also found in northern counties, but it is very uncommon. Because biologists are still learning when and how it arrived in Minnesota, it is the only shrew listed as a state species of special concern. Smoky shrews are found throughout the Appalachian Mountain range and in the eastern United States and Canada.

Least shrews are very cooperative, building burrows and nests together. They feed and sleep together most of the time.

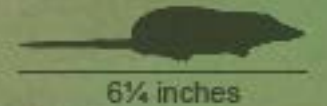


They are known for pouncing on and biting heads of grasshoppers and crickets.

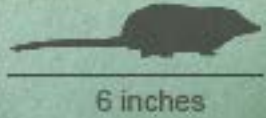
Smoky shrews have been found to have a preference for centipedes.



Larch sawfly larvae make up a large proportion of the diet of the arctic shrew.



Shrews have the fastest heartbeat of any mammal: 500–1,320 beats per minute.



AMERICAN WATER SHREW

THE SHREW THAT SWIMS. How long can you hold your breath? Thirty seconds, maybe close to a minute? That's about the same as the American water

shrew (*Sorex palustris*), a species that spends most of its time in and around lakes, rivers, and wetlands. Weighing about 15 grams—the same as three nickels—this species is the world's smallest mammal that goes underwater.

It's also among the fastest, reacting in microseconds to capture small fish as they try to escape, then delivering a quick bite through the fish's head and neck. Like other shrews, water shrews have eyes and an optic nerve, but their vision is underdeveloped, so they must operate with their other senses.

MOTION DETECTORS. The key to the water shrew's hunting prowess is the prominent whiskers, or *vibrissae*, that cover their snout. These sensitive hairs seem to be connected directly to the shrew's nervous system, which allows shrews to detect changes in the water that reveal the motion of an escaping fish, allowing a quick reaction.

WATER WALKER. Water shrews are the only shrews that have thick vibrissae on their hind feet. These stiff hairs help propel them through the water while staying beneath the surface. The vibrissae are also thick and stiff enough to trap air bubbles that provide enough buoyancy for this shrew to walk upright across the surface of water—at least for a few very fast steps.




NONSTOP SURVIVAL

Have you ever seen a shrew? Maybe you were lucky enough to spot a northern short-tailed shrew, one of the most common in the state, but even those are pretty hard to find. Still, no matter the season, shrews are always scrambling just beneath our feet. The next time you're peacefully walking through a meadow or whiling away the afternoon on a creek bank, consider the drama that might be unfolding just inches away.

Is there a northern short-tailed shrew nearby, ready to stun some unsuspecting animal with a venomous bite? Maybe a water shrew is launching itself at a tiny fish. Could a pygmy shrew be battling with a mouse twice its size? What if a

least shrew is gorging on earthworms right next to your big toe?

The existence of shrews proves that small doesn't mean weak. Shrews are important. They're eating machines who must run, jump, and swim to survive. Without their relentlessness, there might be too many bugs for healthy plants. And without shrews around, owls and other predators that depend on them as prey might go hungry.

Nature, like shrews, is in constant motion. It's all around us. Even when we take a break by a quiet meadow or wade through a tumbling stream, nature is always at work—chasing, eating, whirling, writhing, and never stopping. 

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