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Homeowner Guide to Idaho's Arachnids Around the Home and Field

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Introduction

ARACHNIDS ARE SOME OF THE MOST misunderstood and unfortunately feared organisms people encounter in Idaho and, for that matter, worldwide. Though they often cause the public distress, their place in Earth's tree of life is critical to the healthy functioning of terrestrial ecosystems. Arachnids play an important role as a top predator of arthropods in agricultural fields, grasslands, orchards, the high desert, conifer forests, wetlands, and your neighborhood by eating massive amounts of insects or other small arthropods. For example, they eat an estimated 400–800 million tons of insects per year—compare that with the fact that humans consume approximately 400 million tons of meat and fish annually. Generalist predators that eat almost any insect they can catch, arachnids also serve as important prey for many mammals, birds, lizards, and other animals.

The vast majority of arachnids are harmless to humans. In fact, there is only one arachnid in Idaho that is considered medically important to humans (i.e., possesses dangerous venom), the black widow spider (Figure 1). But what about the hobo spider (Figure 2)? Contrary to you what you may have heard around town, from friends or family, or on social media, the hobo spider is **NOT** dangerous.

Figure 1. A western black widow (*Latrodectus hesperus*, Theridiidae), showing off its classic red hourglass on the ventral side of its abdomen..

Figure 2. A hobo spider (*Eratigena agrestis*, Agelenidae), which is not as dangerous as some people would have you believe.

Figure 3. The three species of scorpion we have in Idaho are the **A**, northern scorpion (*Paruroctonus boreus*, Vaejovidae); **B**, yellow devil scorpion (*Paravaejovis confusus*, Vaejovidae); and **C**, black hairy scorpion (*Hadrurus spadix*, Hadruridae).

Making things even more complicated, a number of harmless spiders resemble some of the dangerous ones, adding more urgency to associations of arachnids with danger. Even the three scorpion species found in Idaho (Figure 3) are not medically important—for example, it would hurt to be stung, but it's not likely to cause any health issues. Hopefully, this publication will help to correct some of these misconceptions you may have about arachnids, help you to more accurately identify those you encounter in the state, and learn a few simple approaches to controlling them.

Important Note

Spiders, scorpions, rattlesnakes, and wasps are all *venomous*. They are not *poisonous*.

What's the Difference?

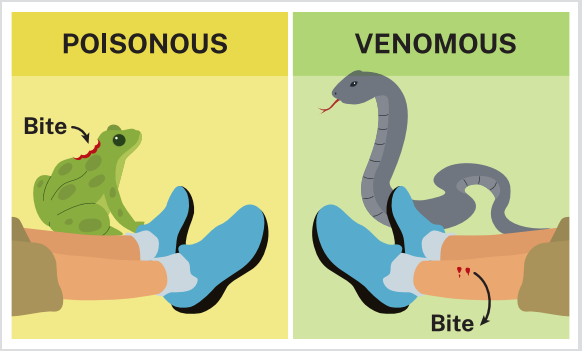

Figure 4. *Venomous* refers to the ability to inject a toxic substance into another body. *Poisonous* refers to a creature that produces a toxic substance that if ingested or absorbed (eating, drinking, etc.) causes injury or death. The one indicates more action and intention than the other.

poisonous. Something that contains a toxic substance in its body that can cause harm if ingested or absorbed by another body.

venomous. The ability to inject a toxic substance into a body.

Think of it this way: If you eat an arachnid, you are not going to get sick and/or die, but they might bite/sting you. If you are stung by a scorpion or bitten by a rattlesnake, you have been injected with venom.

Part 1: What Are Arachnids?

Arachnids (Class Arachnida) are one of the major predatory groups of arthropods on Earth (Figure 5). What are arthropods? An arthropod (Phylum Arthropoda) is broadly identified as an animal that has an external skeleton of hardened plates rather than an internal skeleton of bones. Bees, moths, beetles, spiders, and scorpions are all familiar examples of arthropods.

Figure 5. Three examples of arachnids found in Idaho: **A**, a scorpion; **B**, an opilionid; and **C**, an orb-weaving spider.

Arachnids have eight legs, but do not have antennae or wings. Their body is made up of two major parts: the prosoma (cephalothorax—a fused head and thorax) and opisthosoma (abdomen) (Figure 6). They don't have bones; instead, they have an exoskeleton on the outside—a hard cuticle that gives them their structure, with their muscles, nervous and circulatory systems, and organs on the inside. They shed the cuticle (or it molts), at different times over their life, allowing them to grow episodically instead of continuously (Figure 7). Arachnids are found on all continents on Earth, except Antarctica. They have also colonized almost every terrestrial habitat (deserts, caves, tops of mountains, etc.) and can be found in both freshwater and saltwater habitats.

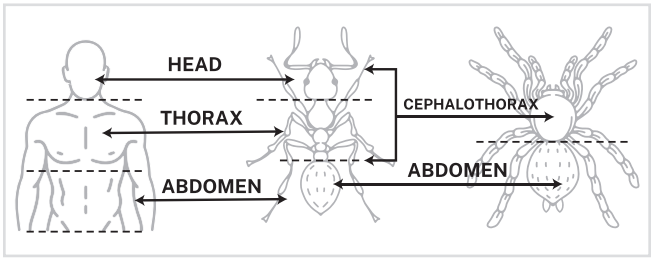

Figure 6. A comparison of the major body sections in arachnids (the cephalothorax and abdomen) and in humans (the head, thorax, and abdomen). The body of spiders is divided into two main parts: the cephalothorax, which bears the mouth parts, pedipalps, and eight legs, and the abdomen, which has no appendages except for small silk-spinning structures (spinnerets) at the tip.

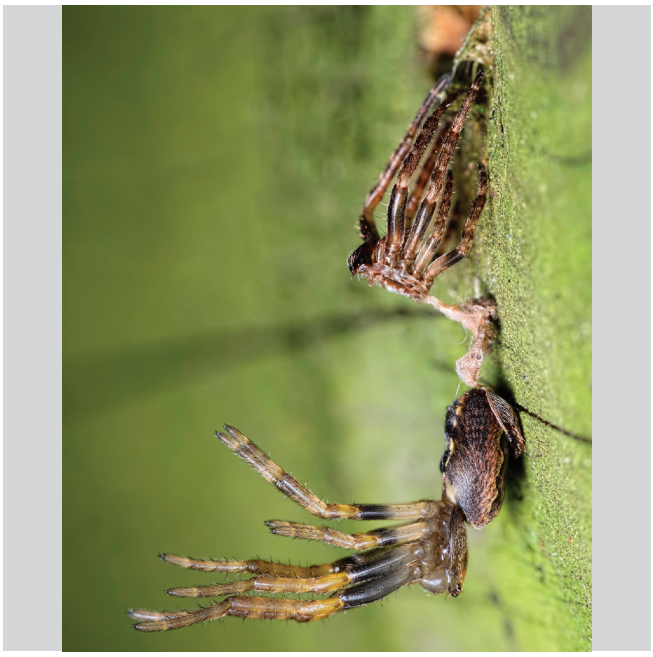

Figure 7. Arachnids grow via shedding their exoskeleton, like this walnut orb-weaving spider, *Nuctenea umbratica*.

The Class Arachnida

The Class Arachnida is divided into eleven orders (Figure 8):

A–B. Acari (ticks and mites)
C. Amblypygi (tailless whip scorpions)
D. Araneae (spiders)
E. Opiliones (harvestmen or daddy longlegs)
F. Palpigradi (microwhip scorpions)
G. Pseudoscorpiones (pseudoscorpions)
H. Ricinulei (hooded tick spiders)
I. Schizomida (short-tailed whip scorpions)
J. Scorpiones (scorpions)
K. Solifugae (camel spiders)
L. Thelyphonida (whip scorpions or vinegarroons)

Only spiders, scorpions, harvestmen (opilionids), pseudoscorpions, camel spiders (solfugids), and mites and ticks are found in Idaho.

Figure 8. Arachnid orders. Only the Acari, Araneae, Opiliones, Pseudoscorpiones, Scorpiones, and Solifugae are found in Idaho. **A**, Acari, tick. **B**, Acari, mite; **C**, Amblypygi, tailless whip scorpion; **D**, Araneae, spiders. This is a tarantula, *Aphonopelma iodius* (Theraphosidae); **E**, Opiliones, harvestman or daddy longleg; **F**, Palpigradi, micro whip scorpion; **G**, Pseudoscorpiones, pseudoscorpion; **H**, Ricinulei, hooded tick-spider; **I**, Schizomida, short-tailed whip scorpion; **J**, Scorpiones, scorpions; **K**, Solifugae, a camel spider or sun spider, found in Pocatello, Idaho; **L**, Thelyphonida, a whip scorpion or vinegarroon.

There are around 100,000 described species of arachnids out of over an estimated one million species—mostly due to our poor understanding of mite diversity on the planet. Arachnids also have an incredibly ancient lineage—the oldest arachnid fossil is a scorpion from the Silurian period (roughly 440 million years ago). The two most diverse groups are the spiders and the mites and ticks (Acari), which make up almost 90% of the described species of arachnid. (Examples of Acari aren't discussed in this publication.) Although most people think of venom when they think of arachnids, only three orders have venom (spiders, scorpions, and pseudoscorpions).

Spiders

Spiders (Order Araneae) are the most well-known of the arachnids (Figure 9). They differ physically from all other arachnids by having their **cephalothorax** (a fused head and thorax) separated from their abdomen by a thin stemlike connection (**pedicle**). In contrast, the cephalothorax and abdomen of ticks, scorpions, harvestmen, and other nonspider arachnids join broadly so that their body appears to be a single structure. There are two major groups (suborders) of spiders: the Mesothelae and the Opisthothelae. The Mesothelae are the most

Figure 9. Spider suborder Mesothelae and suborder Opisthothelae, which include the infraorders Mygalomorphae (trapdoor spiders and tarantulas) and Araneomorphae (orb weavers, jumping spiders, wolf spiders, etc.). **A**, Mesothelae, *Liphistius bristowei* (Liphystiidae); **B**, Mygalomorphae, *Antrodiaetus pacificus* (Antrodiaetidae); **C**, Araneomorphae, *Habronattus hirsutus* (Salticidae).

"primitive" of the spiders and not terribly diverse. They look like trapdoor spiders but have a pseudosegmented abdomen and spinnerets centrally on the ventral side of their abdomen and are also only found in Southeast Asia. The Opisthothelae include the suborders Mygalomorphae and Araneomorphae (Figures 9A and 9B), which make up the vast majority of spider diversity. Mygalomorphs are the some of the largest of all spiders and include the tarantulas, trapdoor spiders, and their kin. Mygalomorph spiders do not build prey capture webs and mostly live in burrows or under rocks or logs. The Araneomorphs are the spiders that most people think of when they envision a spider (Figure 9C). This incredibly diverse group includes orb weavers, cellar spiders, wolf spiders, jumping spiders, crab spiders, etc. Araneomorphs are found in pretty much all ecosystems on the planet (aside from Antarctica). See American Arachnological Society (2017) for more detailed information about spider diversity in the United States.

Biology

One arachnid feature that differs from other arthropods is a pair of "jaws" called chelicerae attached to the front of their "face" (Figure 10). The pair are external mouthpart structures used for eating (in most arachnids). In spiders, however, the chelicerae are part of the mechanism used to inject venom into their prey (tipped with hollow fangs) (Figure 10). The venom helps spiders eat a wide variety of prey, from small soil arthropods to insect pests and even vertebrates. Spiders can only ingest liquid food, so most inject prey with digestive enzymes that dissolve body tissues, a slurry they suck up into their stomach (Figure 11). Some spiders go further, macerating prey between their chelicerae before ingesting the fluids.

Figure 10. A jumping spider (*Phidippus audax*; Salticidae) shows off its chelicerae and fangs.

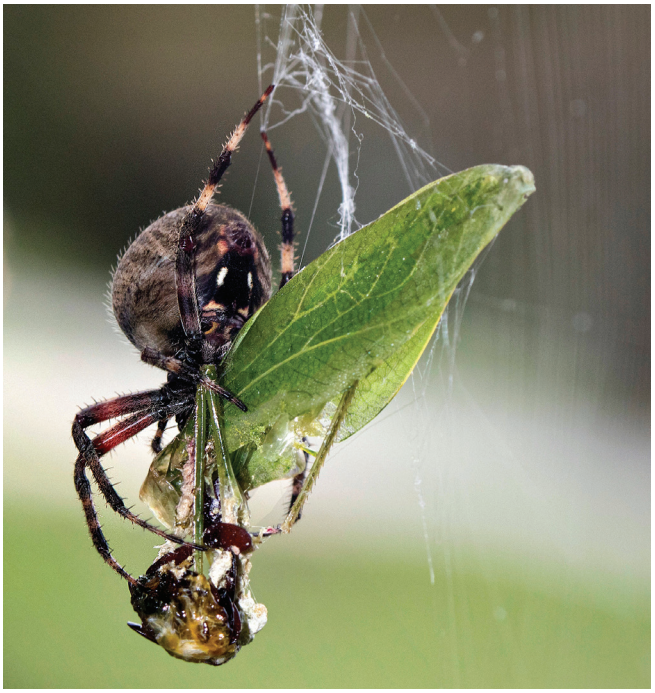

Figure 11. A spider eats by externally digesting its prey via its venom and digestive enzymes. As a spider sucks up its prey into its stomach, the prey becomes a food bolus, a crushed-up ball.

Spiders tend to be generalist predators, eating whatever prey they trap in their webs, hunt down, or can overpower and capture. Some spiders entangle prey in silk before they bite it so that the spider is not injured by large, struggling quarry. Spider legs are tipped with tiny claws, which aid in their ability to grab prey and to walk on many different surfaces. For those that build prey-capture webs, their claws enable them to manipulate the silk. Many spiders have spiny legs, "long" hairy limbs that some people find scary or repulsive. In many spiders, the "hairs" and spines are sensory organs that detect wind currents and other vibrations, like disturbed air currents from the flapping wings of a nearby flying insect or a beetle running past their burrow.

Most spiders in Idaho have eight eyes arranged in two rows across the top and front of their face (Figure 12). A few only have six eyes. Eye size and arrangement help differentiate broad groupings of spiders from each other. Unlike insects, which have compound eyes consisting of thousands of lenses, spider eyes have single lenses. As a consequence, most spiders have poor eyesight. Aside from a few groups, like jumping spiders and wolf spiders, most spiders only see light, dark, and movement. Even if it seems that a spider is deliberately running toward you, most likely it cannot see you. Most spiders depend on sensing vibration rather than visual ability to capture prey (that's the "spidey sense" that Spider-Man uses); they smell and feel the world around them.

Additionally, all arachnids have a pair of segmented appendages called **pedipalps**, which are located behind/to the side of the chelicerae, but in front of the legs. The pedipalps of adult female spiders, as well as all immature spiders, look like miniature legs and are used in handling prey, like our fingers help us to place food into our mouths. In contrast, the pedipalps of adult male spiders have swollen bulbs on their end; these serve as external sex organs that transfer sperm from the genital opening on the underside of the male's abdomen to the opening on the female's abdomen. Adult male spiders are always recognizable because the swollen bulbs at the end of their pedipalps resemble boxing gloves (Figure 13). The bulbs are complex structures that often differ from one species to the next. Because body color and pattern differ from individual to individual, even within the same species, the male pedipalps are an important feature for species identification. This complicates diagnosis because it often means that to identify a spider species, a specimen needs to be a male spider.

Figure 12. Number of eyes and their pattern (or layout) often indicate the taxonomic family, for example a jumping spider (Salticidae) (**A**) and a wolf spider (Lycosidae) (**B**).

Figure 13. Male spider pedipalps look swollen and like boxing gloves. This spider is a mature male jumping spider (Salticidae). The pedipalps of all adult male spiders are swollen at the tips; adult female spiders and all immature spiders, however, have thin fingerlike pedipalps without swollen tips.

The Importance of Silk

Perhaps the most distinguishing feature of all spiders is that they produce silk (Figure 14). Indeed, silk making is one of the spider's most important traits and explains why they can live in so many different habitats. Unlike with Spider-Man, who shoots silk from his hands, the spinnerets of spiders appear at the tip of the abdomen as tiny but visible fingerlike projections, with silk glands inside. Silk is a liquid protein produced by these internal abdominal glands and released from microscopic spigots at the tip of each spinneret. The liquid hardens into a thread by being stretched (or pulled) rather than from exposure to air. The output from many spigots is interwoven to make a single silk thread. Spiders produce up to seven different types of silk for different functions; all of them vary in stickiness. But only the orb weavers make all seven types.

All spiders make silk, but not all of them use their silk to make webs and capture prey. Some use their silk to "balloon" (disperse) to different areas via the air. Immature spiders utilize silk for ballooning when they climb to the top of a plant or other perch and begin making a silk strand. When the strand is long enough, it catches the wind, and, like a parachute, carries the spider to a new location. The seemingly invisible webbing that you feel across your face or arms is probably the silk thread of a ballooning spider. Similarly, web spinners and non–web spinners use silk as draglines, single threads that trail behind them much like safety ropes used by mountain climbers. Spiders often rely on draglines when threatened, because they allow them to drop quickly to the ground to escape danger. For humans, draglines often become household nuisances when dust covers the threads and appear as cobwebs in corners and along ceilings.

Additionally, female spiders utilize silk to protect their eggs by wrapping them in a tough outer silk coat (Figure 15). The result, often called an egg sac, can be attached to the web, attached to the tip of a female's abdomen, and carried around by her—or not attached at all and carried around like a ball, containing dozens to potentially thousands of eggs, depending on the species. The majority of **spiderlings** (baby spiders, Figure 16) that hatch from them normally remain inside an egg case without feeding until their next molt, a week or so later, after which they leave it behind and live independently.

Figure 14. *Argiope picta* (Araneidae) wrapping prey in silk.

Figure 15. *Eratigena atrica* (hobo spider, Agelenidae) and its egg sac.

Figure 16. A green lynx spider (Oxyopidae) and her offspring.

Development

Spiders gradually develop from eggs into adults through a series of immature stages. Development from one life stage to the next occurs by molting: a spiderling sheds its skin and grows to the next larger stage. The exact number of immature stages depends on the species. For instance, once araneomorph spiders reach adulthood, most stop molting and growing. Mygalomorphs are exceptions—they continue to molt and grow as adults, though their physical growth slows down.

After reaching maturity, the two sexes become sexually **dimorphic** (their morphology changes and they look different). Males usually wander off in search of a mate, while females tend to stay close to their web. Males do not tend to live as long as females for a variety of reasons: they stop eating and run out of resources; or predators—including a female spider—eat them (though the latter scenario is actually rarer than popular culture would have you believe). One thing spiders can do when attacked by a predator (or hungry/angry female) is to "drop" or release a leg from the joint in the cephalothorax—freeing them for escape from their assailant—which they regrow during subsequent molts.

The life cycles of Idaho's spiders have not been well studied. But based on our knowledge of other spiders, it seems likely that the majority survive Idaho winters as immature spiderlings in protected places, though some overwinter as adults or eggs. Most require one to two years to complete egg-to-adult development. A short life span is typical of araneomorph spiders, but differ significantly from their sister group, the trapdoor spiders. Mygalomorph spiders live in Idaho for many years (sometimes decades) before they mature.

Spider Bites

Were you bitten by a spider? The most likely answer is NO.

Unless you actually saw a spider bite you, it's unlikely you were actually bitten by one. This is because spiders are actually quite timid and reclusive. They recognize you as being much larger than they are and they're not looking to make you angry or increase the chance that they will be killed. Spiders would much rather escape or flee. In fact, no spider is "aggressive"—meaning actively looking for a fight.

No spider deliberately searches out and attacks people. But they do bite defensively. People usually are bitten when they accidentally touch a spider on its web or otherwise trap a spider against their skin. If a spider should accidentally crawl onto your skin, flick it away rather than squashing it against you. And even if a spider does bite, the amount of venom it injects is usually so small that its effect is mild, causing temporary pain and redness.

Beware the Western Black Widow?

In Idaho, only one native spider is dangerous to humans, the western black widow (*Latrodectus hesperus*) (Figures 1 and 17). In vertebrates, a black widow's venom attacks the central nervous system and can produce symptoms such as anxiety; difficulty breathing; headache; high blood pressure; muscle rigidity and cramping; tenderness and burning or numbness and tingling around the bite; increased saliva and sweating; and fever, nausea, vomiting, and seizures. In general, upper body bites cause chest pain, those on the lower body, abdominal pain. But the health risk is low—no human deaths from black widow or other spider bites have been reported in Idaho. However, note that small children and the elderly are at the greatest risk for serious reactions. If you think you have or someone else has been bitten by a black widow, seek **IMMEDIATE** medical attention.

Figure 17. A western black widow (*Latrodectus hesperus*, Theridiidae).

Almost all spiders are venomous (they produce venom and inject it into prey or as a defense). The one group that isn't includes the Family Uloboridae. These unique spiders have been seen in Idaho but are extremely rare. Though all other spiders have venom, the percentage that are actually dangerous to humans is very small. Most spider venom is mild and only produces itchiness and redness at the injection point. And most times it's difficult to even sense that you have been bitten. But if you do feel one, it most likely feels like a pinprick. Obviously the larger the spider, the larger the fangs—so larger spider bites produce more pain simply because of the mechanical damage of the fang. But fang marks are hardly ever visible, even in cases of known spider bites, because spider fangs are so small.

Diagnosing if a spider bite has occurred is tricky, though spiders are easy to blame (Vetter et al. 2003; Vetter and Isbister 2004). Nearly fifty different types of skin infections, vascular diseases, and other medical conditions produce symptoms that look like spider bites. A bacterial infection called CA-MRSA (short for Community-Acquired Methicillin-Resistant *Staphylococcus aureus*) is commonly misdiagnosed as a spider bite, as are bites from mosquitoes, fleas, bedbugs, and other blood-sucking insects.

Skin infections attributed to spider bites most often occur from miniscule scratches that become irritated or infected. Online sleuths or even medical professionals sometimes mistakenly attribute a number of these wounds to brown recluse bites. Adding to the hysteria, people often assume they have seen a brown recluse (Family Sicariidae) in their house (Figure 18). Thankfully, this is highly, highly unlikely. *Loxosceles reclusa* (brown recluse) is not native to Idaho. If found in the state, it was likely transported from a site located in their native range in the United States during a move. Documented allergic reactions to spider bites—in which the body overreacts to proteins in the venom rather than to its effects—are virtually unheard of, but if an allergic reaction develops, seek medical attention **IMMEDIATELY**.

Scorpions

Scorpions (Order Scorpiones) are the second most well-known group of arachnids (Figure 19). They have maintained the same basic physical characteristics for over four hundred million years. Their distinctive prey-capture and defense mechanisms, tail and stinger (metasoma and telson) and claws/pinchers (chelae), are recognized worldwide.

They also carry venom. In Mexico, North Africa, and the Middle East, scorpions kill many people each year. But in the United States, only one species is dangerous, *Centruroides sculpturatus* (Arizona bark scorpion), and it doesn't live in Idaho. Scorpions sting defensively when they are disturbed and threatened. For example, turning over a rock or piece of wood might provoke one to sting a person on their hand; putting your foot into a shoe in which a scorpion was hiding risks an attack on your foot. If you are stung by an Idaho species, it will hurt (similar to a bee or wasp sting), but the effects (localized swelling, pain, itching) generally last only for a few days.

Figure 18. A brown recluse (*Loxosceles reclusa*, Sicariidae).

Figure 19. *Paruroctonus silvestrii* (Vaejovidae).

The majority of scorpions are nocturnal, when they act as sit-and-wait predators. Most scorpions live in burrows, but also hide under rocks, fallen trees, or other debris. They are generalist predators, feeding on small to large arthropods and even small vertebrates (Figure 20). A less well-known fact is that scorpions give birth to live young, which is extremely rare in terrestrial arthropods. Their pregnancy can last 2–18 months, depending on the species. When the mother gives birth, she cradles the newborn when it emerges from the gonopore and helps it onto her back. The young stays on its mother's back for a couple of molts before going off on its own. After that, scorpions usually live many years; the species in Idaho likely lives 5–7 years.

Perhaps their most unique feature is the ability to fluoresce under ultraviolet light (Figure 21). Like spiders (as well as most other arachnids), scorpions can't see very well. They feel and sense the world around them by using their many sensory hairs and receptors (specialized cells)—chemoreceptors, mechanoreceptors, and photoreceptors. Chemoreceptors are particularly useful because they help scorpions to smell and pick up on the hormones of mates and the scent of prey. The pectines are perhaps the most important sensory structure enabling this ability (Figure 22). Comblike structures located on a scorpion's ventral side, they sweep and touch the ground as a scorpion walks. Pectines are unique to scorpions—the most densely innervated sensory organs in all the arthropods—and play a crucial role in the reproductive process by helping mates to find each other and to signal back and forth.

Three species of scorpion exist in Idaho (Figure 3). Two are in the Family Vaejovidae: *Paruroctonus boreus* (the northern scorpion) and *Paravaejovis confusus* (the yellow devil scorpion); the third is in the Family Hadruridae: *Hadrurus spadix* (the black hairy scorpion). *Paravaejovis confusus* and *H. spadix* are only found in southern Idaho, where they are Great Basin Desert inhabitants. *Paruroctonus boreus* lives throughout the state and even into Canada—it is Canada's only scorpion species.

Figure 20. *Hadrurus spadix* (Hadruridae), eating a centipede.

Figure 21. *Smeringurus* sp. (Vaejovidae), reflecting under a UV light.

Figure 22. Pectines are major sensory structures for scorpions. They sweep them over the surface as they walk.

Camel Spiders

Camel spiders, wind scorpions, or sun spiders are members of the Order Solifugae. Although their appearance frightens some people, they are harmless (except for a very strong pinch/bite) (Figure 23). In spite of their name, they are neither spiders nor scorpions. "Camel" or "sun" in the name refers to the characteristics of their preferred habitat—sunny, windy deserts. "Wind" refers to the speed with which they can move across the ground, often while hunting or to escape from the light. Solifugids are mostly nocturnal predators that use their hairy bodies to "sense" the world around them (a common theme with arachnids). Much like scorpions, during the day they hide in their burrow or under rocks or other debris.

Figure 23. Solifugid (camel spider).

Figure 24. The formidable and fearsome jaws of a solifugid.

When they capture prey, their massive chelicerae and toothed pincer-jaws crush and slice up their quarry. Indeed, their massive "jaws" make them easily identifiable (Figure 24). Solifugids are highly defensive and bite if they are handled or pestered. They have an attitude and use their jaws (chelicerae) to "suggest" you leave them alone. But solifugids are NOT venomous. Any reaction to a bite is caused by the mechanical damage or a bacterial infection of the wound.

Like scorpions, they have very unique sensory structures on their ventral side. These **malleoli** (or racquet organs) are chemosensory structures that are used much like scorpion pectines—to probe the substrate for chemical cues (prey, mates, etc.). Interestingly, people have tried to keep them as pets, like spiders and scorpions, though solifugids are virtually impossible to keep alive for very long—on average, they live for about a year. Researchers think this is because they require a lot of space to roam, hunt, and hide.

Solifugids are found statewide, though they are much rarer in the mountains and northern part of the state; they have been seen around Idaho City, McCall, and Salmon. They prefer the drier, warmer habitats of the sagebrush and canyonlands in the south (the Great Basin Desert) up to Lewiston and the Palouse habitats of northwestern Idaho.

Harvestmen

Daddy longlegs are members of the Order Opiliones (Figure 25). Opiliones are also often called harvestmen ("men of the harvest") because some species gather by the hundreds during the fall. Opilionid diversity centers around the tropics, but the Pacific Northwest (PNW)—in particular Idaho—has some very cool and unique diversity, mostly in its mountains. Because harvestmen do not like being dry, most need humid habitats to survive and thus Idaho woodlands/forests provide safe harbor for a variety of species.

Their general appearance can be misleading, however. At first glance, opilionids look like they have only one contiguous body part. But in reality their body is made up of two parts, just like other arachnids (the prosoma and opisthosoma). Most opilionids also have extremely long, thin, fragile-looking legs (hence the name, "daddy longlegs"),

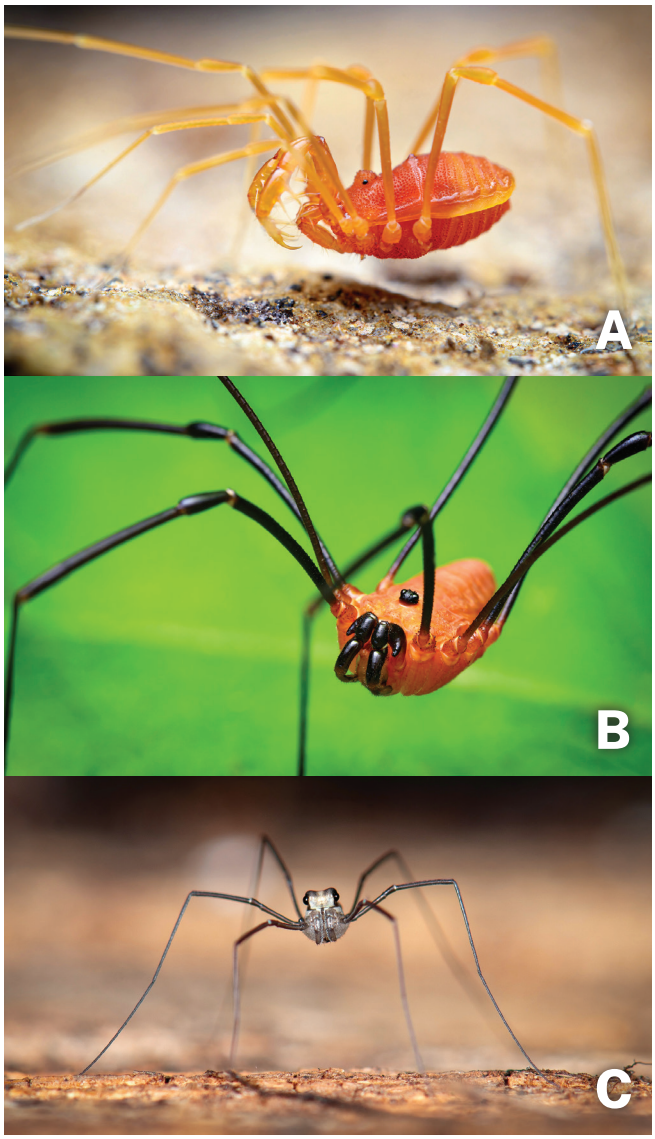

Figure 25. Examples of harvestmen (daddy longlegs; Opiliones). These daddy longlegs are NOT spiders, plus they pose no threat to human health. **A**, *Bishopella* sp. (Phalangodidae); **B**, *Leiobunum calcar* (Sclerosomatidae); and **C**, *Caddo agilis* (Caddidae).

Figure 26. *Leiobunum* sp. (Sclerosomatidae), eating a fly. Opiliones are a mix of predators, omnivores, and detritivores.

though some that are chunky and squat with shorter legs and raptorial palps. Unfortunately, the name *daddy longlegs* can confuse their proper identification because the name also refers to another spider species (cellar spider; see Family Pholcidae). Like all arachnids, adult males are usually smaller than the females.

Opilionids can be predators or herbivores, but most are omnivores (Figure 26). Some are detritivores, organisms that eat dead things—they recycle by eating other dead animals, which is unique for arachnids. When they attack live prey, opilionids use their chelicerae, raptorial palps, and legs to grab and hold on until they are ready to eat. Then they just tear the prey apart, eating them alive. To digest meals, they don't have a sucking stomach (which slurps up digested or smashed-up prey), like other arachnids. They chew their food. Because there are some that are

Are Opilionids (Daddy Longlegs) Dangerous?

Opilionids do not produce silk and are **NOT** venomous. They are **NOT** the most dangerous animal on the planet (a myth/urban legend)—their mouth is too small for them to use it to bite something that's threatening them and they don't have fangs.

But they can produce defensive chemicals to repel predators, which reportedly smell like walnuts or horseradish. These chemical compounds can be cocktails of alcohols and acyclic ketones, naphthoquinones, terpenoids, phenols, or alkylated benzoquinones. The substances irritate the respiratory tract and can harm the skin or make the harvestmen incredibly distasteful.

Interestingly (or weirdly), one behavior that opilionids exhibit is that they drop their legs when threatened. Their legs also "break off" or autotomize (release at the joint) when roughly handled. This predator response allows them to leave a leg with a predator so they can escape and survive another day. Unlike spiders, however, they do not regenerate their legs.

predators, harvestmen have been used successfully in pest management. In New Zealand, they're particularly effective with helping to control cabbage white butterfly populations, which damage cabbage fields, much more successfully than wolf spiders.

Phalangium opilio is the most common daddy longlegs here in North America (Figure 27). They sometimes appear in great masses. This is fascinating behavior because as the opilionids rest, their legs touch their neighbors, greatly increasing the size of their sensory range—like what a web does for a spider. When an individual on the outside senses a threat, the entire group very quickly becomes aware. A number of reasons why they behave this way: 1) it reduces water loss, 2) it facilitates overwintering, 3) it helps them to maintain heat, and 4) it improves success in mating. Additionally, some opilionids that rest in groups exhibit a strange habit of bobbing up and down if disturbed. The activity likely helps them to warm up their leg muscles, while bringing fresh air into their tracheae (branching tubes that pull oxygen into the bodies of arachnids and insects; they don't have lungs like us), enabling them to move away quickly, if needed.

Figure 27. *Phalangium opilio* (Phalangiidae) is one of the most common harvestmen — in fact, the most widespread harvestman species — worldwide, occurring natively in Europe, North and Central Asia, and Asia Minor. The species was introduced to North America, North Africa, and New Zealand from Europe.

Pseudoscorpions

Pseudoscorpions are members of the Order Pseudoscorpiones. These tiny, harmless arachnids (sometimes called false scorpions or book scorpions) resemble scorpions, but lack a metasoma (tail and stinger) (Figure 28). Because of their small size, they are often overlooked; most Idahoans probably have never seen one even though they are fairly common in the state. As an order, they are all relatively similar in appearance. They live mainly under leaf litter, moss, and loose bark on trees where they prey on tiny arthropods. They produce venom, but in a way unique to pseudoscorpions: from the pointy tips of their tiny chelae (claws), which they use to kill their tiny prey (like Collembola—springtails). Most appear to like hunting and stalk their prey instead of lying in ambush. Like spiders, they produce silk but do so by using silk glands on the tips of their chelicerae (jaws). Because of their size, they cannot envenomate a human.

Pseudoscorpions can be found throughout Idaho but are more common in habitats with more moisture, like the mountains. To overwinter in cold conditions, they migrate down into the leaf litter and build a silken retreat to avoid freezing. Like most other arachnids, they can't see very well and perceive the world around them by using their small eyes and

Figure 28. Neobisiid pseudoscorpion from the St. Joe National Forest in Idaho (Pseudoscorpiones, Neobisiidae).

sensory hair structures. When they walk, they hold their pedipalps outstretched in front of them, often with the chelae spread open—very similar to what scorpions do when they walk. They usually walk forward but can run surprisingly fast backward. Pseudoscorpions also have the ability to rapidly turn 180 degrees, which helps them react to potential prey or predators.

A unique reproductive feature is that females hold onto and move around with their fertilized eggs in a special sac (brood pouch) on the ventral side. These tiny arachnids rely on similar transport in general, in that they are notorious for hitching rides on other animals, in particular beetles and flies, whose leg they grab and hold onto so they can ride from one location to another (called **phoresy**) (Figure 29). They also inhabit the nests of a wide variety of other creatures, for example birds, rodents, and bat roosts, often eating their parasites (mites, ticks, lice). Another quasisymbiotic adaptation includes living in beehives, where they eat *Varroa* mites—a horrible bee pest. They have even been found living in people's libraries, eating book lice (hence the name, book scorpion). Although small, pseudoscorpions are fearsome predators and play an important role in eating small arthropods that transmit disease or pester ecosystems.

Figure 29. A pseudoscorpion, hitching a ride on the leg of a beetle (phoresy).

Part 2: Commonly Encountered Arachnids in Idaho

There are around 8,000 species of arachnid in North America and about half of these are spiders. Biologists classify this diversity by sorting them into taxonomic groups (Phylum, Class, Order, Family, Genus, and Species). For example, spiders that share a particular leg structure, the comb foot, are grouped together into the Family Theridiidae or comb-footed spiders (the black widow and relatives). The following are some of the most common arachnids that Idaho homeowners will come across.

Spiders (Araneae)

Spiders can be divided into two ecological groupings: those that catch prey by spinning capture webs and those that catch prey without using capture webs. See American Arachnological Society (2017) for more detailed information about spider diversity in the United States.

Capture Web–Spinning Spiders

These spiders make capture webs with their silk to entangle and trap prey. Web shape and size are often distinctive enough to confidently match spiders to the correct Family.

Family Araneidae — The Orb-Weaving Spiders

These are perhaps the most iconic of all capture web–spinning spiders. They often build large, circular, vertical webs for capturing flying insects (Figure 30).

Figure 30. A mix of Araneidae and Linyphiidae spider webs.

They typically form webs by constructing a frame, followed by a series of radii that intersect a central hub, like the spokes of a bicycle wheel. The spider then weaves a temporary nonsticky spiral, which a sticky or capture spiral replaces as the spider finishes a web. Orb weavers are typically nocturnal, when they wait in their web's central hub for prey to get trapped. These spiders, like most arachnids, have poor vision; vibrations made by trapped prey serve as alerts. Once captured, the spider bites its prey, injects venom, wraps it in silk, and carries it back to the center of the web, where it consumes it. When threatened, araneids often quickly retreat to the edge of a web and hide in a leaf or drop down to the ground.

For maintenance, they sometimes take down their webs in the morning and eat it to recycle the nutrients, putting it back up the next evening. Diurnal orb weavers (active during the day) build their web in the morning and take it down at night.

Other characteristics: Body size ranges from small to large. Many have large, brightly colored abdomens with pointed protuberances and short, thick legs with spines. Often, orb weavers show sexual size dimorphism— smaller males than than females (Figure 31). Most large orb weavers mature in the summer or fall, though some overwinter and mature in the spring. They usually live only one or two years.

This group includes the so-called cat-faced spiders (*Araneus* sp.) (Figure 32). These spiders often build webs around porch lights, where the abundance of moths and other night-flying insects provides ample prey. The spider hides at the side of the web under a protected place. Other commonly encountered orb weavers are *Argiope* sp., garden spiders (Figures 5C, 14), with their vividly colored black and yellow-silver abdomens with 2-inch leg spans. They sit in the center of the orb web they spin between bushes and tall weeds. Webs themselves can be 2 feet or more in diameter and often suspend across garden paths. Prey can be seen wrapped in silk like mummies on the web. Though frightening in appearance, garden spiders pose no threat to human health. They rarely bite people, but if they do it only causes minor localized pain. Orb weavers are common around home landscapes, but with few exceptions, normally do not build webs inside homes. They are clumsy crawlers when removed from their webs and very rarely crawl into homes like some other spiders.

Family Linyphiidae — The Sheetweb Spiders

Sheetweb spiders are the second most diverse lineage of spider on the planet (second only to the jumping spiders). Yet because of their tiny body size, the spiders themselves—but not their webs—often go unnoticed around the yard. Most sheetweb spiders are about ⅛ inch in body size; the largest no more than ¼ inch (Figure 33). They are also orb weavers, but they build their webs horizontal to the ground. They spin irregular horizontal layers or domes

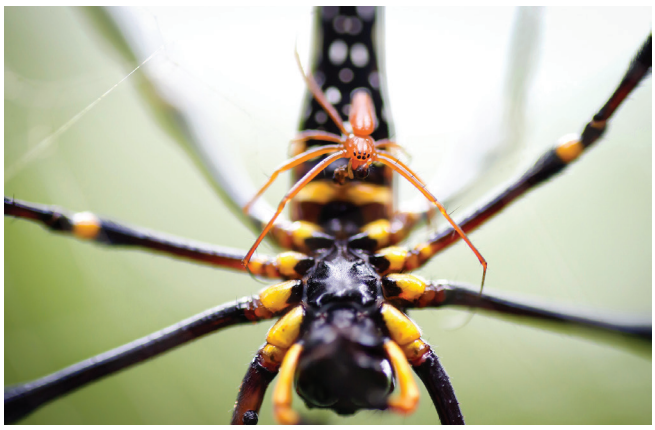

Figure 31. Extreme sexual size dimorphism between a female (large) and male (small) *Nephila pilipes* (Nephilidae).

Figure 32. *Araneus gemmoides* (Araneidae), eating prey in its web in Bonneville County, Idaho.

of web mainly on the soil surface but sometimes between leaves of plants (Figures 30, 34). Linyphiids generally hang upside down beneath the primary sheet (Figure 33). Most live in leaf litter or on the ground surface and their little webs can easily be seen in a yard when the morning dew reflects the light. Because of their size, they feed on very small insects and other arthropods—often pests. Most species are annual (one generation per year). They pose no threat to human health. Confined to outdoor habitats, they are valuable as beneficial predators.

Figure 33. Mature male *Neriene* sp. (Linyphiidae), hanging upside-down in its web in Latah County, Idaho. Notice the "boxing gloves," the male's sexual organs.

Figure 34. Linyphiidae web in Farragut State Park, Athol, Idaho. Sheetweb spiders spin flat scaffolds of web suspended from vegetation by crisscrossed threads. It waits for small prey insects by hanging upside-down under the sheet web.

Family Tetragnathidae — The Long-Jawed Orb-Weaving Spiders

These spiders also produce an orb web, which sometimes looks very similar to that of the Araneidae. But generally, their webs are horizontal and do not have an open hub. Many tetragnathids build their webs near water or in the vegetation over water. The spider can easily be differentiated from araneids because of their unique long "jaws" or chelicerae (Figure 35).

Family Theridiidae — The Cobweb Spiders or Comb-Footed Spiders

Of all Idaho spiders, this family contains the state's only dangerous ones, the genus *Latrodectus*—or the widow spiders. These spiders are frequently encountered because they spin three-dimensional irregular cobweb-style sticky webs in dry, protected places, often near the ground, both outside and

Figure 35. *Tetragnatha* sp. (Tetragnathidae) in Sandpoint, Idaho.

inside the home. As a group, theridiid spiders are characterized by globular, pea-shaped abdomens and thin, long legs that lack spines (Figure 36). They are typically found hanging upside-down in their web, quietly waiting for prey insects.

Cobweb spiders are also called comb-footed spiders because of their row of short bristles (tiny, toothed hairs) that under magnification can be seen on the last section of the hind pair of legs. The hairs serve as a comb to help the spider throw silk strands to anchor prey. Their silk is well known by people because it is extremely sticky. The glue is often placed on strands attached to the substrate which then break when prey touches the line, pulling the prey up off the ground and suspending it helplessly.

Our most well-known cobweb spider is the western black widow (*Latrodectus hesperus*, Figures 1, 17, 36). *Latrodectus* occur statewide but are most common in the southern third. Homeowners often confuse other cobweb spiders in the genus *Steatoda* (Figure 37) with the immature life stages of the black widow. *Steatoda* make the same types of webs as widows and have the same general globular, long-legged body shape. However, *Steatoda* are tan to dark brown with wavy, angular lines on the top of the abdomen, and they **NEVER** have the red hourglass mark on the underside of the abdomen that identifies the black widow (Figures 1, 17). *Steatoda* spiders are beneficial predators that pose no special threat to human health. The body size of most black widow adults, including legs, is about the size of a nickel, while most other theridiids are the size of a dime or smaller.

Theridiid spiders, including the black widow and *Steatoda* species, build cobweb-style snares inside homes, garages, sheds, horse barns, and other buildings, as well as outside under raised patio decks, doghouses, stacked wood and debris piles, basement window wells, and other dry, protected habitats—basically any dark, undisturbed place. Consequently, check your shoes before putting them on if left outside or in the garage. Black widows are actually very calm and tentative but bite if they are cornered or pressed on, like they are getting squished (when someone is putting on their shoe).

The name black widow comes from the misconception that the female always kills and eats the male after mating. Adult male widows are no more than half the size of a female. They often are olive brown but sometimes are black. The upper surface of their abdomen is marked with light stripes and a band down the middle; the lower surface occasionally has a yellow hourglass mark (Figure 36). Color patterns of immature black widows vary; they initially are pale with rows of red or white stripes or spots along the back or a single red spot at the posterior end. Mostly active at night, females commonly are spotted on their web with eggs sacs hanging down. Each whitish-brown pea-size egg sac contains several hundred eggs. A female may produce up to twenty egg sacs during her one-year lifetime—often from only one mating. Spiderlings initially stay on their mother's web but disperse by ballooning within a few weeks. Adults reach maturity within two to eight months.

Figure 36. A male and female *Latrodectus hesperus*, the western black widow (Theridiidae), in the female's web outside Boise, Idaho. This scene accurately represents sexual dimorphism between mature males and females. Cobweb spiders have globular bodies and long, spindly legs. These spiders often hang upside down from their web of messy, tangled threads.

Figure 37. *Steatoda triangulosa* (Theridiidae) outside of Parma, Idaho. *Steatoda* spiders are harmless relatives of the black widow; they lack the red hourglass mark under the abdomen.

Family Pholcidae — The Cellar Spiders

Cellar spiders also are called daddy longleg spiders because of their long thin legs, small body, and light brown color (Figures 38 and 39). In some places in the United States, people use the term "daddy long-legs" to refer to the Opiliones (or harvestmen), which are not spiders (see Harvestmen). The resemblance is superficial. Like all spiders, cellar spiders have two obvious body regions—the cephalothorax and the abdomen—joined by a thin stem-like connection.

Figure 38. *Pholcus phalangiodes* (Pholcidae) with an egg sac in Plummer, Idaho. These daddy longlegs are spiders and are also called cellar spiders, because people come across them there most frequently.

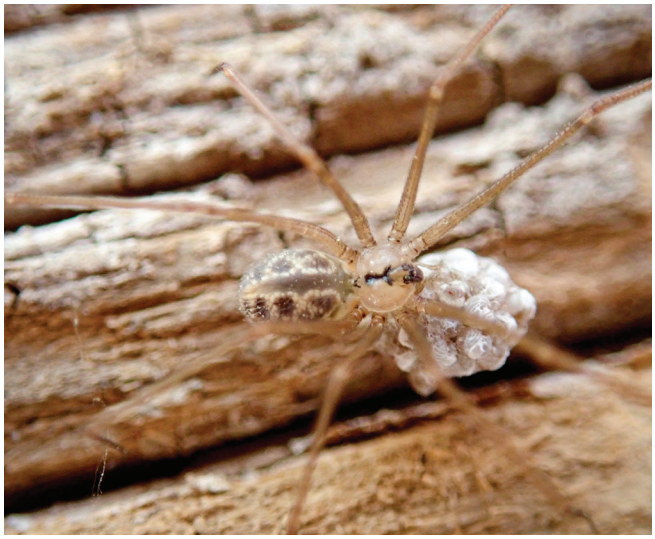

Figure 39. *P. phalangiodes* (Pholcidae) with an egg sac in Twin Falls County, Idaho.

As their name implies, cellar spiders commonly inhabit basements and other dark, damp, undisturbed places inside buildings, especially in corners of rooms and along the ceiling. They make tangled webs where the spider usually is seen hanging upside down. Closer inspection often shows two spiders on the same web—the larger female and the smaller male. Females carry their round, pea-sized egg sac in their chelicerae (Figures 38 and 39). When disturbed, they vibrate back and forth on their web so rapidly that they become a blur. The webs of cellar spiders (rather than the spiders themselves) can become nuisances inside residential buildings. Unlike some spiders that periodically make new webs, cellar spiders continually add to the same web, resulting in large cobwebs with numerous carcasses of dead prey. Substantial populations of cellar spiders also develop inside sheds and garages, where lights are left turned on and doors remain open at night; these conditions attract insect prey that in turn support large spider populations. In the wild, pholcids can be found in dark spaces, under logs or rocks, in leaf litter, and in caves.

Family Agelenidae — The Funnel-Web-Weaving Spiders or Grass Spiders

Agelenids are a very commonly encountered spider in Idaho. They resemble many active hunting spiders (see Spiders Who Capture Prey Without Webs) that don't make a prey capture web (like wolf spiders), instead agelenids spin flat, trampoline-like webs with a characteristic tubular funnel-shaped extension under a rock or other protected place where the spider hides (Figure 40). Common web locations include tall grass, rock gardens, stacked firewood, and dense evergreen shrubs. Though called "funnel webs" by some, these spiders should not be confused with the same-named web constructed by the highly venomous funnel web spiders of Australia, which are mygalomorph spiders, or Idaho's tiny, completely harmless funnel web spider, also a mygalomorph spider (see Family Microhexuridae).

Figure 40. *Agelenopsis* sp. (Agelenidae) outside Garden City, Idaho. Funnel-web weavers build flat webs that narrow into a tubular retreat where the spider hides.

Adult agelenids are typically medium-to-large, brown-colored spiders that run with rapid, darting movements. In many species, the spinnerets are long and can be seen extending from the tip of the abdomen when the spider is viewed from above (Figure 41). Though their eyesight is poor, most agelenids are exceptionally fast runners. They hide in the funnel portion of their web until vibrations from prey walking across the nonsticky web alert the spider, prompting it to sprint out, bite, and inject venom, killing its prey and starting to digest it.

Agelenids are often found in homes because they accidentally wander into our buildings. Most reach maturity in the late summer and early fall, when mature males inadvertently enter a home in search of a female. They sometimes build webs in cluttered basements and crawl spaces where small crawling insects are present. If you come across one in your home, they are easy to scoop up, place into a container, and put outside.

Idaho's most infamous funnel-web weaver is the hobo spider (Figures 2, 42), *Eratigena agrestis*, a species whose bite reputedly causes ulcerating wounds, but this has been debunked. Hobo spiders are not native to the United States, but western Europe, where they're referred to as the European House spider—a common, harmless spider.

Figure 41. *Agelenopsis* sp. (Agelenidae) outside of Meridian, Idaho.

Figure 42. A hobo spider (*Eratigena agrestis*, Agelenidae) in Kootenai County, Idaho. Legs of hobo spiders are uniformly tan, without any striping, spotting, or banding.

People usually notice hobo spiders as lone specimens running across ground-level floors inside homes from mid-July through the first killing fall frost—likely mature males accidentally wandering in from their outdoor webs in search of mates. Development from egg to adult usually requires two years. Hobo spiders survive winters both as eggs laid in the fall and as first-year spiderlings that hatched the prior spring. Eggs hatch during spring and immatures are active through mid-October. After two summers of growth, spiderlings mature during the fall into reproductive adults that mate and lay eggs in silk sacs outdoors under rocks and other protected areas. If you find a hobo spider that looks like it has "boxing gloves," that is a mature male out looking to mate with a female. This characteristic is not unique to the hobo spider; all adult male spiders have enlarged pedipalps that give them a boxing-glove appearance.

Identifying hobo spiders can be challenging. They are not good climbers, so spiders that run across the ceiling or high on a wall are probably not one. Color and markings alone are also an unreliable way to identify them. Indeed, species identification requires expert examination with a microscope. One quick way to determine if a suspect specimen could be a hobo spider is to place it in a transparent container and look at its legs under a bright light. If alternating dark and light marks on the legs appear, as in Figures 2 and 42, it is not a hobo spider. Hobo spiders have uniformly colored legs, a tan brown with no pattern of darker or lighter marks. But many spiders have uniformly colored tan legs, so it is not possible to know by leg color alone if the specimen is in fact a hobo spider. Another body feature that quickly separates hobo spiders from some look-alikes is eye pattern. Under magnification, their eight eyes appear as two slightly curving rows of four eyes each. All eight eyes are the same size and the same color. If some of the eyes are obviously bigger than others, it is not a hobo spider. To be sure about your identification, collect the spider, put it in the freezer to kill it, transfer it to a container of alcohol (isopropyl is fine), and take it to your local University of Idaho Extension office.

Spotlighting the Hobo Spider

Eratigena agrestis (hobo spider) (Figures 2, 15, 42), is one of many species of funnel-web weavers found in Idaho. Hobo spiders normally build webs outdoors around any low landscape feature with cracks or crevices (such as rock gardens or low-growing shrubs) that can shelter the tubular part of a web. The web by itself, however, does not identify the hobo spider because many other funnel-web-weaver species build similar webs outside and inside residences.

E. agrestis was first found in Seattle during the 1940s, first detected in Idaho during the late 1960s, and established statewide in Idaho by the early 1990s. It now inhabits Oregon and Washington, as well as in parts of Colorado, Montana, Nevada, Utah, and Wyoming; populations also have established in southern British Columbia and Alberta. The spider's common name—hobo—was inspired by its initial discovery in the United States along railroad tracks and its presumed movement around the region via commercial shipping.

Spiders Who Capture Prey Without Webs

Active Hunters

These spiders do not make webs to capture prey but instead run down and capture their food. Hunting spiders especially depend on eyesight to locate prey.

Family Salticidae—The Jumping Spiders

Jumping spiders are the most species-diverse family of spiders, with over 6,500 described species. They are found in all continents (except Antarctica) and occur in basically every microhabitat. Most are small, stout-bodied creatures that crawl with short, jerky, hopping movements along windowsills and on home walls—similar to how cats stalk their prey. Most are distinctively colored and covered with short, dense hair. They are extremely active hunters during the day and very inquisitive, often looking like they are watching you and would like to interact with you—studying you, trying to understand what you are. Indeed, they are extremely charismatic and are often very easy to identify because of their very large anterior median eyes (Figures 9C, 10, 13). Their eyes make them unique. Although most spiders can't see very well, jumping spiders see exceptionally well

Figure 43. *Phidippus audax* (Salticidae) in Boise, Idaho. Jumping spiders can be identified by two large eyes that point forward like headlights on its face. With four smaller eyes on the face and one on each side of the head, jumping spiders possess acute vision that helps them to hunt and capture prey.

Figure 44. *Platycryptus californicus* (Salticidae) in Moscow, Idaho.

(better than us) and use their vision to court, hunt, and navigate. They may not be "fast," but they are incredibly agile and "smart."

Salticids are among the most commonly seen spiders inside homes and are absolutely harmless to humans. They are accidental invaders that enter homes at loose-fitting windows or doors. Ecologically, they are significant because they are important natural predators of pest insects. Perhaps the most common species Idahoans encounter is *Phidippus audax* (the bold jumping spider), a large jumping spider species that is grey black with small white spots and shiny green jaws (chelicerae) (Figures 10, 43). Another common species is *Platycryptus californicus* (the flattened jumping spiders), a very enigmatic spider with black, grey, and white stripes (Figure 44). However, they are easily scooped up into a container and placed outside.

Family Lycosidae—The Wolf Spiders

Another spider family that sees much better than most others is the wolf spider. Like jumping spiders, most are very active hunters. Wolf spiders are medium to large, dark-colored spiders with long, spiny legs that dart rapidly over the ground when threatened—like when you mow your yard or turn over rocks and boards lying on the soil surface (Figure 45). Idaho's largest species reach up to 2 inches in diameter measured across their extended legs. Their body color is typically dark brown to grey black with mottled light and dark flecks that camouflage them on the soil surface. Some are boldly marked with a pair of broad dark stripes that run the length of their cephalothorax. One easily identifiable

Figure 45. *Pardosa* sp. (Lycosidae) in Idaho County, Idaho.

Figure 46. Mother wolf spider, carrying her egg sac outside Boise, Idaho. Wolf spiders attach their egg sac to the underside of their abdomen so they can carry it around with them.

Figure 47. Wolf spider mother, carrying her recently hatched babies on her back in Boise, Idaho.

Figure 48. *Hogna* sp. (Lycosidae) in Bannock County, Idaho. This image shows their characteristic eye arrangement with two large eyes over four smaller eyes. Two other eyes (one on each side of the face) are out of view.

Figure 49. A wolf spider eye shines at night outside Meridian, Idaho. You can easily see their eyes by shining a flashlight out into your yard at night.

feature of female wolf spiders is that they carry their egg sacs by attaching them to their spinnerets (Figure 46) and then, for a period of time, carry them on their backs after the spiderlings hatch (Figure 47).

Wolf spiders can be readily identified under magnification by the arrangement of their eyes (Figure 48). The six eyes on the face appear as two distinctively large "headlights" located above a straight row of four smaller eyes, with another pair of eyes positioned on each side of the "head." The arrangement provides the spider with excellent eyesight for stalking or ambushing prey. Their large eyes are not the same as a jumping spider's—although wolf spiders have very good vision, theirs doesn't match the acuity of a jumping spider. But their vision is incredibly important for courtship. Males often have special coloration or tufts of setae (hairs/spines) on the front legs that they use to wave and communicate with a female. One unique feature of wolf spiders is that if you shine a light at the ground at night, you will likely see them because their eyes reflect the light. Do this on a summer night and you'll see just how common wolf spiders are in Idaho (Figure 49).

Wolf spiders are everyday accidental household invaders during late summer and fall. Most do not make retreats, but hide wherever they can, though some species make burrows and are sit-and-wait predators. They do not deliberately attack people but bite if antagonized or accidentally stepped on with bare feet or otherwise pressed on. Bites can be painful, but they do not pose a human health threat. They also can easily be scooped up into a container and put outside.

Family Gnaphosidae—Ground Spiders or Mouse Spiders

Gnaphosids are wandering hunters that are easily identifiable from all other spiders by their barrel-shaped anterior spinnerets (Figure 50). These spiders are probably the most abundant spiders in the drier, open habitats of southern Idaho. They are primarily nocturnal and can be found hiding in leaf litter, under rocks, and within decomposing wood. They are generalist predators, but one very unique feature of this group is that a number of them are ant mimics (and are active during the day), which they use to get predators to leave them alone (not many animals mess with ants). They also eat ants. Gnaphosids are known for hunting other spiders and are common accidental household or workplace invaders because of their active hunting lifestyle but are no threat to humans. They can easily be scooped up into a container and put outside.

Family Cheiracanthiidae—The Long-Legged Sac Spiders

In the United States, we have two species of sac spider, the yellow sac spider (*Cheiracanthium inclusum*, Figure 51) and the long-legged sac spider (*C. mildei*, Figure 52). The former is a native species, the latter introduced from Europe and North Africa. These small spiders are usually pale in color, ranging from yellow to beige. Sac spiders are nocturnal predators often found living and hunting in grasslands and gardens, where they build silken sac-like hiding places in rolled leaves or under rocks. Their mating season occurs in the late spring and egg sac development during June and July. Adults typically overwinter as adults or subadults.

Though they are beneficial predators in agricultural fields, they are thought to be mildly venomous, and their bites can cause problems for humans because the venom is reportedly necrotic—though there is no definitive research to verify this claim. Known symptoms are rather mild. The bite is about as painful as a bee's sting and develops into a red itchy welt around the bite area that lasts a day or so. No human deaths are known from this spider's bite. Sac spiders can be accidental household or workplace invaders because of their active hunting lifestyle but they are generally not thought to be threats to humans. They can easily be scooped up into a container and put outside.

Figure 50. *Sergiolus* sp. (Gnaphosidae) in Moscow, Idaho. These spiders are ant mimics. Gnaphosid spinnerets are very distinctive of this family.

Figure 51. The sac spider *Cheiracanthium inclusum* (Cheiracanthiidae).

Figure 52. The sac spider *Cheiracanthium mildei* (Cheiracanthiidae). This species is not native to North America.

Family Philodromidae—The Running Crab Spiders

The running crab spiders have a flat body and are similar looking to the "true" crab spiders (see Family Thomisidae—Crab Spiders), though this is superficial. They are active hunters and are found on the stems and leaves of plants, where they can be quite cryptic (Figures 53 and 54). These harmless spiders wander into homes and workplaces but are not nearly as common as some of Idaho's other spiders. They can easily be scooped up into a container and put outside.

Figure 53. *Tibellus* sp. (Philodromidae) in Valley County, Idaho.

Figure 54. *Tibellus* sp. (Philodromidae) in Moscow, Idaho.

Sit-and-Wait Ambush Hunters

This group of spiders wait motionless for prey to pass nearby so they can burst out and grab them.

Family Thomisidae—Crab Spiders

Thomisids are classic ambush predators, with some species hiding in flowers where they feed on bees, flies, and other nectar-feeding arthropods. One unique aspect of crab spider biology is that some species can change their body color over a period of several days to match their backgrounds, often white or brightly colored (Figures 55 and 56). Other species use their camouflage to hide beneath loose bark or fence posts, in leaf litter, or among grass roots (Figure 57). Thomisids are the most "crab" looking of all the spiders in the United States (because of how they hold their legs) and are unlikely to be mistaken for anything else, except Philodromidae. Crab spiders frequently enter human homes and while "defensive" (throwing out their front legs to try to scare a predator and make themselves look bigger), they are harmless. They can easily be scooped up into a container and put outside.

Figure 55. *Mecaphesa* sp. (Thomisidae) in Kootenai County, Idaho. Crab spiders often are seen on blooming flowers where they capture nectar-feeding insects.

Figure 56. *Misumena vatia* (Thomisidae) in Island Park, Idaho.

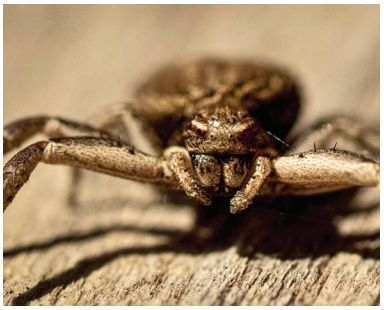

Figure 57. *Xysticus* sp. (Thomisidae) outside Parma, Idaho.

Family Oxyopidae—Lynx Spiders

Oxyopidae are distinctive spiders that might be confused for jumping spiders because they live in the same areas and they hunt and stalk their prey (Figure 58). The easiest way to tell them apart is to look at their eyes—lynx spiders do not have the distinctive large eyes of jumping spiders (Figure 58). They are mostly sit-and-wait predators, often staying on their home plant, even stalking their prey on that plant. Most live in tall grass and herbaceous vegetation and are common inhabitants in agroecosystems where they are excellent biological controls for pests. Lynx spiders have long spines on their front legs, which are distinctive and aid in their sensory perception and prey capture (Figures 16, 58, 59). These harmless arachnids wander into our homes and workplaces, but are easily be scooped up into a container and put outside.

Figure 58. *Oxyopes scalaris* (Oxyopidae) outside Meridian, Idaho.

Figure 59. Lynx spider leg spines.

Family Antrodiaetidae—Folding-Door Spiders

The folding-door spiders are a type of trapdoor spider that lives throughout the state, though many Idahoans have never seen them. *Antrodiaetus* has a broad, flattened cephalothorax with thick spiny legs and stout "jaws" and their spinnerets visibly extend from the end of their oval abdomen. These large, heavy-bodied, tan, orangish, or black spiders (Figure 9B) are Idaho's closest tarantula relatives. (Although no tarantula species are known to have been found in Idaho, if you ever see one please take a picture and email it to the author and include its location.)

Antrodiaetus have a "naked" appearance, though they have a number of larger, harder spines on their legs (Figure 9B). Currently, three described *Antrodiaetus* species exist in Idaho (*A. pacificus*, *A. pugnax*, and *A. montanus*), though there are others that have yet to be described. Like other mygalomorph spiders, the jaws (chelicerae and fangs) of *Antrodiaetus* are hinged so that they only move up and down—whereas araneomorph spiders articulate at an angle (fangs move side to side in a pincer-like motion). Mygalomorph spiders catch prey by using speed and strength to rush out of their burrow, grab, and overpower their prey while they envenomate. Their venom is very mild to humans.

Antrodiaetus build burrows lined with silk. At the entrance they extend the silk and cover it with soil and surface debris (Figure 60). When these "folding-doors" are closed, it is very difficult to find. Nocturnal predators, these spiders set a trap by opening the entrance of the burrow and sitting and waiting for prey to wander nearby. Mygalomorph spiders spend most of their lives in their burrow, rarely leaving

Figure 60. *Antrodiaetus* sp. (Antrodiaetidae) folding-door open at the burrow entrance. To close it, they fold the sides onto each other, which causes the burrow to disappear from view.

it or moving somewhere else. Most people only see *Antrodiaetus* during the mating season, when mature males wander, looking for a female to mate with, or by accidentally digging up a female while doing landscaping or work around the house.

Although their large size (up to 1.5-inch leg span) can startle people, folding-door spiders are not pests, they rarely bite people or pets, and their bites are no worse than a bee's sting—their venom is very mild to humans. The mechanical damage of the larger fangs, however, causes pain. If found in your home, they can easily be scooped up into a container and put outside.

Family Microhexuridae—Funnel Web Spiders
The Microhexuridae has only one genus and two described species. Just one of them lives in Idaho, *Microhexura idahoana* (Figure 61). These "funnel web" spiders are tiny—indeed, **VERY** tiny. In fact, they are the world's smallest mygalomorph spider. They live in tiny ground webs or irregular flattened tubular retreats under rocks, moss mats, or logs (including rotting logs) in the conifer forests of the Pacific Northwest.

These spiders are not likely to be found in homes, but if they are found, they are completely harmless and can easily be scooped up into a container and put outside. You can determine whether a mygalomorph seen in Idaho is *Antrodiaetus* or *Microhexura* by looking at its abdomen: *Antrodiaetus* have abdominal tergites (hard sclerotized plates on the dorsal part of its abdomen), whereas *Microhexura* lack these structures (Figures 9B and 61).

Scorpions (Scorpiones)

Idaho has three species of scorpion (Figure 3). Two are in the Family Vaejovidae: *Paruroctonus boreus* (northern scorpion, Figure 3A) and *Paravaejovis confusus* (yellow devil scorpion, Figure 3B). One species is in the Family Hadruridae: *Hadrurus spadix* (black hairy scorpion). Scorpions are almost always seen as lone individuals and do not require any control. They are not considered pests. None of Idaho's scorpions poses a significant threat to human health—though people can have allergic reactions to the proteins in scorpion venom.

The Family Vaejovidae (devil scorpions) is a diverse family with twenty-five genera and over two hundred species. They are found only in North America (southwestern Canada, the United States, and Mexico) and Central America (Guatemala), where they live in a wide variety of habitats, from the deserts to high-elevation conifer forests—though most are found in the hotter, drier habitats. Many of these species can give painful stings but they are not considered to be medically significant to humans. *Paravaejovis confusus*, along with *H. spadix*, can be found only in southern Idaho, where they are Great Basin Desert inhabitants. *Paruroctonus boreus* (Figure 62) can be found throughout the state and into Canada, where it is Canada's only scorpion species. In Idaho, *P. boreus* is most often found on barren, fissured, or rocky soil on the sloping surface of hills and mountains.

Figure 61. *Microhexura idahoana* (Microhexuridae) are some of the smallest of all mygalomorph spiders.

Figure 62. *Paruroctonus boreus* (Vaejovidae) outside Howe, Idaho.

The Family Hadruridae (giant hairy scorpions) has just two genera and nine species, which are found only in the western United States and Mexico. These are very large scorpions and although their sting can be painful, they are not medically significant to humans. The only species in Idaho is *Hadrurus spadix* (black-back scorpion, Figure 3C). *Hadrurus* are burrowing species that make an almost crescent-shaped burrow in arid habitats.

Harvestmen/Daddy Longlegs (Opiliones)

There are five opilionid species, from multiple families, that Idahoans commonly encounter: *Phalangium opilio*, *Nelima paessleri*, *Acuclavella shoshone*, *Sclerobunus idahoensis*, and *Leiobunum* sp. Opilionids usually travel on the ground around sheds, gardens, woodpiles, and sometimes inside damp basements and crawlspaces. Despite their awkward appearance (Figures 25–27), most daddy longlegs are agile predators of small insects and other arachnids. They typically seek shelter during the day and hunt prey at night. Some species scavenge on dead insects and plant matter. Harvestmen are entirely harmless to people. Aggregations that look like tangled hair balls of twisted legs sometimes occur on the sides of homes during the fall; they cause concern but pose no threat other than being a nuisance. However, they are not pests. Lone specimens may be seen in homes but likely wandered inside. No control action is needed.

Phalangium opilio (Family Phalangiidae) is the most common species in Idaho and it is an introduced species here in North America (Figures 27, 63). This species is a generalist predator and scavenger found in a wide range of habitats, from fields to forests. It is also abundant in anthropogenic habitats and is thus considered a synanthropic species of harvestmen. Because of this, it can be found in habitats modified by humans, such as gardens, agroecosystems, lawns, urban green spaces, walls, and bridges. In agricultural settings, *P. opilio* is common in temperate cropland, living among crops such as corn, alfalfa, small grains, potatoes, cabbage, strawberries, and apple.

Camel Spiders (Solifugae)

Solifugids (camel spiders) are found statewide. They are not a diverse arachnid group in Idaho, but they are also not a group that is well studied. Mostly found in the southern part of the state, they prefer the arid sagebrush and canyonlands in the south (the Great Basin Desert) but can be found in the mountains and northern parts of the state (sightings around Idaho City, McCall, and Salmon), though this is rare. Two species in the genus *Eremobates* (Family Eremobatidae) have been found in Idaho (*E. ctenidiellus* and *E. hodai*) (Figure 64). According to an observation on iNaturalist (a citizen science project), solfugids in the Family Ammotrechidae might have been found in Idaho. They are not pests. Lone specimens may be seen in homes but likely wandered inside. No control action is needed.

Figure 63. *Phalangium opilio* (Phalangiidae) in Latah County, Idaho.

Figure 64. *Eremobates* sp. (Eremobatidae) in Pocatello, Idaho.

Pseudoscorpions (Pseudoscorpiones)

Pseudoscorpions can be found throughout Idaho. These tiny arachnids are rarely noticed due to their small size, despite being common in many environments. When people see them, especially indoors, they often mistake them for ticks or small spiders. In Idaho, they are more common in less arid habitats, like the mountains, where they live in the soil/leaf litter. One common species throughout the state is *Chelifer cancroides* (Family Cheliferidae) (Figure 65), though other species in the families Chernetidae and Neobisiidae have been seen. Not a lot is known about the pseudoscorpion species diversity in the state. They are not pests. Lone specimens may be seen in homes but were likely carried inside on firewood or other insects (via phoresy, where they ride on other organisms to move around). No control action is needed.

Figure 65. *Chelifer* sp. (Cheliferidae) on someone's hand, found in Utah.

The Brown Recluse

In spite of what you may have read in a newspaper or even been told by your physician, the brown recluse spider, *Loxosceles reclusa* (Family Sicariidae), **DOES NOT INHABIT** Idaho (Figure 18). The only documented record from our region occurred during 1978 in Washington when a family from Kansas (where the spider is common) accidentally transported the spider in moving boxes. The arachnid is also known as the violin spider or fiddleback spider due to the dark violin-shaped mark on the top of the cephalothorax (Figure 66). Unless you are an expert, the mark itself is not enough to confidently identify a brown recluse. Other Idaho spiders have violin-like marks along the body. Unlike almost every other spider, however, the brown recluse has six eyes (almost all other spiders have eight), distinctively arranged in three sets of two each along the top and sides of the face (Figure 67). The eye arrangement, in combination with the violin mark, thus differentiates brown recluses from all other spiders. Eye number and pattern are best observed microscopically by an expert. After capturing a suspect (in a sealable container), place it in the freezer to kill the spider, put alcohol into the container to preserve the specimen (isopropyl is fine), and take it to the nearest UI Extension office for proper identification.

The venom of brown recluse spiders can produce large, ulcerating skin wounds around a bite site. Death due to kidney failure has been reported among children but is rare. In most cases, symptoms are minor and the bite heals by itself. Even with these known effects, brown recluse spiders are often blamed for skin lesions actually caused by some other medical condition. Furthermore, physicians mistakenly diagnose recluse bites in states where the spider does not occur. As a case in point, nearly seventy brown recluse bites were reported one year to Poison Control Centers in Idaho, Oregon, and Washington, yet the nearest brown recluse spiders are many hundreds to thousands of miles away.

As its name suggests, the brown recluse is indeed reclusive, hiding during the day and hunting prey at night. It does **NOT** aggressively attack people; it is actually quite calm and timid. In the midwestern United States, infestations of dozens to hundreds of brown recluse spiders have been documented inside homes without any cases of human bites (including the author, who grew up in Kansas and saw brown recluse spiders commonly in the house or garage). People typically are bitten when they accidentally press a spider against their skin, such as putting on clothing dropped on the floor overnight into which a spider crawled.

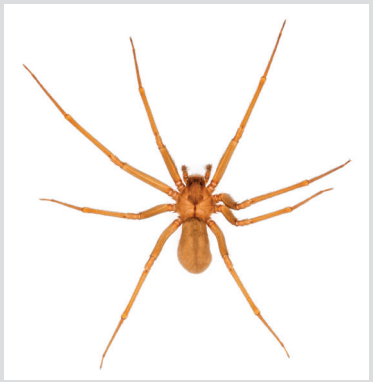

Figure 66. An adult female *Loxosceles reclusa* (brown recluse, Sicariidae). No verified cases of brown recluse spiders are known from Idaho.

Figure 67. *L. reclusa* (brown recluse, Sicariidae), eye pattern and violin shape on the cephalothorax. Other spiders have a similar pattern on the cephalothorax, but none that is violin-shaped. The neck of the violin points backward toward the abdomen.

Part 3: Managing Arachnids

Managing arachnids inside homes or outside around residences—particularly via application of insecticides—is only warranted when you know you might encounter black widow spiders. The other types of arachnids commonly seen outside are beneficial natural enemies of insect pests and never require control action. The key to dealing with nuisance arachnid problems inside residences is recognizing that arachnids are predators—they only survive if ample prey is available. Unless substantial infestations of small insects also are present, no arachnid can establish inside any residence. If you are worried, some useful tips include the following:

Eliminate Outdoor Habitats Next to Home Foundations

Landscape rocks and coarse bark mulches are refuges for ground-dwelling hunting arachnids. Consider replacing these materials with finer-grained products that do not make cracks and crevices where arachnids hide. Mitigate other likely havens: trim background covers, grass, shrubs, and trees so that they do not touch your house, including the roof. Dense vines growing along windows especially can be a source of problems. Remove weeds and trash that accumulate in window wells. Stack firewood away from buildings.

Regular, heavy watering of foundation planting beds with sprinklers also discourages spiders such as funnel-web weavers from establishing, but may create ideal conditions for slugs, sow bugs, and other pests. Watering after lengthy dry intervals, however, can increase problems by flushing arachnids into homes from plantings where they have become established.

Do not leave porch lights on all night. Lights attract small flying insects that in turn serve as spider food. Orb weavers routinely build webs under eaves next to lights. Forcefully spray off webs under eaves and around lights with a garden hose or power washer.

Pest-Proof Your Home

Keep spiders, scorpions, and other arachnids out of your home by weather stripping and caulking around doors, windows, and utility lines. Fill in cracks in the siding and around the foundation; reset loose bricks and siding, which also helps to keep out nuisance invading insects that serve as food for arachnids. Inspect firewood for arachnids and egg sacs before using it in the house.

If You Are Bitten by a Spider or Stung by a Scorpion

Try to remain calm. The only medically important arachnid in Idaho with venom that produces an immediate reaction is the black widow. The Idaho Department of Health and Welfare has no records of human deaths from spider bites or scorpion stings in the state. Immediately contact your physician or emergency room if any bite or sting causes unusual reactions like excessive swelling or breathing difficulty. For more information on spider bites, see https://www.cdc.gov/niosh/outdoor-workers/about/venomous-spiders.html?CDC_AAref_Val=https://www.cdc.gov/niosh/topics/spiders/symptoms.html. For scorpion stings, see https://www.cdc.gov/niosh/outdoor-workers/about/insects-and-scorpions.html?CDC_AAref_Val=https://www.cdc.gov/niosh/topics/insects/scorpions.html.

If possible, collect the spider or scorpion—even if it is smashed—into a small container with a tight lid and take it to the nearest UI Extension office for proper identification. Arachnids are soft bodied and shrivel into unidentifiable remains after they die, so preserve the specimen in rubbing alcohol (isopropyl alcohol) or spirit grain alcohol (such as vodka or Everclear).

Prepare to describe the detailed circumstances about the bite or sting:

- Where and when did you encounter the spider or scorpion?
- What were you doing when the spider bit you or scorpion stung you?
- What symptoms resulted from the bite or sting?

Protect Yourself from Bites and Stings When Working Around Arachnid Habitats

Choose appropriate clothing: Wear gloves when gardening, especially when placing your hands into dense vegetation or when hand weeding along landscaped soils, where spiders and scorpions hide. Wear long-sleeved shirts and pants if you work around crawl spaces or cedar-shingled rooftops. Additionally, shake out any shoes or boots left outside or in the garage before putting them on.

Physically Trap Pests Inside Residences

Commercially available sticky traps can capture large numbers of crawling pests inside residences (Figure 68). Traps are sold under several brand names and all are equally effective. Those that consist of open-ended boxes are less messy to use than traps designed as an unenclosed pad. They are especially useful in late summer through the first freezing fall temperatures, when many types of spiders accidentally wander into homes. Some traps say they are "pre-baited," which means they are ready to use, **NOT** that they are baited with an arachnid-attracting odor. Place traps on floors along walls, near doors, behind furniture, and other places where you see crawling arachnids. The downside of these types of traps is that they trap and kill indiscriminately—whatever becomes trapped—and not all small creatures running around are bad.

Figure 68. A sticky trap is effective and will help manage pests inside the home without having to use insecticide/pesticide, but they kill indiscriminately.

Reduce Clutter in Indoor Storage Spaces

Boxes and other household goods stored in undisturbed basements, crawl spaces, garages, and closets provide arachnids with places in which to hide.

Vacuum Webs Inside Homes and Garages

Remove spiders, egg sacs, and webs by vacuuming room corners and behind furniture. Shop vacuums are good for accumulated webs in basements and crawl spaces. Place the bag (or empty the vacuum contents) into a ziplock bag so that any surviving spiders do not escape into the home.

Apply Insecticides as Outdoor Barrier Sprays Along Foundations

Insecticides by themselves probably will not stop problems with arachnids that move into residences from outdoor landscapes. But if you still routinely find arachnids inside home living spaces after following all of the prior advice, apply insecticides as outdoor barrier sprays along the foundation. Products containing any one of the following pest-killing active ingredients should be equally effective as foundation sprays: beta-cyfluthrin (b-cyfluthrin), bifenthrin, carbaryl, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, gamma-cyhalothrin, lambda-cyhalothrin, and permethrin. These pest-killing chemicals are sold under dozens of different commercial trade names. All are broad-acting nerve poisons that kill both by direct contact with the wet spray and when pests crawl over the dry but treated surface. A single spray should provide immediate control that lasts at least 10–14 days. Use with caution because these are poisons.

The US Environmental Protection Agency (EPA) classifies most of these home barrier products as toxic to people by inhalation, skin contact, or ingestion; the word "Caution" is printed on the label, which designates the lowest (least-toxic) EPA category. A few are moderately toxic to people and contain a "Warning" on the label. None of the homeowner products carry the word "Danger," a label signal word that identifies products that can seriously burn skin or eyes. Unless otherwise

directed by the label, spray a 1- or 2-foot-wide continuous band of insecticide on the soil outside and around the building foundation, spraying upward on the exterior foundation another 2 feet. Spray around doors, windows, utility line entrances, vents, and other exterior-wall openings. It is neither necessary nor desirable to spray entire landscape beds. Broad-scale sprays kill pest and beneficial species alike, including earthworms, lady beetles, and pollinators. Indeed, when arachnids remain outside the home, they too are best considered beneficial species.

"Least-toxic" alternatives to broad-acting pesticides include diatomaceous earth and plant-derived botanical insecticides. These products pose reduced risks to people, pets, and wildlife, but are not necessarily less toxic to beneficial insects and earthworms. Additionally, just because it is less toxic and comes from a plant does **NOT** mean it can't hurt you.

All of these products have limited usefulness as outdoor barrier treatments for home-invading pests. Only three diatomaceous earth products are available to homeowners for outdoor use: Safer Home Ant and Crawling Insect Killer, Natural Guard Diatomaceous Earth Crawling Insect Control Dust, and Concern Diatomaceous Earth Crawling Insect Killer. These should be applied as a light, dry dust to patios, window wells, and around door thresholds. Plant extracts include pyrethrin (which is sold under many different commercial trade names) and the Green Light Biorganic product line of clove, thyme, and sesame-oil sprays. Botanicals can kill when arachnids come into direct contact with the wet spray, but they quickly evaporate, break down, and disappear. **NEVER SPRAY** any yard and garden plants—especially vegetable plants, berries, and fruits for human consumption—unless the pesticide label specifically lists the plant. **DO NOT SPRAY FIREWOOD**. Treated logs may produce toxic fumes when burned.

Use Indoor Sprays Only When All Else Fails

Pressurized aerosol sprays that contain pyrethrins, tetramethrin, allethrin, resmethrin, phenothrin, or bioallethrin may be used to kill arachnids. It only takes a little bit of spray to kill an arachnid. These kill quickly but do not last as long as residual foundation sprays. **NEVER USE YARD AND GARDEN PESTICIDES INSIDE YOUR HOME** unless the pesticide label states the chemical is safe for indoor use. Again, these are poisons—use them carefully.

Further Reading

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