ADVANCED
PEST CONTROL

ADVANCED PEST CONTROL

MODULE 5 SPIDERS

List of Figures

5.1 An Introduction to Spiders (Arachnids)

There are eleven orders of arachnids. These include the scorpions; mites and ticks; harvestmen; pseudoscorpions; whipscorpions; solpugids; and spiders. It is like the relation of beetles with insects: beetles constitute one order of insects, the Coleoptera, but not all insects are beetles. Similarly, not all arachnids are spiders.

Class Arachnida

The class Arachnida is the most familiar of the arthropods outside of the ever-present insects. There are over 80,000 named species, and they are united by the possession of eight legs, chelicerae, and pedipalps, and the lack of biting and chewing mouthparts (food is ingested in most cases as a liquid, though some help is often given the food in becoming liquid by the secretion of, or regurgitating onto or into the food of, digestive enzymes from the stomach.

The arachnids are thought to have evolved in the sea, but now they are almost entirely terrestrial and have developed several important features to help them survive on the land. These include: a waterproof (waxy) exocuticle, internal fertilization, malphagian tubules as a metabolic excretory system, and internal organs for breathing and gaseous exchange. The class Arachnida is extremely diverse in form and in lifestyles, and little more can be said that includes them all. This diversity is reflected in the following classification scheme.

Arachnida Classes

The class Arachnida is divided into 13 subclasses, (or orders, depending on which classification scheme you are following), of which the Araneae (spiders) and the Scorpiones (scorpions) are the best known.

Subclass Scorpiones (Scorpions)
Subclass Pseudoscorpiones (Pseudoscorpions)
Subclass Solifugae (Sun Spiders or Wind Scorpions) Subclass Palpigradi (Miniature Whip Scorpions)
Subclass Uropygi (Whip Scorpions) Subclass Schizomida
Subclass Amblypygi (Whip Spiders) Subclass Araneae (Spiders)
Subclass Ricinulei
Subclass Opiliones (Harvestmen)
Subclass Acari (Mites) Acariformes, Notostigmata, and Parastiformes

Chelicerata

The Chelicerata, which is called a subphylum here for convenience, but which called a phylum in some texts, is an extremely ancient group of arthropods, including the extinct Eurypterida. The Chelicerata includes spiders and scorpions, mites and ticks, horseshoe crabs, daddy-longlegs, and extinct “sea-scorpions", to name a few. It is the second most prominent order of terrestrial arthropods, after the uniramians. Most of its marine representatives are extinct, but were prominent in the Paleozoic Era and included some fearsome predators. There is a theory that the first ancestral chelicerates probably evolved about 600 million years ago.

They are now distinguished from the other arthropod groups by the possession of (at least) six pairs of appendages. These normally include four pairs of walking legs, a pair of chelicerae and a pair of pedipalps. They have no mandibles and no antennae and the body is divided into two, not three,

sections, as in the Uniramia. They are, however, normally bilaterally symmetrical, have a through gut, have uniramous appendages, a non-calcareous exoskeleton, and are gonochoristic. No chelicerates possess jaws for biting and chewing, but suck up their food in liquid or semi-liquid form. However, this food may have been seriously torn up by the chelicerae before ingestion.

Most species go in for external digestion to some extent, meaning they secrete digestive juices onto the food item as it is held close to the mouth or inject digestive juices into their prey's body, and suck up the half-digested soup that results.

The inclusion of the class Pycnogonida in the Chelicerata is generally accepted but not scientifically proven; the fossil record for pycnogonids is very scant and they differ in many ways from the other chelicerates. The Chelicerata contain more than 80,000 species known to science, most of which are Arachnids divided almost evenly between the spiders and the mites.

Phylum Arthropoda; Subphylum Chelicerata

Class Merostomata (Horseshoe Crabs)	5 species
Class Arachnida (Spiders, Mite, Scorpions etc.)	80,000 species
Class Pycnogonida (Sea Spiders)	1,000 species

More on Chelicerates

Chelicerates occupy a variety of roles in the ecology of marine and terrestrial systems. While many spiders build webs, others do not, but instead ambush prey as it passes by. This is also the tactic used by scorpions, another group of chelicerate predators. The predatory habits of these incredible critters helps to control insect populations in many parts of the world.

Some arachnid chelicerates are parasites, such as ticks and mites. They live upon the bodies of other animals and feed on the blood, skin, or hair. Some of these carry diseases, which they pass on to the host when they feed. Still other chelicerates are tiny organisms that feed on detritus, the bits of decaying matter that accumulate on and below the ground.

The first terrestrial chelicerates are believed to have been detritus feeders. Parental care is not common among the chelicerates, but some scorpions will carry their young on their backs for a time. In most cases, however, no such care is provided, and the young must fend for themselves from the time they hatch. Survival is then dependent on the fact that large numbers of eggs are produced at a time, and it is likely that at least a few will survive.

Spiders are Harmless

Most spiders found in the United States are harmless, with the exception of the black widow and the brown recluse spider. The brown recluse spider — a tiny oval brown spider with a small shape like a violin on its back — is found mostly in Midwestern and southern parts of the United States. The bites usually don't hurt at first, and a child might not even be aware of the bite, but in some cases they cause swelling and changes in skin colour and a blister.

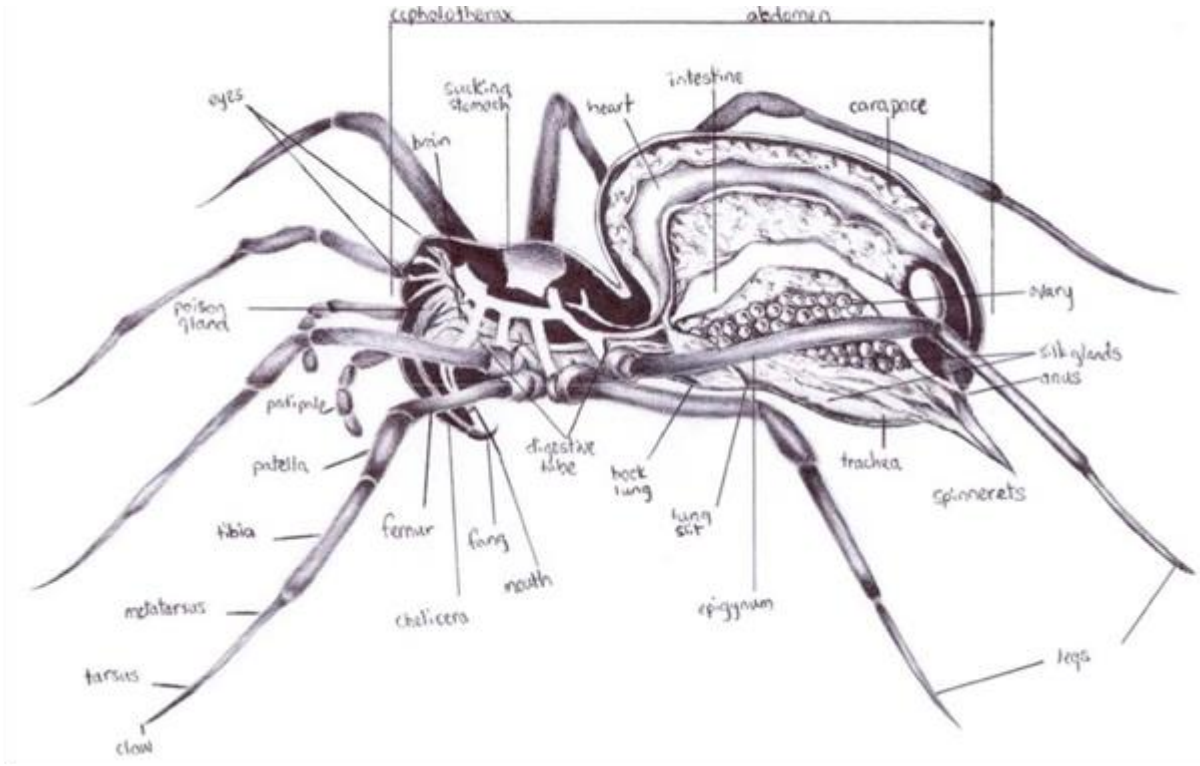
The black widow spider, which is found all over North America, has a shiny black body and an orange hourglass shape on its underbelly. The venom (poison) in a black widow bite can cause painful cramps that show up within a few hours of the bite. The cramps can start in the muscles around the

bite and then spread. The bite may also lead to nausea, vomiting, chills, fever, and muscle aches. If your child has any of these symptoms — or you know that he or she has been bitten — go to the emergency room right away.

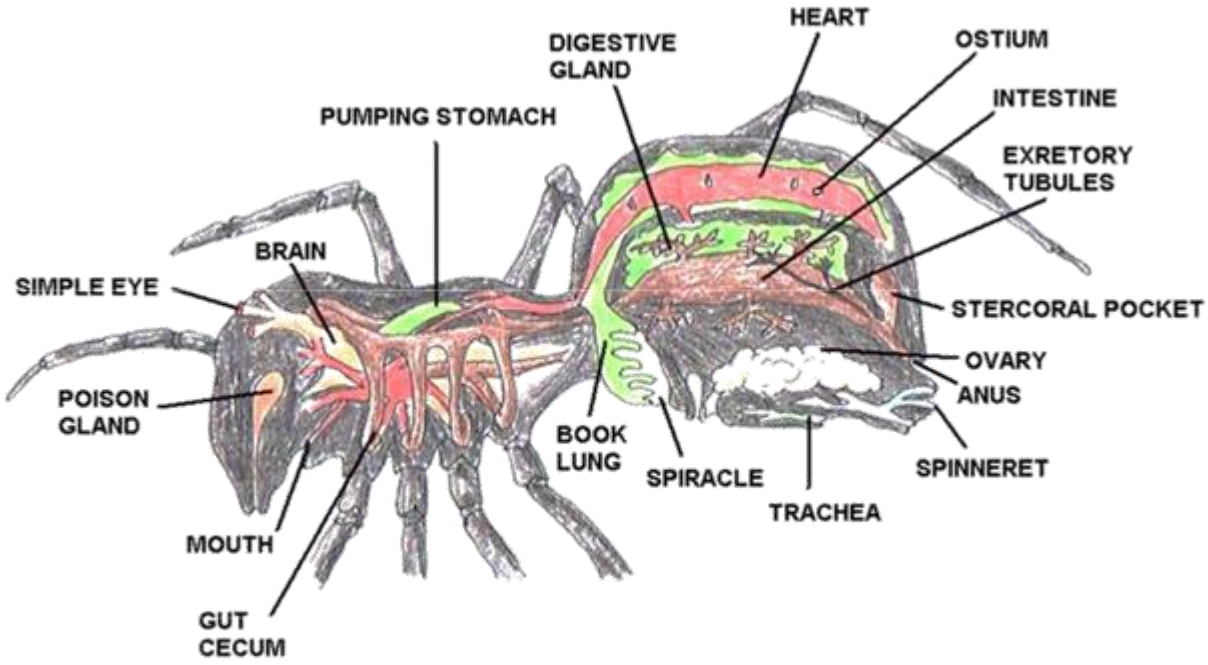
Class Arachnida, Order Araneae

Spiders are mostly terrestrial, of the class Arachnida, order Araneae, with four pairs of legs and a two-part body consisting of a cephalothorax, or prosoma, and an unsegmented abdomen, or opisthosoma. The cephalothorax is covered by a shield, or carapace, and bears eight simple eyes. On the underside of the head (the cephalic part of the cephalothorax) are two pairs of appendages, the anterior pair called chelicerae, and the second pair pedipalps, with which the spider captures and paralyzes its prey, injecting into it venom produced in the poison glands. The spider then liquefies the tissues of the prey with a digestive fluid and sucks this broth into its stomach, where it may be stored in a digestive gland. Breathing is by means of tracheae (air tubes) or book lungs, or both.

Arachnid book lungs are similar to the gill books of horseshoe crabs, but are internal and adapted to a terrestrial habitat. Three pairs of spinnerets toward the tip of the abdomen produce protein-containing fluids that harden as they are drawn out to form silk threads. Several kinds of silk glands and spinnerets produce different kinds of silk used variously for constructing cocoons or egg sacs, spinning webs, and binding prey; other light strands are spun out for ballooning, or floating, the spiders, especially young ones, long distances on air currents.



General Spider Anatomy


HEART
DIGESTIVE GLAND
OSTIUM
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SIMPLE EYE
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BOOK LUNG
SPIRACLE
SPINNERET
TRACHEA
MOUTH
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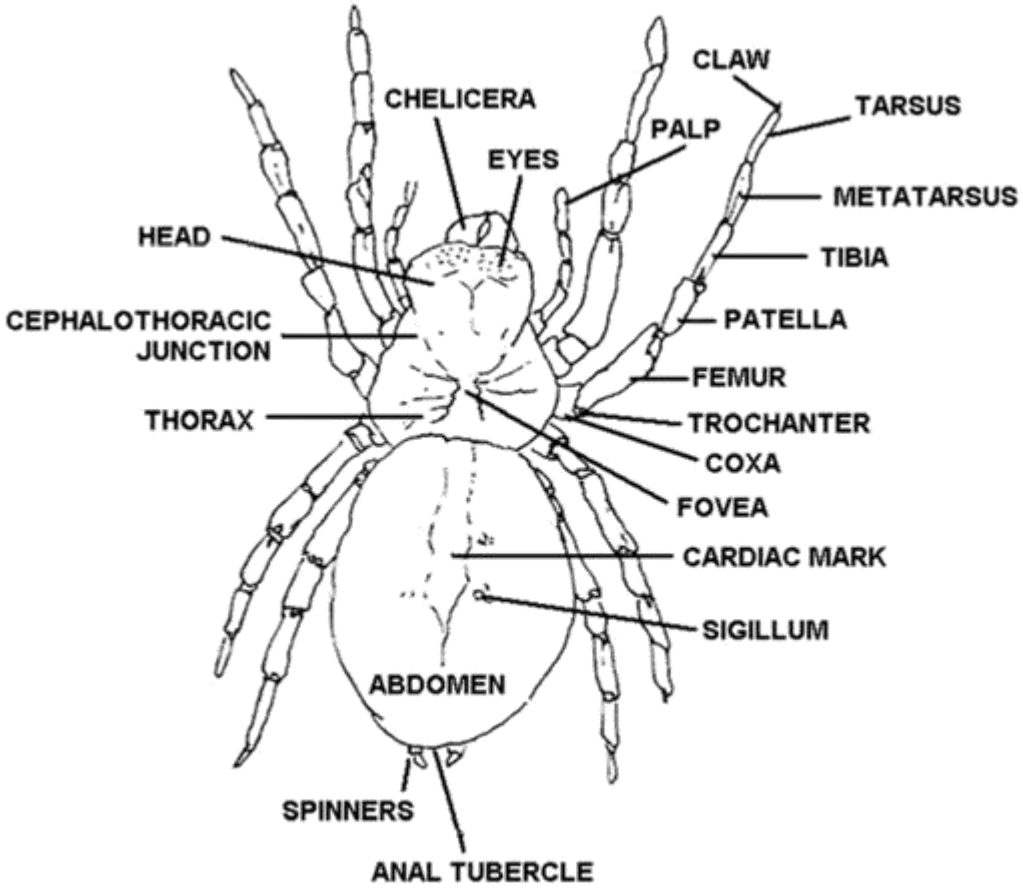

CLAW
CHELICERA
TARSUS
PALP
EYES
METATARSUS
HEAD
TIBIA
CEPHALOTHORACIC JUNCTION
PATELLA
FEMUR
THORAX
TROCHANTER
COXA
FOVEA
CARDIAC MARK
SIGILLUM
ABDOMEN
SPINNERS
ANAL TUBERCLE

5.2 The Life of a Spider

A Spider's Habitat

Spiders can be found in nearly every conceivable kind of habitat. The limiting factor appears to be the lack of available food to prey upon. Many species live outdoors under natural surroundings and seek shelter in ground litter, vegetation under rocks, or in crevices. Those species that build webs may construct them in vegetation or are associated with human dwellings. A few species, such as the house spider, cellar spider, and brown recluse, have adapted to living inside houses. They take advantage of the protection and warmth that our houses provide. It has been stated that usually we are never farther than about eight feet from a spider during most of our lives!

A vegetarian species was described in 2008, but all other known species are predators, mostly preying on insects and on other spiders, although a few large species also take birds and lizards. Spiders use a wide range of strategies to capture prey: trapping it in sticky webs, lassoing it with sticky bolas, mimicking the prey to avoid detection, or running it down. Most detect prey mainly by sensing vibrations, but the active hunters have acute vision and hunters of the genus Portia show signs of intelligence in their choice of tactics and ability to develop new ones. Spiders' guts are too narrow to take solids, and they liquidize their food by flooding it with digestive enzymes and grinding it with the bases of their pedipalps, as they do not have true jaws.

Male spiders identify themselves by a variety of complex courtship rituals to avoid being eaten by the females. Males of most species survive a few matings, limited mainly by their short life spans. Females weave silk egg-cases, each of which may contain hundreds of eggs. Females of many species care for their young, for example by carrying them around or by sharing food with them. A minority of species are social, building communal webs that may house anywhere from a few to 50,000 individuals. Social behaviour ranges from precarious toleration, as in the aggressive widow spiders, to co-operative hunting and food- sharing. Although most spiders live for at most two years, tarantulas and other mygalomorph spiders can live up to 25 years in captivity.

The Biology of a Spider

Spiders range in size from less than 1.0 mm (0.04 in) to more than 10 cm (4 in) in length, with a leg span of up to 20 cm (8 in). A spider's body is divided into two parts: the front portion, called the prosoma or cephalothorax, and the rear portion, called the opisthosoma or abdomen. A narrow stalk called the pedicel connects these two parts.

A hard shell, called an exoskeleton, covers the entire body of a spider. The exoskeleton is made of cuticle, a material composed of a combination of protein and tough fibres called chitin. The cuticle forms thin layers stacked on top of one another, an arrangement that improves the strength and elasticity of the exoskeleton. The spider's cuticle provides attachment sites for many muscles, and it also prevents desiccation (loss of body water). The cephalothorax cuticle is strong and stiff, while the cuticle of the abdomen is soft and extensible. As a spider grows, it sheds or moults its exoskeleton and grows a new one to cover its larger body.

Cephalothorax Structures

The cephalothorax contains a number of structures and appendages: one pair of biting mouthparts known as chelicerae; a pair of poison glands; one pair of short, leg -like appendages called pedipalps or palps; and four pairs of legs. The spider's eight eyes are also located on the cephalothorax.

Mouthparts

When a spider catches prey, it uses a pair of jointed appendages known as the chelicerae, located in front of the mouth opening. Chelicerae resemble tiny pocketknives. Each chelicera has a sharp fang that swings out of its resting position to stab into the victim. Near the tip of the fang is a duct opening that comes from a poison gland. The fang acts like a hypodermic needle—it ejects venom from the poison gland and delivers it into the prey.

Spiders also use chelicerae as multipurpose tools. They have been called the "hands" of the spider. Spiders can use their chelicerae to perform tasks such as digging burrows in the soil and transporting small prey.

Poison Glands

Most spiders have a pair of poison glands that lie within the cephalothorax. Each bulblike poison gland produces and stores toxin. A muscle spirals around the gland. When this muscle contracts, it squeezes poison from the gland through a duct into the fangs of the chelicerae, which then pass the poison into the prey.

Palps and Legs

Behind the chelicerae is a pair of palps, segmented limbs that are used in feeding and as feelers. Male spiders also use palps to transfer sperm to females during mating. Adjacent to the palps are four pairs of long, hairy legs. Unlike human hair, each spider hair found on the legs acts as a sensory organ, sensitive to touch and vibration. Each leg is made up of seven jointed segments, called the coxa, trochanter, femur, patella, tibia, metatarsus, and tarsus. More than 30 muscles control the movement of each leg. In addition, some joints of the leg move by the hydraulic action of body fluid. The tips of the legs have two or three small claws that are used for climbing or grasping the spider's silk thread. Many ground spiders have specialized adhesive hairs beneath their claws, known as claw tufts or scopulae. These claw tufts enable the spiders to walk sure-footedly on smooth, vertical surfaces—even upside down on glass.

Sensory Organs

Most spiders are active at night, and as a result, they use their other senses more than they use their eyesight, which is not well developed. In addition to the thousands of hairs found on the palps and legs that are highly sensitive to touch and vibrations, spiders also have hairs on their feet that they use to taste things.

Most spiders have four pairs of simple eyes (eyes with a single lens) that are located on the front of the cephalothorax. The eyes are usually grouped into two or three rows that form specific patterns in different spider families. This eye arrangement is often used to identify and classify a spider.

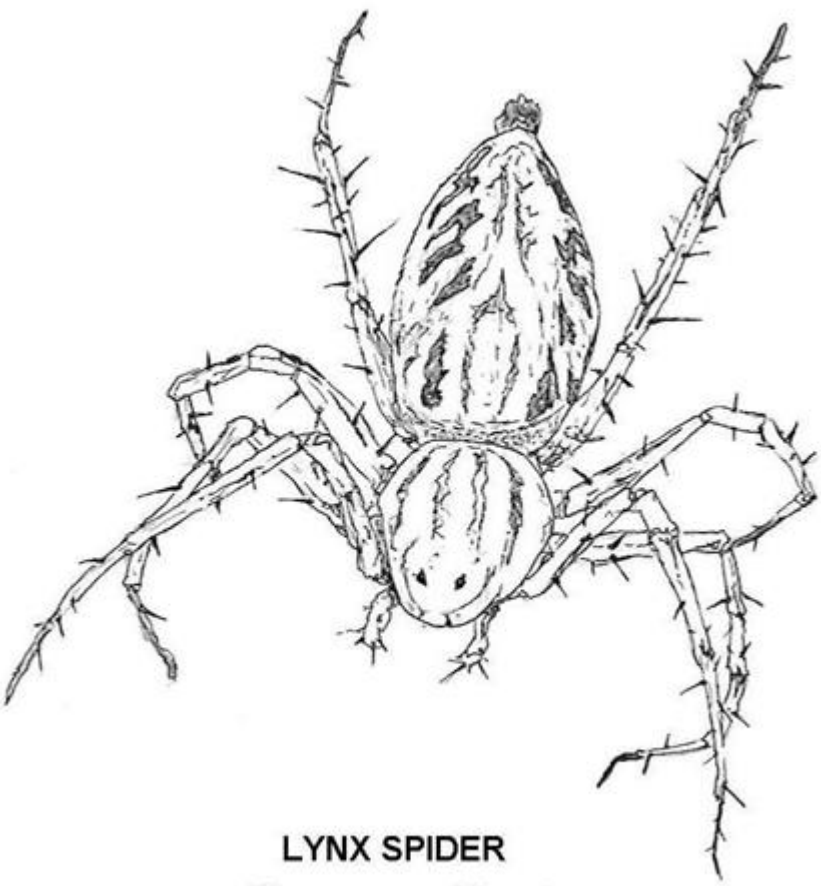
Unlike spiders that are active at night, spiders that are active during the day, such as jumping spiders and lynx spiders, typically have good vision at close range (around 10 to 20 cm, or 4 to 8 in). Their vision easily rivals the eyesight of many insects, which have compound eyes (eyes with multiple lenses).

Spider's Abdomen

The spider's abdomen is soft and saclike. On the underside of the tip of the abdomen are three pairs of spinnerets. Each spinneret is studded with many fine, hair-like tubes called spigots, which produce

a variety of silk threads. The spigots lead to several large silk glands inside the abdomen. Silk is formed as a liquid inside these abdominal glands.

As the silk is drawn out through the spigots, protein molecules within the silk line up parallel to one another, causing the silk to harden and form strong, elastic filaments. The hardening of silk results from the drawing- out process through the spigots, not from exposure to air, as is commonly believed. Several silk threads produced by different spigots may fuse to form a stronger one. Spinnerets are actually shortened limbs. They can move to place silk strands in precise locations when the spider builds a web or wraps prey in silk.



LYNX SPIDER
(Oxyopes salticus)

Internal Anatomy and Function

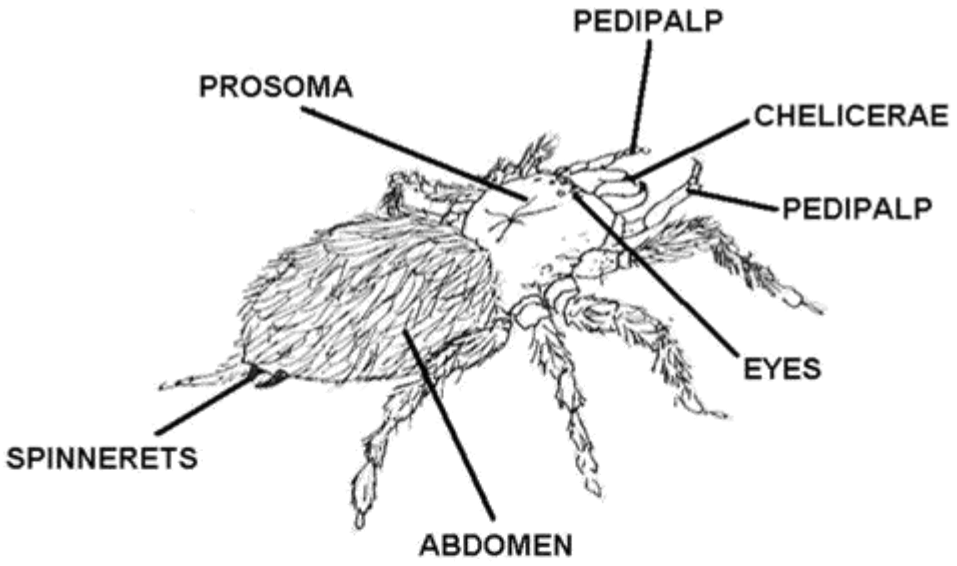
The cephalothorax houses part of the digestive system and the central nervous system. The abdomen contains most of the spider's vital organs, including a long, tubular heart; respiratory organs; reproductive organs; and excretory organs.

Breathing Organs

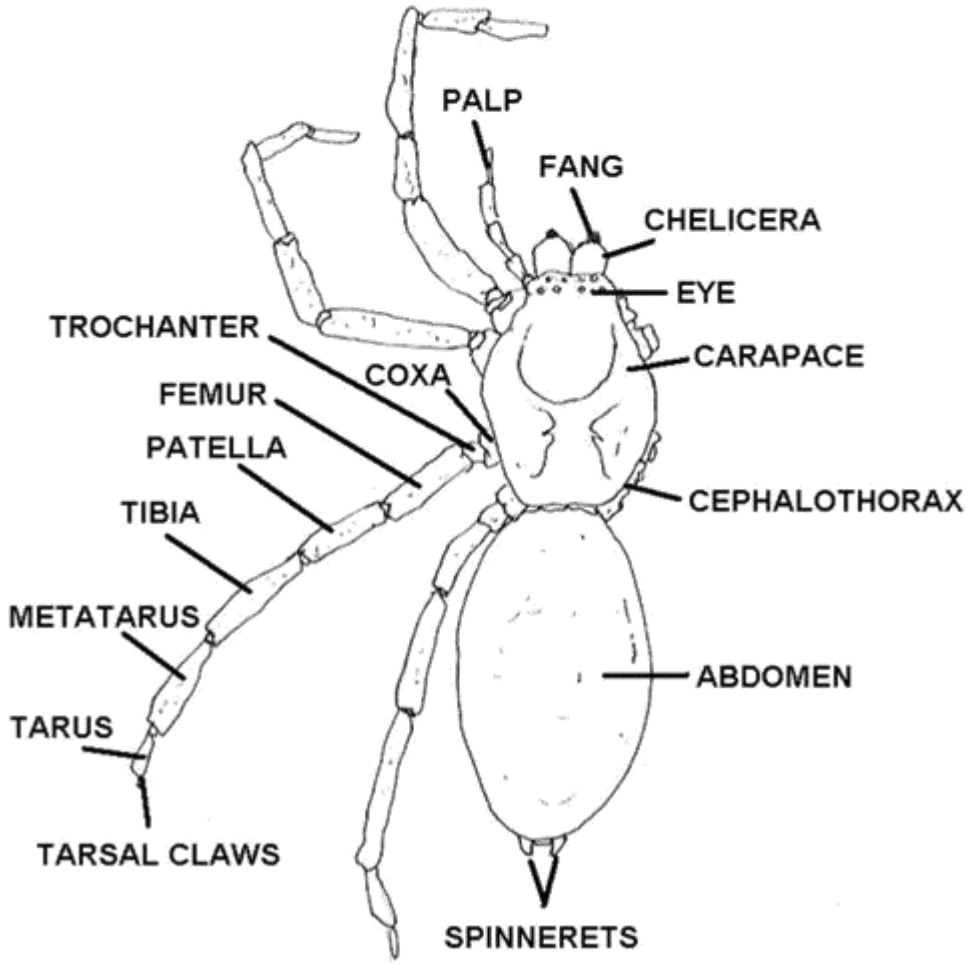
Spiders use two types of breathing organs: book lungs and tracheal tubes. Narrow slits on the underside of the abdomen lead to two or four respiratory organs called book lungs. These organs are so named because they consist of alternating layers of air spaces and thin leaflets of cuticle filled with blood, making the structures resemble a slightly opened book.

Oxygen from the air passes through the extremely thin cuticle leaflets directly into the blood. A small opening in front of the spinnerets, known as a spiracle, leads to tracheal tubes made of cuticle.

These tiny tubes branch and spread throughout the body. Air enters the spiracle and passes through the tracheal tubes so that oxygen can travel to all the spider's body tissues.



SPIDER PARTS



Spider's Blood

Spider blood, also known as haemolymph contains many blood cells with oxygen-carrying pigments called hemocyanin, which give the blood a light blue colour. In contrast, the primary components of human blood are red blood cells carrying the red pigment haemoglobin. Spider blood also contains many other types of blood cells that play a role comparable to that of the white blood cells of humans. Among other functions, these cells play a role in blood clotting after an injury.

The spider's long, tubular heart lies toward the backside of the abdomen. When the heart contracts, it pumps blood forward into the cephalothorax and backward into the abdomen. Blood travels through closed tubes, or arteries, into spaces in the body cavity. From these spaces, the blood travels to the book lungs, where it releases carbon dioxide and picks up a fresh supply of oxygen before returning to the heart.

Digestive System

The digestive system consists of a branched tube that extends from the mouth to the anus. In the cephalothorax, the tube enlarges to form a stomach with powerful muscles. When these muscles contract, they produce a powerful sucking action that pulls food into the midgut. Spider digestion is unusual in that it begins outside of the spider's body. When a spider captures an insect or other animal, it uses its chelicerae to pierce the prey and inject poison into the wound to paralyze or kill the animal. The spider then vomits juices containing digestive enzymes into the wound of the victim to break down and liquefy its body tissue.

This liquefied tissue is then drawn through the spider's mouth and into its body by the sucking action of the stomach. Two mechanical filters in the mouth prevent solid food particles from passing into the digestive system. From the stomach, food passes into the midgut, which branches throughout the entire body. Enzymes secreted by the midgut further break down the liquefied food into nutrient molecules small enough to pass through the walls of the midgut into the blood. Nutrients can be stored for a long time in the spider's extensive digestive system, enabling many spiders to go for weeks or even months without the need to catch any prey.

Nervous System

Most arthropods have a central nervous system made up of a long chain of nerve cell centres, called ganglia that run throughout the body. In spiders, the ganglia are concentrated in the cephalothorax, where they condense into two compact masses: the sub-oesophageal ganglion and the supra-oesophageal ganglion. The sub-oesophageal ganglion directs spider locomotion. The supra-oesophageal ganglion is considered the brain of the spider. Sense organs throughout the body send information to this nerve centre, where information processes and complex functions begin.

Spider's Brain

A spider's brain is relatively highly developed, enabling spiders to easily adapt to changes in their environment. Some scientists believe spiders can learn, and some have observed that spiders can remember where in their web they have stored captured prey; if the prey is removed, the spiders will continue searching for it in the same place for hours.

Spider Reproduction

All species of spiders have two separate sexes, and the males are usually smaller than the females. The male spider has two sperm-producing testes. A sexually mature male spider uses its large palps

to transfer sperm cells into the female during mating. In this process, the male builds a small, triangular sperm web, onto which he deposits a drop of sperm from his abdomen. He then dips both palps into this droplet, drawing sperm cells into the palps as if by a tiny pipette.

The female reproductive system includes two egg-producing ovaries. After the male transfers sperm cells into the female's genital opening, located on her abdomen, they are stored, sometimes for months, in tiny receptacles. These sperm cells fertilize the female's egg cells just before she deposits her eggs into a silky cocoon.

Life Cycle

The life cycle of the spider consists of four stages: egg, larva, young spider, (known as a nymph or spiderling), and adult. Like insects, spiders grow only by moulting, a process that involves periodically shedding their exoskeleton. In each moulting stage, young spiderlings resemble tiny adults, a process known as incomplete metamorphosis.

Courting and Mating

Spiders become sexually mature after their last moult, at which time females have developed functional ovaries and males have mature testes. In most spider species, the male courts the female before mating occurs. After a male spider has filled its palps with sperm cells, he begins searching for a female. A male begins by identifying himself to a female so that she does not mistake him for potential prey. In some spiders, such as American tarantulas, this identification process involves the male repeatedly touching the female. More often, a male courting a female communicates with her over larger distances using vibrations.

For instance, a male wolf spider uses its legs to drum on the ground. In some web spiders, the male attaches a special signal thread to the female's web. The male then drums or plucks the thread in a rhythm that indicates the vibration is caused by another spider of the same species and not by an ensnared insect. If a female is ready to accept a courting male, she may send signals back to him.

Locating the right female can be tricky for a male spider. Fortunately, female spiders produce certain chemical substances, known as pheromones, that aid spider courtship. A female may release these pheromones through the air (like a perfume) or she may deposit them on her silk threads. When a male spider encounters pheromones from a female of the same species, he becomes excited, even if the female is not present.

Spiders with better eyesight may rely mostly on visual signals during courtship. When a male notices a female, he starts a zigzag dance in front of her in which he raises his front legs, vibrates his palps, and twitches his abdomen. Each species uses a different courtship dance with unique movements. A female will only accept a male who performs a dance with movements specific to that species.

When a male finds an interested female, he inserts his sperm-containing palp into the female's genital opening. The process of mating can be very brief (a matter of seconds), or it can last several hours, depending on the species. In most species, both sexes separate peacefully after mating. Contrary to popular belief, the female black widow spider does not necessarily kill her partner after mating. Depending on the species, a female may mate only once or she may mate with several males during her lifetime.

Eggs and Brood Care

In most spider species, a female determines when sperm cells from the female's receptacles will fertilize her egg cells. Fertilization may occur a few weeks after mating, a strategy that enables the female to lay her eggs when she deems external conditions are best. The female then lays her eggs. Most spider species lay several hundred eggs; species of large spiders deposit several thousand within just a few minutes. Typically, the female spider lays her fertilized eggs in a silky case called a cocoon, which provides a protective and insulating environment for the developing spiders. Many females abandon their cocoons right after they deposit their eggs, although they may camouflage them or hang them in hidden locations. Other spiders guard and defend their cocoons until the eggs hatch.

Some spiders exhibit special brood care. Female wolf spiders attach their cocoons to their spinnerets and carry them around until the eggs hatch. The newly hatched spiderlings then climb onto their mother's back, where they stay for about a week before they leave to survive on their own. Occasionally, young spiderlings stay in their mother's web for weeks. During this time, the mother feeds her brood, transferring regurgitated food from her mouth to their mouths.

Development and Growth

Spider eggs hatch inside the cocoon. The first stage hatches from the egg as an immobile, milky white larva. Larvae are covered by an embryonic membrane and receive nourishment from yolk material within their abdomen. After one to two moults over about a two-week period, the larva changes into a mobile spiderling, also referred to as a nymph.

In order to grow to an adult size, spiderlings undergo a series of moults that enables them to increase in size. During moulting, the old cuticle slowly lifts off, while a thin new cuticle forms underneath. The new cuticle is wrinkled and pliable at first, but as moulting progresses and the spiderling grows, the new cuticle stretches to accommodate the larger spiderling body. It later hardens into a new rigid exoskeleton that encases the larger spiderling. The number of moults between the spiderling and adult stage varies according to the size of the species. Small species may moult about five times, while some large tarantulas may moult as many as 40 times. For most spiders, a spiderling's last moult marks adulthood, when functional sexual organs have developed and growth halts. Some adult female spiders, such as American tarantulas, continue to moult repeatedly. Most spiders live only 1 or 2 years. Notable exceptions are large female tarantulas, which can live up to 20 years. Male tarantulas live only 2 to 3 years. Many male spiders die soon after mating.

Behavioural Characteristics of Spiders

Most species of spider are active at night and all are predatory, feeding on a wide range of other invertebrates. Cannibalism may also occur among spiders especially where there is overcrowding. Different species of spiders use a variety of methods to capture their prey, but most usually construct sticky silk webs or threads to trap potential prey. Other species chase their prey often capturing them with rapid lunges. The venom that spiders produce is predominantly used to kill or immobilize their prey by being injected through hollow fangs into the captured animal. The prey is then squeezed or held by the strong basal section of the fangs and saliva in the spiders' upper lip digests the body contents. The insides of the victim are then consumed and the hard outer body discarded.

1) All spiders are predatory, feeding on other smaller animals. Some spiders, for example, the orb weavers, spin silk webs in which to catch prey. Others, such as wolf spiders and jumping spiders, hunt down their prey.

2) Spiders kill their prey by injecting them with venom from their poison glands. The venom is injected using their fang-like chelicera.

Spiders, scorpions and bed bugs are probably the most difficult to control and yet are great money-makers for there is great fear associated with these insects.

5.3 Spider Webs

Spider webs can be quite delicate, or exceptionally strong, depending on the species and age of the spider. Webs of black widows, for example, are expansive (usually about a cubic foot) and incredibly elastic. You can pluck the threads like guitar strings without breaking them. The webs of Nephila orb weavers from tropical regions are so strong that native peoples in Papua New Guinea use them as handheld fishing nets. Spider silk is widely regarded as the strongest natural fabric known, at least half as strong as a steel thread of the same thickness, and much more elastic. Efforts to synthesize spider silk have met with mixed results, but it is not out of the question to imagine a future with bullet-proof vests and parachutes made of spider silk.

Silks, Threads, and Webs

Nearly all spiders produce silk composed of the protein fibroin. This is the same protein produced by silkworms, the larvae stage of certain silk moths. Each spider has four to eight different kinds of silk glands in its abdomen, and each gland produces a different type of silk with different properties. For instance, spiders lay out a line of dry silk behind them as they move about. This dragline acts as a safety line like that used by a mountain climber. Other glands produce cocoon threads that blanket and protect fertilized eggs. Still other glands produce sticky capture threads that ensnare prey.

Spider silk threads are very thin, about 1 micrometre (0.01 mm) in diameter. Each thread weighs very little. A spider web composed of 20 m (70 ft) of silk thread weighs less than 1/1000 of a gram or 1 milligram. Despite its lightness, a spider silk thread is as strong as a nylon thread, but with more elasticity. The combination of strength and elasticity makes spider silk ideal for web building. Spider threads are tough enough to withstand the impact of a flying insect, while being elastic enough not to tear apart with the captured prey's weight.

Types of Spider Webs

Web patterns vary considerably, depending on the species of spider. Perhaps the most recognizable web is the almost circular orb web, in which an outer framework supports a continuous spiralling thread and a series of threads radiating from the centre of the web. Other web types may have a more irregular shape. Some spiders build irregular, flimsy webs. Common house spiders construct funnel webs, flat silk sheets with a raised tube in the corner that serves as a retreat for the spider.

Cobweb spiders build an irregular silk meshwork with sticky threads at the bottom that trap insects. Sheet web spiders construct a horizontal silk sheet with a dome, from which the small spider hangs upside down. Many spider webs are found near the ground or in low vegetation, although orb webs often span the open spaces between bushes or trees in order to trap flying insects. The size of a web depends on the size of the spider. Whether the web has a tight or wide mesh depends on the size of the prey the spider expects to capture.

Web Building

Web building is a complex process, but some spiders can complete a web in less than 30 minutes. Spiders typically build their webs at night, completely relying on their sense of touch, not eyesight, during construction. Each type of spider uses a different procedure when building a web. Spiders that weave orb webs generally begin by spinning a thread that is carried by air currents until it catches on a tree limb or other firm support. From this thread, the spider lays down another thread to form a Y-shaped structure that is the basic framework of the web.

The spider then climbs to the midpoint of the Y-structure, known as the hub, and begins creating radius lines, or spokes, around the web. As the spider builds radius lines, it connects these lines with a few narrow circles of thread in the centre of the web that forms the auxiliary spiral. The auxiliary spiral prevents radius lines from sagging when the spider walks on them. Using the auxiliary spiral as scaffolding, the spider begins the formation of the catching spiral, fastening sticky threads to each radius line. As the spider constructs the catching spiral, it dismantles the auxiliary spiral.

The catching spiral extends from the periphery of the web and stops short of the web's hub. In the finished web, only remnants of the auxiliary spiral remain and there is an empty space in the web's centre known as the free zone. The spider may sit upside down with its legs placed in the centre of its web to detect vibrations in the web when prey gets caught in the sticky catching spiral. Others may hide nearby under a curled leaf and use the vibrations from a signal thread attached to the hub to stay informed when prey has struck the web. The orb web is built anew every day. Some species eat their old web before starting a new web, while others roll up the web and discard it as a tiny silk ball.

Spider Web Types

Many spiders are classified by the type of webs they weave, the different types of webs are:

- Sheet webs
- Dome or tent webs
- Tubular webs
- Funnel webs
- Tangle webs or cobwebs
- Spiral orb webs

Depending on the type of spider, several different types of silk may be used in constructing a web such as a sticky capture silk to a fluffy capture silk. Webs may be constructed horizontally, normally sheet webs, or vertically, predominately orb webs, or any other angle in between.

Constructing an Orb Web

During the making of the orb web, the spider will use itself for measurements. The majority of webs made by spiders span gapes they could not have easily crawled between. They accomplish this by first letting out a fine and very adhesive thread that will drift on the finest breeze across a gap. As soon as the thread has stuck to a suitable position, the spider will walk along it carefully while strengthening it with a second thread. The spider will continue backward and forward strengthening the line in order for it to support the rest of the web. After this thread is strengthened, the spider will continue to construct a Y-shaped netting. With this complete, the web can now be constructed, with more radials being added with the distance between each being small enough to cross. The size of the spider and the web determines how many radials there will be.

Once all the radials are in place, the spider will then move on to fortifying the centre of the web with around five circular threads. After, the spider will spiral outwards using a non-sticky web, with widely spaced threads to be used for moving around the web during construction working from the inside to out.

Then working from the outside in, the spider will replace the non- sticky guide web with a stick web spaced closer together. The spacing between each spiral will be proportionate to the distance from

the tip of its back legs to its spinnerets. This is one of the ways in which the spider will use its self for measuring.
Once the web is completed, the spider will chew of the initial three centre spiral threads then sit and wait for its prey. During construction, if the web becomes broken but without structural damage, the spider will not initially attempt to fix the problem. After having made the web, the spider will wait on or near the web for its prey to fall victim to its sticky trap. Once its prey has become trapped, the spider will initially feel the vibrations from the impact and then the struggle.

Spiders do not normally stick to their own webs thou they are not immune to sticking to them. When moving around there webs they must be careful so not to get stuck by using non sticky threads in there webs.

A spider that positions its self at the centre of the web is very visible to predators such as birds; many orb web spiders that hunt during the day will reduce this risk by hiding at the edge of its web, with one foot on a signal line from the centre of the web.

Spider Web Uses
Some species of spiders do not use there webs for catching prey directly, some spiders pounce from hiding such as trapdoor spiders, or some chase down there prey such as the wolf spider. The Net casting spider uses both methods for catching its prey. The Net casting spider will weave a small net that it attaches to its front legs, it will then lurk in wait for potential prey, when potential prey comes along, and the spider will lunge forward at its prey and wrap its victim in the net, followed by biting and paralyzing its victim. Using this technique, the Net casting spiders' uses less energy. They don't loss energy building a whole web and they don't loss energy from chasing down prey.

Some spiders don't even spin a web, they use the signalling technique. There are several types of water dwelling spiders that rest their feet on the surface of the water. Then when an insect falls into the water and breaks the water's surface tension, they become trapped; the spider senses the vibrations through the water and runs out to capture the prey. Spiders webs are rich in vitamin K which can be very effective at clotting blood, in traditional European medicine, webs were used to help heal wounds and cuts and to reduce bleeding.

Communal Spiders Webs
Spiders may build webs together occasionally, in the same area. One measuring 500 feet (180 meters) across was reported at Lake Tawakoni State Park in Texas.

Enemy of Spiders
The greatest enemy of spiders, aside from frightened human beings, might be other spiders. Even some web-weaving spiders, such as cellar spiders in the family Pholcidae, can leave their own webs to stalk other spiders in their webs. Thread-legged assassin bugs in the family Reduviidae patiently approach spiders in their webs and then nab them lightning-fast with their vice-like front legs. Giant tropical "helicopter" damselflies hover in front of spider webs and pluck the spider off. Mud dauber wasps tug on spider webs to mimic an entangled insect, then grab the spider and sting it into paralysis. The immobile spider is then stored in a nest as food for the wasp's offspring.

Huge, colourful “tarantula hawk” wasps tackle the largest of spiders. Other wasps called ichneumons will lay a single egg on a spider and the wasp larva that hatches then slowly eats the spider alive. Still other insects are parasites or predators of spiders in all life stages.

Mantidflies in the family Mantispidae develop as larvae inside a spider egg sac, eating all the spider’s eggs. Even human beings eat spiders intentionally. Some native peoples in South America hunt giant tarantulas and fry them. The spiders are considered a crunchy delicacy. Other mammals, like shrews, coatimundi, meerkats, and grasshopper mice also eat spiders regularly. So do reptiles, especially lizards. Birds not only eat spiders, but will use spider silk in making their nests.

Spiders get into your homes in one of two ways: 1) because you brought them in (firewood, boxes, stored materials, etc.) or 2) because they are attracted to the prey insects living in and around your house and found a way in. You can prevent them from coming in by weather stripping doors, repairing screens, and caulking and control prey insect populations. Insecticidal treatments are not recommended for controlling spiders.

Many types of spiders prefer living in houses and these species are generally not harmful to humans. Various kinds of small hunting spiders may wander indoors and occasionally, rather large, hunting - type spiders are discovered in homes or garages. Often these are fully grown wolf spider or tarantula males that have reached maturity and are searching for females. When these spiders are wandering, one or more may accidentally get indoors. The more insects there are inside a building, the more likely it is to have spiders living there.

When working in potentially spider-infested areas or handling firewood, always wear gloves and a long-sleeved shirt. When working in crawlspaces or attics wear a hooded sweatshirt and tuck your pants into your socks. If you suspect you have been bitten, try to safely capture the spider for identification (I know what you are thinking and yes, a smashed sample is better than nothing). Finding the spider is helpful in diagnosing and treating the bite and may aid physicians in diagnosis and treatment of spider bites (especially brown spider bites).

Bites from blood-feeding insects (kissing bugs, bird bugs, and bedbugs) can be mistaken for spider bites. In addition, environmental conditions, reactions to chemicals in the environment (pesticides, cleaning products, etc.), and other underlying health conditions can be misdiagnosed as spider or insect bites. It is best to learn to respect, tolerate, and enjoy spiders - they are excellent pest controllers in your garden, landscape and home.

Prevention and Non-Chemical Control

Spiders may enter houses and other structures through cracks and other openings. They also may be carried in on items like plants, firewood, and boxes. Regular vacuuming or sweeping of windows, corners of rooms, storage areas, basements, and other seldom used areas helps remove spiders and their webs. Vacuuming spiders can be an effective control technique because their soft bodies usually do not survive this process. Indoors, a web on which dust has gathered is an old web that is no longer being used by a spider. Individual spiders can also be removed from indoor areas by placing a jar over them and slipping a piece of paper under the jar that then seals off the opening of the jar when it is lifted up. To prevent spiders from coming indoors, seal cracks in the foundation and other parts of the structure and gaps around windows and doors. Good screening not only will keep out many spiders but also will discourage them by keeping out insects that they must have for food.

5.4 Common Spider Classifications, Families and Sub-Species in Alphabetical Order

Amblypygi

Amblypygi is an order of invertebrate animals belonging to the class Arachnida, in the subphylum Chelicerata of the phylum Arthropoda. They form a separate order of arachnids alongside the spiders, scorpions and others. Amblypygids are also known as whip spiders and tailless whip scorpions (not to be confused with whip scorpions that belong to the Arachnid order Thelyphonida). The name "amblypygid" means "blunt rump", a reference to a lack of the telson ("tail") carried by related species. Despite an off -putting appearance, they are totally harmless to humans. By 2003, 5 families, 17 genera and around 155 species had been discovered. They are found in tropical and subtropical regions worldwide. Some species are subterranean; many are nocturnal. During the day, they may hide under logs, bark, stones, or leaves. They prefer a humid environment.

Amblypygids may range from 4 to 45 millimetres (0.16 to 1.8 in). Their bodies are broad and highly flattened, with a solid carapace and a segmented abdomen. They have a pair of median eyes at the front of the carapace, and three smaller eyes placed further back on each side. The pedipalps are large and somewhat pincer-like, being adapted for grabbing prey. As in some other arachnid orders, the first pair of legs are modified to act as sensory organs, while the animal uses the other six legs for walking. The sensory legs are very thin, have numerous sensory receptors, and can extend several times the length of body. Typically, the animal holds one of these legs out in front of it as it moves, and uses the other to probe the terrain to the side. Amblypygids have no silk glands or venomous fangs.

Amblypygids often move about sideways on their six walking legs, with one "whip" pointed in the direction of travel while the other probes on either side of them. Prey are located with these "whips", captured with pedipalps, then masticated with chelicerae. Courting rituals involve the male depositing stalked spermatophores which have one or more sperm masses at the tip on the ground and guiding the female with his pedipalps over them. She gathers the sperm and lays fertilized eggs into a sac carried under the abdomen. When the young hatch, they climb up onto the mother's back; any of which falling off before their first moult will be eaten by the mother. Amblypygids, particularly the species Phrynus marginemaculatus and Damon diadema, are thought to be one of the few species of arachnids that show signs of social behaviour. Research conducted at Cornell University by entomologists suggests that mother amblypygids communicate with their young by caressing the offspring with her anteniform front legs. Further, in an experiment where two or more siblings were placed in an unfamiliar environment, such as a cage, they would seek each other out and gather back in a group.

Anelosimus Spiders

Anelosimus is a genus of tangle web spider (Theridiidae) described by Eugène Simon, in 1891, from Venezuela. It includes the South American social spider Anelosimus eximius and related species. A colony of A. eximius social spiders in the Amazon forest is a wonder of nature and a show- stopper for the naturalist or eco-tourist. The capture strands of the colony's web can reach 8 m into the canopy, and the basket-like retreat at 30 to 150 cm above the ground can be up to 3 m in diameter. A colony may house more than 1000 spiders.

Atrax

These spiders are medium-to- large in size, with body lengths ranging from 1 cm to 5 cm (0.4" to 2"). They are darkly coloured, ranging from black to blue-black to plum to brown, with a glossy, hairless carapace covering the front part of the body. Like the related diplurid spiders, some hexathelids have relatively long spinnerets; this is especially true of A. robustus. Like other Mygalomorphae (also incorrectly called Orthognatha) —an infraorder of spiders that includes the tropical tarantulas — these spiders have fangs which point straight down the body and do not point towards each other (cf Araneomorphae). They have ample venom glands that lie entirely within their chelicerae. Their fangs are large and powerful, capable of penetrating fingernails and soft shoes.

Funnel -webs make their burrows in moist, cool, sheltered habitats—under rocks, in and under rotting logs, some in rough-barked trees (occasionally meters above ground). They are commonly found in suburban rockeries and shrubberies, rarely in lawns or other open terrain. A funnel-web's burrow characteristically has irregular silk trip-lines radiating from the entrance. Unlike some related trapdoor spiders, funnel-webs do not build lids to their burrows.

Araneida

A large class of arthropods including spiders and ticks and scorpions and daddy longlegs; have four pairs of walking legs and no wings.

Araneomorphae

The Araneomorphae (also called the Labidognatha) are a suborder of spiders. They are distinguished by having fangs that oppose each other and cross in a pinching action, in contrast to the Mygalomorphae (tarantulas and their close kin), which have fangs that are nearly parallel in alignment. Almost all of the familiar spiders are included in this group. The major exception is the Tarantulas, which have become as common as pets that many people have seen them. There are a few other members of Mygalomorphae that one might see around homes or gardens, but they typically are relatively small and not easily noticed.

For instance, the females of one such species lives and hunts from within a long silken tube, so unless one opens the tube or chances upon a male looking for a mate, one will never see them. The Araneomorphae, to the contrary, include the weavers of spiral webs, the cobweb spiders that live in the corners of our rooms and between windows and screens, the crab spiders that lurk on the surfaces of the flowers in our gardens, the jumping spiders that look back at us curiously from walls and tree trunks, the wolf spiders that sometimes carpet good hunting sites in a sunny spot in the lawn, the large Huntsman spiders that sometimes frighten people by getting into their cars or taking up residence behind wall clocks.

Cellar Spider or Daddy Longlegs

The cellar spider or daddy longlegs (Pholcus phalangioides), also known as the skull spider due to its cephalothorax looking like a human skull, is a spider of the family Pholcidae. Females have a body length of about 9 mm; males are slightly smaller. Its legs are about 5 or 6 times the length of its body (reaching up to 7 cm of leg span in females). Its habit of living on the ceilings of rooms, caves, garages or cellars gives rise to one of its common names. In Australian homes, they are considered beneficial because it is sometimes believed they will kill and eat the venomous Redback spider. This is the only spider species described by the Swiss entomologist Johann Kaspar Füssli who first recorded it for science in 1775. Confusion often arises over its common name, because "daddy

longlegs" is also applied to two other unrelated arthropods: the harvestman and the crane fly. Pholcus phalangioides has the habit of shaking its web violently when disturbed as a defence mechanism against predators. They can easily catch and eat other spiders (even those much larger than itself, such as Tegenaria duellica), mosquitoes and other insects, and woodlice. When food is scarce, they will prey on their own kind. Because they originally came from the tropics, these spiders do not appear to be influenced by seasonal changes and breed at any time of the year. The female holds the 20 to 30 eggs in her pedipalps. Spiderlings are transparent with short legs and change their skin about 5 or 6 times as they mature.

Chelicerata

The subphylum (or phylum Chelicerata constitutes one of the major subdivisions of the phylum (or superphylum) Arthropoda, and includes horseshoe crabs, scorpions, spiders and mites. They originated as marine animals, possibly in the Cambrian period, but the first confirmed chelicerate fossils, eurypterids, date from the Late Ordovician period. The surviving marine species include the four species of Xiphosurans (horseshoe crabs), and possibly the 1,300 species of Pycnogonida (sea spiders), if the latter are chelicerates. On the other hand, there are over 77,000 well -identified species of air-breathing chelicerates, and there may be about 500,000 unidentified species.

Chelicerata

Segmented Bodies with Jointed Limbs

Like all arthropods, chelicerates have segmented bodies with jointed limbs, all covered in a cuticle made of chitin and proteins. The chelicerate bauplan consists of two tagmata, the cephalothorax and the abdomen, except that mites have lost a visible division between these sections. The chelicerae, which give the group its name, are the only appendages that appear before the mouth. In most sub-groups they are modest pincers used in feeding. However, spiders' chelicerae form fangs that in most species are used to inject venom into their prey. The group has the open circulatory system typical of the arthropods, in which a tube-like heart pumps blood through the hemocoel, which is the major body cavity.

Marine chelicerates have gills, while the air-breathing forms generally have both book lungs and tracheae. In general, the ganglia of living chelicerates' central nervous systems fuse into large masses in the cephalothorax, but there are wide variations and this fusion is very limited in the Mesothelae, which are regarded as the oldest and most primitive group of spiders. Most chelicerates rely on modified bristles for touch and for information about vibrations, air currents, and chemical changes in their environment. The most active hunting spiders also have very acute eyesight.

Chelicerates were originally predators, but the group has diversified to use all the major feeding strategies: predation, parasitism, herbivory, scavenging and eating decaying organic matter. Although harvestmen can digest solid food, the guts of most modern chelicerates are too narrow for this, and they generally liquidize their food by grinding it with their chelicerae and pedipalps and flooding it with digestive enzymes.

To conserve water, air-breathing chelicerates excrete waste as solids that are removed from their blood by Malpighian tubules, structures which also evolved independently in insects. While the marine horseshoe crabs rely on external fertilization, air-breathing chelicerates use internal but usually indirect fertilization. Predatory species generally use elaborate courtship rituals to prevent males from being eaten before they can mate. Most lay eggs that hatch as what look like miniature

adults, but all scorpions and a few species of mites keep the eggs inside their bodies until the young emerge. In most chelicerate species the young have to fend for themselves, but in scorpions and some species of spider the females protect and feed their young.

Although the venom of a few spider and scorpion species can be very dangerous to humans, medical researchers are investigating the use of these venoms for the treatment of disorders ranging from cancer to erectile dysfunction. The medical industry also uses the blood of horseshoe crabs as a test for the presence of contaminant bacteria. Genetic engineers have experimented with modifying goats' milk and plants' leaves to produce spider silk. Mites can cause allergies in humans, transmit several diseases to humans and their livestock, and are serious agricultural pests.

Cheiracanthium

Cheiracanthium is a genus of spiders in the Miturgidae family. Certain species are commonly known as the "yellow sac spider. Cheiracanthium are usually pale in colour, and have an abdomen that can range from yellow to beige. Both sexes range in size from 5 to 10 mm. Some yellow sac spiders are attracted to the smell of hydrogen oxide in gasoline. An unusual double pipe configuration in the Mazda 6 led to a recall of around 65,000 Mazda 6 vehicles in the US, Canada, Mexico and Puerto Rico from the 2009-10 model years after it was found that yellow sac spiders were building nests in the fuel line of the vehicles.

Cybaeidae (Water Spiders)

Small web-building spiders that typically live on the ground in forests (no common name). This family includes the highly unusual European spider Argyroneta aquatica that lives entirely underwater. While the water spider is the only representative of the family in northern Europe, three more species in the Cybaeus genus are found in central and southern Europe. The only species in this genus, Argyroneta aquatica, is also known as the water spider. It is a special spider because it lives in water. The scientific name of the spider, Argyroneta, means 'with a silvery net'. The silvery net is the air bubble that surrounds the spider, which it needs to breathe. Special hairs on the skin of the spider give it the ability to keep the air attached to its body. The spider has to go to the surface regularly to refresh the air.

Argyroneta aquatica

Argyroneta aquatica constructs a web under water and fills it with air. She catches air from the surface and releases the air bubble from her body with her legs. This is repeated until there is enough air in her 'diving bell'. Diffusion and oxygen bubbles released by the water plants also add air in the bubble. Prey is caught under water, killed by a poisonous bite and consumed in the air bubble in her web. The spider is a good hunter under water and swims quickly between the water plants. Change of skin is done outside the water or in a separate diving bell.

There is hardly any foreplay before mating and male and female stay together for some time. The eggs with the spiderlings are packed in a white sac in a separate air bubble in late spring or early summer. Late in autumn her nest is sealed and the spider stays there during wintertime. The male is 9-12 mm large and the female 8 -15 mm and both are light to dark yellow -brown. The spider can be found in vegetated, fresh, not running water. The bite of the spider is very annoying to humans and should be avoided.

Cyphophthalmi

The Cyphophthalmi are a suborder of harvestmen, with about 36 genera, and more than hundred described species. The six families are currently grouped into two infraorders, the Tropicophthalmi and the Temperophthalmi; however, these are not supported by modern phylogenetic analysis. They are smaller than the more familiar "daddy long-legs" harvestmen, with adults ranging from 1 to 6mm, including legs. Moreover, their legs are comparatively short compared to their body length, typically shorter than the body. Some superficially resemble mites. Their coloration is almost always some shade of brown, with a heavily sclerotized body, and they are quite inconspicuous, residing in leaf litter or in caves. Many cyphophthalmids are eyeless, and presumably rely on olfactory cues to find food and mates. Their scent glands are located on special elevated cones called ozophores. They have low dispersal rates and consequently high endemism.

Dyspnoi

The Dyspnoi are a suborder of harvestmen, with about 32 genera, and about 320 described species. Several fossil species are known, including two extinct families. The superfamilies Ischyropsalidoidea and Troguloidea are monophyletic. However, the families Sabaconidae and Ceratolasmatidae are not; amongst other inconsistencies, Taracus (Sabaconidae) is a sister group to Hesperonemastoma (Ceratolasmatidae). The Dyspnoi are one of the most conserved biogeographically conserved higher groups of harvestmen. None occur in the Southern Hemisphere, and most families are restricted along temperate regions. The only exceptions are some Ortholasmatinae (Nemastomatidae) inhabiting the tropics on high mountains in Mexico (Ortholasma bolivari) and northern Thailand (Dendrolasma angka). Some Troguloidea were also found in tropical regions during the Cretaceous.

Eupnoi

The Eupnoi are a suborder of harvestmen, with more than 200 genera, and about 1,700 described species. They consist of two superfamilies, the Phalangioidea with many long-legged species common to northern temperate regions, and the small group Caddoidea, which have prominent eyes and spiny pedipalps. Examples of this suborder include Hadrobunus grandis (Sclerosomatidae), Phalangium opilio and Dicranopalpus ramosus (Phalangiidae).

Gerridae (Water Striders, not Spiders)

Gerridae is a family of true bugs in the order Hemiptera, commonly known as water striders, water bugs, magic bugs, pond skaters, skaters, skimmers, water scooters, water skaters, water skeeters, water skimmers, water skippers, water spiders, or Jesus bugs. One main characteristic that sets gerrids and other true bugs apart from other insects is that the front wing is only half functional. Rather than using it for flight, it acts as a membranous covering and the thickened part is by where claws develop. Consistent with the classification of Gerridae as true bugs, gerrids have a mouthpart evolved for piercing and sucking, Gerrids distinguish themselves by having the unique ability to walk on water. Gerridae, or water striders, are anatomically built to transfer their weight to be able to run on top of the water's surface. As a result, one could likely find water striders present in any pond, river, or lake. Scientists have identified over 1,700 species of Gerrids, 10% of them being marine.

Freshwater Bugs

While 90% of Gerridae are freshwater bugs, it is the oceanic Halobates that helped the entire Gerridae family to gain attention. The genus Halobates was first heavily studied between 1822 and 1883 when Buchanan-White collected several different species during the Challenger Expedition. Around this time, Eschscholtz discovered three species of Family Gerridae, Order Hemiptera, raising attention to the species even though little of their biology was known. Since then, the Gerridae have

been continuously studied due to their ability to walk on water and unique social characteristics. Small gerrids have frequently been confused with the other semiaquatic bugs, Veliidae. The most consistent characteristic used to separate these two families are internal genitalia differences. Since internal genitalia require specific training and tools to identify, it is almost impossible to tell a member of the Gerridae apart from a member of the Veliidae by external visual cues. One must study their habitat and behaviours to properly differentiate the two without looking at their specific anatomy.

Gnaphosidae (Ground Spiders)

Ground spiders (family Gnaphosidae) include nearly 2,000 described species in over 100 genera, distributed worldwide. This makes the family the seventh largest known. New species are still being discovered. They are closely related to Clubionidae. Generally, ground spiders are characterized by having barrel -shaped anterior spinnerets that are one spinneret diameter apart. The main exception to this rule is found in the ant-mimicking genus Micaria. Another characteristic is an indentation in the endites (paired mouthparts anterior and lateral to the labium, or lip). All ground spiders lack a prey-capture web and generally run prey down on the surface. They hunt at night and spend the day in a silken retreat. The thick-walled egg sacs are guarded by the mother until the spiderlings hatch. At present, no ground spiders are known to be seriously venomous to humans. Very few people even notice them. Common genera include Gnaphosa, Drassodes, Micaria, Cesonia, Zelotes and many others.

Habronattus

Habronattus includes approximately 100 species of jumping spiders, most from North America, the remainder in the neotropics. Most are ground-dwelling on open ground with sparse vegetation, especially on rocks, dry leaf litter and sand. The arid southwest has many species, but Florida also has many species, and others are known above the Arctic Circle and east to maritime Canada. The genus was recently revised by Griswold (1987), and its phylogeny studied by Maddison and Hedin (2003). The genus is notable for the remarkable forms and colours of the courtship ornaments of males, which are used in complex courtship behaviours.

Harvestmen (Daddy Long Legs)

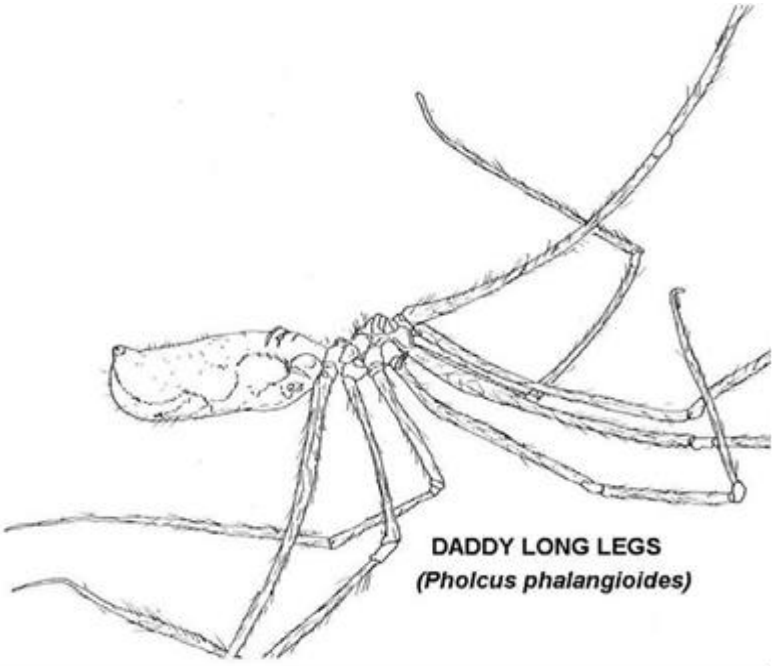
Opiliones (formerly Phalangida) are an order of arachnids commonly known as harvestmen. Over 6,400 species of harvestmen have been discovered worldwide, although the real number of extant species may exceed 10,000. The order Opiliones can be divided into four suborders: Cyphophthalmi, Eupnoi, Dyspnoi and Laniatores. Well-preserved fossils have been found in the Rhynie cherts of Scotland, which look surprisingly modern, indicating that the basic structure of the harvestmen has not changed much since then. Phylogenetic position is disputed: their closest relatives may be the mites (Acari) or the Novogenuata (the Scorpiones, Pseudoscorpiones and Solifugae).

Not Spiders

Although they belong to the class of arachnids, harvestmen are not spiders, which are of the order Araneae rather than the order Opiliones. In some places, harvestmen are known by the name "daddy longlegs" or "granddaddy longlegs", but this name is also used for two other unrelated arthropods: the crane fly (Tipulidae) and the cellar spider (Pholcidae). Opiliones like spiders and scorpions are arachnids, so there are always questions about whether or not they follow spider practices and bite humans.

There is a common myth that Daddy Longlegs are the most venomous of all spiders but have a mouth too small to bite. This is untrue. They are also called harvestmen, and to make matters more confusing, crane flies and cellar spiders also go by the name daddy long legs. Daddy long Legs have eight legs, but only one body part. A close -up picture would also show their two eyes rather than the more common six and eight eyed spiders. They have the nickname harvester because they are omnivores that harvest most insects and plants that cross their path.
Daddy-longlegs do not have fangs or venom for killing prey, and therefore there is no need for humans to be concerned about being bitten by them. It also seems reasonable to assume that since they are omnivorous, eating insects, plants and fruit, they would have to bite or chew the food to eat it. Sometimes the words people choose to explain things are a bit confusing. Certainly daddy-longlegs eat. Many species are omnivorous, eating primarily small insects and all kinds of plant material and fungi; some are scavengers, feeding upon dead organisms, bird dung and other faecal material.

This broad range is quite unusual in arachnids, which are usually pure predators. Most hunting harvestmen ambush their prey, although active hunting is also found. Because their eyes cannot form images, they use their second pair of legs as antennae to explore their environment. Unlike most other arachnids, harvestmen do not have a sucking stomach or a filtering mechanism. Rather, they ingest small particles of their food, thus making them vulnerable to internal parasites such as gregarines.



Hubbardiidae

Hubbardiidae is a family of arachnids, superficially resembling spiders. It is the larger of the two extant families of the order, Schizomida, and is divided into two subfamilies. The family is based on the description published by Orator F. Cook in 1899, and was previously named as Schizomidae. The American Arachnological Society assigns the common name hubbardiid short tailed whipscorpion to members of this family. The classification of the family includes 28 genera. Seven of these genera are found in Australia, five of them occur nowhere else: Draculoides, Julattenius, Notozomus , Attenuizomus and Brignolizomus. Five genera are found in Mexico, three of which are endemic (Pacal, Mayazomus and Sotanostenochrus).

Laniatore

Laniatores is the largest suborder of the arachnid order Opiliones with over 4,000 described species worldwide. The majority of the species is highly dependent on humid environments and usually correlated with tropical and temperate forest habitats. Laniatores are typically (relatively) short-legged, hard-plated, spiny Opiliones, common under logs and stones, in leaf litter and in caves. They often have spiny pedipalps and paired or branched claws on the third and fourth pairs of legs. The largest family is Gonyleptidae Sundevall, 1833, endemic of the Neotropics, with over 800 valid species and showing many cases of maternal and paternal care.

Liocranoid (Sac Spiders)

Liocranid sac spiders consist of about 160 species of wandering spiders in 30 or so genera. The best known are those in the Holarctic genus Agroeca. Various genera of rather obscure spiders are included in the family, which still lacks a diagnosis. Two species in the North American genus Neoanagraphis are found in often hyperarid conditions in the Mojave, Sonoran and Chihuahuan Deserts. The females apparently live in animal burrows and the males wander and are often caught in pitfall traps.

Loxosceles (Recluse Spiders)

The recluse spiders or brown spiders (genus Loxosceles), also known as fiddle-back, violin spiders or reapers, are a venomous genus of spiders known for their necrotic bite, which sometimes produce a characteristic set of symptoms known as Loxoscelism. Recluse spiders are now identified as members of the family Sicariidae, having formerly been placed in their own family, "Loxoscelidae". Loxosceles is distributed nearly worldwide in warmer areas, and are often known as violin spiders, fiddlebacks or reapers. All have six eyes arranged in three groups of two (dyads) and some are brownish with a darker brown characteristic violin marking on the cephalothorax. However, the "violin marking" cannot be used as a reliable way to identify the spider as literally thousands of species of spider have the same markings. Spiders come with many markings varying greatly within the same species.

Most Loxosceles can live for one and a half to two years. Members of both genera can live for very long times without food or water. They are about 7–12 mm long. Because wolf spiders are sometimes seen indoors and because they are usually brown in colour, they are often mistaken for brown recluse spiders. If you see a fast-moving, dark-coloured spider running on the floor, it is more likely to be a wolf spider than a brown recluse. Brown recluses are very secretive and are almost never seen out in the open. With a little practice, it is easy to tell the difference between wolf spiders and brown recluses.

The recluse spider family includes about 13 species in the United States, the brown recluse spider (Loxosceles reclusa) being the best known of these. It is found in a large area of the Midwest, west to Colorado and the New Mexico state line and east to Northern Georgia. Sporadic records from other locations only represent incidental introductions, not established populations. Other notable members of this genus include the Chilean recluse (L. laeta) and the Mediterranean recluse (Loxosceles rufescens).

Recently, concerns have been raised regarding recluses spreading faster due to warmer air carrying them further as a result of global warming. On the contrary, newly hatched recluses do not travel via ballooning and thus the populations are confined to very tight spaces with dense populations.

Loxosceles spiders, like their cousins in Sicarius, have potent tissue-destroying venoms containing the dermonecrotic agent, sphingomyelinase D, which is otherwise found only in a few pathogenic bacteria. Recent research has indicated the venom is composed largely of sulfated nucleosides, though these compounds are relatively new discoveries, so little is known about them. This venom is highly necrotic in effect, capable of causing lesions (open sores) as large as a bottle cap. The wounds take a long time to heal and may require skin grafts.

If these open wounds become infected there are often serious consequences. Rarely, the venom is carried by the blood stream to internal organs causing systemic effects.

The constituency of recluse venom is identical in both male and female spiders, although females have a particularly potent venom, containing up to twice the concentration of toxins. For unknown reasons, the toxicity of the venom to mammalian species varies—recluse bites will cause necrosis in humans, rabbits, and guinea pigs, but not in mice or rats.

The Chilean recluse (Loxosceles laeta) supposedly has a more potent venom, which results in systemic involvement more often. This spider was accidentally introduced to the Los Angeles area (Alhambra, Sierra Madre, and Monterey Park). This spider, however, seems to be confined to a very limited area, even though it has lived there for over 30 years. Other members of the genus that have been tested have venoms similar to the brown recluse and all members of this genus are best avoided. However, the brown recluse and its relatives are not very aggressive and huge populations have been found in houses where the human inhabitants remained unbitten after years of cohabitation.

A possible problem with diagnosing a recluse spider bite is that the bite of these spiders is probably both underreported in some areas and over reported generally. Unfortunately several diseases can mimic the lesions of a recluse spider bite, including Lyme disease, various fungal and bacterial infections and the first sore of syphilis. Therefore it is extremely important to associate the spider directly with the bite, if at all possible, and consider alternative diagnoses if no spider was seen.

Recluse spiders are usually found in the centre of space webs made of fungus-like silk, which often contains the remains of their recent meals. The most abundant food items for the Arizona recluse (Loxosceles arizonica) are night-active ants such as carpenter ants. The brown recluse feeds on whatever small prey is available. This is also true of all sicariids. Loxosceles reclusa have been shown in laboratory experiments to prefer scavenging than actively hunting.

Bites most often occur when the spider is engaging in defence while trapped against the skin, such as when the person is putting on clothes the recluse is inside of, or when the person while sleeping rolls over against the recluse. However, bug spray and other chemicals intended to repel or kill arthropods that do not kill the recluse will cause its nervous system to break down partially, inducing undesirable aggressive behaviour.

The bite of a recluse spider can generally be categorized into one of the following groups:

- Unremarkable - self-healing minute damage.
- Mild reaction - self-healing damage that displays itchiness, redness, and mild lesion. Most bites fall into the unremarkable or mild reaction categories.

- Dermonectrotic - (uncommon) necrotic skin lesion (the "classic" recluse bite). Approximately 66% of necrotic lesions caused by this type of bite heal with no complications. In extreme cases, the lesion may expand to as many as 40 cm in width, last for several months, and cause a permanent scar.
- Systemic or viscerocutaneous - (extremely rare) a fatal blood system condition. This type of bite is directly related to obesity, and it is life-threatening, particularly to children.

Lycosidae (Wolf Spiders)

Wolf spiders are members of the family Lycosidae, from an Ancient Greek word “Lycos” meaning "wolf". They are robust and agile hunters with good eyesight. They live mostly solitary lives and hunt alone. Some are opportunistic hunters pouncing upon prey as they find it or even chasing it over short distances. Some will wait for passing prey in or near the mouth of a burrow.

Wolf spiders resemble Nursery web spiders (family Pisauridae), but they carry their egg sacs by attaching them to their spinnerets (Pisauridae carry their egg sacs with their chelicerae and pedipalps). Two of the Wolf spider's eight eyes are large and prominent, which distinguishes them from the Nursery web spiders whose eyes are all of approximately equal size. There are many genera of wolf spider, ranging in body size from less than 1 to 30 millimetres (0.04 to 1.18 in). They have eight eyes arranged in three rows.

The bottom row consists of four small eyes, the middle row has two very large eyes (which distinguishes them from the Pisauridae), and the top row has two medium-sized eyes. They depend on their excellent eyesight to hunt. They also possess an acute sense of touch. Their eyes reflect light well, allowing someone with a flashlight to easily hunt for them at night. Flashing a beam of light over the spider will produce eye shine. The light from the flashlight has been reflected from the spider's eyes directly back toward its source, producing a "glow" that is easily noticed. This is also especially helpful because the wolf spiders are nocturnal and will be out hunting for food, making it easier to find them.

Wolf spiders are unique in the way that they carry their eggs. The egg sac, a round silken globe, is attached to the spinnerets at the end of the abdomen, allowing the spider to carry her unborn young with her. The abdomen must be held in a raised position to keep the egg case from dragging on the ground, however despite this handicap they are still capable of hunting. Another aspect unique to wolf spiders is their method of infant care. Immediately after the spiderlings emerge from their protective silken case, they clamber up their mother's legs and crowd onto her abdomen. Because they depend on camouflage for protection, they do not have the flashy appearance of some other kinds of spiders. In general their coloration is appropriate to their favourite habitat.

Hogna is the genus with the largest of the wolf spiders. Among the Hogna species in the U.S., the nearly solid dark brown H. carolinensis (Carolina wolf spider) is the largest, with a body that can be more than one inch long. It is sometimes confused with H. helluo, which is somewhat smaller and entirely different in coloration. Some members of the Lycosidae, such as H. carolinensis, make deep tubular burrows in which they lurk much of the time. Others, such as H. helluo, seek shelter under rocks and other shelters as nature may provide. They may wander from place to place, and are therefore more likely to be the ones attracted into human habitation when the weather starts to turn colder in autumn.

There are many smaller wolf spiders. They live on pastures and fields and are an important natural control on harmful insects. In most cases, wolf spiders benefit humans by feeding on all sorts of insects, including crop pests. Wolf spiders are rarely pests, but they sometimes wander into houses, where their large size often frightens homeowners. Wolf spiders can bite, but their bites are extremely rare and no more dangerous or painful than bee stings. In fact, bees and wasps are more dangerous than wolf spiders because a wolf spider will never "attack" a person, unlike bees or wasps that will attack to defend a hive. Wolf spiders will only bite if they are handled. Wolf spiders that are found indoors have wandered in by mistake and should be collected and released outdoors (if you ever need to collect a wolf spider, "herd" the spider into a container with a stick or a pencil).

Because wolf spiders are sometimes seen indoors and because they are usually brown in colour, they are often mistaken for brown recluse spiders. If you see a fast-moving, dark-coloured spider running on the floor, it is more likely to be a wolf spider than a brown recluse. Brown recluses are very secretive and are almost never seen out in the open. With a little practice, it is easy to tell the difference between wolf spiders and brown recluses

Mimetidae

The family Mimetidae, commonly called pirate spiders, are spiders which typically feed on other spiders. The family Mimetidae contains roughly 200 species divided among 12 genera, of which Mimetus and Ero are the most common. Mimetids are usually yellow and brown and are usually 3 to 7 mm long. Mimetids can be recognized by the rows of spine-like hairs on their long front legs; the rows consist of a long spine, followed by a series of progressively shorter ones. Mimetidae usually hunt by picking at the strands on their prey's web to simulate the movements of either a trapped insect or a potential mate. When their prey comes to investigate, they are instead captured and eaten. Some mimetids have been observed to feed on insects as well.

The spider-feeding habit presents problems in mating, and little is known about how the males court females to avoid being eaten. However, some male mimetids in the genus Gelanor, found in South America, have enormously long appendages which they use to inseminate females. The Mimetidae are sometimes taxonomically grouped in the superfamilies Araneoidea or Palpimanoidea.

Mygalomorphae

The Mygalomorphae, (also called the Orthognatha), are an infraorder of spiders. The latter name comes from the orientation of the fangs which point straight down and do not cross each other (as opposed to araneomorph). This suborder includes the heavy bodied, stout legged spiders popularly known as tarantulas as well as the dangerous Australasian funnel-web spiders. Like the "primitive" Mesothelae, they have two pairs of book lungs, and downward pointing chelicerae. Because of this, the two groups were once believed to be closely related. Later it was realized that the common ancestors of all spiders had these features (Symplesiomorphy), and that the mygalomorphs just retained them, while the closely related araneomorphs evolved new features (including a cribellum) (Coddington & Levy, 1991).

Almost all species of Mygalomorphae have eight eyes, however there are some with fewer (Masteria lewisi has only six eyes). They have ample venom glands that lie entirely within their chelicerae, but only spiders of the Australian genus Atrax can be really harmful to humans. Their chelicerae and fangs are large and powerful. Occasionally members of this suborder will even kill small fish, small mammals, and the like. While the world's biggest spiders are mygalomorphs - Theraphosa blondi

(Latreille, 1804) has a body length of 10 cm, and a leg span of 28 cm - some species are less than one millimetre long. Mygalomorphs are capable of spinning at least slightly adhesive silk, and some build elaborate capture webs that approach a meter in diameter (Coddington & Levy, 1991).

Unlike Araneomorphae, which die after about a year, Mygalomorphae can live for up to 25 years, and some don't reach maturity until they are about six years old. Some flies in the family Acroceridae which are endoparasites of mygalomorphs may remain dormant in the book lungs for as long as 20 years before beginning their development and consuming the spider.

Novogenuata

Dromopoda is a subclass of the arachnids, including the Opiliones (harvestmen), Scorpions, Pseudoscorpions and Solifugae ("camel spiders"). The latter three are sometimes grouped as Novogenuata. However, morphological analysis showed the Dromopoda to be monophylic only when fossils were not taken into account.

Oxyopidae (Lynx spiders)

Stalk and capture resting or walking insects. Active hunters with good vision. Most have spiny legs and a brightly coloured body that tapers sharply toward the rear. They have four pairs of eyes grouped in a hexagon. About 2 dozen known species in North America.

Pantopoda or Pycnogonids (Sea Spiders)

Sea spiders, also called Pantopoda or pycnogonids, are marine arthropods of class Pycnogonida. Sea spiders have long been considered to belong to the Chelicerata, together with horseshoe crabs, true spiders, mites, ticks and scorpions. They are cosmopolitan, found especially in the Mediterranean and Caribbean Seas, as well as the Arctic and Antarctic Oceans. There are over 1300 known species, ranging in size from 1 to 10 millimetres (0.039 to 0.39 in) to over 90 cm (35 in) in some deep water species. Most are toward the smaller end of this range in relatively shallow depths; however, they can grow to be quite large in Antarctic waters.

Although "sea spiders" are not true spiders, or even arachnids, and should not be confused with Water Spiders, their traditional classification as chelicerates would place them closer to true spiders than to other well-known arthropod groups, such as insects or crustaceans. However this is in dispute, as genetic evidence suggests they may even be an ancient sister group to all other living arthropods. The class Pycnogonida comprises over approximately 1,300 species, which are normally split into eighty-six genera. The correct taxonomy within the group is uncertain, and it appears that no agreed list of orders exists. Accordingly, families are listed in the taxobox, all considered part of the single order Pantopoda.

Another idea is that they belong to their own lineage, distinct from chelicerates, crustaceans, myriapods, or insects. The reason for this is that it seems the appendages called chelifores are unique among extant arthropods, and are not homologous to the chelicerae in real chelicerates as previously supposed. Instead of developing from the deuterocerebrum, they can be traced to the protocerebrum, the anterior part of the arthropod brain and found in the first head segment that in all other arthropods give rise to the eyes only. This is not found anywhere else among arthropods except in some fossil forms like Anomalocaris, indicating that the Pycnogonida may be a sister group

to all other living arthropods, the latter having evolved from some ancestor that had lost the protocerebral appendages. If this is confirmed, it would mean the sea spiders are the last surviving (and highly modified) members of an ancient stem group of arthropods that lived in Cambrian oceans. Recent work places the Pycnogonida outside the Arachnomorpha as basal Euarthropoda, or inside Chelicerata (based on the chelifore-chelicera putative homology).

Phalangiidae

The Phalangiidae are a family of harvestmen with about 380 known species. The best known is Phalangium opilio. Dicranopalpus ramosus is an invasive species in Europe. It is not to be confused with the harvestman family Phalangodidae, which belongs to the suborder Laniatores.

Pisauridae (Nursery-web and fishing spiders)

Nursery -web and fishing spiders are large, hairy spiders in the family Pisauridae. These spiders are typically patterned with black, brown, white, and grey markings. Although difficult to distinguish from wolf spiders, nursery-web and fishing spiders are usually slimmer in build than wolf spiders. Like all spiders, nursery-web and fishing spiders have 8 legs, 2 body parts, and fangs (called "chelicerae"). Nursery-web and fishing spiders have 8 eyes. Simple metamorphosis: like all spiders, young nursery -web and fishing spiders hatch from eggs and look like tiny adults when they are born. They shed their skin as they grow. After laying her eggs, a female nursery- web or fishing spider will wrap them into a silk egg sac. She will then carry the egg sac in her chelicerae until the eggs hatch.

When hatching time arrives, the female will build a "nursery" in which the eggs can hatch. The nursery consists of a few leaves woven together with silk. This forms a protective pocket into which the egg sac is placed. Many spiders in the Pisauridae family are active hunters that search the ground for insects, worms, spiders, and other small creatures. Others are ambush predators that wait quietly for prey to come to them. Fishing and nursery- web spiders are common in forests and meadows, especially near streams and creeks, where they patrol rocks and pebbles at the water's edge. Fishing spiders, in particular, are very common around ponds and streams, and will even hunt for prey on the water's surface, usually by holding onto vegetation at the water's edge.

Some fishing spiders will partially submerge themselves underwater for brief periods of time to catch aquatic prey. Although nursery-web and fishing spiders resemble tarantulas, they are not closely related. Nursery- web and fishing spiders are closely related to wolf spiders. Fishing spiders in other parts of the world can grow very large!

Ricinulei

The Order Ricinulei is a group of arachnids known as hooded tickspiders. In older works they are sometimes referred to as Podogona. 60 extant species of ricinuleids have been described worldwide, all in the single family Ricinoididae. They occur today in west-central Africa (Ricinoides) and the Neotropical region (Cryptocellus and Pseudocellus). In addition to the three living genera, there are two families and four genera containing fossil species. Ricinulei are typically about 5 to 10 millimetres (0.2 to 0.4 in) long. The cuticle (or exoskeleton) of both the legs and body is remarkably thick. Their most notable feature is a "hood" (or cucullus) which can be raised and lowered over the head. When lowered, it covers the mouth and the chelicerae. Living ricinuleids have no eyes, although two pairs of lateral eyes can be seen in fossils and even living species retain light-sensitive areas of cuticle in this position.

The heavy- bodied abdomen (or opisthosoma) exhibits a narrow pedicel, or waist, where it attaches to the prosoma. Curiously, there is a complex coupling mechanism between the prosoma and opisthosoma. The front margin of the opisthosoma tucks into a corresponding fold at the back of the carapace. The advantages of this unusual system are not well understood, and since the genital opening is located on the pedicel (another rather unique feature) the animals have to 'unlock' themselves in order to mate. The abdomen is divided dorsally into a series of large plates or tergites, each of which is subdivided into a median and lateral plate.

Salticidae (Jumping Spiders)

The jumping spider family (Salticidae) contains more than 500 described genera and about 5,000 described species, making it the largest family of spiders with about 13% of all species. Jumping spiders have good vision and use it for hunting and navigating. They are capable of jumping from place to place, secured by a silk tether. Both their book lungs and the tracheal system are well-developed, as they depend on both systems (bimodal breathing).

Jumping spiders live in a variety of habitats. Tropical forests harbour the most species, but they are also found in temperate forests, scrub lands, deserts, intertidal zones, and even mountains. Euophrys omnisuperstes is a species reported to have been collected at the highest elevation, on the slopes of Mount Everest. Jumping spiders are generally recognized by their eye pattern. All jumping spiders have four pairs of eyes with very large anterior median eyes.

Jumping spiders are generally diurnal, active hunters. Their well-developed internal hydraulic system extends their limbs by altering the pressure of body fluid (haemolymph) within them. This enables the spiders to jump without having large muscular legs like a grasshopper. Most jumping spiders can jump several times the length of their body. When a jumping spider is moving from place to place, and especially just before it jumps, it tethers a filament of silk (or dragline) to whatever it is standing on. Should it fall for one reason or another, it climbs back up the silk tether.

Schizomida

Schizomida (common name short tailed whipscorpion) is an order of arachnids, superficially resembling spiders and generally less than 5 millimetres (0.20 in) in length. The order is not yet widely studied. As of 2005, more than 230 species of schizomids have been described worldwide, most belonging to the Hubbardiidae family. Schizomids are relatively small, soft-bodied arachnids, somewhat similar in appearance to whip scorpions. The prosoma (cephalothorax) is divided into three regions, each covered by plates, the large protopeltidium and the smaller, paired, mesopeltidia and metapeltidia. The name means "split or cleaved middle", referring to the way the thorax is divided into two separate plates.

Opisthosoma

The opisthosoma (abdomen) is a smooth oval of 12 recognizable segments. The first is reduced and forms the pedicel, while the last three are constricted, forming the pygidium. The last segment bears a short whip-like tail or flagellum, consisting of no more than four segments. Like the related orders Thelyphonida, Amblypygi, and Solifugae, the schizomids use only six legs for walking, having modified their first two legs to serve as sensory organs. They also have large well- developed pincer-like pedipalps just before the sensory legs. Schizomids have no actual eyes, but a few species have vestigial eyespots capable of telling light from dark. Schizomids are generally tropical creatures, although some populations have been found in California and Arizona. They tend to live in the top

layer of soil and in the cavities beneath logs and rocks, where they can avoid desiccation. They seek water and avoid light. Some species are cave dwellers, and a few live in or near termite or ant colonies.

Scytodidae

Spitting spiders (family Scytodidae) are spiders of the genus Scytodes and their relatives. There are five known genera and over 150 species of scytodids worldwide. They catch their prey by spitting a fluid that immobilizes it by congealing on contact into a venomous and sticky mass. They can be observed swaying from side to side, in order to cover the prey in a crisscrossed "Z" pattern; each of two pores in the chelicerae emits half of the pattern. The spider usually strikes from a distance of 10-20mm and the whole attack sequence is over in a little under 1/700th of a second.

Like the Sicariidae and Diguetidae these spiders are haplogyne (lack hardened female genitalia) and have six eyes, which are arranged as three pairs. They differ from these in having a dome-shaped carapace and in their characteristic flecked pattern of spots. Two scytodes will fight each other, the larger one is strong enough to break free and win.

Spider identification is difficult even for experts. There are about 3,700 species of spiders in North America alone, and there are no doubt many “new” species awaiting descriptions and names from scientists. Even taking a picture of a spider and posting it here to SpiderIdentification.org is no guarantee that one of our experts can tell you what species it is. The characters needed to identify a spider, like the arrangement of its eyes, are often not visible in images.

It is helpful, however, to note the kind of web you found the spider in (not all spiders spin webs, though), whether it was outdoors or indoors, and include an accurate assessment of the size of the spider (body length or legspan). Always remember to include a specific geographic location in your post. Lastly, make sure it is actually a spider that you have, and not another arachnid, or even an insect.

Solifugae (Sun Spiders or Wind Scorpions)

Solifugae is an order of Arachnida, known as camel spiders, wind scorpions or sun spiders, comprising more than 1,000 described species in about 153 genera. They may grow to a length of 15 cm (6 in) including legs, and have a body comprising an opisthosoma (abdomen) and a prosoma (head) with conspicuously large chelicerae, which are also used for stridulation. Most species live in deserts and feed opportunistically on ground-dwelling arthropods and other animals. A number of urban legends exaggerate the size and speed of Solifugae, and their potential danger to humans. Solifugids are moderate to large arachnids, with the larger species reaching 15 centimetres (6 in) in length.

The body is divided into a forward part, cephalothorax or prosoma, and a ten-segmented abdomen or opisthosoma. The prosoma comprises the head, mouthparts and somites containing the pedipalps. It is divided into a relatively large anterior carapace, including the animal's eyes, and a smaller posterior section. The most distinctive feature of Solifugae is their large chelicerae, which are longer than the prosoma.

Each of the two chelicerae are composed of two articles forming a powerful pincer; each article bears a variable number of teeth. While solifuges appear to have ten legs, they have eight legs like

other arachnids; the first set of appendages are pedipalps, which function as sense organs similar to insects' antennae and give the appearance of an extra pair of legs.

The pedipalps terminate in eversible adhesive organs, which are used to capture flying prey, and for climbing. They stridulate with their chelicerae, producing a rattling noise. Of the four pairs of legs, the first pair are smaller in size, and act as accessory tactile organs used to feel the animal's surroundings, so that only the other six legs are used for running. On the last pair of legs, Solifugae have fan-shaped sensory organs called racquet organs or malleoli. Like pseudoscorpions and harvestmen, they lack book lungs, having instead a well-developed tracheal system that takes in air through three pairs of slits on the animal's underside. In some species there are very large central eyes that are capable of recognizing forms, and are used for hunting. Lateral eyes are only rudimentary, if present at all. Males are usually smaller than females, with longer legs.

Theridiidae

Theridiidae is a large family of spiders, also known as the tangle-web spiders cobweb spiders and comb-footed spiders. The diverse family describes over 2200 species in over 100 genera) of three-dimensional space-web-builders found throughout the world. Theridiid spiders are entelegyne (have a genital plate in the female) araneomorph ecribellate (use sticky capture silk instead of woolly silk) spiders that often build tangle space webs and have a comb of serrated bristles (setae) on the tarsus of the fourth leg.

The family includes some model organisms for research, for example, the genus Latrodectus, the medically important widow spiders. In addition to studies characterizing their venom and its clinical manifestation, widow spiders are broadly used in research on spider silk, and on sexual biology including sexual cannibalism.

Anelosimus spiders are also model organisms, used for the study of sociality, its evolution, and its ecological and evolutionary causes and consequences. They are particularly important for such studies as the genus contains species varying from solitary to permanently social, and because sociality has evolved frequently within the genus allowing comparative studies across species. These spiders are also a promising model for the study of inbreeding as their mating system co-varies with sociality, and all permanently social species are highly inbred.

One species in Theridion, the Hawaiian T. grallator, is used as a model to understand the selective forces and the genetic basis of colour polymorphism within species. Theridion grallator is known as the "happyface" spider, as certain morphs have a pattern uncannily resembling a smiley face or a grinning clown face on their yellow body.

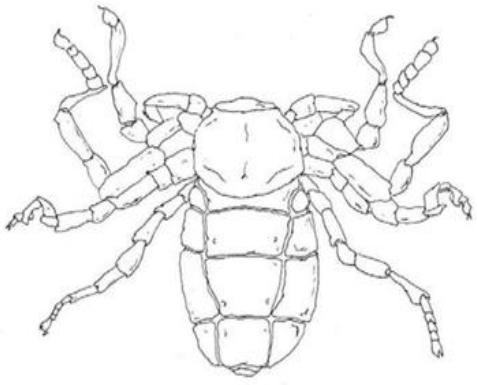
The family also contains the well-studied kleptoparasitic species of the subfamily Argyrodinae (including Argyrodes, Faiditus, and Neospintharus) which often have triangular bodies. These spiders live in the webs of larger spiders and pilfer small prey caught by their host's web, eat prey killed by the host spider, and may consume silk from the host web, as well as attack and eat the host itself. The largest genus with over 600 species currently placed in it is Theridion, but it is not monophyletic. Another large genus is Parasteatoda, previously Achaearanea, which includes the common house spider. Many theridiids trap ants and other ground dwelling insects by means of elastic sticky silk trap lines leading to the soil surface. Despite their name, cobweb or tangle-web spiders have a huge range of web architectures.

Vinegarroons

Vinegarroons range from 25 to 85 mm (0.98 to 3.3 in) in length, with most species not longer than 30 mm (1.2 in); the largest species, of the genus Mastigoproctus, reaching 85 mm (3.3 in). Like the related orders Schizomida, Amblypygi, and Solifugae, the vinegarroons use only six legs for walking, having modified their first two legs to serve as antennae-like sensory organs. Many species also have very large scorpion-like pedipalps (pincers). They have one pair of eyes at the front of the cephalothorax and three on each side of the head, a pattern also found in scorpions. Vinegarroons have no venom glands, but they do have glands near the rear of their abdomen that can spray a combination of acetic acid and octanoic acid when they are bothered. The acetic acid gives this spray a vinegar-like smell, giving rise to the common name vinegarroon.

Carnivorous, Nocturnal hunters

Vinegarroons are carnivorous, nocturnal hunters feeding mostly on insects and millipedes, but sometimes on worms and slugs. Mastigoproctus sometimes preys on small vertebrates. The prey is crushed between special teeth on the inside of the trochanters (the second segment of the leg) of the front legs. They are valuable in controlling the population of roaches and crickets. Males secrete a sperm sac, which is transferred to the female. Up to 35 eggs are laid in a burrow, within a mucous membrane that preserves moisture. Mothers stay with the eggs and do not eat. The white young that hatch from the eggs climb onto their mother's back and attach themselves there with special suckers. After the first moult they look like miniature vinegarroons, and leave the burrow; the mother dies soon after. The young grow slowly, going through three moults in about three years before reaching adulthood. They live for up to another four years.



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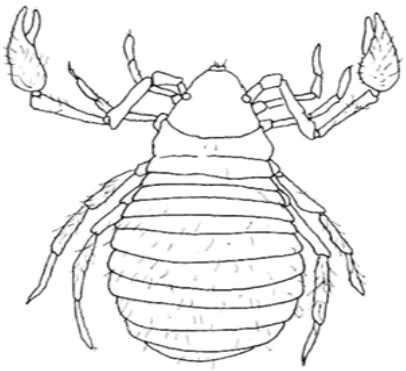

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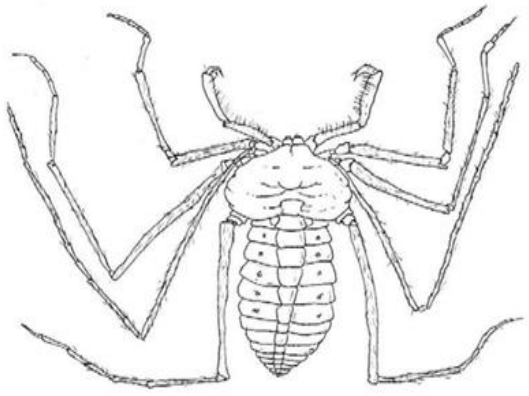
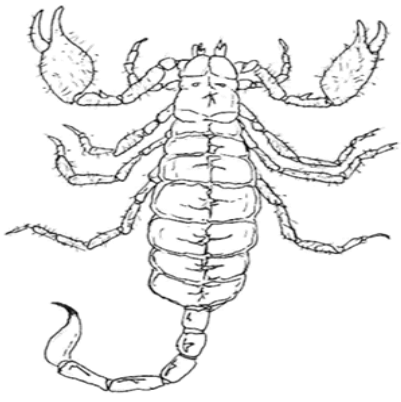


AMBLYPYGI



SCORPIONES

5.5 Scorpions

Note: The word scorpion is sometimes misspelled as scorpion, and the plural scorpions have sometimes been misspelled as scorpions or scorpions. The correct spellings are scorpion and scorpions.

Scorpions are arachnids, close relatives of ticks, mites and spiders. There are approximately 1,300 species of scorpions worldwide, characterized by an elongated body and a segmented tail that is tipped with a venomous stinger. Scorpions are very common in the Southern and Southwestern States. Most are not poisonous, except for two species found in the southwestern states like Arizona, California, New Mexico, and Texas. Scorpions are commonly thought of as desert animals, but in fact, they occur in many other habitats as well, including grasslands and savannahs, deciduous forests, pine forests, rain forest and caves.

Scorpions are opportunistic predators of small arthropods, although the larger kinds have been known to kill small lizards and mice. The large pincers are studded with highly sensitive tactile hairs, and the moment an insect touches these, they use their chelae (pincers) to catch the prey. Depending on the toxicity of their venom and size of their claws, they will then either crush the prey or inject it with neurotoxic venom. This will kill or paralyze the prey so the scorpion can eat it.

Scorpions have a relatively unique style of eating using chelicerae, small claw-like structures that protrude from the mouth that are unique to the Chelicerata among arthropods. The chelicerae, which are very sharp, are used to pull small amounts of food off the prey item for digestion into a pre- oral cavity below the chelicerae and carapace. Scorpions can only ingest food in a liquid form; they have external digestion. The digestive juices from the gut are egested onto the food and the digested food sucked in liquid form. Any solid indigestible matter (fur, exoskeleton, etc.) is trapped by setae in the pre-oral cavity, which is ejected by the scorpion.

Predatory Arthropod

Scorpions are predatory arthropod animals of the order Scorpions within the class Arachnida. They have eight legs and are easily recognized by the pair of grasping claws and the narrow, segmented tail, often carried in a characteristic forward curve over the back, ending with a venomous stinger. Scorpions range in size from 9 mm (Typhlochactas mitchelli) to 21 cm (Hadogenes troglodytes). Scorpions are nocturnal; they prefer to be active during the night. They have poor eyesight yet thrive in the dark relying on their strong body, pinchers and stinger as a way to both defend and navigate any hostile environment.

Scorpions are found widely distributed over all continents, except Antarctica, in a variety of terrestrial habitats except the high latitude tundra. Scorpions' number about 1752 described species, with thirteen extant families recognized to date. The taxonomy has undergone changes and is likely to change further, as a number of genetic studies are bringing forth new information. Though the scorpion has a fearsome reputation as venomous, only about 25 species have venom capable of killing a human being. The body of a scorpion is divided into three parts (tagmata): the head (cephalothorax), the abdomen (mesosoma) and the tail (metasoma).

Bark Scorpion

The bark scorpion is found throughout Arizona, in the extreme south-eastern portion of California near Arizona, and in southwestern New Mexico. Bark scorpions reach a length of 3 inches and have a very thin tail only 1/16 inch wide; the body is yellow without stripes or patterns. The bark scorpion is the only common climbing scorpion and does not normally burrow, but usually lives above ground under tree bark and in palm trees and crevices of rocky cliffs. Because it can ascend slump block walls or stucco, this species is the scorpion most likely to enter dwellings. The bark scorpion is attracted to moisture around homes and in the house. It also may be found in stacked lumber or bricks, firewood piles, cellars, and attics. It needs only a crack of 1/16 inch to enter a home.

Arizona Hairy Scorpion

The Arizona hairy scorpion, Hadrurus arizonensis, is a common desert species found in southern California and throughout Arizona. At maturity it can be 5 to 7 inches in length. Like many other desert scorpions, the Arizona hairy scorpion is a burrower, but may also be found under rocks, logs, sleeping bags, and other surface objects. This scorpion can often be found around homes and in garages. It is a night feeder attracted to water, swimming pools, irrigated areas, or outside lights where food prey such as beetles, cockroaches, crickets, moths, and other insects are attracted as well. During the day it may be found in woodpiles, palm trees, and decorative bark, or under loose boards, woodpiles, rocks, or the bark of trees. Like some other scorpions, the Arizona hairy scorpion may enter homes in search of water. Common indoor places where it might be found are dark, cool areas in the bathroom or kitchen as well as crawl spaces, attics, and closets.

Stripedtail Scorpion

The stripedtail scorpion, Vaejovis spinigerus, is one of the most common scorpion species in southern California, Arizona, and the United States. It is a burrowing scorpion that is often found in sandy soil but can survive in a variety of habitats, from desert floor to rocky hillside. At maturity, the stripedtail scorpion is about 2-1/2 inches long and the body is striped on the upper side. This scorpion is venomous, but not considered dangerous. It may be found under common objects such as sleeping bags, shoes, and other similar items.

Scorpion Biology

Scorpions have a three-part body comprised of the cephalothorax (head), their main body or trunk which has 7 segments and their tail, which has 6 segments. The last segment of their tail works like a universal joint with a stinger attached. Scorpions are able to manoeuver their tail in any direction and though most people think of them stinging in the classic "C" position with stinger over their head, scorpions will sting anyway possible when danger is present. Scorpions have 8 legs along with a set of pinchers up front which are quite strong and agile. They use these pinchers for hunting their prey, self-defence, grooming and maintaining their young.

Cephalothorax

The cephalothorax, also called the prosoma, comprises the carapace, eyes, chelicerae (mouth parts), pedipalps (commonly called claws, pincers or chelae) and four pairs of walking legs. The scorpion's exoskeleton is thick and durable, providing good protection from predators. Scorpions have two eyes on the top of the cephalothorax, and usually two to five pairs of eyes along the front corners of the cephalothorax The position of the eyes on the cephalothorax depends in part on the hardness or softness of the soil upon which they spend their lives. The pedipalp is a segmented, chelate (clawed) appendage used for prey immobilization, defence, and sensory purposes. The segments of the pedipalp (from closest to the body outwards) are coxa, trochanter, femur (humerus), patella, tibia (including the fixed claw and the manus) and tarsus (moveable claw).A scorpion has darkened or granular raised linear ridges, called "keels" or carinae on the pedipalp segments and on other parts of the body which are useful taxonomically.

Mesosoma

The abdomen, also called the opisthosoma, consists of seven segments (somites), each covered dorsally by a sclerotosed plate (tergum) and also ventrally for segments 3 to 7. The first abdominal segment bears a pair of genital opercula which cover the gonopore. Segment 2 consists of the basal plate with the pectines. Each of the mesosomal segments 3 to 7 have a pair of spiracles which are the openings for the scorpion's respiratory organs, known as book lungs. The spiracle openings may be slits, circular, elliptical, or oval.

Metasoma

The metasoma, the scorpion's tail, comprises five caudal segments (the first tail segment looks like a last mesosoman segment), and sixth bearing the telson (the sting). The telson, in turn, consists of the vesicle, which holds a pair of venom glands, and the hypodermic aculeus, the venom-injecting barb. On rare occasions, scorpions can be born with two metasomata (tails). Two-tailed scorpions are not a different species, merely a genetic abnormality.

Scorpion Habits

Scorpions are nocturnal, predatory animals that feed on a variety of insects, spiders, centipedes, and other scorpions. The larger scorpions occasionally feed on vertebrates, such as smaller lizards, snakes, and mice. Prey is located primarily by sensing vibrations. Although scorpions are equipped with venom to defend themselves, scorpions fall prey to many types of creatures, such as centipedes, tarantulas, insectivorous lizards, birds (especially owls), and mammals (including shrews, grasshopper mice, bats). Scorpions feed mainly on insects and spiders and can survive without feeding for six months. During the day scorpions hide under stones, in piles of rocks, in cracks in masonry, in wood piles and under the bark of trees. Scorpions enter structures seeking water and shelter

Fluorescence

Scorpions are also known to glow when exposed to certain wavelengths of ultraviolet light such as that produced by a black light, due to the presence of fluorescent chemicals in the cuticle. One fluorescent component is now known to be beta-carboline. A hand-held UV lamp has long been a standard tool for nocturnal field surveys of these animals. Fluorescence occurs as a result of sclerotization and increases in intensity with each successive instar.

Scorpion Lifespan

Scorpions have quite variable lifespans and the actual lifespan of most species is not known. The age range appears to be approximately 4–25 years (25 years being the maximum reported life span in the species Hadrurus arizonensis). Lifespan of Hadogenes species in the wild is estimated at 25–30 years.

Scorpions prefer to live in areas where the temperatures range from 20 °C to 37 °C (68 °F to 99 °F), but may survive freezing temperatures to the desert heat. Scorpions of the genus Scorpiops living in high Asian mountains, bothriurid scorpions from Patagonia and small Euscorpius scorpions from Central Europe can all survive winter temperatures of about 25 °C (13 °F). In Repetek (Turkmenistan), there live seven species of scorpions (of which Pectinibuthus birulai is endemic) in temperatures which vary from –31 °C to 50 °C.

They are nocturnal and fossorial, finding shelter during the day in the relative cool of underground holes or undersides of rocks and coming out at night to hunt and feed. Scorpions exhibit photophobic behaviour, primarily to evade detection by their predators such as birds, centipedes, lizards, mice, possums, and rats.

Scorpions can consume huge amounts of food at one sitting. They have a very efficient food storage organ and a very low metabolic rate combined with a relatively inactive lifestyle. This enables scorpions to survive long periods when deprived of food; some are able to survive 6 to 12 months of starvation. Scorpions excrete very little; their waste consists mostly of insoluble nitrogenous waste such as xanthine, guanine and uric acid.

Reproduction

The mother scorpion produces an average of 30 living young per brood which she carries on her back for up to 15 days. It takes up to four years for most species to reach maturity. Scorpions are predators, feeding mainly on insects and spiders. They can survive without feeding for many months.

Most scorpions reproduce sexually, and most species have male and female individuals. However, some species, such as Hottentotta hottentotta, Hottentotta caboverdensis, Liocheles australasiae, Tityus columbianus, Tityus metuendus, Tityus serrulatus, Tityus stigmurus, Tityus trivittatus, and Tityus urugayensis, reproduce through parthenogenesis, a process in which unfertilized eggs develop into living embryos. Parthenogenic reproduction starts following the scorpion's final moult to maturity and continues thereafter.

Sexual reproduction is accomplished by the transfer of a spermatophore from the male to the female; scorpions possess a complex courtship and mating ritual to affect this transfer. Mating starts with the male and female locating and identifying each other using a mixture of pheromones and vibrational communication. Once they have satisfied the other that they are of opposite sex and of the correct species, mating can commence.

Courtship

The courtship starts with the male grasping the female's pedipalps with his own; the pair then performs a "dance" called the "promenade à deux". In reality this is the male leading the female around searching for a suitable place to deposit his spermatophore. The courtship ritual can involve several other behaviours such as juddering and a cheliceral kiss, in which the male's chelicerae – claw like mouthparts – grasp the female's in a smaller more intimate version of the male's grasping the female's pedipalps and in some cases injecting a small amount of his venom into her pedipalp or on the edge of her cephalothorax, probably as a means of pacifying the female.

When the male has identified a suitable location, he deposits the spermatophore and then guides the female over it. This allows the spermatophore to enter her genital opercula, which triggers release of the sperm, thus fertilizing the female. The mating process can take from 1 to 25+ hours and depends on the ability of the male to find a suitable place to deposit his spermatophore.

If mating goes on for too long, the female may eventually lose interest, breaking off the process. Once the mating is complete, the male and female will separate. The male will generally retreat quickly, most likely to avoid being cannibalized by the female, although sexual cannibalism is infrequent with scorpions.

Birth and Development

Scorpions are viviparous. The young are born one by one, and the brood is carried about on its mother's back until the young have undergone at least one moult. Before the first moult, scorplings cannot survive naturally without the mother, since they depend on her for protection and to regulate their moisture levels. Especially in species which display more advanced sociability (e.g. Pandinus spp.), the young/mother association can continue for an extended period of time. The size of the litter depends on the species and environmental factors, and can range from two to over a hundred scorplings. The average litter however, consists of around 8 scorplings.

The young generally resemble their parents. Growth is accomplished by periodic shedding of the exoskeleton (ecdysis). A scorpion's developmental progress is measured in instars (how many moults it has undergone). Scorpions typically require between five and seven moults to reach maturity. Malting commences with a split in the old exoskeleton just below the edge of the carapace (at the front of the prosoma). The scorpion then emerges from this split; the pedipalps and legs are first removed from the old exoskeleton, followed eventually by the metasoma. When it emerges, the

scorpion's new exoskeleton is soft, making the scorpion highly vulnerable to attack. The scorpion must constantly stretch while the new exoskeleton hardens to ensure that it can move when the hardening is complete. The process of hardening is called sclerotization. The new exoskeleton does not fluoresce; as sclerotization occurs, the fluorescence gradually returns.

Relationship with Humans

Certain species of scorpion are aggressive and will attack humans with little to no provocation, while others will only attack when threatened.

Scorpion Sting and Venom

All known scorpion species possess venom and use it primarily to kill or paralyze their prey so that it can be eaten; in general, it is fast-acting, allowing for effective prey capture. It is also used as a defence against predators. The venom is a mixture of compounds (neurotoxins, enzyme inhibitors, etc.) each not only causing a different effect, but possibly also targeting a specific animal. Each compound is made and stored in a pair of glandular sacs and is released in a quantity regulated by the scorpion itself. Of the 1000+ known species of scorpion, only 25 have venom that is dangerous to humans; most belong to the family Buthidae.

First Aid

First aid for scorpion stings is generally symptomatic. It includes strong analgesia, either systemic (opiates or paracetamol) or locally applied (such as a cold compress). Hypertensive crises are treated with anxiolytics and vasodilators.

Medical Use

The key ingredient of the venom is a scorpion toxin protein. Short chain scorpion toxins constitute the largest group of potassium (K+) channel blocking peptides; an important physiological role of the KCNA3 channel, also known as KV1.3, is to help maintain large electrical gradients for the sustained transport of ions such as Ca2+ that controls T lymphocyte (T cell) proliferation. Thus KV1.3 blockers could be potential immunosuppressants for the treatment of autoimmune disorders (such as rheumatoid arthritis, inflammatory bowel disease and multiple sclerosis). The venom of Uroplectes lineatus is clinically important in dermatology.

Toxins being investigated include:

Chlorotoxin is a 36-amino acid peptide found in the venom of the deathstalker scorpion (Leiurus quinquestriatus) which blocks small-conductance chloride channels. The fact that chlorotoxin binds preferentially to glioma cells has allowed the development of new methods, that still are under investigation, for the treatment and diagnosis of several types of cancer.
Maurotoxin from the venom of the Tunisian Scorpio maurus palmatus

Control of Scorpions

Sanitation is the first step in scorpion control. Loose boards, wood piles, rocks, and debris should be eliminated from areas around the home, especially near foundation walls. Spray an excellent residual insecticide in these areas. This will also reduce populations of insects that the scorpions feed on. Spray a swath outside approximately six feet around the perimeter of the home and one foot up the foundation wall.

Spray all entry points from the inside. We recommend using Suspend SC. Use a Chapin pump-up type sprayer for application. Both are excellent insecticides. Use Delta Dust to treat the electrical outlets, attic spaces and around the plumbing and electrical fixtures. Use a Hand Duster for application of the dust. Always wear Gloves and a Dust mask. Scorpion infestations can be effectively controlled with thorough applications of the above insecticides into cracks and crevices and other potential harbourage areas.

Scorpions present a hazard both in the yard and in the home. They love to reside where it is moist and irrigated lawns and landscaping will naturally attract them. It is thought they are coming for the other insects on which to feed but regardless of why they come around, once they're found in the grass and turf some will undoubtedly find their way inside. For this reason, it is important that you address outside populations on a regular or maintenance type program. As is the case with many perimeter invading pests, by keeping outside populations in check, you can dramatically reduce the risk of any getting inside local structures. This will help to reduce contact with people which in turn will help to minimize the chance of anyone getting stung.

Scorpion Pesticide and Chemical Treatments
Scorpions and Spiders may be the toughest of all the insects to kill. Fumigation will kill living scorpions and spiders, but unless you kill every last one of them, you still have the problem. Scorpions arrive for food. If you get rid of the food then they go away. Fill up bathtubs and sinks with water and flush them on a regular basis. Scorpions tend to come up the drainage system at night. Also they make have to put up screens on A/C ducts as well if above method does not get rid of them.

Scorpions can be controlled with pesticides, but because of the scorpions' cryptic nature, it is difficult to deliver the pesticide directly. Residual pesticides, i.e., pesticides that last a long time after application, provide a means of "indirect fire" against the scorpions. Residual pesticides should be applied to the yard and exterior of the home, paying special attention to structures that provide harbourage (stone walls, etc.) and potential entry points around the home. Pesticide application must be done on a regular basis, the interval of which will be determined by the severity of the infestation and the success of your cultural and mechanical control methods. This type of pesticide application can only be done by a certified pest control operator, so consult your local pest control company for more information. Although an important part of the overall control strategy, chemical control is the one most fraught with problems. It is expensive, temporary (needs to be repeated), and environmentally and medically hazardous.

Scorpion outside Treatments
Around the home, scorpions love to nest in flower beds, mulch piles, under wood chips or pine straw and in garages which store a lot of boxes or other items on the floor. The scorpion's flat body lends itself well to being able to crawl under most any object. This ability to crawl into small cracks and crevices is what makes the scorpion a common invader to our living environments.

They are great climbers and will readily scale brick, wood, stucco and most any siding on a house so if you let them live around the home, some will invariably move inside. They do this seeking both warmth and refuge and once inside, will require extensive treatments to exterminate established populations.

Deltamethrin Granules

Treating them outside is both easier and less costly and should be done on a regular basis if you reside where scorpions are present. There are two types of preventive maintenance which should be done around the home. First, apply Deltamethrin Granules around the home quarterly.

The most minimal treatment needed is to disperse the granules around all sides of the home effectively establishing a "band" of treated turf. This treated band will stop scorpions from both nesting and crawling thus keeping them out of the home. Use a granule spreader when doing the application to insure uniform application. These granules pose no hazard to people or pets when applied properly and will last 2-3 months per treatment. Be sure to treat at least a 10-foot-wide area around the structure. This amount of coverage will give you adequate protection. If you are in an area which borders on woods, fields or other turf which has a high amount of scorpions present, treat as much of the yard as possible. Getting this area blanketed will cut down and all but eliminate scorpions from nesting and foraging. This will enable you to have both pets and children use the area with minimal risk of getting stung. Since the Deltamethrin Granules are slow acting and need a week or so to "kick in", the use of a liquid material over the turf will be needed if you want immediate knockdown.

Cykick CS

Cykick CS is an excellent material for this type of application. Use it in a 20 -gallon hose end sprayer. This is the type of sprayer that connects to your garden hose. Just add some water and Cykick CS, attach it to your garden hose and spray away. Getting the local turf, flower beds and mulch areas soaked will insure you penetrate down where scorpions like to hide. Be sure to spray the sides of the home with it as well. Direct the spray at the foot of the foundation and come up at least 3 feet. Since scorpions will regularly climb up just about any building, treating the side of the home is important and should be done a regular basis. Just keep children and pets away when the application is done but they will be able to safely access the treatment sights once all areas are dry. This will usually be within an hour of the application. If you have just a small area to treat, you could opt to use a pump sprayer for the job. Just remember that the key when spraying over flat areas for scorpions is being sure to use enough water.

The bottom line here is being sure to get the right amount of Cykick out for the area you want to treat. Using a lot of water won't hurt; in fact, more water is better at dispersing the Cykick down into the key areas where scorpions like hide.

Inside Treatment

Anyone with current nesting and scorpions active in the home should be taking a lot of precautions to insure occupants don't get stung. Be especially careful at night when walking around. Since scorpions are nocturnal, it is highly likely that you will encounter them when it is dark. Try to wear slippers, sandals or some other footwear to minimize the possibility of being stung when walking around. Stepping on a scorpion is one of the more common ways people get stung so be careful at night! If you see scorpions on a regular basis in the home during the night, get a black light to help identify where they are located. Scorpions reflect the light making them very visible and easy to see.

Recommended Measures for Scorpion Control:

1. Remove outdoor harbourages e.g. piles of trash, stones, boards, firewood on the ground and the landscape timbers, should be removed.

2. Points of entry into buildings, e.g. siding, windows, doors, pipes and wires, should be sealed.
3. The use of a residual insecticide such as the wettable powders (WP).

Demon WP or Cyper WP should be applied as a 3- to 10-foot band around the perimeter of the structure, into harbourage sites, and/or around potential entry points, such as: around all windows and doors, along baseboards, plumbing, inside closets, and garage and basement areas. Both Demon WP and Cyper WP are wettable powders that may leave a visible residue that can be seen against dark surfaces.

The next best alternative would be: *Cyonara 9.7 or Suspend SC.*
These products would last just as long and cannot not be seen against dark surfaces. However, wettable powders work better against scorpions.

4. **The use of dusts:** Drione Dust or Delta Dust should be used in the attic area if that is source of entry.

Bark Scorpion

5.6 Spider Identification Section

Two Primary Spider Groups
Spiders can be divided into one of two groups depending on how they capture their prey: hunting (sometimes known as wandering) spiders and web-building spiders. All spiders produce silk, but hunting spiders do not construct webs to capture food. Instead, they rely on their quickness and relatively good eyesight to capture prey. Web-building spiders construct webs in rather quiet, undisturbed places to capture their food. They live in or near their web and wait for food to come to them. They generally have poor eyesight and rely on sensing vibrations in their web to detect prey.

5.6.1 Hunting Spiders

Crab Spiders
Are common spiders outdoors, but are not usually seen indoors. They are small to medium-sized spiders (1/10 - 2/5 inch long) ranging in colour from yellow or red to brown or grey. The first four legs of crab spiders are crab-like, being held out to the sides. They are also usually longer than the back four. Crab spiders can walk forwards, sideways, or backwards. While many hunting spiders actively pursue prey, crab spiders wait motionless and ambush insects that pass closely by. Outdoors, crab spiders are often found on flowers but are also seen on stems or leaves.

Fishing Spiders
Also known as dock spiders, are typically seen around ponds, swamps, slow-moving streams, and nearby vegetation. They may occasionally be found indoors. Fishing spiders are the largest spiders in the Upper Midwest (1 inch long). With legs spread out, some fishing spiders cover as much as 4 inches. They are generally dark-coloured, usually brownish or grayish, with white markings. Fishing spiders can "skate" across water and can dive underneath to capture prey. In addition to insects, fishing spiders can also catch tadpoles, small fish, and other small vertebrate animals.

Gnaphosid Spiders
Are commonly found outdoors. A specific gnaphosid spider known as a parson spider is occasionally seen inside. The parson spider is a medium-sized spider (1/2 inch long) with a brownish body and grey abdomen with a white band running down over half the length of its abdomen. Parson spiders hunt at night. During the day, they are usually found outdoors under stones or loose bark in silken retreats. Indoors, they hide under objects or in cracks or crevices.

Huntsman Spiders
Venom toxicity - the bite of Huntsman Spiders is of low risk (non-toxic) to humans. They are a non-aggressive group of spiders. However, a large individual can give a painful bite. Beware in summer when the female Huntsman Spider is guarding her egg sacs or young.

Spider Identification - an adult varies greatly around 1/2" in body length - has long legs - the diameter of an adult including legs may reach 2" - the first 2 pairs of legs are longer than rear two - it is hairy - buff to beige brown in colour, with dark patches on the body.

Habitat - a hunter that prefers to live under the flaking bark of trees, under flat rocks and under eaves or within roof spaces of buildings. The Huntsman Spider often wanders into homes and is

found perched on a wall. It is a shy, timid spider that can move sideways at lightning-fast speed when disturbed.

Jumping Spiders - Are common spiders outdoors and indoors. They are active during the day and are often found around windows, ceilings, walls, and other areas exposed to sunlight. Jumping spiders are generally small to medium-sized (about 1/5 - 1/2 inch long) and compact -looking. They are usually dark-coloured with white markings, although some can be brightly coloured, including some with iridescent mouthparts.

These spiders move quickly in a jerky, irregular gait. They get their name from their ability to leap on their prey, often jumping many times their own body length. Like most spiders, jumping spiders have eight eyes, of which the two middle eyes are particularly large. Jumping spiders have the best vision of spiders, seeing objects up to 8 inches away.

Jumping spiders (Family Salticidae) get their name from the sometimes spectacular leaps they make when pouncing on prey or simply hopping about in the foliage. They are very small to medium sized spiders 3-15mm (1/8 -- 5/8") long. Their eight eyes are arranged in 3 rows - the first row near the midline contains the largest pair, which faces forward in the manner of predatory animals requiring binocular vision, and a second, smaller pair outboard of those, also facing forward and slightly upward. The second row of eyes is very much smaller and facing upwards and only slightly forward. The jumping spiders have the most acute eyesight of all spiders.

Mouse Spiders

Venom toxicity - known to cause severe illness, especially to young children - similar to Red-Back Spider. Although normally not aggressive, the male mouse spider will bite if provoked, and should be considered dangerous to humans. It has large hard fangs which can cause a deep painful bite. First aid and medical attention (ambulance) should be sought as soon as possible.

Spider Identification - a medium to large spider of up to 1 and 1/2 inches in body length. The male Mouse Spider often has a bright red head and elongated fangs.

Habitat - Mouse spiders are ground dwellers with burrows of more than 3 feet deep. The male often wanders about during the day on open ground, especially after rain, in search of females.

Purseweb Spiders (Sphodros genus, Atypidae family, Mygalomorphae suborder) Mygalomorphs are generally large spiders; though they seem to be the species most likely to inspire arachnophobia, all of the US species are harmless to humans. True Tarantulas (family Theraphosidae) are members of this suborder; some are found in the Southwestern US. The Atypidae are sometimes known as "atypical tarantulas." There are two genera in the US: Atypus and Sphodros

Sac Spiders

Also known as two-clawed hunting spiders are common spiders on foliage or on the ground, and can be commonly found indoors. They are small to medium-sized spiders (1/5 - 2/5 inch long) and are usually yellowish or light-coloured. Although sac spiders do not construct webs, they do build retreats from silk. Outdoors, they usually roll up leaves into a tube, or may construct a retreat under stones. Inside buildings, sac spiders are found in retreats in a variety of places, including high up on walls near ceilings.

Wandering Spiders

Some spiders will enter buildings in search of food and shelter, particularly in the fall when the temperatures become cooler. Below is a list of spiders that are often found in or around buildings. Although many spiders can bite, the injury from this group is usually similar to a bee sting.

Wolf Spiders

Are common spiders outdoors and are occasionally seen indoors. They are moderate to large-sized spiders (1/4 - 3/4 inch long). Wolf spiders are found on the ground or under stones in a wide variety of habitats, such as forest floors, grassy meadows, swamps, and bogs. Some even like to live underground. They commonly hunt during the day or at night when it is warm. Wolf spiders are dark-coloured, usually brownish or greyish, with white markings.

5.6.2 Ground Spiders

Tarantula

True tarantulas are a type of wolf spider that belong to the family Lycosidae in the suborder Araneomorphae. However, most people use the term tarantula to refer to about 700 species of spiders belonging to the family Theraphosidae in the suborder Mygalomorphae.

Sometimes known as American tarantulas, they are found in tropical regions throughout the world, with many species in the southwestern United States. These giants of the spider world can attain a body length of 10 cm (4 in) with a leg span up to 20 cm (8 in), making it possible for some species to overpower small vertebrates (animals with backbones), such as frogs or lizards, for their meal. Their large body and long legs are covered with hairs, and they have powerful chelicerae, giving them a fearsome appearance.

Most tarantulas stay on the ground (often in burrows). As ground hunters, tarantulas are typical sit-and- wait predators—they wait for insects or small vertebrates to come near before they pounce and kill the prey with their strong chelicerae.

Perhaps because of their frightening size and appearance, tarantulas have gained a deadly reputation among humans. For the most part, however, tarantulas do not attack unless provoked, and their venom is not harmful to humans, although their strong chelicerae can cause painful wounds. Tarantulas are popular pets, and some become so tame that they can be picked up and handled safely. Although the chance of receiving a bite is small, there is another danger: Many tarantulas brush off their abdominal hairs when they feel threatened. These barbed hairs fly through the air and can penetrate skin and the mucous membranes of the nose, causing a strong burning sensation.

Wolf Spider

About 2,000 species of wolf spiders belong to the family Lycosidae in the suborder Araneomorphae. Found throughout the world, these spiders have dull brown or black coloration, stout bodies, and long, thick legs. Some species have hairy bodies. Wolf spiders are ground hunters, but their name inaccurately suggests that they actively hunt their prey just like their wolf namesake. However, like tarantulas, most wolf spiders usually sit in a hidden spot. When prey happens by, they ambush the prey by jumping on it. Wolf spiders are sensitive to vibrations, such as the buzzing wings of insects, as well as to visual signals.

For instance, during courtship males drum their legs on the ground or wave their legs and palps in a rhythmic dance in order to catch a female's attention. Female wolf spiders are renowned for their brood care. After laying eggs, a female spider carries the cocoon attached to her spinnerets. When the spiderlings hatch, she allows them to ride on her back for about a week. Some larger wolf spiders dig burrows in the soil, which they may line with silk and provide with a door. At night, they leave their burrows to hunt for insects.

WOLF SPIDER *(Lycosidae Gulosa)*

Biology: Wolf spiders occupy a variety of ecological niches, including most terrestrial habitats. Some species are amphibious, having the ability to skate on the surface of water. Other species are diggers that build burrows in sandy soil. Wolf spiders are most numerous in grasslands where crickets and grasshoppers abound. These spiders capture prey by pouncing on and holding it while several bites are delivered with the chelicerae. They have a higher visual acuity than most spiders and use vision to locate and track prey. Nocturnal species have reflective surfaces behind the retina that double the stimulation from a given unit of light and also cause the eyes to glow brightly in a flashlight beam.

Although there are considerable variations in life histories, all female wolf spiders have a common and fascinating set of maternal care behaviours. After mating, a female produces a carefully constructed silken sac, into which she lays her eggs. She then attaches the egg sac to her posterior at her spinnerets and carries it with her wherever she goes, until the young spiderlings have hatched. After hatching, the mother opens the sac with her chelicerae, and the young quickly escape and climb on their mother's back, where they remain until ready to moult and take up independent lives.

Envenomation: Although some tropical wolf spider species are suspected of having venoms that produce serious pathology in humans, the bite of most species causes only very mild symptoms.

Tarantula Hawk Wasp

The tarantula hawk is the common name for species in the genera Pepsis and Hemipepsis of the family Pompilidae, in the insect order Hymenoptera. These two genera are limited to the Western

Hemisphere, and “tarantula hawks” in the Eastern Hemisphere belong to different genera. These genera of wasps are called tarantula hawks due to their hunting of tarantulas as food for their larvae.

Tarantula hawks are up to two inches (50 mm) long with a blue-black body and bright rust-coloured wings. The bright rust colouring that they have on their wings is also known as aposematic colouring; this warns potential predators that they are dangerous. Their long legs end with hooked claws for grappling with their victims. The stinger of a female tarantula hawk can be up to 1/3 inch (7 mm) long.

Female tarantula hawks may hunt for wandering male tarantulas. However, during the insect's reproductive season, male tarantulas are usually emaciated from ignoring food while searching for females. The tarantula hawks prefer female tarantulas and seek them in their burrows. They capture (often following a dramatic battle), sting, and paralyze the spider. Next they either drag the spider back into her own burrow or transport their prey to a specially prepared nest where a single egg is laid on the spider’s body, and the entrance is covered.

The wasp larva, upon hatching, begins to suck the juices from the still-living spider. After the larva grows a bit, the spider dies and the larva plunges into the spider's body and feeds voraciously, avoiding vital organs for as long as possible to keep it fresh. The adult wasp emerges from the nest to continue the life cycle. Tarantula hawks are "nectarivorous."

The consumption of fermented fruit sometimes intoxicates them to the point that flight becomes difficult. While the wasps tend to be most active in daytime during summer months, they tend to avoid the very highest temperatures. The male tarantula hawk has an interesting behaviour: many act in a behaviour called "hill-topping," where they sit on top of tall plants and look out for females who are ready to reproduce.

These wasps are usually not aggressive, but the sting, particularly of Pepsis formosa, is among the most painful of any insect. Commenting on his own experience, one researcher described the pain as "...immediate, excruciating pain that simply shuts down one's ability to do anything, except, perhaps, scream." Mental discipline simply does not work in these situations."

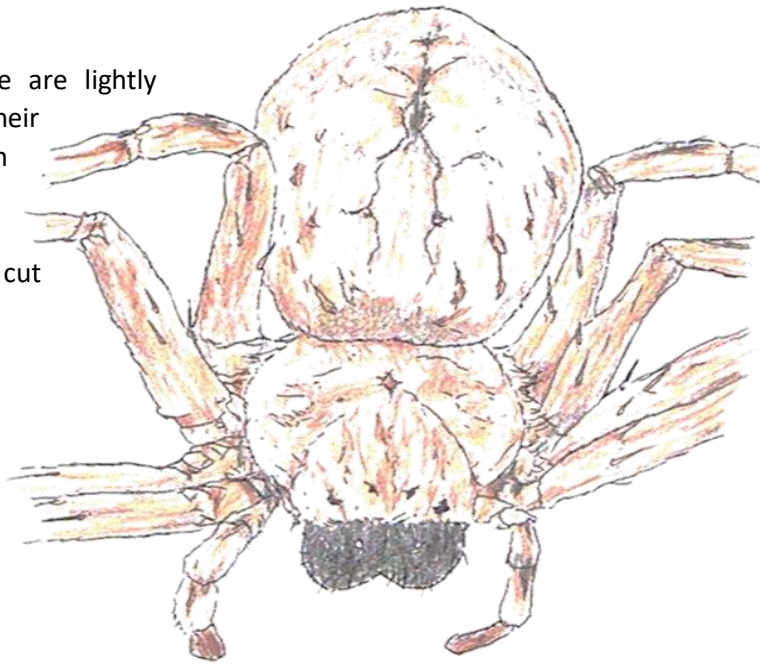
It is listed near the top of the list in Schmidt Sting Pain Index. Although the sting is quite painful, the effect is reported to last only a few minutes and is fatal less often than the honey bee. Because of their stingers, very few animals are able to eat them; one of the few animals that can is the roadrunner.

What is a Wasp?

A wasp is any insect of the order Hymenoptera and suborder Apocrita that is not a bee or ant. The suborder Symphyta includes the sawflies and wood wasps, which differ from members of Apocrita by having a broader connection between the mesosoma and metasoma. In addition to this, Symphyta larvae are mostly herbivorous and "caterpillar-like", whereas those of Apocrita are largely predatory or "parasitic" (technically known as parasitoid).

Crab Spider

Small crab spiders are dark or tan; some are lightly coloured orange, yellow or creamy white. Their legs extend out from their sides causing them to scuttle back and forth in a crab-like fashion. These spiders hide in flower blossoms and may be brought inside in cut flowers.



GIANT CRAB SPIDER

(Olios giganteus)

To avoid harm from the pesticide, you should:

- Pour the clothes from their container into the washer without touching them.
- Handle only the inner surfaces, such as the inside of boots, aprons, or coveralls.
- Do not breathe the steam from the washer and dryer.

Always follow the label's instructions no matter the case or what you think might work. Applicators go to jail and are given large fines for not following the label.

You should wear work clothing that protects your body from pesticide residues, such as long-sleeved shirts, long pants, shoes, and socks. If possible, avoid touching the parts of the equipment where the pesticide is most likely to be. Or, if practical for the job that you will be doing, consider wearing rubber or plastic gloves and an apron.

You should not let pesticides stay on your hands:

- Wash your hands as soon as you finish handling the equipment.
- Wash your hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Wash or shower with soap and water, shampoo your hair, and put on clean clothes after work.
- Wash work clothes that may have pesticides on them separately from other clothes before wearing them again.

5.6.3 Black Widow

Black Widow Spider

Brown Recluse

Araneae: Theridiidae, Latrodectus mactans

The male black widow's abdomen is more elongated than that of the female, with white and red markings on its sides. The female's abdomen is almost spherical, usually with a red hourglass mark below or with 2 transverse red marks separated by black. The legs of the male are much longer in proportion to his body than those of the female. The female is more easily recognized, her shiny black body giving great contrast to the red hourglass marking on her round abdomen.

The black widow's range is from Massachusetts to Florida and west to California, Texas, Oklahoma and Kansas. Although they can be found in almost every state (and some portions of Canada), this spider is most common in the Southern locales of the United States. Black widow spiders are common around wood piles, and are frequently encountered when homeowners carry firewood into the house. Also found under eaves, in boxes, underneath unused construction materials, inside wooden toy boxes, firewood boxes, outdoor toilets, meter boxes, and other unbothered places.

The female black widow spider rarely leaves her web. The web she constructs is an irregular, tangled, crisscross web of rather coarse silk. The core of the web is almost funnel shaped, woven into a silken tunnel in which the female spider spends the majority of her daylight hours.

This web is altered and rebuilt on a regular basis and is capable of capturing rather large insects. The female wraps any captured prey with her silk, repeatedly turning her victim with her legs as she applies more silk.

After her victim is covered in silk, the spider kills her prey by injecting her venom. The prey might be eaten immediately or reserved for a later feeding. After the prey is fed upon and the body fluids are sucked from the victim, the carcass is cut loose and allowed to drop to the ground. The female black widow is most often found hanging upside down in her web, where she spends most of her daytime hours. She stays close to her egg mass, defensively biting anything that disturbs her or her egg sac.

After laying her eggs, the female black widow is hungry and more likely to bite a human. The female black widow stores sperm, producing more egg sacs without mating. Some females live more than three years, with older females dying in autumn after egg laying.

Egg Sacs

Egg sacs are pear shaped (or oval); brown, papery, and about ½ inch long. They hold from 25 to 900 or more eggs, which have an incubation period of 20 days. The spiderlings disperse shortly after emerging, tearing an opening in the egg sac but staying near the sac. After several hours, these second instar spiderlings balloon to the ground and scatter. Growth requires two to three months. Of all spiders, the Black Widow is the most feared. The female's venom is especially poisonous to people. Despite its reputation, this spider often attempts to escape rather than bite, unless it is guarding an egg mass or if it is cornered and pressed.

The male black widow will not bite you. After mating, the female sometimes eats the male (remember, she only has to mate once in her life), earning the name "widow." During the period shortly following mating and laying of eggs, the female black widow can be a little cranky and hungry. After this period (if he lives through it!) the male lives quite comfortably, eating prey captured by the female. The development of his venom sacs stop and become inactive as the male matures, thus making him less of a potential problem than his female counterpart.

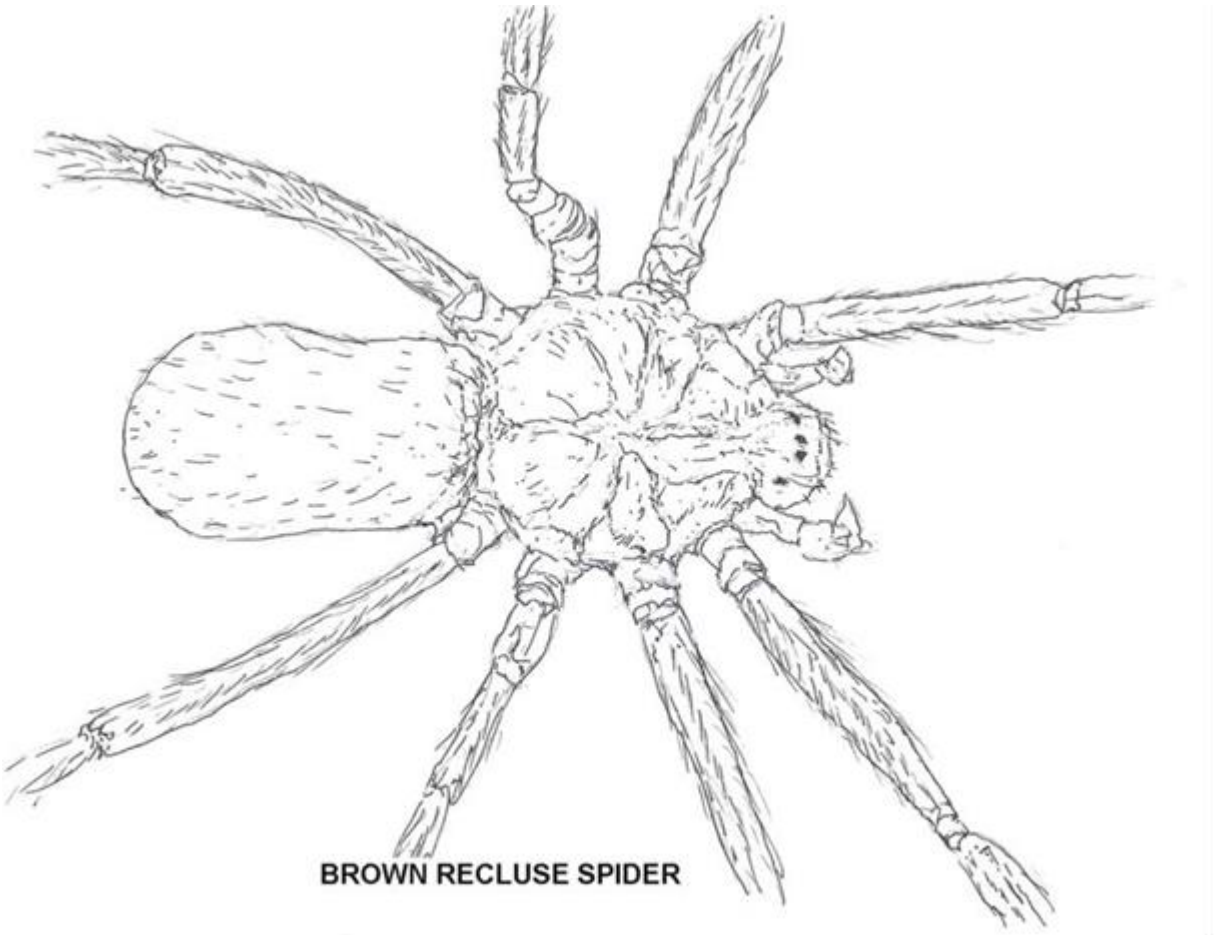
Bite

The bite of the female black widow spider may not always be felt at first, and besides slight local swelling; there is usually little evidence of a lesion. Two tiny red spots can sometimes be observed in the centre of the swollen area. Most of the time, pain at the site of the bite occurs immediately and becomes most intense after about three hours. An overall aching of the body, especially the legs, is a common reaction. Headache, elevated blood pressure, nausea and profuse perspiration may occur in severe cases. The condition is self-limiting and in most cases symptoms disappear in two or three days. Calcium gluconate is used intravenously to relieve and relax muscle spasms produced by black widow venom.

Be very careful when working around areas where black widow spiders may be established. Take proper precautions, wear gloves, and pay attention to where you are working. Black widow bites are sharp and painful, and the victim should go to the doctor immediately for treatment. Seek medical attention if you think you have a spider bite. If possible, collect up the spider or what remains of it and take with you to your doctor or emergency clinic.

5.6.4 American Recluse Spiders

Eleven species of recluse spiders are native to the United States, and a few non -natives have become established in circumscribed areas of the country. The brown recluse spider is the proper common name for only one species, Loxosceles reclusa. It is the most widespread of the North American recluse spiders and lives in the south central Midwest from Nebraska to Ohio and south through Texas to Georgia.



Although the brown recluse does not live in California, they do have four species of native recluse spiders. The most common Californian recluse spider is the desert recluse, L. deserta. It is found mostly in the Sonoran and Mojave deserts, in the foothills of the lower San Joaquin Valley, and in adjacent areas of Mexico, all of which are sparsely populated by humans. In older literature, this spider was referred to as L. unicolor. There are additional species (L. russelli, L. palma, L. martha), but they are so uncommon that they are of scientific interest only.

In addition to these native species, a South American recluse spider, Loxosceles laeta (pronounced "LEE-ta"), has become established in portions of Los Angeles (Alhambra, Sierra Madre, Monterey Park). This spider, however, seems to be confined to a very limited area in Los Angeles County, even though it has lived there for over 30 years. Also, occasional interceptions of the Mediterranean recluse, L. rufescens, are found in commercial goods shipped from out-of-state, but no populations of this spider have been found in California.

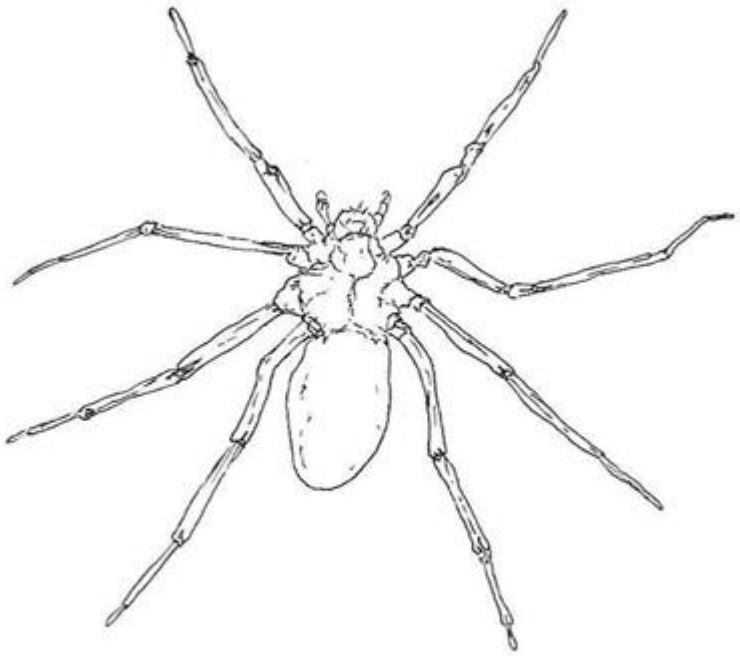
5.8 Neil Young Spider?

American rock icon Neil Young has had an honour bestowed upon him that is not received by many musicians – his own spider. Jason Bond, a biologist at East Carolina University, named a newly discovered arachnid, Myrmekiaphila neilyoungi. It is also known as a trapdoor spider.

Young isn't the first musician to have a new species named after him, which honour goes to Roy Orbison whose name graces the whirligig beetle. (Orectochilus orbisonorum)

5.6.6 Brown Recluse Spider

Araneae: Loxascelidae, Loxosceles reclusa



BROWN RECLUSE *(Loxascelidae Reclusa)*

Over the years, the group of spiders to which the brown recluse belongs has been known by various colloquial names: "violin" spiders, "fiddleback" spiders, "recluse" spiders, and "brown" spiders. Recently the American Arachnological Society chose "recluse spiders" as the official common name for this group. The scientific name for the recluse spider group is Loxosceles (lox-SOS-a-leez). All known members of the group have a scientific name, and the more familiar members of this group also have a common name (e.g., brown recluse, desert recluse, Arizona recluse).

The spider is golden brown, with the fiddle being dark brown or black. This spider is not hairy and the fiddle pattern is often shiny. They are about 1/4 to 3/4 inch long. Members of this small family are known for their poisonous venom. They have six eyes in three pairs.

The most definitive physical feature of recluse spiders is their eyes: most spiders have eight eyes that typically are arranged in two rows of four, but recluse spiders have six equal-sized eyes arranged in three pairs, called dyads. There is a dyad at the front of the cephalothorax (the first main body part to which the legs attach) and another dyad on each side, further back.

Many publications refer to the violin on the dorsal surface of the cephalothorax as the most important diagnostic feature. Although this marking is fairly consistent in mature brown recluses and Texan recluses (L. devia), it can vary in intensity and sometimes fades in preservative, and it is very faint to non-existent in several recluse species found in the southwestern United States (e.g., the desert recluse).

Therefore, checking the eye pattern will eliminate almost all suspect recluse spiders from consideration, whereas the presence or absence of the violin marking may lead to misidentifications.

In addition, the abdomens of all recluses are covered with fine hairs and are uniformly coloured, although the coloration can vary from light tan to dark brown, depending on what they have eaten. There is never a coloration pattern on the abdomen. Finally, the legs are similarly covered with fine hairs, whereas many non-recluse spiders have stout spines on their legs.

Some spiders share each of these physical characteristics (six eyes in dyads, dark pattern near the eyes, uniformly coloured abdomen with fine hairs, no spines on the legs); however, no non-recluse spider has all four characteristics. On this basis, more than 99% of the spiders found by Californians can be identified as something other than a recluse spider. If, however, you do find a recluse spider in California, it will most likely be the native desert recluse, L. deserta. To further identify Loxosceles spiders to species requires a high-power microscope and the skills of a spider expert (arachnologist).

The cephalothorax is rather flat above and has a conspicuous, lengthwise furrow in the midline at the rear third. Each foot has two claws. Many of the wolf spiders are similar in appearance and have similar markings as the brown recluse. They are large, robust, hairy, and therefore, they can be distinguished from the brown recluse.

Brown Recluse spiders spin small, irregular webs under bark, stones, or other secluded areas. Their venom is especially poisonous to people; those bitten often become ill and find that the wound does not heal quickly. Both male and female brown recluse spiders, as well as their spiderlings, are capable of injecting venom that may result in serious lesion formation or systemic reactions. The severity of the bite may vary. The symptoms may vary from no harm at all to a reaction that is quite severe. Usually, the brown recluse spider bite is not felt and the pain sets in from six to eight hours later. A typical bite area may resemble a pimple, pustule, or blister formation within six to 12 hours later. Mild to severe pain, accompanied by swelling, may occur during this interval.

The surrounding tissue begins to darken, is irregular in shape, and has sharply raised edges, resulting in a sunken area which may be several centimetres in diameter. Often there is a systemic reaction within 24-36 hours, characterized by restlessness, fever, chills, nausea, weakness, and joint pain. Where the bite occurs, there is often tissue death, and skin is sloughed off. In some severe cases, a wound may develop that lasts several months. In all cases, a physician should be notified. If at all possible, kill and take the spider to the physician for positive identification. Individual spiders can be crushed underfoot or sprayed with an aerosol spray.

Brown recluse spiders are found primarily in the Midwest. Many cases of bites are reported from Alabama, Florida, Georgia, Texas, Kansas, Missouri, and Oklahoma. They are suspected of being in other states as well. The edge of its range just reaches the tip of western Virginia, but it occurs rarely in this state. The Brown Recluse has adapted quite well to indoor habitats.

They are commonly found in the storage areas of residences, including areas such as attics, closets, bedrooms and other dark recesses. This spider frequently inhabits clothing, toys, books, boxes, and furniture, as well as transport trucks, tool sheds, tree houses, and little-used or abandoned dog houses. Bites often occur when the spiders hide in towels or old clothes left in those areas.

The brown recluse spider is nocturnal and prefers food such as firebrats, crickets, Arachnides, and other soft-bodied creatures.

5.6.7 Web Spiders

Cellar Spiders
Cellar spiders have long, thin legs and build sheet-like or irregular webs in dark places. They commonly hang upside down under the web.

Comb-footed spiders
Also known as cobweb spiders, are very common spiders outdoors and indoors. They are small to medium-sized spiders (about 1/8 - 3/8 inch long). Comb-footed spiders are usually brownish or greyish. They build irregular webs in many places, including wood and stone piles and in quiet areas of buildings, such as basements. A common type of comb-footed spider found indoors is the house spider. It is greyish to brownish with chevron-like markings on its abdomen and a body length of over 1/4 inch.

Funnel Web Weavers
Funnel web weavers (Family Agelenidae) are small to medium sized spiders often found in grassy fields, low shrubbery, or living among leaf litter in forests. They spin sheet webs of non-sticky silk with a characteristic funnel extending off to one side. The funnel is where the spider hides while awaiting prey. There is a 3- dimensional barrier web spun above the sheet web, and when a prey item falls through onto the sheet web, the spider quickly runs out and bites its victim, then drags it back to the funnel to feed. These sheet webs are nearly invisible unless covered with dewdrops on a cool morning, and the spider can move very quickly over the surface. It almost looks as if the spider is walking on air. There are over 400 North American species.

Spiders in the most common genus, Agelenopsis, are commonly called "grass spiders," after their habit of building their combination sheet-and-funnel webs in grass and low shrubs.

Venom toxicity - the bite of these spiders is of low risk to humans.

Spider Identification - are common outdoors and are occasionally found indoors. They are generally brownish or greyish with light and dark stripes near the head. They have long spinnerets and are moderate-sized (3/4 inch long). Grass spiders construct a large sheet web with a funnel they use as a retreat. These webs are commonly built on the ground, around steps, window wells, foundations, and low shrubs.

Habitat - These spiders are often called grass spiders because they construct their webs in tall grass, heavy ground cover and the branches of thick shrubs. Rarely will a funnel web spider be seen indoors, except for an occasional wandering male. They are found mostly in the Pacific Northwest states.

Grass spiders
A type of funnel weaver, are common outdoors and are occasionally found indoors. They are generally brownish or greyish with light and dark stripes near the head. They have long spinnerets and are moderate-sized (3/4 inch long). Grass spiders construct a large sheet web with a funnel they use as a retreat. These webs are commonly built on the ground, around steps, window wells, foundations, and low shrubs.
Orb spiders

Are common spiders outdoors near buildings, but are usually not found indoors. They range in size from small to large (1/8 - 1 inch long) and are found in a variety of colours, with some being brightly coloured. Orb spiders have large, swollen-looking abdomens, including some that are oddly shaped. They make the classic round, flat, wheel-like web familiar to most people. The black and yellow argioper, also known as the garden spider, is familiar to many. It is large (up to 1 inch long) and brightly coloured black and yellow. Another common orb spider is the barn spider. It is large (4/5 inch long) and brownish in colour.

Orb Weaving Spiders

Orb weavers (Family Araneidae) comprise a huge family of spiders, of which there are several hundred species in North America. These spiders vary greatly in colour, shape and size, measuring between 2 - 30mm (1/16 -- 1 1/4") long. They have eight eyes arranged in two horizontal rows of four eyes each. The males are generally much smaller than the females and commonly lack the showy colouring of their fairer sex. They often spin their own smaller orb web near an outlying portion of the female's, and I've noticed most males give the females wide berth. Indeed, I rarely see male orb weavers, they are so reclusive.

Venom toxicity - the bite of Orb-Weaving Spiders is of low risk (not toxic) to humans. They are a non-aggressive group of spiders. Seldom bite. Be careful not to walk into their webs at night - the fright of this spider crawling over one's face can be terrifying and may cause a heart attack, particularly to the susceptible over 40 year olds.

Spider Identification - an adult is about 2/3 to more than 1 inch in body length - has a bulbous abdomen - often colourful - dark to light brown pattern. The common Golden Orb-Weaver Spider has a purplish bulbous abdomen with fine hairs.

Habitat - often found in summer in garden areas around the home - they spin a large circular web of 6 feet or more, often between buildings and shrubs, to snare flying insects, such as, flies and mosquitoes.

Trap-Door Spiders

Venom toxicity - the bite of the Trap-Door Spider is of low risk (non-toxic) to humans. It is a non-aggressive spider - usually timid but may stand up and present its fangs if harassed. Rarely bites - but if so it can be painful.

Spider Identification - an adult is about 1 and 1/2 inches in body length - brown to dark brown in colour - heavily covered with fine hairs. The male has distinct boxing glove-shaped palps, that is, the two "sensory feelers" at front of its head.

Habitat - this spider is a ground dweller, with a burrow retreat lined with silk of up to 10 inches in depth and around 1 inch in width - prefers nesting in drier exposed locations - often has a wafer-like lid on the burrow entrance. Trap-Door Spiders are commonly found in the drier open ground areas around the home.

Always follow label instructions and take steps to avoid exposure. If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. For additional treatment advice,

contact the Poison Control Center at 1-800-222-1222. If you wish to report a pesticide problem, please call 1-800-858-7378.

NOTE: When pesticides are used, it is the applicator's legal responsibility to read and follow directions on the product label. Not following label directions, even if they conflict with information provided herein, is a violation of federal law.

House Spider

The common house spider belongs to the funnelweb spiders in the family Agelenidae in the suborder Araneomorphae. House spiders are found throughout Europe and North America. This spider is so named because its horizontal sheet web is often seen in wall corners of houses, but it can also be found in any cool, dark place, such as dense vegetation or crevices of logs or rocks. The spider's web forms a tube, and the narrowed end serves as a retreat where the spider can hide. When an insect walks over the sheet web, the spider immediately rushes out from the funnel, grabs its victim, and delivers a poisonous bite. The spider then carries its prey back to its retreat, where it begins to feed.

Sometimes house spiders leave their webs and can be seen wandering around or trapped in a bathtub. These are usually males who have given up building webs, but are always in search of a female. Male house spiders lack adhesive hairs on their feet, and therefore, cannot climb on smooth vertical surfaces, such as those found in sinks and bathtubs. Most house spiders are harmless and may actually prove beneficial to humans since they feed on insects that stray indoors.

Garden Spiders

Garden spiders belong to the family Araneidae, a group of 2,500 different species of spiders that weave orb, or circular, webs. Marked with varying shades of brown, garden spiders have a distinctive white cross on their abdomens, and some people refer to them as cross spiders. They are found throughout the continental United States, Canada, and Mexico. Some species are found in Europe and Hawaii.

Like most orb weavers, a garden spider typically sits upside down in the middle of the orb web, placing its eight feet on the threads radiating out from the centre of the web. The feet act as sensors, picking up vibrations when prey enters the web. When an insect becomes stuck in the web's sticky spiral threads, the spider rushes out to wrap the victim with silk and give it a paralyzing bite. The spider then carries the prey back to the hub of the web to feed on it.

Jumping Spider

The jumping spiders are active hunters. Depending on the species, they can leap up to 25 times their body length when stalking prey. They belong to the family Salticidae, the largest spider family, with more than 4,000 species, in the suborder Araneomorphae. Jumping spiders are found mostly in

tropical regions throughout the world, although some species live in high elevation regions in the Himalayas.
Jumping spiders are small spiders, seldom growing larger than 2 cm (0.8 in) in length. Most jumping spiders have sombre brown or grey coloration, but a few male species are quite colourful, with iridescent scales and spines and tufts of bright hair. The most striking feature of jumping spiders is their eyes. They have two primary eyes on the front of their cephalothorax that provide exceptionally acute vision.

For example, at 20 cm (8 in), they not only see sharp images, but also recognize members of their own species. Their six secondary eyes detect motion. Their excellent eyesight makes these spiders reliant on visual cues for courtship and hunting, and as a result, they are active mostly during the day. At night they hide in crevices or under bark, often in small silken cells that they weave for themselves.

During courtship, the male jumping spider identifies himself by dancing in front of a female, waving his legs in a pattern specific to that species. Hunting is also guided by visual cues. The spider's secondary eyes are able to detect a moving insect, which prompts the spider to turn toward the insect and scrutinize it with its primary eyes. This overlapping visual field produced by the primary and secondary eyes enables the spider to accurately calculate the distance to the prey.

Jumping spiders approach their prey the way a cat stalks a mouse. When the spider comes within a few centimetres of its prey, it suddenly leaps by pushing off the ground with its hind legs and then grabs the prey with its front legs. Muscle power and the hydraulic action of body fluids fuel the explosive force of the jumping spider's legs.

Common name: Jumping spider; Genus/species: Metaphidippus sp.; Order/family: Araneae: Salticidae; Stage: Adult. Pretty cool little insect.

Hobo Spider Information

The hobo spider is a member of the funnel-web spider family Agelenidae. Funnel-web spiders are long-legged, swift-running spiders that build funnel or tube -shaped retreats. The hobo spider runs at an average speed of about 0.45 meters (17 inches) per second, with a maximum speed of about 1.1 meters (40 inches) per second. The hobo spider has a brown cephalothorax (the front portion to which the legs are attached) and brown legs, with darker markings on the cephalothorax. The abdomen has a distinctive pattern of yellowish markings on a greyish back ground, although this pattern can be difficult to discern without the aid of a microscope or hand

HOBO SPIDER

(Tegeneria agrestis)

lens. The pattern is generally more discernible in immature specimens. Unlike many other similar-looking spiders, hobo spiders do not have darker bands (like multiple arm bands) on their legs. Spiders with such banding can be assumed not to be hobo spiders.

Female Hobo Spider

The hobo spider is one of the most dangerously venomous spiders in the United States. The hobo's "stronghold territory" ranges from extreme southern Alaska through southern B.C. and Alberta, Canada, to central and southern California, and east into central Colorado. However, we have confirmed catches throughout the continental USA to the eastern seaboard and into all Gulf States, making the "hobo spider" a national pest.

The hobo spider, originating from Europe, began its infestation of the continental USA in the Port of Seattle some time before the 1930's. Most poisonous spider bites in the western half of the USA are due to the Hobo spider. A venomous bite from a Hobo or Brown Recluse Spider can be severe. Necrotic arachnidism results from envenomation (venom poisoning) from the bite of Hobo, or Recluse. It occurs due to the venom's ability to clot blood which results in an area of tissue receiving inadequate blood flow and thus dying secondary to oxygen starvation.

Male Hobo Spider

Although the bite of the hobo spider is initially painless, the bite can be serious. After 24 hours, the bite develops into a blister and after 24-36 hours, the blister breaks open, leaving an open, oozing ulceration. Typically, when the venom is injected, the victim will experience an immediate redness, which develops around the bite. The most common reported symptom is severe headache. Other symptoms can include nausea, weakness, fatigue, and temporary memory loss and vision impairment. In any case, first aid and medical attention should be sought, if bitten, as and when any adverse health effects are observed.

Spider Identification - they are brown in colour and the adults' measure roughly 1/3 to 2/3 inch in body length and 2/3 to 2 inches in leg span. Their abdomens have several chevron shaped markings. Males are distinctively different from females in that they have two large palpi (mouth parts) that look like boxing gloves. Females tend to have a larger and rounder abdomen when compared to males. Up to 50% of bites by dangerously venomous spiders are "dry," with no venom injected and no signs of poisoning developing.

Most people bitten and envenomated by Hobo or Recluse spiders do not feel the initial bite and do not see the biting spider. Bites that are more serious occur when the Hobo gets between clothes or bedding and skin and is trying to get away. Keeping clothes, bedding, and storage boxes off the floor is a wise precaution, since they are preferred hiding places for the Hobo. People often get bitten in bed, sleeping on couches or floors, when putting on clothes, coats, gloves or shoes that have been on the floor, and when picking up piles of laundry.

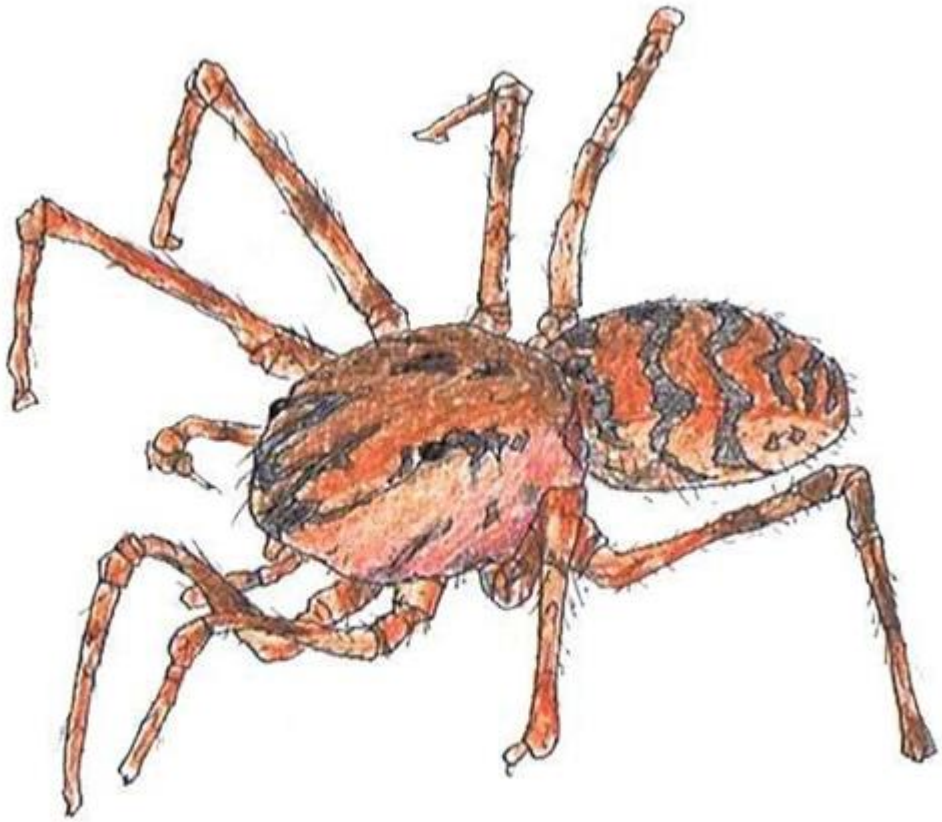
Seek medical attention if you think you have a Hobo or Brown Recluse spider bite. If possible, collect up the spider or what remains of it and take with you to your doctor or emergency clinic.

Always follow label instructions and take steps to avoid exposure. If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. For additional treatment advice, contact the Poison Control Center at 1-800-222-1222. If you wish to report a pesticide problem, please call 1-800-858-7378.

NOTE: When pesticides are used, it is the applicator's legal responsibility to read and follow directions on the product label. Not following label directions, even if they conflict with information provided herein, is a violation of federal law.

This publication contains pesticide recommendations that are subject to change at any time. These recommendations are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. Due to constantly changing labels and product registration, some of the recommendations given in this writing may no longer be legal by the time you read them.

Six-Eyed Spiders

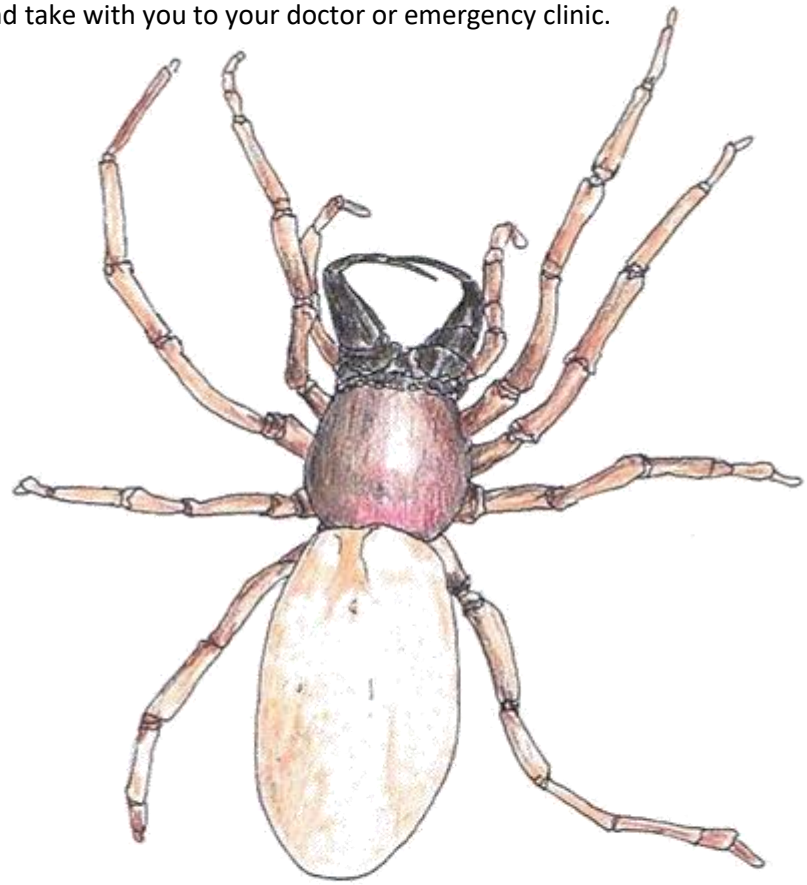


SPITTING SPIDER *(Scytodes thoracica)*

An adult spitting spider with characteristic body coloration.

The spitting spiders (Scytodes spp.) are closely related to recluse spiders and have six eyes arranged in a similar pattern. However, they also have many black spots or lines on their bodies that would exclude them as recluses.

Seek medical attention if you think you have a spider bite. If possible, collect up the spider or what remains of it and take with you to your doctor or emergency clinic.



WOODLOUSE HUNTER

(Dysdera crocata)

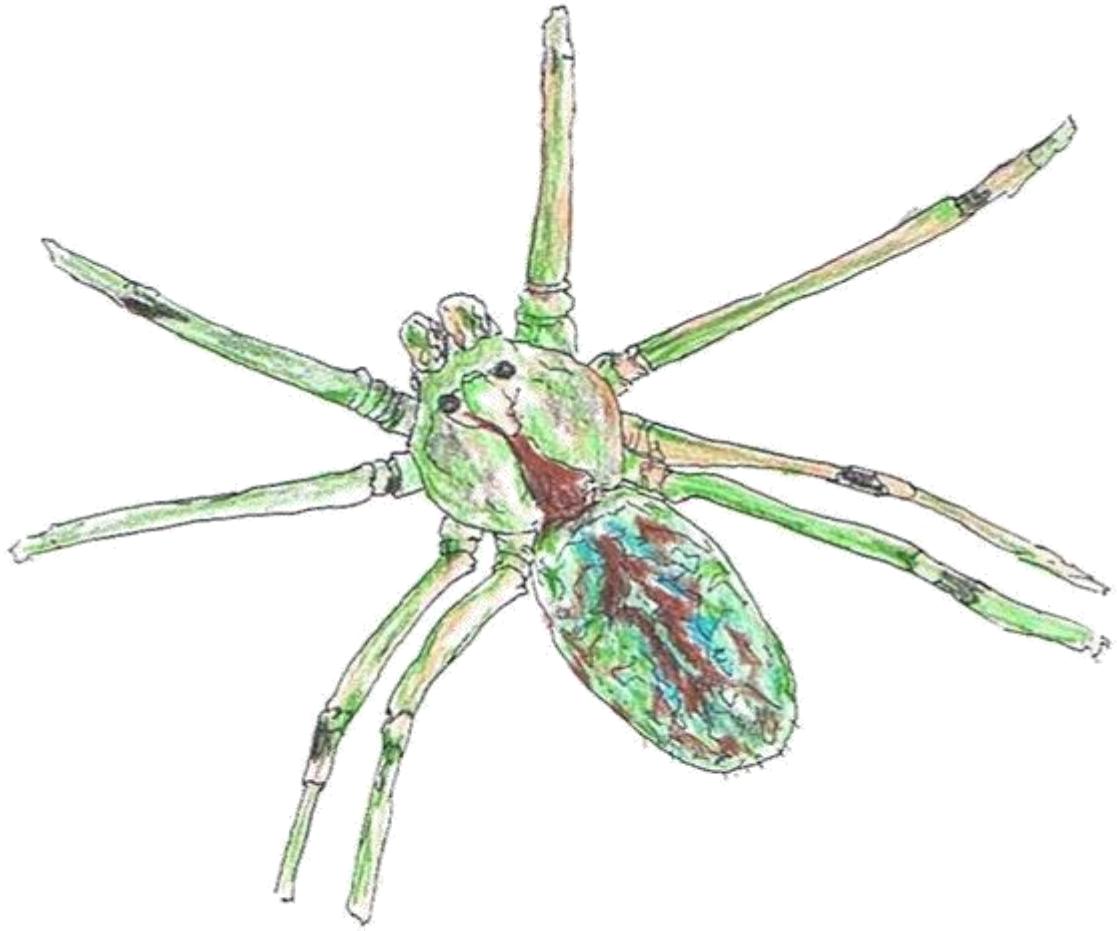
The Woodlouse spider lacks any markings on its body.

The woodlouse spider, Dysdera crocata, has six eyes arranged in two groups of three (triads) and no bodily markings; nonetheless, it is commonly mistaken for a recluse in the United States.

Spiders with Violin-Shaped or Other Dark Markings

Many common tan or grey spiders have dark markings on the head region, which convinces people that they have caught a bona fide recluse spider. These spiders include cellar spiders (Psilochorus spp., Physocyclus spp.), pirate spiders (Mimetus spp.), and sheet web spiders (Linyphiidae). The marbled cellar spider, Holocnemus pluchei, also confuses people even though the dark marks are on the ventral (underside) not the dorsal (top) surface of the body.

Seek medical attention if you think you have a spider bite. If possible, collect up the spider or what remains of it and take with you to your doctor or emergency clinic.



MARBLED CELLAR SPIDER ***(Holocnemus pluchei)***

Cellar spiders have a darkened area on their cephalothorax (head region) but have 8 eyes.

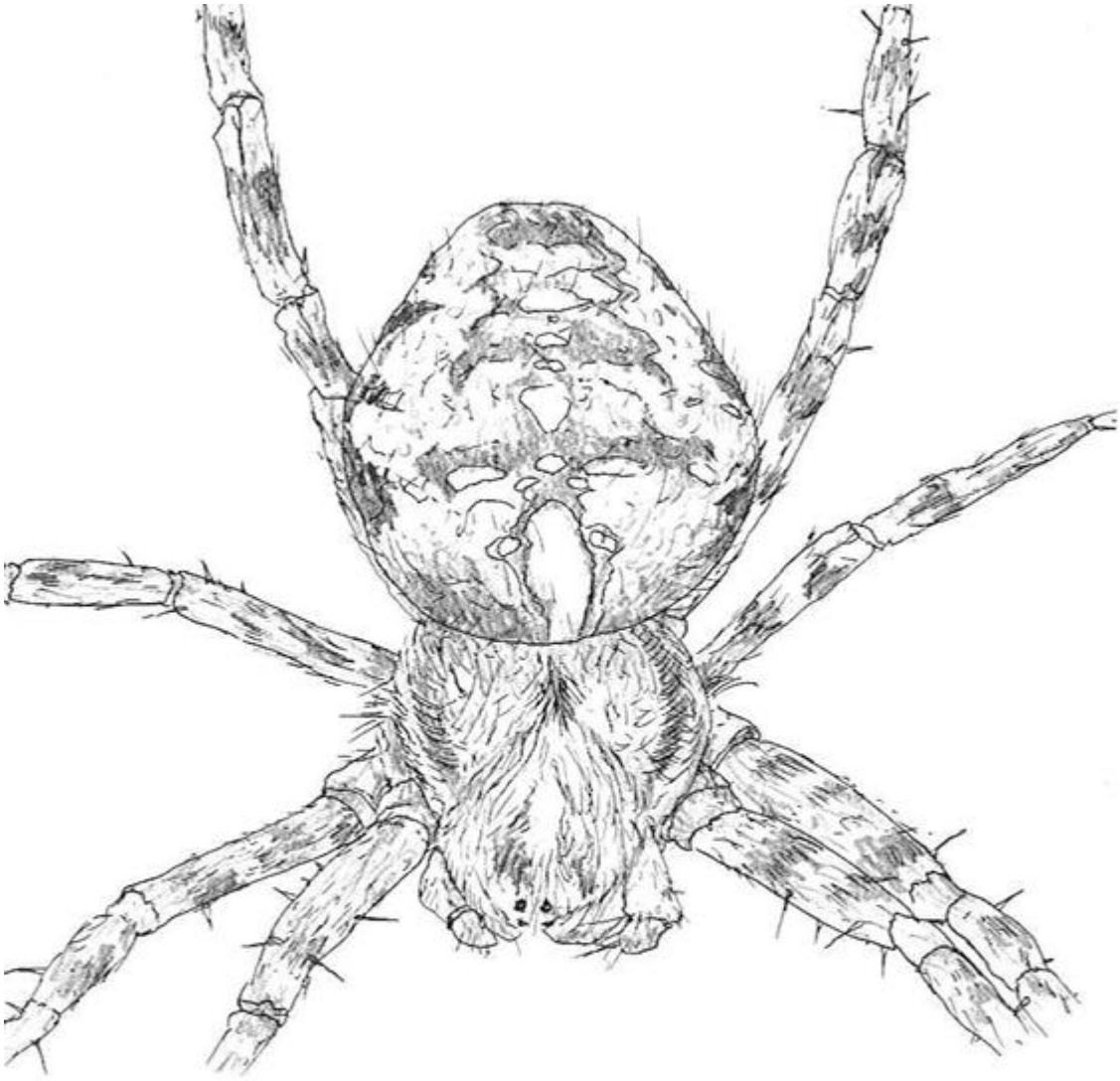
Ubiquitous Brown Spiders

Virtually every spider that is tan or brown has been turned in as a potential brown recluse. There are hundreds of species of these spiders. They include ground spiders (Gnaphosidae), sac spiders (Cheiracanthium spp., Trachelas spp., and many of the liocranoid spiders), wolf spiders (Lycosidae), grass spiders (Agelenidae), orb weavers (Araneidae), and male crevice spiders (Filistatidae).

More specifically, males of both the western black widow (Latrodectus hesperus) and the false black widow (Steatoda grossa) are frequently brought in for recluse verification. All of these brown spiders have eight eyes and can quickly be eliminated from consideration.

Seek medical attention if you think you have a spider bite. If possible, collect up the spider or what remains of it and take with you to your doctor or emergency clinic.

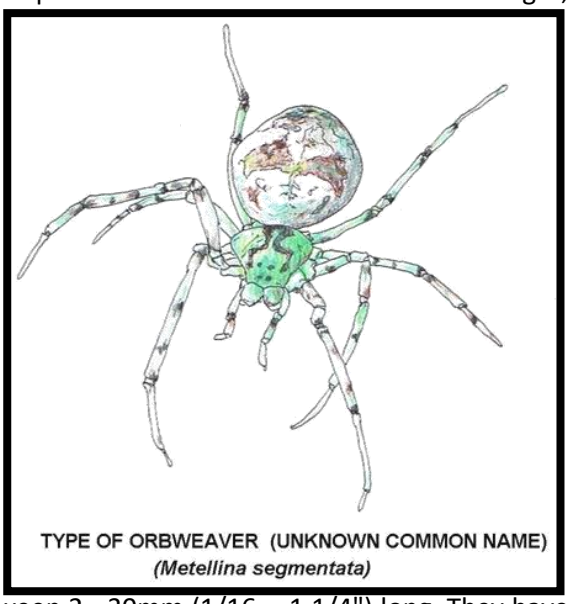
5.6.8 Orb Weavers (Araneidae)



AMERICAN HOUSE SPIDER (TYPE OF CROSS ORBWEAVER)
(Araneus diadematus)

Individual spiders' colouring can range from extremely light yellow to very dark grey, but all European garden spiders have mottled markings across the back with five or more large white dots forming a cross. The white dots result from cells that are filled with guanine, which is a by-product of protein metabolism. The third pair of legs of garden spiders are specialized for assisting in the spinning of orb webs. These spiders also use them to move around on their web without getting stuck. These legs are useful only in the web; while on the ground, these legs are of little value. Garden spiders have been known to stridulate when threatened. Since this tends to be a passive animal, it is difficult to provoke to bite- but if it does, the bite is just slightly unpleasant and completely harmless to humans.

Metellina (or Meta) segmentata - Is a colourful stretch spider that builds orb webs, and is often seen in late summer/autumn. The webs are built by the larger females who usually lie head down on the web, as in this photo, waiting for prey to get entangled in the web. The prey is then quickly captured and wrapped in silk before being eaten. Orb Spiders are said to eat their webs each night, along with many of the small insects stuck to it. They have been observed doing this within a couple of minutes. A new web is then spun in the morning. The much smaller male will approach the female cautiously in order to mate. If not careful, he could end up being eaten by her. Seek medical attention if you think you have a spider bite. If possible, collect up the spider or what remains of it and take with you to your doctor or emergency clinic.



TYPE OF ORBWEAVER (UNKNOWN COMMON NAME)
(Metellina segmentata)

Orb Weaving Spiders

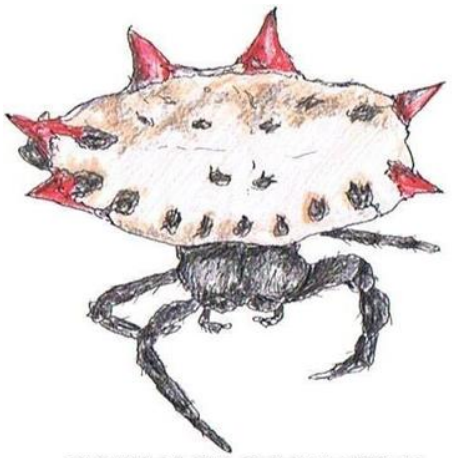
Orb weavers (Family Araneidae) comprise a huge family of spiders, of which there are several hundred species in North America. These spiders vary greatly in colour, shape and size, measuring between 2 - 30mm (1/16 -- 1 1/4") long. They have eight eyes arranged in two horizontal rows of four eyes each. The males are generally much smaller than the females and commonly lack the showy colouring of their fairer sex. They often spin their own smaller orb web near an outlying portion of the female's, and I've noticed most males give the females wide berth. Indeed, I rarely see male orb weavers, they are so reclusive.

Venom toxicity - the bite of Orb-Weaving Spiders is of low risk (not toxic) to humans. They are a non-aggressive group of spiders. Seldom bite. Be careful not to walk into their webs at night - the fright of this spider crawling over one's face can be terrifying and may cause a heart attack, particularly to the susceptible over 40 year olds.

Spider Identification - an adult is about 2/3 to more than 1 inch in body length - has a bulbous abdomen - often colourful - dark to light brown pattern. The common Golden Orb-Weaver Spider has a purplish bulbous abdomen with fine hairs.

Habitat - often found in summer in garden areas around the home - they spin a large circular web of 6 feet or more, often between buildings and shrubs, to snare flying insects, such as, flies and mosquitoes.

Photo Right: Gasteracantha cancriformis. This is a female orb weaving spider. Like Micrathena gracilis, it also has spines on its abdomen.

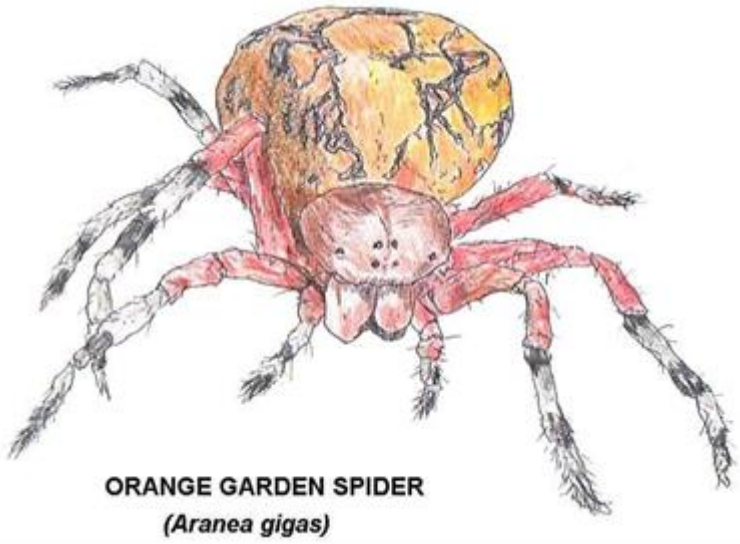


SPINYBACK ORBWEAVER
(Gasteracantha cancriformis)

Aranea trifolium is commonly named the shamrock spider. She is a rather large orb-weaver. She is off-white with dark median longitudinal stripe and with dark marginal stripes. Legs are white to yellow with dark annulations. Abdomen off-white, reddish or purplish, sometimes greenish. Coloured specimens usually with paired and unpaired angular white spots. Venter dark, usually unmarked.

SHAMROCK SPIDER ***(Araneus trifolium)***

Hentzia basilica Those who have seen a spider of this species spin its web indicate that it first produces a horizontal orb having more than 50 radii; then it attaches numerous silk threads to the outer portions of the orb, pulls them downward, and anchors them; finally it connects numerous silk threads to the more central parts of the orb, pulls them upward, and fastens them. The appearance of the final dome-shaped web with the supporting lines led to Basilica Spider as its common name.



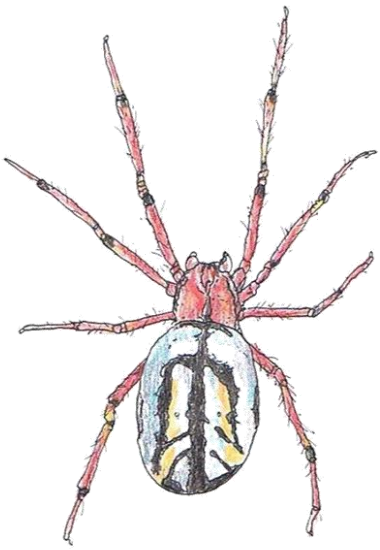
ORANGE GARDEN SPIDER
(Aranea gigas)

Mimetus interfector. It is an unusual spider in that it climbs into the webs of other spiders (usually orb weavers) and preys upon them. Thus, to obtain food, it does not spin a web of its own.

BOWL & DOILY SPIDER

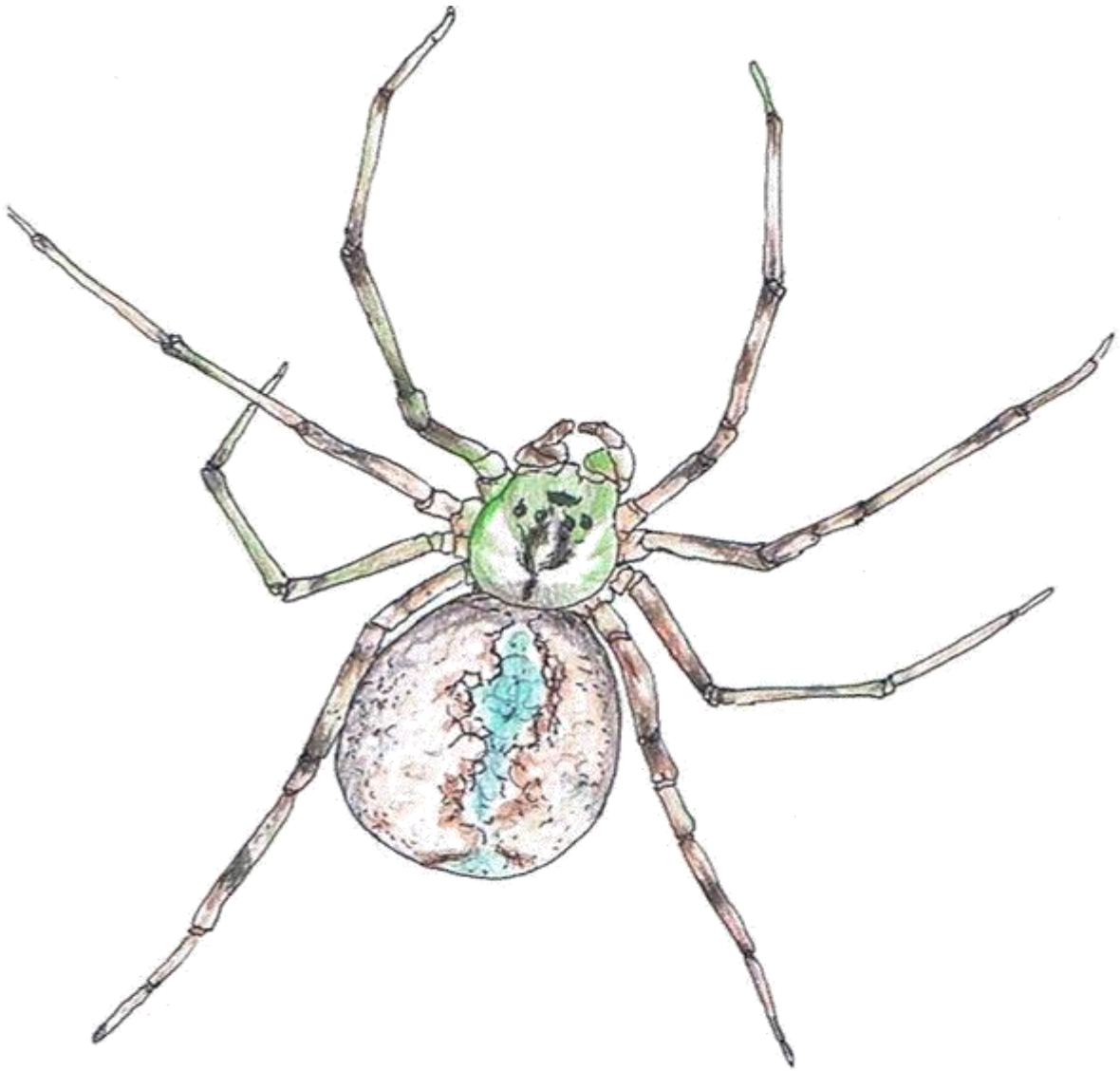
(Mimetus interfector)

The Orchard spider (Leucauge venusta) is a long- jawed, orbweaver spider that may be found from the East Coast, reaching into the central US. The web is often oriented horizontally, with the spider hanging down in the centre. The neon yellow, orange, or red spots on the rear of the abdomen are variable in size among individuals and sometimes absent. This species is parasitized by a wasp larva, which attaches itself externally at the junction of the cephalothorax and abdomen.



ORCHARD SPIDER

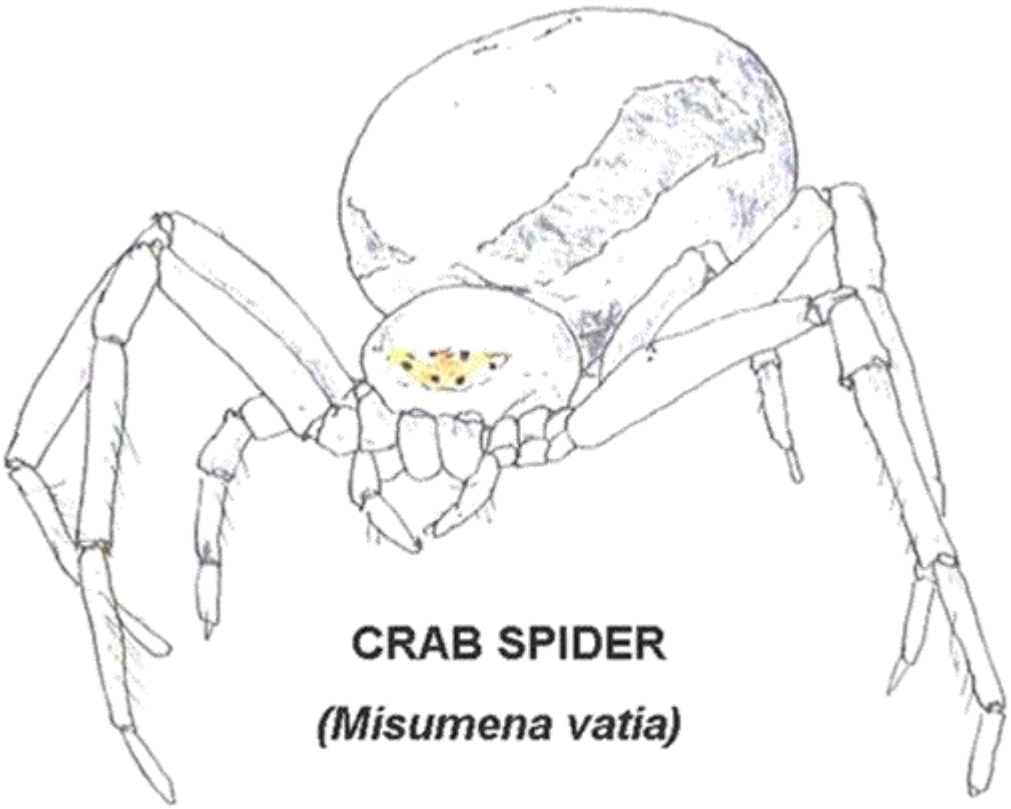
(Leucauge venusta)



HAMMOCK SPIDER

(Linyphia phrygiana)

This is a common group of small spiders (order Araneida), numbering about 2,000 species throughout the world. Most are less than 6 mm (1/4 inch) in length and are seldom seen. Their webs are flat and sheet like and dome- or cup-shaped. The spider is usually found on the lower side of the web and often between two layers of webbing. The hammock spider (Linyphia phrygiana), native to North America, builds a hammock-shaped web



CRAB SPIDER

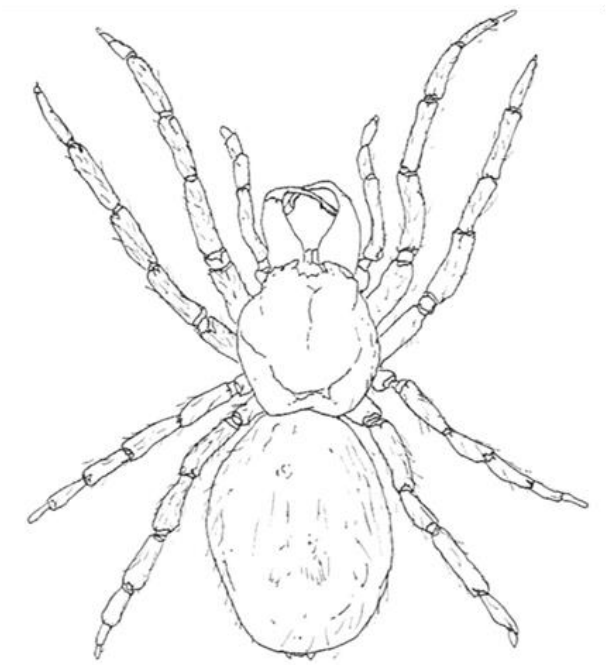
(Misumena vatia)

Misumena vatia is one of the crab spiders. Crab spiders are masters of disguise, and some, such as this one, they can gradually change their colour to that of the flower in which they hide to ambush unobservant insects.

Parson Spider

The parson spider is a nuisance in homes and is generally nontoxic; although some people may experience allergic reactions to the bites. The parson spider is about 1/2 inch long and may vary in colour from brown to black. The front segment of the body tends to be a chestnut colour, while the abdomen is greyish, with a distinctive white or pink pattern along its middle. The body is covered with fine hairs, giving a velvety appearance. The parson spider is usually found outdoors under rocks or in piles of brush or firewood. This spider does not spin a web, but wanders on the ground in search of prey.

Indoors, this spider wanders about at night and conceals itself beneath objects or in clothing during the day. Most bites from this spider occur at night or when it is trapped in clothing.

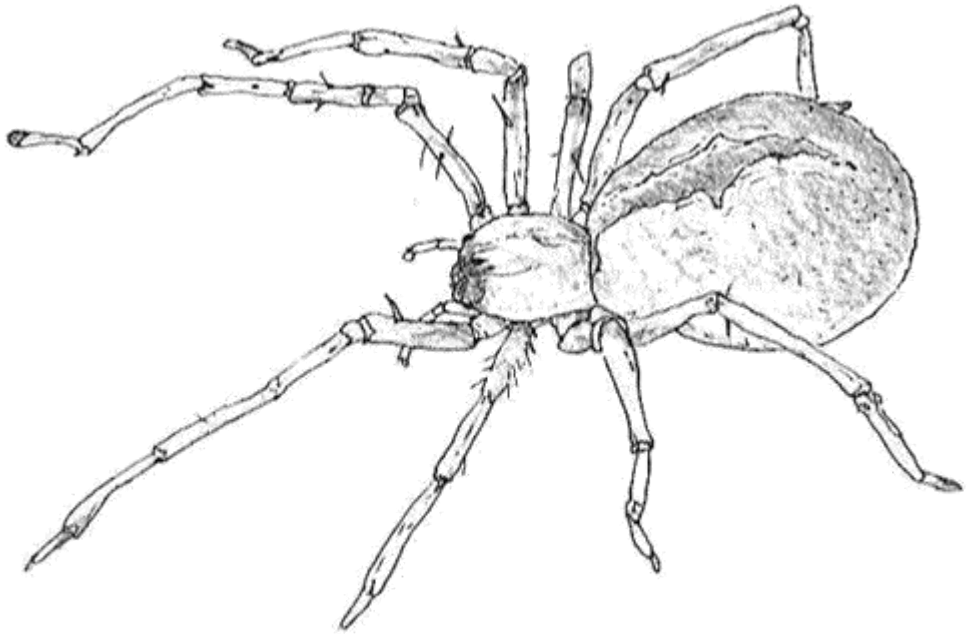


PARSON SPIDER

(Hepyllus ecclesiasticus)

While the parson spider is not considered poisonous, bite symptoms vary in severity. Some people may experience localized allergic swelling and itching, in addition to initial pain. A few persons may experience excessive swelling, nervousness, nausea, sweating, and elevated temperatures from the bites.

Sac Spiders



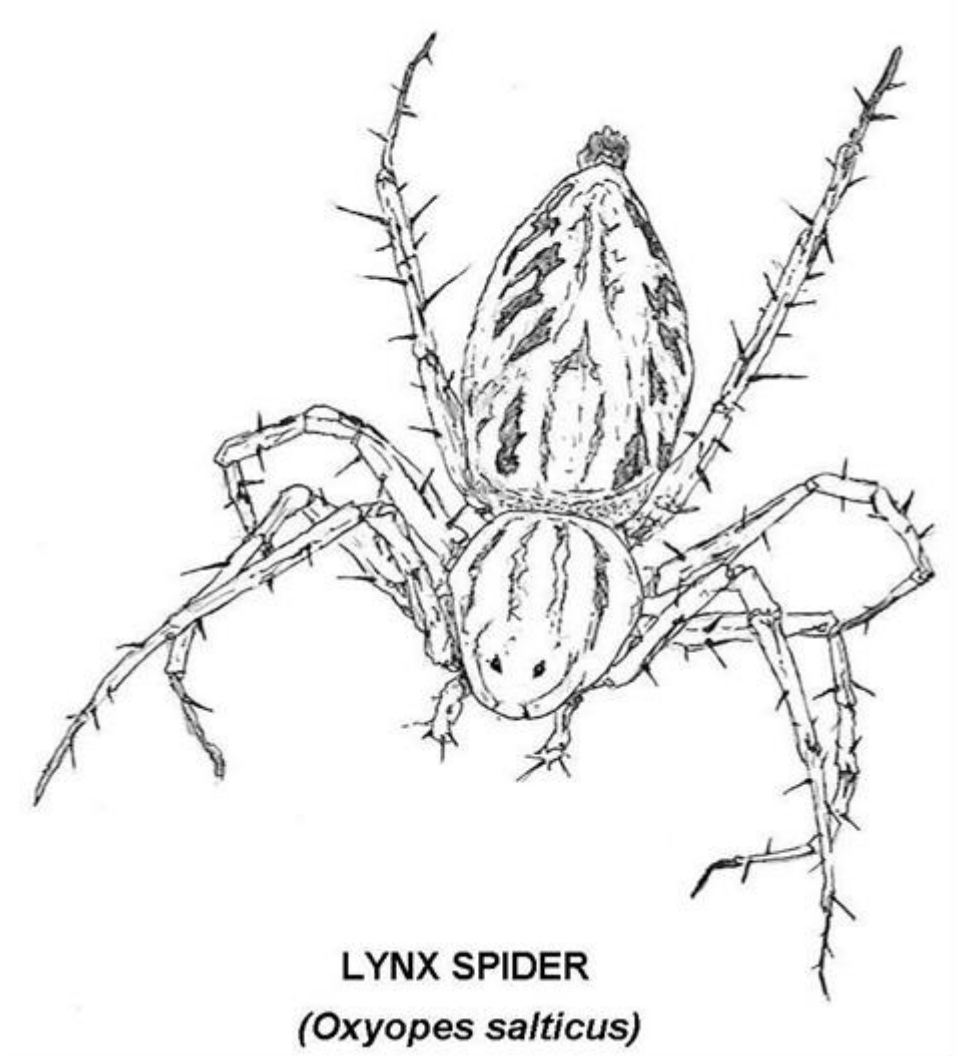
SAC SPIDER
(Cheiraconthium mildei)

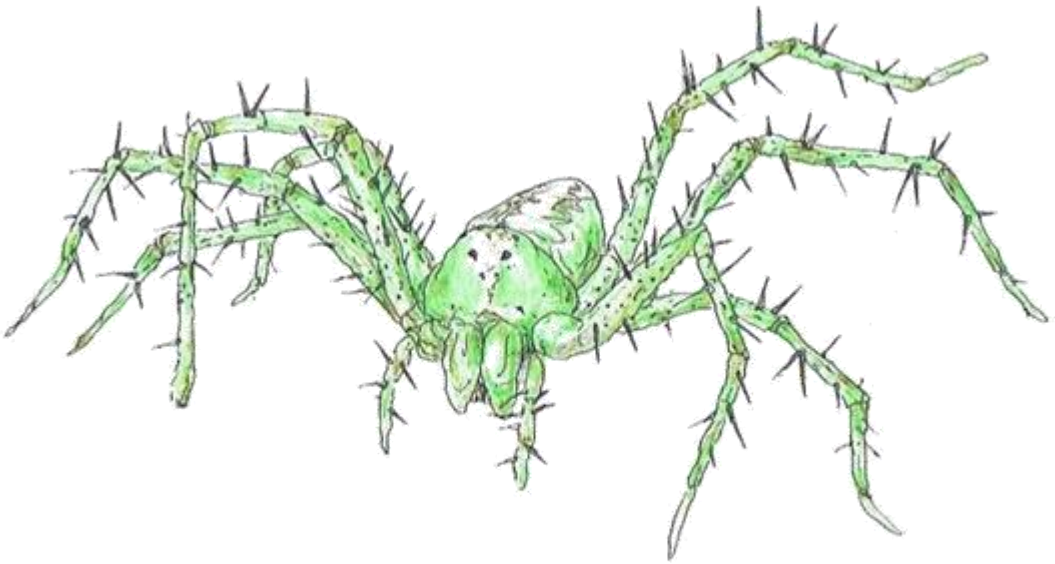
Some members of this group of spiders are quite common in homes. These spiders are light or dark-coloured and have a darker coloration on the cephalic (head) region. The body is covered with short hairs, which give it a silky appearance.

The night-time feeding behaviour of sac spiders is similar to that of the parson spider. These spiders do not capture prey in webs, but actively hunt their prey at night. During the day, they hide in tubular silken capsules that they construct, which gives them their common name. You may be able to find silken capsules on walls, ceiling, draperies, and other locations. Bites from these spiders may result in localized allergic reactions in some individuals.

Crab Spiders

Xysticus luctans (left) and Xysticus ferox (right) (Comstock, pp. 549 -551) are small crab spiders. The crab-like reach of its legs is useful for grabbing its prey and holding on until its venom has its effect. The bees and other insects that crab spiders attack in flowers are generally quite a bit larger than the crab spider itself. Thus, crab spiders can easily lose part of a foreleg even when their victim is overcome. Given time, they have the ability to regrow missing parts of limbs.





GREEN LYNX SPIDER

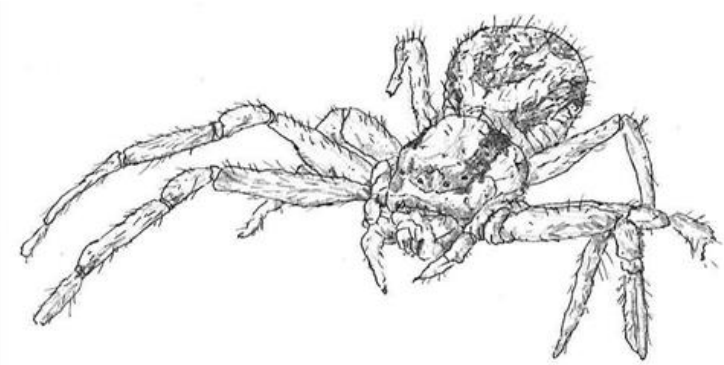
(Peucetia viridans)

Peucetia viridans is one of the Lynx spiders. They catch their prey in several ways. They can run rapidly about plants and jump from branch to nearby branch and they can wait in ambush (like a wildcat) and drop down on their prey. This species has an interesting eye arrangement with two small eyes in front, then two larger eyes behind them, and a row of four eyes behind them. This is a large spider, and it has excellent vision as well as depth perception.

Micrathena gracilis

Micrathena gracilis unlike various insects where numerous similar species can occur, there appear to be relatively few species of spiders that give similar difficulty. However, the names of more than a few spiders have led to controversy among experts. While Professor Comstock's book lacks some of the latest professionally approved scientific names, its descriptions are accurate and very useful (Reference: Professor Comstock's "The Spider Book").

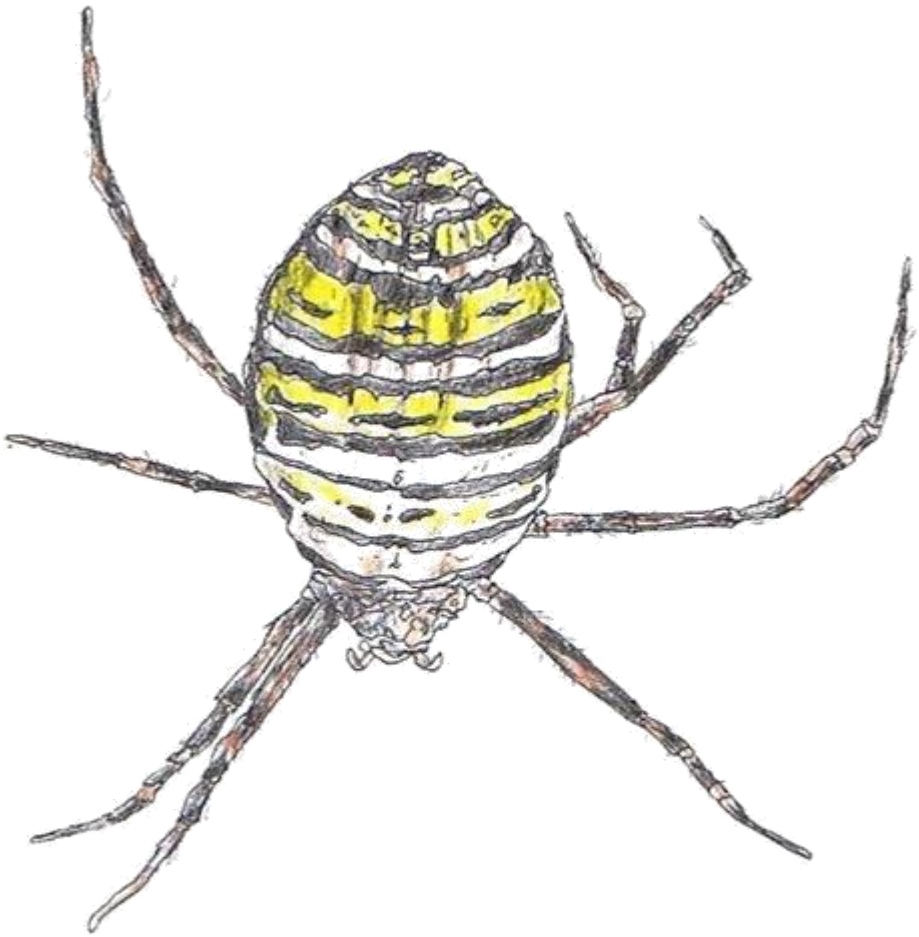
The web of a particular Micrathena gracilis spider is shown above. The web is constructed in a vertical plane, and the spider hangs head downward in the centre of the web when waiting for a prey. The distance from left to right across the spirals is about 3 feet.



CRAB SPIDER *(Misumenops Asperatus)*

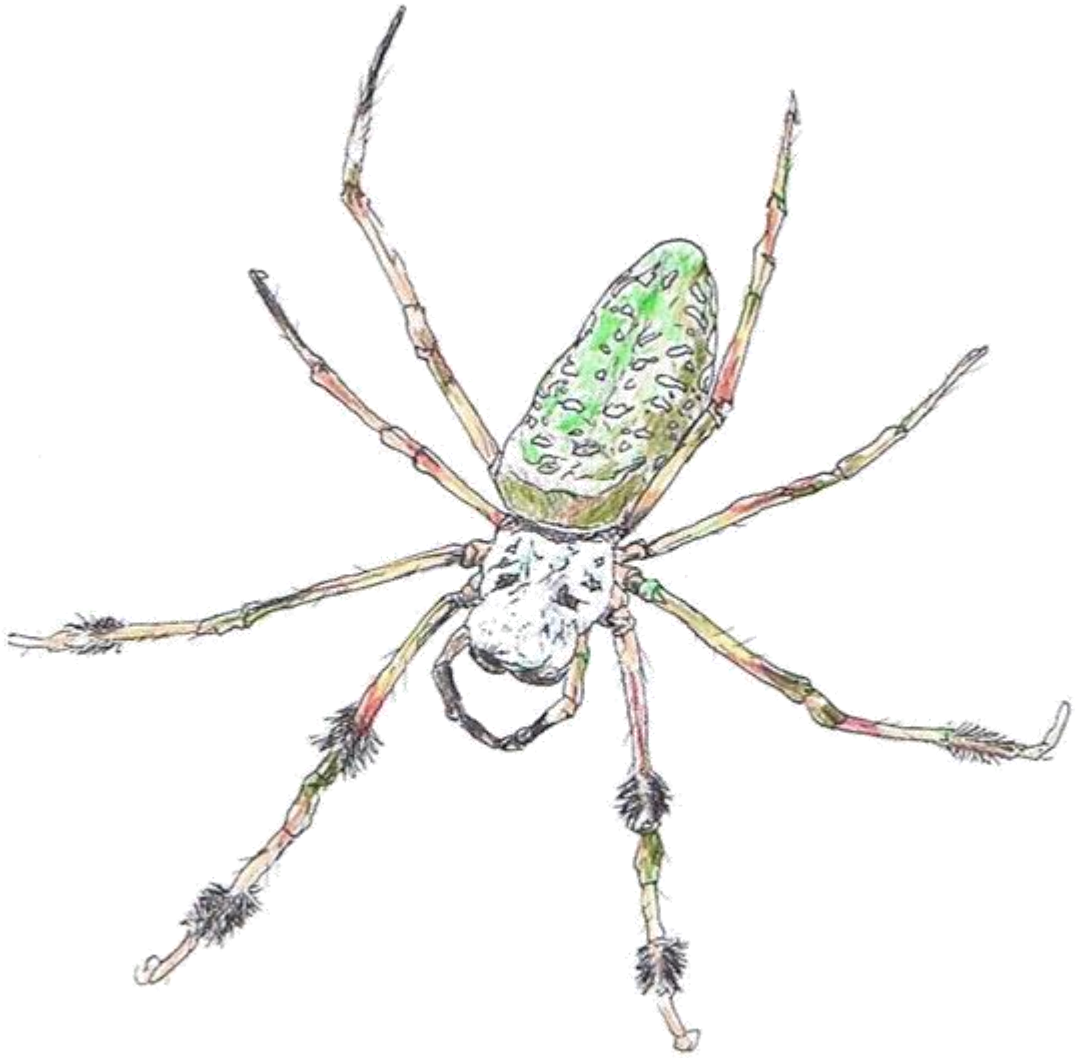
One of the “flower spiders” (so-called because they generally hunt in similarly coloured flowers for visitors such as bees and flies, and they are very happy), Misumenops asperatus is a much smaller relative of the better-known goldenrod spider Misumena vatia. M. asperatus is easily told by the markings on its abdomen (a "capped" V, with the point of the V at the end of the somewhat angular abdomen) and its striped legs. The background colours of the abdomen is often whitish or even a pale greenish colour, in contrast to its larger relatives, which may be white, but are more often yellow.

Miranda aurantia (Comstock, pp. 448-452) has been given the common names: the "Orange Garden Spider," the "Black and Yellow Garden Spider," “Zig Zag Spider,” and the "Writing Spider". The female shown above is a large orb-weaving spider. Its web is frequently found constructed close to the ground in grassy fields in late summer and early autumn when grasshoppers are abundant. From the time a grasshopper lands in its web, it takes the spider just a few seconds to wrap the grasshopper in a shroud of silk and store it for later consumption. To illustrate how different names have been used, B. J. Kaston in "The Spiders," (William Brown Col. Publishers, Dubuque, Iowa, Second Edition, 1972) refers on page 172 to this spider as Argiope aurantia. Photo from Rusty Randall.



BANDED GARDEN SPIDER
(Argiope trifasciata)

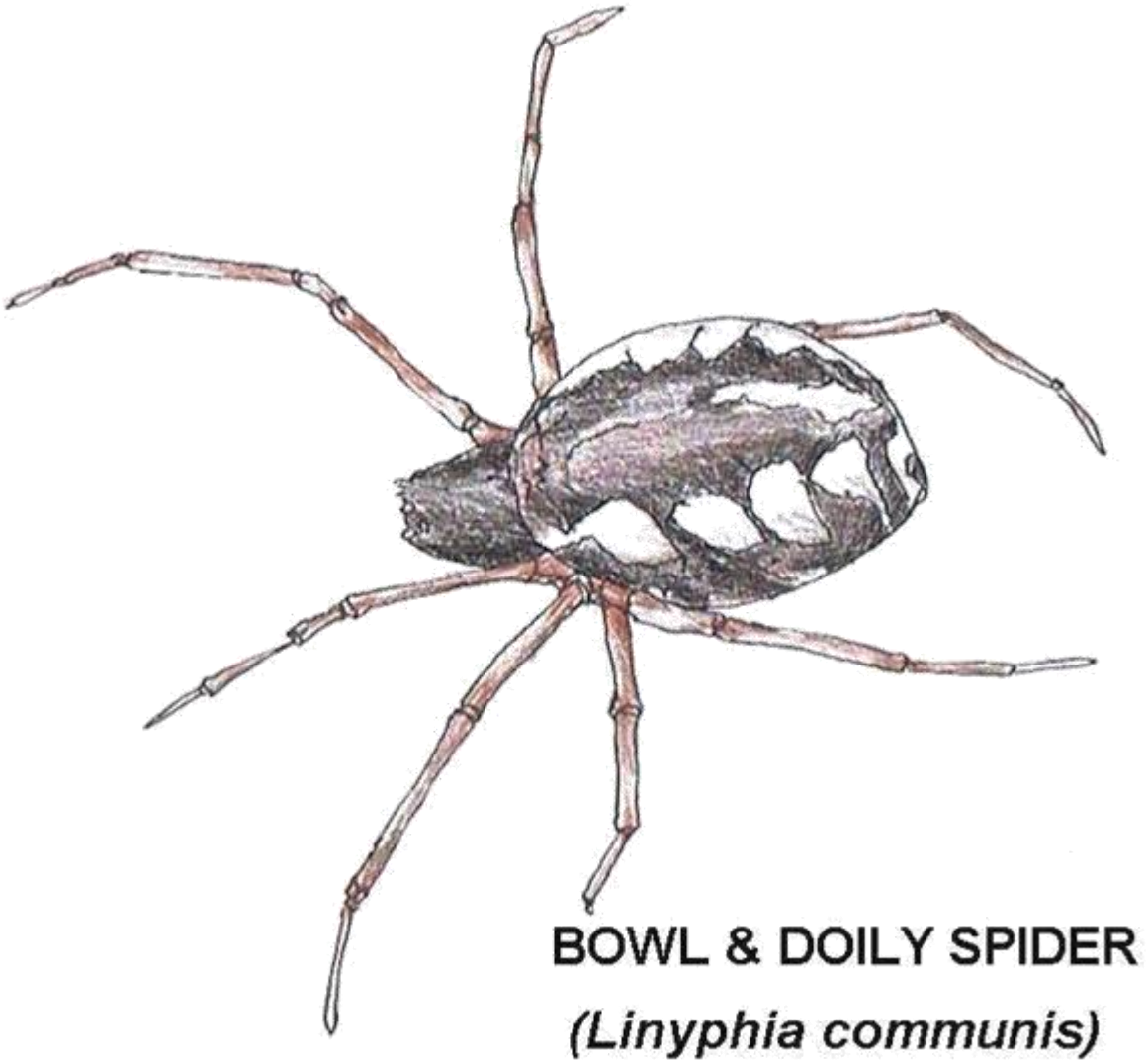
Argiope aurantia and Argiope trifasciata are common spiders throughout most of the US. They can often be found building webs side by side, but A. trifasciata tends to favour slightly drier habitats. A. trifasciata lacks the strong black patches of A. aurantia, although it often has thin black bands on its abdomen. While A. aurantia includes a stabilimentum in almost every single web it builds, A. trifasciata only sometimes builds a stabilimentum. Silk stabilimenta can be a good defence against predators but also cost spiders prey so they have to decide carefully whether or not to include a stabilimentum in each web. Argiope uses its past foraging success to help make this decision. Hungry spiders, which most need to capture prey, are less likely to build stabilimenta. Metargiope trifasciata is also known as the Banded Garden Spider.



GOLDEN SILK SPIDER ***(Nephila clavipes)***

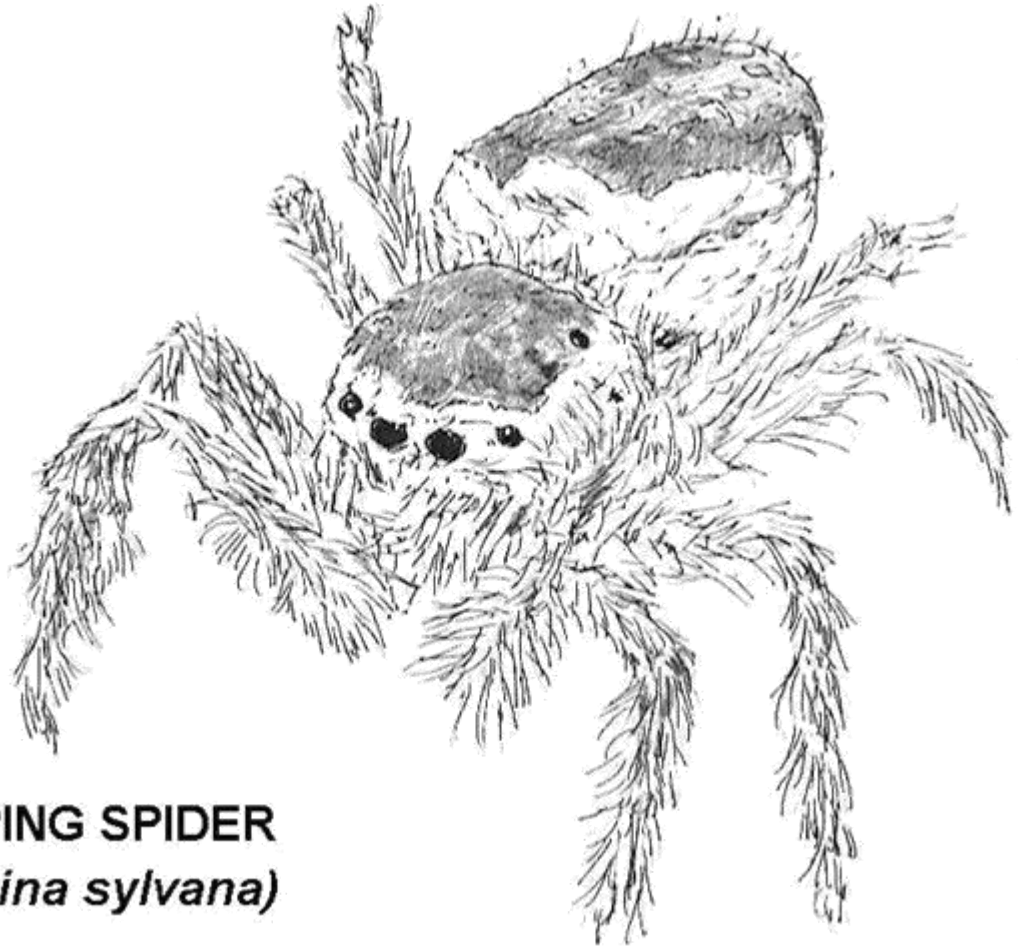
Nephila clavipes is a very large orb-weaving southern spider whose web is unusually strong. Small birds can even become fatally trapped. Because the lowest part of its web is usually at least 7 feet above the ground, with long support threads between tall shrubs or trees, it creates an interesting silhouette against a blue sky, particularly when the sun is low in the sky. It has remarkable tufts of hair in patches on its legs. When its strong web is freshly made, has the unusual character that the spiral strands make angles with the radial strands that are closer to right angles than is the case with other orb-weavers.

Tetragnatha elongata (Comstock, pp. 425- 426) Has its chelacerae conspicuously extend forward. Its two fangs are at the ends of the two chelacerae. This is an orb-weaving spider that, unlike the orb weavers of most other genera, spins its web in a plane that is tilted about 45 degrees from the vertical and usually positions it near or over a body of water, such as a creek or lake.



Linyphia communis the spider's common name of bowl-and-doily spider. When waiting for a prey, it resides on the bowl-like upper portion. Captured insects are usually ones that have flown between the bowl and doily parts of the web and become trapped therein, or on the top of the doily. From the spider's position on the bowl, it walks on the bowl until it is above the trapped insect and then approaches the insect directly.

Theridion fordum (Comstock, pp. 361-362) It is a near (but much larger) relative of the common house spider (Theridion tepadariorum) and has a similar helter-skelter type of web. Its web is certainly not confined to one plane, as in the case of orb -weavers, and it does not have a simple geometric outline as, for example, the two parts to the web of the bowl-and-doily spider.



JUMPING SPIDER
(Thiodina sylvana)

Jumping spiders appear to operate in a stealth mode, moving and turning slowly to face objects of interest in their surroundings. This genus of spiders is known for their scanning telescopic anterior medial eyes, and both extension and retraction of the articulated foot pads. A God-designed hunting machine that will hunt other spiders.

Phidippus audax (Comstock, pp. 689-690) is a type of jumping spider. Unlike spiders that spin a web to catch their prey, the vision of jumping spiders (and wolf spiders) is excellent. Jumping spiders like to turn and look directly at the person who is taking their photograph. You may have noticed the greatest variety of jumping spiders at golf courses in the autumn of years having drought conditions, where such spiders can be observed on golf-ball washers waiting for an insect to land for moisture. Then the jump is short and precise. By attaching a silk line to the washer, they can jump, catch their prey, swing around on the line with their prey in their fangs, and climb right up the short silk line to their starting point on the washer.

Phidippus clarus Spiders have eight legs, two chelicerae (the first two appendages of the head, here iridescent greenish-blue) having retracted fangs at their extremities, and two pedipalps, which are short appendages attached to the head on each side of chelicerae. Here, the tips of the pedipalps are enlarged. This distinguishes male spiders from female spiders of all species. Usually, a mature female spider is from somewhat to considerably larger than a mature male spider of the same species. In the case of jumping spiders, the size difference is less accentuated.

5.7 Controlling Spiders around the Home

From a biological standpoint, it is rarely necessary to control spiders. However, if it is desirable to get rid of spiders in the home, a combination of sanitation and pesticides should be effective. Pesticides alone, without some effort to remove or modify favourable spider habitats, will not be effective.

Remove rocks, wood piles, compost piles, old boards, and other sheltering sites adjacent to the home. Eliminate migration of spiders into homes by caulking cracks and crevices around the foundation. Make sure all screens and doors are sealed tight. Keep crawl spaces free of debris and limit boxes and other potential hiding places from basements and other dark storage areas. Regularly vacuum or brush spider webs. The elimination of other insects that are prey can limit spider development.

Occasional spiders can be removed by hand (wear gloves or grasp the spider with a tissue) or with a vacuum. Sticky traps, used to control cockroaches and rodents, can capture spiders when placed along baseboards or other migration areas.

Residual insecticides can be used to control spiders when applied to corners and other sites where spiders tend to breed. Household insecticide products containing various pyrethroids (bifenthrin, cyfluthrin, permethrin, tetramethrin) are commonly available for this purpose and should be applied in accordance with the label's instructions. Total release foggers, containing pyrethrins, probably will have little effect on spiders.

Where spiders and webbing occur in nuisance numbers on the outside of buildings they can be washed off with a forceful jet of water. Reduction of outdoor lighting, or replacing lighting with yellow or sodium vapour lights that are not attractive to insects, can limit spider web building. Dark coloured siding seems to be less attractive than white siding to the insects on which spiders feed.

This publication contains pesticide recommendations that are subject to change at any time. These recommendations are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. Due to constantly changing labels and product registration, some of the recommendations given in this writing may no longer be legal by the time you read them. If any information in these recommendations disagrees with the label, the recommendation must be disregarded. No endorsement is intended for products mentioned, nor is criticism meant for products not mentioned. The author and Technical Learning College (TLC) assume no liability resulting from the use of these recommendations.

Habitat Control: Landscaping for spider control

There are many ways to make your property less hospitable to spiders and the insects they are after. Making these changes will decrease the amount of spiders in your yard, as well as reduce the likelihood that they'll migrate indoors. Get rid of rock and wood piles. Decorative rock piles and woodpiles are a favourite dwelling place for ground spiders.

Get them away from the house. If possible, keep wood piles off the ground and only bring into your home as much as you immediately need. Similarly, it is best to just get rid of other spider shelters adjacent to the home - bricks, building materials, compost piles, debris, trash, etc.

Remove excess vegetation for spider control. Let the sun in, keep the spiders out. Thick vegetation makes for great spider habitat. Keep vegetation around your home trim and away from the house. Clear away ivy, bushes, shrubs, and grasses – anything that fosters large spider populations near your home. Promptly clean up leaf litter and debris. Mow your lawn regularly, and trim tree branches that are too near or overhang your home. Plant trees and shrubs away from structures to allow for light.

Physical Controls: Keeping the spiders out

Get rid of spider entry points. Exclusion – also known as pest-proofing – is an essential part of spider control and indeed all pest control. Here are some things you can do to keep spiders out of your home.

Apply weather stripping to all doors and windows. Also, it is a good idea to install door sweeps. You need a tight seal to keep spiders out.

Repair all window and door screens using silicone caulk or screen patches. Windows are a common spider entry point, so be sure that each layer, from screen to glass to trim, is sealed completely.

Buy some outdoor sealant and a caulking gun. Walk around your home looking for cracks and crevices around your foundation and fill them in. Next look at your siding. You may need a specialized sealant depending on your siding material and colour. Be sure to check the lowest edge of your siding for cracks and holes. Lastly, fill in all holes created by utilities: cables, wires, pipes, faucets, outlets, plumbing…etc. Concrete, mortar, or expandable foams are also options for filling in holes.

Screen all vents leading into the home.

Spider Harbourages

Get rid of spider harbourages (hideouts). Once you've worked to spider-proof outside, head indoors and start again. First stop is the basement, crawl space, or lowest level. Fill in any cracks or crevices in the foundation and around windows. Find the same utilities you sealed around outside (pipes, plumbing, wires, etc.) and seal them inside. Work your way up from the basement. Spiders hide in cracks in trim, flooring, behind outlets, countertops – any dark secluded space. Of course it would be difficult, if not impossible, to seal all such areas inside the home. Focus your energies where you've seen the most spider activity and where your spider traps (mechanical control below) have killed the most spiders.

Mechanical control: Spider traps and manual spider removal

Use glue boards for spider control and monitoring. While sticky traps won't work for web-building spiders, they are outstanding for the many ground -dwelling, hunting spider species, including funnel-web, wolf, and brown recluse spiders. With glue boards, more is better. Place them along walls, in corners, behind furniture, and in dark, protected areas, in outbuildings and garages, in window sills and near doors, as well as places you've seen spider activity.

- ✓ Glue boards not only kill spiders in a spiteful, inhumane fashion, they also help you monitor spider activity as well as that of other pests. By routinely checking and replacing glue boards, you'll be able to determine whether your spider control strategies are working. Full, disgusting traps help pinpoint areas with the most spider activity so you'll be able to focus your efforts in the right places. The best sticky spider traps are those that are not raised and do not have a lip, but lie flat against surfaces.

- ✓ Replace outdoor lights with “bug lights.” Lights near doors and porches attract hoards of insects, which in turn attract armies of spiders to eat them. Many of these spiders may migrate into your home.
- ✓ Replace your blue wave lights with yellow bug lights, LED lights, or sodium vapour lights, which do not attract insects or their predators. It also helps to draw shades around windows during darkness.
- ✓ Utilize a hose or pressure sprayer for outdoor spider removal. Entrenched between two lakes and much wilderness, my neighbourhood is spider prone. We generally wash them off our homes a few times a year using a pressure sprayer or a simple hose attachment. It’s effective and chemical free.
- ✓ Kill spiders with a vacuum. Break out the vacuum hose and all its spider-killing attachments as often as necessary to remove webs, egg sacs, and spiders. Focus on suspected sites, corners, window sills, along trim, closets, behind furniture, and any dark, protected areas. You may need to gather your courage and adorn a rosary before bringing your vacuum into your attic, basement, and similar spider hot spots. When finished, remove the vacuum bag (or contents) and seal it in a plastic bag and toss it in an outside trash can. You can rest easy knowing that the spiders that survived the violence of your domestic killing machine will no doubt liquefy and eat one another.

Always follow label instructions and take steps to avoid exposure. If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. For additional treatment advice, contact the Poison Control Center at 1-800-222-1222. If you wish to report a pesticide problem, please call 1-800-858-7378.

NOTE: When pesticides are used, it is the applicator’s legal responsibility to read and follow directions on the product label. Not following label directions, even if they conflict with information provided herein, is a violation of federal law.

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Biological Control: Natural Spider Control

Diatomaceous Earth (DE)

Diatomaceous earth is made of the fossilized remains of ancient algae called diatoms. It is a food-grade, pet and child friendly dust that can be used in the same fashion as other insecticidal dusts. When spiders (or any creature blessed with an exoskeleton) walk over a thin layer of DE, they leak fluids, dehydrate, and die. Apply DE as a perimeter barrier around your home. You can also dust wood and rock piles. Indoors, use DE in basements, crawl spaces, cracks and crevices, door and window thresholds – anywhere you’ve seen spider activity.

Natural spider repellents

Though you won't find much research to back them up, there are a variety of popular natural spider repellents. Of these, the most widely-used are Osage hedge balls, which can be found in the produce section of some grocery stores (you can ask your grocer to order some). You place them in corners of rooms and windows and apparently spiders don't like this. Horse chestnuts and eucalyptus are other popular spider repellents that are used in the same manner.

Chemical Control: Spider control products

There are many consumer products on the market that effectively kill spiders, and I will make some recommendations below. However, chemicals for spider control are often discouraged unless you're dealing with the black widow or brown recluse spider. When it comes to chemical spider control, more important than what you use is how you use it. First of all, chemicals alone won't solve your problem; if you don't make the changes listed above, your property will still have the same spider population potential. Secondly, use chemicals in a focused manner, not indiscriminately all over the place. Lastly, always pay close attention to directions when dealing with pesticides. They are only deemed safe by the EPA when used according to the label.

For outdoor spider control

Barrier treatments, in conjunction with pest proofing, can effectively protect your home from spiders. Before sealing off cracks and crevices in siding and foundation, apply something like Delta Dust Insecticide (deltamethrin) or Drione Dust (pyrethrins, pipernyl butoxide, and silica gel). Besides the cracks and crevices, you may want to treat under the eaves of the roof, under porches, along the base of the foundation, the lowest edge of siding, behind shutters, and around doors and windows. For these areas you'll want a non-dust outdoor insecticide for spider control. Good options are Bayer Advanced Home Pest Control: Indoor and Outdoor Insect Killer (cyfluthrin) and Ortho Home Defence Perimeter & Indoor Insect Killer (bifenthrin).

Classes of Pesticide Examples

- Carbamates -Carbaryl
- Pyrethroids -Permethrin, deltamethrin, cyfluthrin
- Pyrethrums- Plant extracts called pyrethrins, primarily for use inside the home because they break down so quickly.

Always follow label instructions and take steps to avoid exposure. If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. For additional treatment advice, contact the Poison Control Center at 1-800-222-1222. If you wish to report a pesticide problem, please call 1-800-858-7378.

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recommendations disagrees with the label, the recommendation must be disregarded. No endorsement is intended for products mentioned, nor is criticism meant for products not mentioned. The author and Technical Learning College (TLC) assume no liability resulting from the use of these recommendations.

Liquid insecticide formulations include:

- Products containing the botanical insecticide pyrethrin, which gives quick knockdown but little long-term control;
- Various synthetic pyrethroid products (cyhalothrin, bifenthrin, deltamethrin, and permethrin); and
- Newer types of products including the pyrrole insecticide chlorfenapyr (Phantom) and the insect growth regulator hydroprene (Gentrol), which cause sterility in adults.

There is growing interest in the last two products, because some bed bug populations have developed resistance to pyrethroid insecticides and no longer can be effectively controlled by them. However, both newer products take up to several days to be effective.

Insecticides applied as dusts cling to the pest's cuticle, wearing away the insect's protective wax covering or poisoning the insect when it grooms itself. Several dust products used in bed bug management include boric acid, diatomaceous earth, fumed silica, and formulations of pyrethroids. These materials can provide long-term control as part of an integrated program if they are placed in out of-the-way places—such as under baseboards or in wall voids—that don't get wet.

For trees, vegetation, and lawn

Two respected yard spider control products are Spectricide Triazicide Insect Killer (lambda-cyhalothrin) and Ortho BugBGon Max Garden & Landscape Insect Killer Concentrate (Esfenvalerate).

For indoor spider control

Insecticide dusts like Drione Dust, Delta Dust Insecticide, and EcoExempt D (plant based) are ideal for wall voids, basements, behind power outlets and light switches, cracks and crevices, and other spider retreats. For direct contact spider killing, use a non- residual aerosol like CB-80 Extra or 565 Plus XLO (your shoe can be just as effective). For a longer lasting residual treatment, try Cy- Kick Aerosol, D-Force HPX, Demon WP Insecticide, or Cynoff WP (or Cynoff EC). Many of the products listed above for outdoor use can also be used to spot treat indoors, so read labels.

Bifenthrin

Bifenthrin is a pyrethroid insecticide that affects the nervous system of insects. It was discovered and developed by FMC Corporation. Products containing bifenthrin include Talstar, Maxxthor, Capture, Brigade, Bifenthrine, Ortho Home Defence Max, Bifen IT, Bifen L/P, and Scotts LawnPro Step 3.

Cyfluthrin

Cyfluthrin is a synthetic pyrethroid derivative that is used as an insecticide. Like most pyrethroids, it is highly toxic to fish. It is generally supplied as a 10-25% liquid concentrate for commercial use and is diluted prior to spraying onto agricultural crops and outbuildings. Excessive exposure can cause nausea, headache, muscle weakness, salivation, shortness of breath and seizures. In humans, it is deactivated by enzymatic hydrolysis to several carboxylic acid metabolites, whose urinary excretion half-lives are in a range of 5–7 hours. Worker exposure to the chemical can be monitored by

measurement of the urinary metabolites, while severe over-dosage may be confirmed by quantification of cyfluthrin in blood or plasma. Cyfluthrin is a skin and eye irritant in humans, but overall poisonings from pyrethroid chemicals are rare. In humans pyrethroids are rapidly broken down by the liver proteins. In addition pyrethroids are not absorbed into the bloodstream very well. Cyfluthrin may cause itching, burning, or stinging if it comes in contact with human skin which may last up to 24 hours. The onset of these symptoms can take 1 or 2 days to appear after initial exposure but may also occur at the time of the exposure. Sweating and/or exposure to sun/heat may exacerbate skin irritation

Lambda-cyhalothrin

Cyhalothrin is a pyrethroid insecticide, an ingredient in the Karate brand of pesticides sold by Syngenta. Cyhalothrin is a fluorinated pyrethrin analog. Lambda-cyhalothrin is a mixture of highly active isomers of cyhalothrin. Brand names include 'Karate', 'Kung-fu', 'Matador', and 'Demand CS' (Syngenta); in the USA, 'Triazicide' and 'Hot Shot' are used in the Home Landsape and Garden markets. Home Depot carries a brand of the insecticide under the brand name Real Kill. Terro also makes an outdoor ant and other insect prevention treatment similar to Home Defence using this ingredient. Sygenta held the patent for Lambda-cyhalothrin. This patent expired in most major markets in 2003.

Spider Control Summary

Ridding your home of insects will help discourage spiders from sharing your habitat, as will removal of webbing. Eventually, if no other food source happens into your house, control is inevitable. This takes time, immaculate cleanliness, and rigid pest control. Sometimes, spiders have to be chemically treated.

A consistent presence of spiders in structures may be a sign of an insect infestation, because spiders cannot survive long without food. Reducing insect infestations will also decrease spiders.

Most applicators have discovered that wettable powders and dusts work better than standard liquid pesticides for spider control. In unfinished basements, fan spray with a wettable powder on sill plates, and cracks and crevices throughout the rest of the house to provide excellent control. If the spider population is severe throughout the house, foggers may be in order in combination with the spraying for more immediate results.

For accidentally invading spiders (these are most frequent spider situations), we recommend that efforts be made to seal cracks and crevices as the most permanent solution.

Treat the perimeter of the building with Ficam W or equivalent, paying particular attention to corners and entry points. Ficam W is effective against all spiders, including the brown recluse, black widow, house, wolf, and garden spiders. Ficam W is odourless, has a low mammalian toxicity, and is especially effective against ants, millipedes, spiders, big roaches, carpenter bees, clothes moths, and scorpions.

For continuous spider control, repeat this outside spraying each month.

On the inside, an aerosol can be used to kill spiders quickly, and then use Ficam W or equivalent at maximum strength and low volume to keep the spiders from rebuilding their webs. It is very

important to use a wettable powder pesticide formulation such as Ficam W. Using a garden-type spray will give you almost no residual because the spiders will rebuild their webs in the sprayed areas within just a few days after spraying with one of these emusifiable water based sprays. For heavy infestations, you may also want to spray the attic and crawlspace.

In areas where insecticides should not be used (for example, boat docks and boat houses or in areas where access is difficult, for example, high rise buildings), then the use of Cobweb Eliminator or equivalent is recommended. This is a non-toxic spray that discourages spiders from building their webs on the areas sprayed.

Cobweb Eliminator

A product that eliminates cobwebs both indoors, outdoors, or anywhere cobwebs are noticed with 100% natural ingredients. Cobweb Eliminator will not stain and has no long lasting odour. The mildly acidic odour noticed after application indicates the product is effectively working.

This odour disappears usually in 24 hrs. Cobweb Eliminator deteriorates the webs' attachment points making for easy removal and maintains a neat, clean appearance. It also discourages the reformation of cobwebs. It is 100% natural, nontoxic, biodegradable, non-flammable, non-corrosive and safe around humans, pets, and crops, when used as directed.

Crack and Crevice (C/C)

When spiders began to build resistance to chemicals and manufacturers designed their products with less volatility, new packaging and treatment techniques became necessary. These new trends became known as "crack and crevice".

Basically, Crack and Crevice (C/C) means applying the chemical into the cracks and crevices suspected of harbouring spiders. There are two types of products commonly used for this purpose: dust and aerosol. In fact, a good pest control technician should be able to get spider control with nothing more if he or she knows where to do the application. With the use of Drione Dust or equivalent, applicators have solved many problems. Apply it in cracks and crevices, behind cabinets and major appliances, in wall voids, and electric outlets. This requires a lot of work and this product can be messy to work with, but provides the fastest results possible when used properly. Use a Crusader Hand Duster for the application. Since dust can be messy to work with, aerosol products became popular throughout the 1980s.

Although not as popular as when they first came out, aerosols offer a clean, ready-to- use formulation that is effective. PT-280 uses Orthene as an active ingredient, which is still the least resistant chemical available for pest control. On a special note, don't think you can substitute boric acid or a can of "Raid" for either of the products mentioned above.

Residual Sprays

These formulations are oil -based or water-based emulsions and water-based suspensions (wettable powders). They are available in ready-to-use pressurized containers or non-pressurized containers with built-in spray pumps. Residual sprays also can be purchased as concentrates to mix with water before applying with a compressed-air sprayer, plunger-type sprayer, or paint brush.

Be careful when using oil-based insecticides; they may stain, dull, or damage certain floor tiles, linoleum, painted surfaces, plaster, plastics, houseplants, carpets, and carpet backing. Oil-based

sprays can create a fire hazard when used near an open flame (pilot lights, gas stoves, furnaces). Water emulsions may stain wallpaper, light-coloured carpets, draperies, or other materials.

Water-based sprays can short out electrical circuits, and are inferior to oil-based sprays on impervious surfaces such as glass or metal. Wettable powders must be frequently agitated in the spray tank, but they leave the most active residues, especially on porous surfaces such as unpainted wood, mortar, or concrete block.

Residual sprays are generally easy and fast to apply. The spray should wet or dampen the treated surface; do not allow spray to puddle or run off. When treating for pests, pay particular attention to cracks and crevices. Exposed surfaces, especially those used to prepare foods, should usually not be treated with sprays.

Habit Modification

Habit modification is the most important tactic for good spider control. Whether indoors or outdoors, most spiders have a preference for undisturbed areas. Outdoors, remove debris near the building to disturb their natural habitat. Also, remove webs in outdoor areas, especially porches, under eaves, and other likely breeding places around the home. Inside, clutter in garages, basements, closets, and other storage areas should be removed.

5.8 Spider Glossary

Abdomen: The posterior (rear) of the two major divisions of a spider.

Accessory claws: Serrated, thickened hairs near the true claws in some spiders.

Alveolus: A ventral depression in the male palp which receives the basal and middle divisions of the genital bulb. Although usually described as a cup-like depression, the alveolus is actually a ringed depression, the inner margin of which is joined to the basal haematodocha.

Anal tubercle: A small projection, dorsal to the spinners, carrying the anal opening.

Annulations: Rings of pigmentation around leg segments.

Anterior: Nearer the front or head.

Apex: Distal tip.

Apomorphy: Derived character.

Apical male palp: The conductor and the embolic subdivision comprise the apical division of the bulb.

Apophysis: An excrescence or appendage changing the general cylindrical or globular shape of a sclerite; most often used in description of male palp.

Atrium (pl. atria): Internal chamber at the entrance of copulation tract in female haplogyne spiders.

Ballooning: Aeronautical dispersing by means of air currents acting on strands of silk.

Booklung: An air-filled cavity, containing sacks of blood-filled leaves, opening on the underside of the abdomen.
Bronchial opperculum: A sclerotized, hairless plate overlying the book lung.

Bulbus: The genital bulb is the terminal segment of the palpus. It's an hollow organ with external elaborations. The bulbus is divided into three divisions: (1) Basal division, (2) Middle division and (3) Apical division.

Calamistrum: A comb-like series of hairs on metatarsus IV of cribbelate spiders.

Caput (pl. capita): Another name for the cephalic region of the cephalothorax.

Carapace: The exoskeleton covering, or shell, over the dorsal (upper) surface of the cephalothorax.

Cardiac mark: An elongate midline mark on the anterior, dorsal surface of the abdomen, overlies the heart.

Cephalothorax: The anterior (front) of the two major divisions of the body of a spider.

Chelicerae: The jaws, each one comprising a large basal part and a fang.

Chelate: Said of chelicerae in which the fang closes down on a tooth-like process.

Chilum (pl. Chila): Small sclerite at the base of chelicerae, just under the clypeus.

Chitin: A linear homopolysacheride found as the characteristic molecule in the cuticle of arthropods. The molecules are layered in chains and cross-linked to form a strong, lightweight basis of the cuticle.

Claw tuft: A bunch of hairs at the tip of the leg tarsus in spiders with only two claws.

Clypeus: The area between the anterior row of eyes and the anterior edge of the carapace.

Colulus: A small midline appendage or tubercle arising just in front of the anterior spinners in some spiders.

Conductor: A semi-membranous structure in the male palp, which supports and guides the embolus in insemination.

Condyle: A smooth, rounded protuberance sometimes present on the outer side of the chelicera, near its base.

Coxa (plural: Coxae): The segment of legs nearest the body, modified in the palp to form the maxilla.

Cribellum: A spinning organ just in front of the spinners, which appears as a transverse plate. Only present in cribellate spiders, which also have a calamistrum.

Cryptozoic: Living a concealed life.

Cymbium: The broadened, hollowed-out tarsus of the male palp within which the palpal organs are attached.
Diaxial: Said of chelicerae extending downwards with fangs closing towards midline.

Dionychous: Possessing two claws on tarsus.

Distal: Pertaining to the outer end, furthest away from the body or point of attachment.

Dorsal: Pertaining to the upper surface.

Dorsum: The upper surface.

Ecdysis: moulting; the periodic casting off the cuticle.

Ecribellate: Without a cribellum and calamistrum.

Edentate: Without teeth.

Embolus: The structure, in the male palp, containing the terminal part of the ejaculatory duct and its opening. It may be very small, or long, whip-like, or coiled; and is sometimes divided into several structures.

Endite: Basal segment of palp, also called the maxilla or gnathocoxa.

Entelegyne: The group of spiders in which the females have an epigyne.

Epigastric fold: A fold and groove separating the anterior part of the ventral abdomen (with epigyne and book lungs) from the posterior part.

Epigyne: A more or less sclerotized and modified external structure associated with the reproductive openings of adult females of most spiders.

Exoskeleton: The hard, external supportive covering found in all arthropods.

Exuviae: The parts of the cuticle cast off during moulting.

Fang: The claw-like part of each chelicera; the poison duct opens near its tip.

Femur (pl. femora, adj. femoral): The third segment of the leg, counting from the body.

Fissidentate: Teeth having more than one point.

Folium: Any pattern of pigment on the dorsum of the abdomen that is fairly broad and leaf-shaped.

Fovea: A short median groove on the thoracic part of the carapace that marks the internal attachment of the gastric muscle.

Gnathocoxa (pl. gnathocoxae): Basal segment of palp, also called maxilla or endite.

Gossamer: A light film of silk threads, or groups of these floating through the air.
Haematodocha: A balloon of elastic connective tissue between groups of sclerites in the male palp that distends with blood during insemination, causing the sclerites to separate and rotate.

Haplogyne: The group of spiders in which the females have no epigyne.

Head: The part of the carapace carrying the eyes, which is separated from the thorax by a shallow groove.

Labium: The lip, under the mouth opening and between the maxillae, attached to the front of the sternum.

Lateral: Pertaining to the side.

Lanceolata: Tapering to a point.

Lyriform organ: A sensory organ near the distal end of limb segments formed of a group of parallel slit organs.

Maxilla: The mouthparts on each side of the labium, which are the modified coxae of the palps.

Median: In the midline or in the middle.

Median apophysis: A sclerite arising from the middle division of the male palpal organs.

Median septum: Longitudinal sclerite on floor of epigynal atrium.

Metatarsus (pl. Metatarsi): The sixth segment of the leg, counting from the body.

Onychium (pl. Onychia): Ventral extension of tip of tarsus bearing the claws.

Orb web: A two-dimensional web, roughly circular in design (and strictly speaking, a misnomer). Silk threads radiate like spokes from a central hub. These are then overlaid with a spiral of silk, running from the periphery almost to the hub.

Palp short for the pedipalp: The appendage arising just in front of the legs, the coxa of which also forms the maxilla. It has no metatarsal segment, and in adult males, is greatly modified for the transfer of semen.

Palpal organs: The more or less complex structures found in the terminal part of the adult male palp. They comprise groups of sclerites separated from each other and the cymbium by up to three haematodochae, and contain the semen reservoir which opens via ducts through the tip of the embolus.

Paracymbium: A structure in the male palp branching from, or loosely attached to, the cymbium.

Paraxial: Said of chelicera extending forwards, with fangs closing towards abdomen.

Patella (pl. Patellae): The fourth segment of the leg or palp, counting from the body.
Paturon: Basal segment of chelicera.

Pedicel: The narrow stalk connecting the cephalothorax and the abdomen.

Pheromone: A chemical secreted by an animal in minute amounts that brings about a behavioural response in another, often of the opposite sex.

Phylogenetic: Pertaining to evolutionary relationships between and within groups.

Pluridentate: Having more than one tooth.

Porrect: Said of chelicera directed forwards.

Posterior: Near the rear end.

Process: A projection from the main structure.

Procurved: Curved, as an arc, having its ends ahead of its centre.

Prolateral: Projecting from, or on, the side facing forwards.

Proximal: Pertaining to the inner end; closest to the body or point of attachment.

Punctate: Covered with tiny depressions.

Rastellum (pl. rastella): Rake -like structure at extremity of chelicerae in Mygalomorpha, often reduced to a few strong spines; use for burrowing.

Receptaculum (pl. receptacula): See: spermathecea.

Recurved: Curved, as an arc, having its ends behind its centre.

Reticulated: Like network.

Retrolateral: Projecting from, or on, the side facing backwards.

Rugose: Rough, wrinkled.

Scape (Scapus): A finger-, tongue-, or lip-like projection from the midline of the female epigyne.

Sclerite: Any separate sclerotized structure connected to the other structures by membranes.

Sclerotized: Hardened or horny; not flexible or membranous.

Scopula (pl. Scopulae): A brush of hairs on the underside of the tarsus and metatarsus in some spiders.

Scutum: A hard, often shiny, sclerotized plate on the abdomen of some spiders.

Septum: A partition separating two cavities or parts.

Serrated: Saw-toothed.

Seta (pl. setae): Hair-like, tapered, and flexible structures on legs and body (cf. spine and trichobothrium).

Sigillum (pl. Sigila): An impressed, sclerotized spot, often reddish-brown. Often present on the dorsal surface of the abdomen and marking points of internal muscle attachments.

Slit organ: A stress receptor in the exoskeleton.

Spermathecae: The sacs or cavities in female spiders that receive and store semen.

Spiderling: The nymphal or immature spider, generally resembling the adult, but smaller; fully mobile and no longer dependant on yolk.

Spine: A thick, stiff hair or bristle.

Spinners: Paired appendages at the rear end of the abdomen, below the anal tubercle, from the spigots of which silk strands are extruded.

Spiracle: The opening of the tracheae on the underside of the abdomen.

Sternum: The heart-shaped or oval exoskeletal shield covering the under surface of the cephalothorax.

Stria (pl. striae): Paired depressions; usually three pairs of darkened stripes radiating from fovea.

Stridulating organ: A file-and-scraper for sound production; may be variously located on chelicerae, palps, legs, abdomen, and carapace.

Subadult: Almost adult; the last instar before maturity.

Synonym: Each of two or more scientific names of the same rank used to denote the same taxon. The senior synonym is the name first established.

Tapetum (pl. tapeta): A light-reflecting layer in secondary eyes; eyes appear pale in colour; assumed to be used for nocturnal vision.

Tarsus (pl. Tarsi): The most distal (or end) segment of a leg or palp.

Taxon: Any taxonomic unit (e.g., family, genus, species).

Taxonomy: The theory and practice of classifying organisms; part of systematics, the study of the kinds and diversity of organisms.

Tegulum: Part of the male palp: a discoidal sclerite.

Tegument: External cuticular skin.

Thorax: That part of the cephalothorax behind the head region and separated from it by a shallow groove.

Tibia (pl. Tibiae): The fifth segment of the leg or palp counting from the body.

Tracheae: Tubes through which air is carried around the body and which open at the spiracles.

Trichobothrium (pl. Trichobotria): A long, fine hair rising almost vertically from a socket on the leg. Trichobothria detect air vibrations and currents.

Trochanter: The second segment of the leg or palp, counting from the body.

Unidentate: Having one tooth.

Ventral: Pertaining to the underside.