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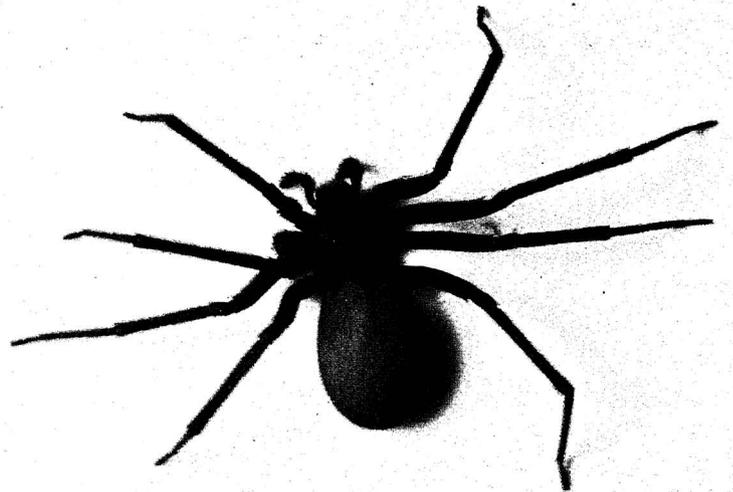
BLACK WIDOW



Actual size

CURTIS W. WINGO

POISONOUS SPIDERS



Actual size

BROWN RECLUSE

Agricultural Experiment Station
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POISONOUS SPIDERS

and Other Venomous Arthropods in Missouri

Curtis W. Wingo

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This bulletin reports on Department of Entomology Project 36, "Entomology Museum."

SPIDERS

Throughout the recorded history of man the spiders, as a group, have been regarded generally as creeping, crawling, loathsome, and venomous beasts. Folklore, ignorance, superstition, and the bizarre appearance of the spiders themselves have contributed to these impressions.

In the 19th and 20th centuries, during a period of strong interest in nature study, scholars tried to change these impressions. These naturalists generally convinced the public that all spiders are friendly, shy, harmless animals that are either incapable of inflicting injury to man or refuse to do so. The true position of spiders and other venomous arthropods stands somewhere between the two extremes.

Folklore would have us believe that all spiders are poisonous. The facts are that, except for two very small groups, all spiders do possess venom glands which empty through small holes near the tips of the *chelicerae* or "jaws." This does not mean these spiders are necessarily poisonous to man or other mammals.

All spiders feed on living animal life. Their "jaws" and venom are simply means of capturing and subduing prey. The great majority of spiders either cannot effectively pierce man's skin or never have the opportunity to do so. Or if they do, the venom at the most causes only trivial, transient pain, a slight local reaction at the site where the venom is injected, or no reaction at all.

Many people fear spiders because they believe they are aggressive and will seek to bite man with little or no provocation. Nothing could be farther from the truth. Only one spider throughout the world is considered aggressive. This is *Atrax robustus*, the funnel-web spider of Australia, which reputedly will offer fight without provocation. No other spider shows fight unless cornered, injured, or otherwise grossly stimulated. It is true that many North American spiders will rush over their webs to investigate any disturbance. This is a natural reaction, as spiders

employ webs to entrap other animals for food. The rush to investigate is merely a hunting reaction.

Another false impression is that bites of known poisonous spiders always cause a very serious condition or even death. The truth is that fatalities from spider bites are rare, and the consequences of the bite may be trivial or severe. The severity of the reaction to poisonous spider bites is dictated by many factors. The amount of venom injected may vary from almost none to a full dose, depending on the site of the bite, the length of time the fangs are in the tissues and the quantity of venom in the glandsacs at the time of biting. Also, the reaction of individuals to the same amount of the same type of venom may vary widely, and the age and general state of the victim's health determine the severity of reaction.

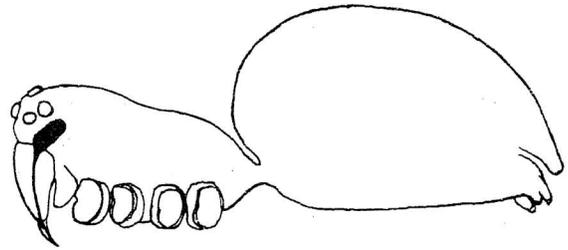
In Missouri, of the thousands of kinds of invertebrate animals found, only a very few are capable of inflicting bites or stings into the tissues of man. Only two of these, the Black Widow and the Brown Recluse spiders, can cause a serious condition by injecting venom. A few other arachnids and a half-dozen insects may cause temporary pain and discomfort by bite or sting.

THE BLACK WIDOW

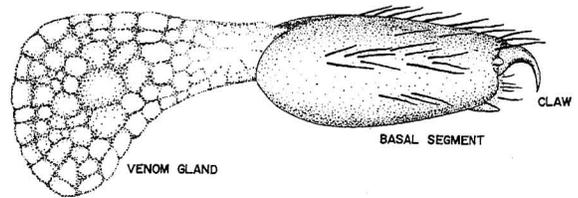
(See cover photograph.)

Since early times natives of many countries have known and feared the bite of the various species of *Latrodectus*. In Missouri a single species *Latrodectus mactans* occurs over the state and is commonly known as the Black Widow or "hour-glass" spider. This spider is easily recognized by the jet black body with the red hour-glass mark on the underside of the abdomen. The males are much smaller than the females and usually have yellow and red bands and spots over the back, as do the immature spiders.

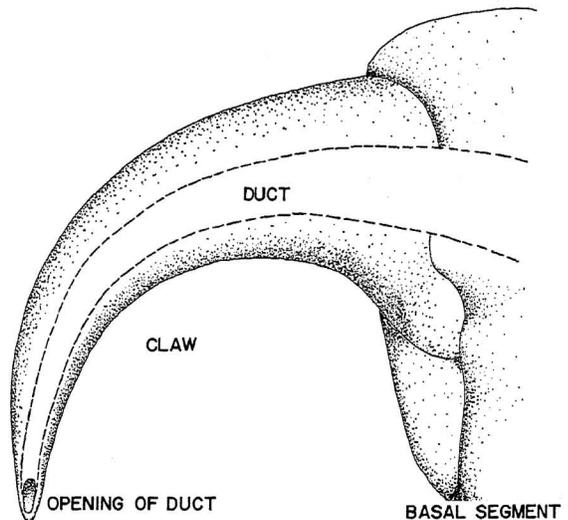
Black Widows spin tangled webs of coarse silk in dark places, usually out-of-doors. Trash, rubble piles, and littered areas are usually most favored by



Outline drawing of spider showing placement of the poison sac with duct leading down the base of the chelicera to the claw.



A chelicera of the Brown Recluse spider. Venom is secreted by the cells of the venom gland and stored in the sac-like interior.



The opening of the venom duct near the tip of the claw resembles that of a hypodermic needle. The lateral placement insures that the opening will not be closed by the tissues of the prey.

the Black Widow. Outbuildings such as privies, sheds, and garages may be infested, as well as crawl spaces, cellars and basements. The webs are usually built near the ground, occasionally within dwellings, but normally under or around houses and in nearby littered areas.

The female Black Widow is shy and nocturnal in habit. She does not leave her hidden web voluntarily and is completely out of her element away from the web. She is not aggressive and often may be subjected to extreme provocation without attempting to bite. However, the female may rush out and bite when her web is disturbed or when she is accidentally trapped in clothing or shoes. Most commonly the bites are inflicted on persons using old-fashioned outdoor privies. Laborers or householders moving lumber and rubble from infested areas may accidentally imprison the spiders with the fingers.

The Black Widow's Bite

The first sensation is the pin-prick sharp insertion of the fangs. This is usually followed by a burning sensation for a few minutes. Pain usually progresses from the bitten member up or down the arm or leg, finally localizing more or less in the abdomen and back. The abdominal muscles become rigid and board-like with severe cramps. Other symptoms may be nausea, depression, insomnia, tremors, speech defect, and a slight rise in body temperature. The general symptoms may appear after a few hours or may be observed within a few minutes of the bite. Muscular spasms and cramps of the arms, legs, back and abdomen may be quite painful at the height of the reaction.

What To Do

First aid measures other than application of iodine on the bite should not be given the victim. Don't cut the skin at the site of the bite, as this may complicate the situation by introducing infection. The person bitten should remain as calm as possible, and should be taken to a physician or hospital at once. The doctor may administer antivenin

prepared for use against Black Widow bite. Pain may be relieved with morphine compounds. He may administer calcium chloride or calcium gluconate to relieve the symptoms. Complete rest for a day or two will usually see the end of pain and systemic disturbance. The victim should take comfort in the fact that fatalities are rare and the robust usually recover quickly and completely.

According to Willis Gertsch, curator of spiders at the American Museum of Natural History, New York, the venom of the Black Widow spider is 15 times as toxic as the venom of the prairie rattlesnake. However, only a minute amount of the toxin is injected with a single bite by the spider, while the relatively large amount of rattlesnake venom injected results in about 15 to 25 percent mortality among those bitten. Fewer than 1 percent of those bitten by Black Widow spiders die.

It is easy to avoid the bite of this spider. In fact, with the gradual disappearance of the out-door privy and increased public knowledge concerning the Black Widow, cases of bite by this spider have been reduced considerably. Premises should be rid of rubble, scrap, and lumber piles. Be careful in moving or using lumber, materials or machinery that have stood unused for a long time. You may spray infested out-buildings, foundations, and crawl spaces with 1% lindane, 2 to 5 percent chlordane or mixtures of chlordane and DDT. Spray near the ground and in all cracks and crevices around windows or doors. These materials not only kill the spiders but also eradicate or reduce populations of insects such as roaches and beetles which serve as food for the Black Widow.

THE BROWN RECLUSE

(See cover photograph.)

Within the past two years a second spider native to Missouri has been shown to bite and cause a serious, or occasionally, a dangerous condition in man. The name "Brown Recluse" indicates both the color and the habits of the species. This spider lives in cracks and crevices and spins a rather irregular web

near the shelter. The Brown Recluse is slightly smaller than the Black Widow but like the latter has long legs. The color varies from a light fawn to a dark, almost chocolate brown. The body is covered by very dense but short hair and to the unaided eye appears to be bare.

Just behind the eyes of the Brown Recluse, a broad dark fiddle-shaped band extends back to the end of the combined head and thorax. This band of darker color is broad behind the eyes, but narrows to a thin line near the middle of the back. This mark distinguishes the Brown Recluse from other common brown spiders, found in or near the house or outbuildings. The females are slightly larger than the males.

The Bite of the Brown Recluse

Experiments with the venom of the Brown Recluse have shown that both sexes are capable of inflicting poisonous bites to mammals. This is unlike the Black Widow in which only the female is poisonous. The symptoms following a bite by the Brown Recluse are quite unlike the typical symptoms of Black Widow bite.

The typical reaction in man following bite by the Brown Recluse is necrosis (killed tissue) at the site of the bite. The victim may not be aware of being bitten for two or three hours, or a painful reaction may occur immediately. A stinging sensation is usually followed by intense pain. A small blister usually rises and a large area around the bite becomes congested and swollen. The patient may become restless, feverish and have difficulty in sleeping. The local pain is frequently quite intense and the area surrounding the bite remains congested and hard to the touch for some time. The tissue affected locally by the venom is killed and gradually sloughs away, exposing the underlying muscles. The edges of the wound thicken and are raised while the central area is filled by dense scar tissue. Healing takes place quite slowly and may take six to eight weeks. The end result is a sunken scar which has been described as resembling a "hole punched or scooped from the body." Scars ranging from the size of a penny to

half-dollar have been reported.

The necrotic condition described above is typical of all bites of the Brown Recluse. However, in some cases a general systemic reaction has also occurred. In one case, the patient broke out with a rash resembling that of scarlet fever. In another case the kidneys were apparently affected causing bloody urine to be passed. These systemic disturbances probably occur infrequently and are the result of a "full" bite (i.e. the injection of a maximum amount of venom), or extreme sensitivity to the venom. This general reaction to the bite of the Brown Recluse is certainly a serious condition and hospitalization of the patient is usually required. Those in poor general physical condition, young children, and older people are more apt to be affected seriously by the bite of the Brown Recluse.

What To Do

At the present time, it seems wise to confine first aid treatment to the application of an antiseptic solution to the punctures made by the spider's fangs to prevent infection and ice packs to localize the venom. The patient should be under the care of a physician as soon as possible. Specific treatment for Brown Recluse bite is not presently available. Experiments with animals indicate that it may be possible to prepare antivenin for use in treating Brown Recluse poisoning. Therapy at the present time is usually supportive and symptomatic.

The Brown Recluse spider has been found over a large area of Missouri. It is common along the Missouri River and abundant in the southern half of the state. Records indicate it is absent or very scarce in northwest Missouri and generally along the northern border. The spider's inclination for living in and around dwellings and out-buildings makes human contact, and possible injury, quite easy.

Recognizing the spider, and knowing it is poisonous should reduce the chance of contact. Examine and shake out clothing which has hung unused for a long time in closets and other storage areas before you wear it. Take care when you clean storage areas. Places suspected of harboring spiders may be treated

with 1% lindane or mixtures of chlordane and DDT. Reducing insects around these places is an important factor in spider control as the insects serve as food for the spiders.

It seems important to rid the premises of the Brown Recluse in the spring and early summer as the spiders move about in the late summer and fall months. This tendency to wander may be due to efforts of the sexes to locate one another for mating. Most of the bites experienced by human beings occur from June to October in Missouri.

OTHER SPIDERS

Many other spiders inhabiting Missouri are feared by the public. This is usually because of the large size or bizarre markings of the spiders. Brief descriptions of these non-poisonous species are given below.

Tarantulas

These largest of American spiders are found only in the southern half of Missouri. Their large size (the leg span of large females may be as much as five inches in diameter) and forbidding hairy appearance have given these spiders an undeserved reputation of dangerous aggression. The jaws of the tarantula work in a vertical plane rather than in a horizontal one as do those of the true spiders. In order to use the fangs in this plane, the tarantula must elevate the front of the body. When cornered by man or other animals, this position is taken and the fangs are used in a rake-like manner. Fortunately, the venom contained in sacs, held entirely within the base of the fangs, is little toxic to mammals. The strong jaws, however, can inflict slightly painful wounds. A tarantula bite may feel like a pin prick, with mild pain, smarting and soreness. The possibility of being bitten by a tarantula in Missouri is quite remote. Accidental contact is almost impossible and the encroachment of civilization has greatly reduced their numbers.

Wolf Spiders

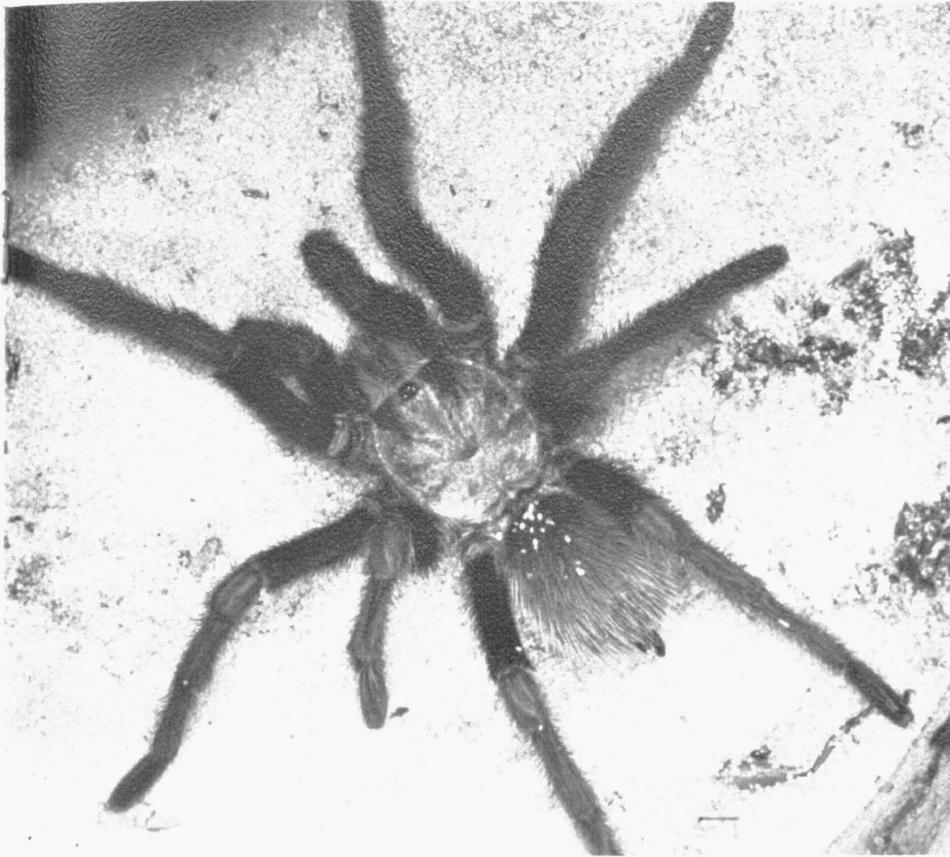
Some of the more common species of the family *Lycosidae* or "wolf spiders" are large, handsome spiders. Perhaps because of their size and rapid movements they are almost universally feared by man. They are, in fact, quite shy and retreat rapidly to shelter when disturbed. The venom of two of the larger species found in Missouri has been tested on laboratory animals and has proven to be quite harmless to mammals. Opportunity for personal contact with the larger Lycosids is rare, for they do not ordinarily inhabit buildings, and being very strong and swift do not tarry long in man's presence.

Benefits from Spiders

Since the Black Widow and Brown Recluse spiders are the only poisonous species known to occur in Missouri (and in fact, in most of the United States), this leaves hundreds of species of spiders in our everyday environment that are either beneficial or neutral in relation to man. The vast majority are distinctly beneficial to man by destroying noxious insects in and around the home, yard, garden and field. Wholesale destruction of spiders in general should be avoided. Indeed, in many southern sections of the United States spiders are not only tolerated but encouraged to inhabit the house as aids in insect control.

SCORPIONS

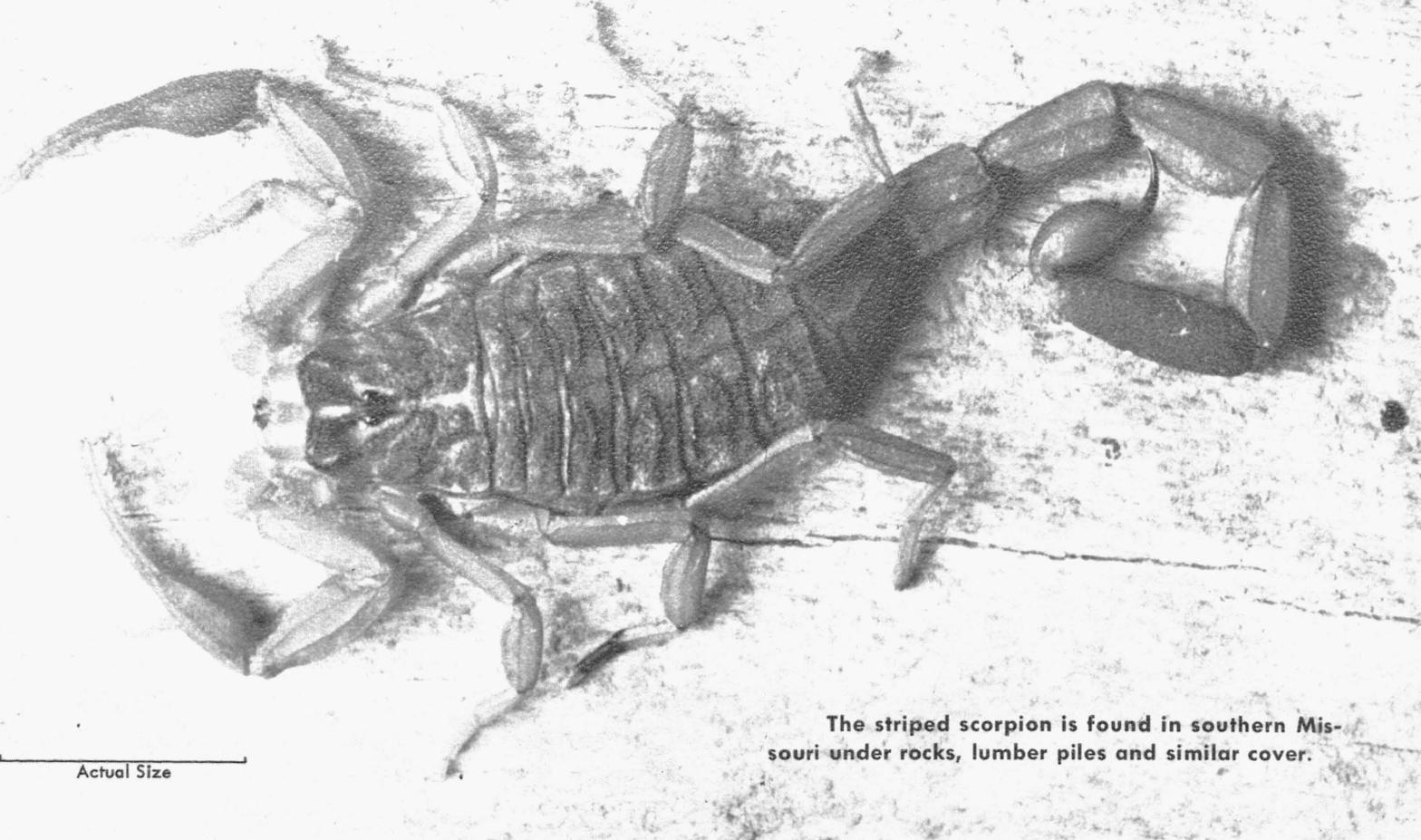
Among the near relatives of spiders are the scorpions. You can recognize them by their large pincer-like pedipalps (modified front legs) and the long post-abdomen which bears a bulbous terminal segment with a poison-sting. Scorpions are common in warm countries. Several species are found in the dry, hot southeastern states and in Mexico. Few are found in the north. Only one species is found in Missouri. This is *Centruroides vittatus*, the common scorpion of the southern United States. It is fairly



The common tarantula of southern Missouri is a harmless curiosity.

Wolf spiders are large and forbidding in appearance, however the venom is generally harmless to humans.





The striped scorpion is found in southern Missouri under rocks, lumber piles and similar cover.

common in southern Missouri counties. The body is pale yellowish brown, usually with two lengthwise dark stripes on the abdomen. In older specimens the body may be a uniform dark brown with the stripes faint or lacking.

The common striped scorpion of Missouri is chiefly nocturnal in habit and frequents rock piles, lumber piles and rubbish-strewn areas in general. Lakeside cottages in the hill country of south Missouri are often invaded by scorpions. They usually come in around fireplaces and poorly-constructed basement foundations.

This species is considered relatively harmless. Several workers have allowed themselves to be stung and have described the effects as: "initial pain sharp, soon subsiding. A small reddened wheal forms at the site of the sting. The wheal soon disappears and no after-effects have been observed." First aid should be confined to applying an antiseptic to prevent infection of the puncture and perhaps an ice pack to relieve the first sharp pain. Ammonia applied to the

wound may relieve the first discomfort.

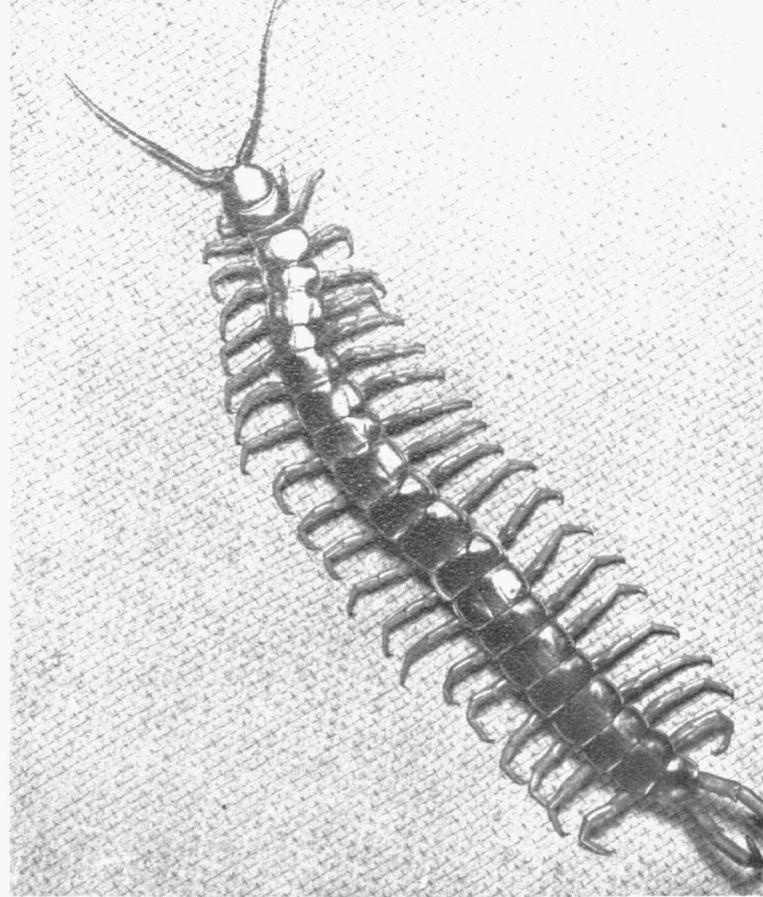
Rarely, a human victim may exhibit an extreme allergic reaction to scorpion venom. This may appear as itching and swelling of the face, nose, and throat with an elevation of temperature to 104° F. Victims so affected, especially children, should be taken to a doctor at once.

Most people are stung by scorpions when moving rocks, lumber, or other material where the creatures may be hiding. Stings may occur when a person puts on shoes or other clothing where a scorpion is concealed.

You can control scorpions around summer cabins and homes by cleaning the premises of rock, lumber and rubble piles which furnish attractive shelter. Foundations and chimney bases, cellars and crawl spaces may be sprayed with heavy (2½ to 5 percent) concentrations of DDT, lindane, or chlordane. These chemicals will kill some of the scorpions and also eliminate insects which serve as their food.

CENTIPEDES

The presence of centipedes or "hundred legged worms" around the house usually indicates that insects are also present and are being used as food by the centipedes. All species bear a pair of front legs equipped with claws having poison glands at the base. These legs extend forward to work with the mouthparts and are used to subdue and kill insects and other small prey. Large, tropical species of centipedes are said to be quite venomous and capable of inflicting serious injury to man. The small species found generally distributed over Missouri are harmless. A single large, dark brown centipede (*Scolopendra*) found in southern Missouri appears to be large enough to puncture human skin with poison claws. However, no instances of human injury by this large centipede have been reported in Missouri.



Missouri's largest centipede often reaches a length of six inches or more. Despite its large size, it is considered harmless.

Millipedes or "thousand leggers" are harmless scavengers of decayed organic matter in damp places.



MILLIPEDES

Close relatives of the centipedes are the "thousand legged worms" or millipedes. The kinds that occur in Missouri are entirely harmless. Some of the species have repugnatorial glands, but none of the secretions from these glands are known to be harmful to man. Millipedes neither bite nor sting.

Millipedes vary from less than one-half inch up to three inches in length. When disturbed, they typically curl up into a tight ring and remain motionless. Their food is decaying organic matter, so that they are found in flower beds which contain leaf mold and other organic mulches. Occasionally millipedes migrate almost en masse from flower beds along foundations up into porches or houses. They can be controlled by spraying the foundation walls and window sills with 5 percent DDT.

INSECTS

The effects of insect bites and stings on human beings are of two types, (1) local reaction to injections of salivary secretions by the mouth parts of insects or venom by the sting and (2) general systemic reaction to these same substances.

Local reaction to insect bites is common and may vary from temporary itching or reddening, as with mosquito bites, to the formation of a thick wheal or welt. The reaction is brief and causes only temporary discomfort. General systemic reaction is usually the result of unusual sensitivity to the injected secretions and may result in anaphylactic shock which can be fatal. Ants, bees, wasps, and assassin bugs may cause either of these conditions.

ANTS

The true ants of Missouri offer no particular hazard except to the unwary picnicker who may be nipped slightly. However, a closely related group of ant-like wasps, the velvet ants, can inflict a painful sting. These velvet ants, so-called because of the dense covering of red-orange and black hair over the body, have a long coiled sting which they use readily when captured. Some of the species are quite large and the sting is extremely painful for a short time.

BEEES AND WASPS

The stings of bees and wasps are somewhat commonplace in everyday life. Individual reaction to these stings varies greatly. In extreme cases individuals show a decided systemic reaction indicating abnormal sensitivity which may be the result of stings suffered earlier in life. These persons, when stung, become short of breath, have a choking sensation in the throat, become flushed or break out in red blotches or a fine rash over the body. Victims of bee or wasp stings showing these symptoms should be kept as quiet as possible and receive medical aid quickly. People previously sensitized to bee venom may suffer these symptoms from a single honeybee sting. Such symptoms are not to be taken lightly

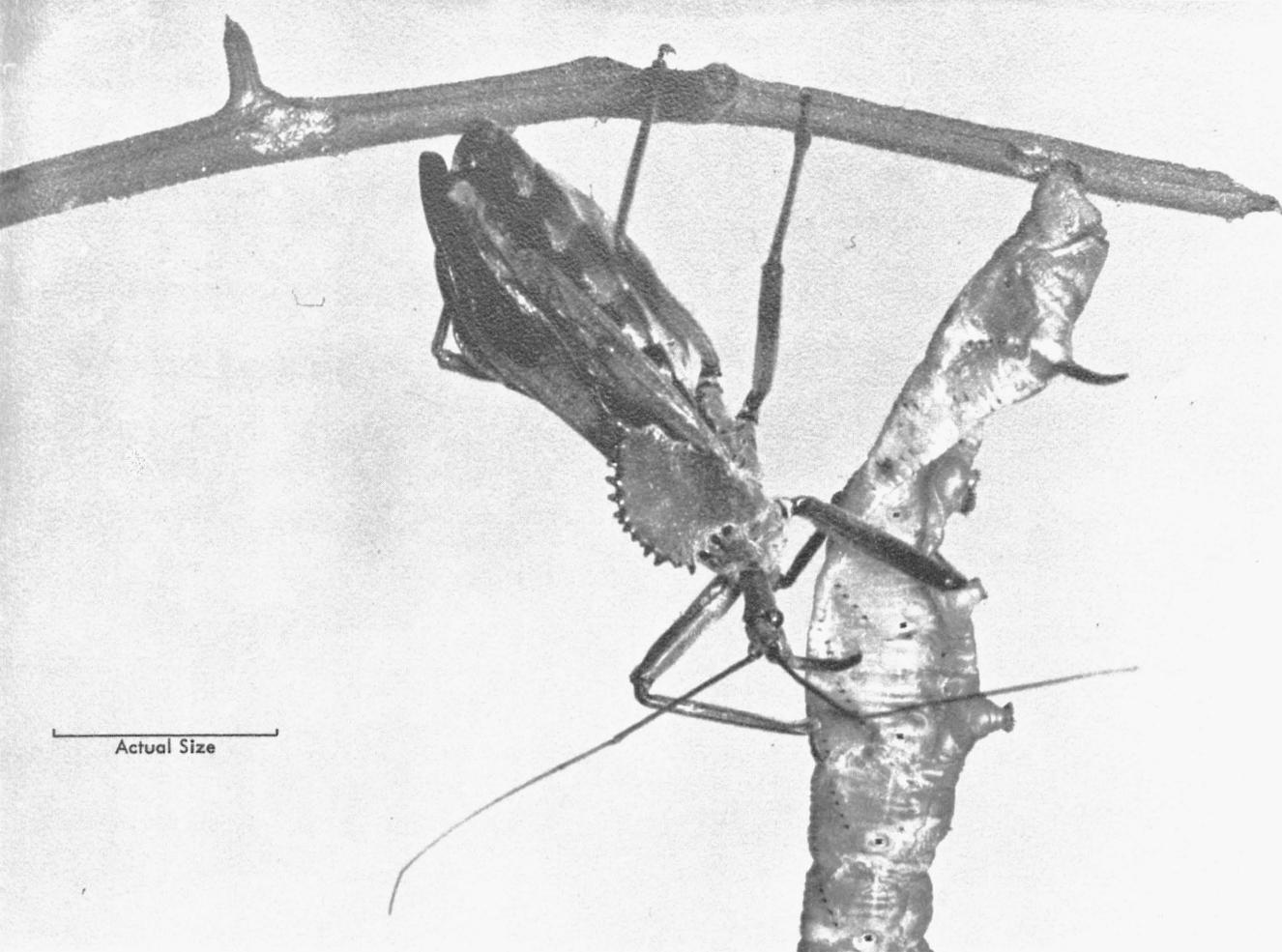
and the person should always receive medical aid. The potential seriousness of bee and wasp stings to sensitized subjects is shown in a recent study at the University of Missouri by Parrish. This study traced 138 deaths in 10 years to snake bites and 229 deaths to allergic or anaphylactic reactions in sensitized subjects stung by bees or wasps.

ASSASSIN BUGS

Assassin bugs are capable of inflicting painful bites on man. This usually occurs when the bug is captured as an object of curiosity and is handled carelessly. There is a sharp pain followed by a burning sensation which may last for an hour or more. The bitten member gradually grows numb and this numbness may persist for a week or two. In some cases, persons bitten have reported the punctured finger remained numb for as long as six months. Occasionally a small necrotic area forms at the site of the puncture. Unlike necrotic spider bite, this heals rapidly and is not extensive. The bite is not considered dangerous but may be quite painful.

Several species of assassin bugs are found in Missouri. Probably the species most often guilty of biting man is the wheel bug. This species is a large grey bug with a notched crest over the back. This crest resembles half of a cog wheel and it is from this structure that the bug gets its name. The strange appearance of this insect often prompts the unwary to pick it up for close examination. Another smaller species, black in color, is often attracted to the light of reading lamps in the summer. It may become entangled in the hair and efforts to remove it may result in a painful bite on the hand.

• • •



The natural food of the Wheel Bug is insects. However, its sharp beak, used to kill insects, can inflict a painful wound to careless fingers.

for further reading . . .

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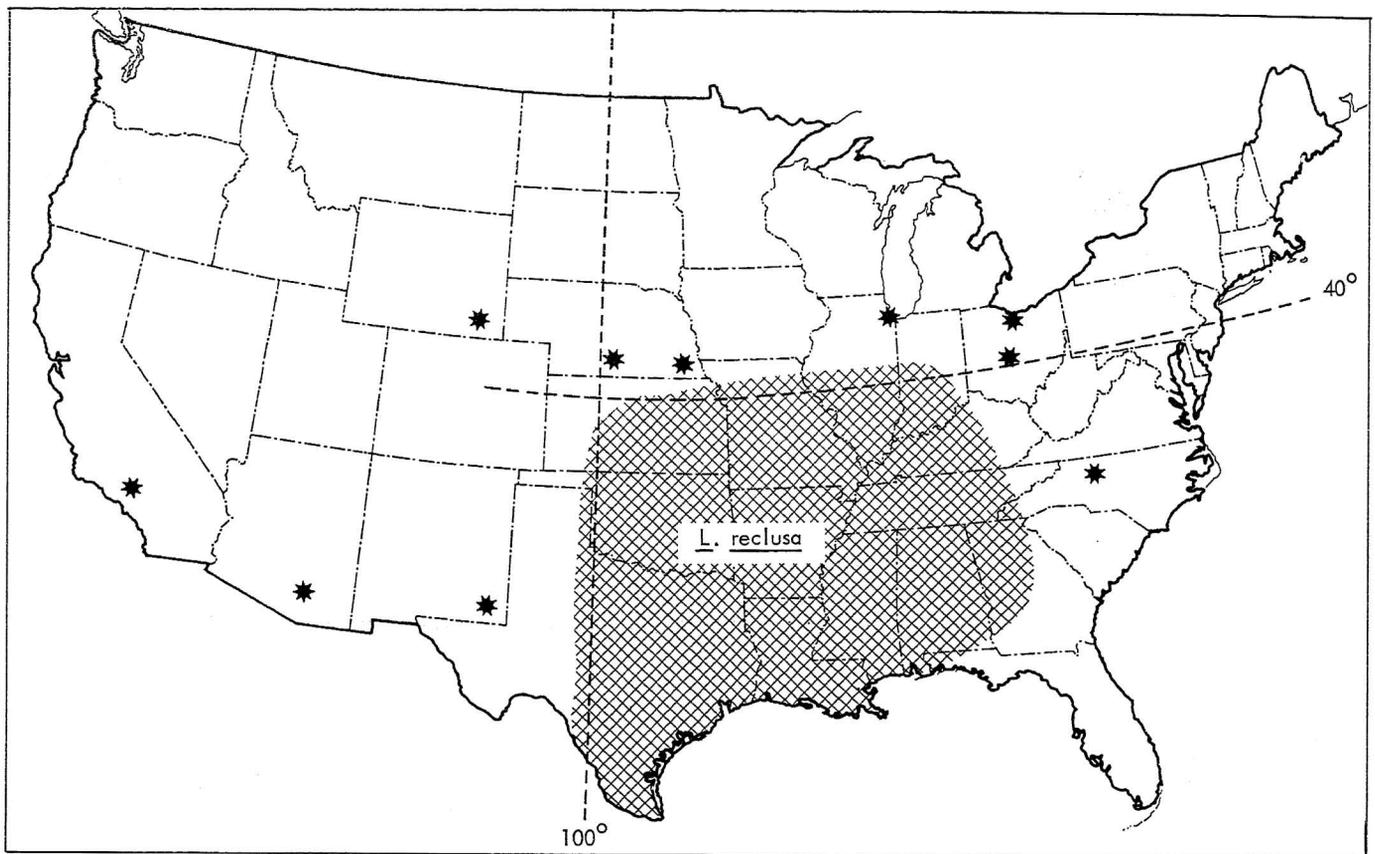
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Photographs of tarantula, scorpion, wheel bug and wolf spider courtesy of Lee Jenkins, Associate Professor of Entomology, University of Missouri. Drawings of venom gland and chelicera by F. E. Wood, Extension Instructor in Entomology, University of Missouri.



Since this bulletin was first published in March of 1960 many readers have written to ask specific questions about the distribution of the brown recluse spider. The approximate range of the spider in the United States is shown as the shaded area of the map above. Due to its habits of living in storage areas and containers the spider may be moved out of this range with household effects and eventually become established in other areas.

Single specimens (indicated on the map*) have been collected recently in Arizona, California, Illinois, Ohio, Nebraska, New Mexico, North Carolina and Wyoming. There is little evidence that the species is established as a reproducing population in these areas. A closely related species native to South America (*Loxosceles laeta*) has been found in Cambridge, Mass., Sierra Madre, Calif., Vancouver, B. C. and Toronto, Ont. The numbers collected in California and Massachusetts indicated reproduction had occurred.

SUMMARY

Only two of the many kinds of spiders found in Missouri are poisonous to man. These are the Black Widow Spider and the Brown Recluse Spider. All others are harmless and for the most part benefit man by destroying insect pests.

Other closely related arthropods such as insects, scorpions, centipedes are not dangerous to man even though their bites or stings may cause temporary discomfort and pain. A few people may show extreme allergic reaction to insect or scorpion bite. These people should seek medical aid immediately.