

# With Venom 15 Times Stronger Than a Rattlesnake's, Keep Your Pet Away from This Insect

If you are healthy and got bit by one, you probably wouldn't die — but that's not the case for your pet. Watch out especially for the females of this species — they have evolved to have extra-potent venom that hijacks its poor victim's nervous system.

Reviewed by Dr. Becker

## STORY AT-A-GLANCE

- Latrotoxins are the neurotoxins responsible for the bulk of black widow venom's poisonous effects
- More spiders produce latrotoxins than was previously thought, but the resulting venom is a "watered-down version" used for hunting prey and is not harmful to people
- Black widow spider bites can be fatal to cats and dogs; if you suspect your pet has been bitten, seek veterinary attention immediately and request anti-venom and supportive therapy

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Black widow spiders are among the most notorious carnivores, known for their potent venom and, among females, penchant for consuming her partner after mating. This latter fact is, by the way, only true among certain widow spider species, like the Australian redback.<sup>1</sup>

The western black widow, which can be found in warmer regions of the U.S., rarely eats her mate. Black widow spiders' reputation for having powerful venom is accurate, however; their venom is said to be 15 times stronger than a rattlesnake's.<sup>2</sup>

Interestingly, female black widow spider venom has evolved rapidly and is now so lethal that the insects are building bigger, stronger webs to accommodate larger prey. Typically black widows dine on flies, mosquitoes, grasshoppers, beetles, and caterpillars, but some can also eat reptiles and small mammals.

For the record, male black widows are smaller than females (about half the size) and have less potent venom; they are considered to be harmless. Female venom, however, is quite formidable and researchers from the University of Massachusetts, Lowell now think they know why.

## Black Widow Spider Venom Hijacks Victim's Nervous System

Latrotoxins are the neurotoxins responsible for the bulk of black widow venom's poisonous effects. The most toxic of the bunch — alpha-latrotoxin — basically takes over the victim's nervous system.

According to research presented at the 2015 annual conference of the Society of Integrative and Comparative Biology in West Palm Beach, Florida, more spiders produce latrotoxins than was previously thought, but the resulting venom is a "watered-down version" used for hunting prey and is not harmful to people.

In the case of female black widows, large amounts of the highly potent venom is produced, which is why their bite is capable of killing a human and, certainly, a pet. Researcher Jessica Garb, Ph.D. explained:<sup>3</sup>

*"If you got bitten by a black widow, alpha-latrotoxin would travel to the pre-synaptic regions of your neurons: this is the juncture right between the synapse of one neuron and your muscle cells or another neuron, and it inserts itself into the membrane ...*

*This causes all of the neuron's vesicles to dump out their neurotransmitters. And that's really what's painful."*

## **Black Widow Spiders Are Choosy About When to Bite — and Use Venom**

Black widows are typically nonaggressive, even shy, spiders. They generally must be provoked to bite, and research shows that not even a poke is enough to prompt an attack.

When researchers poked female black widows one time with a gelatin "finger," the spiders showed avoidance responses. That is, they ran away or played dead.<sup>4</sup>

When faced with a moderate threat — repeated pokes with the gelatin finger — the spiders flicked their silk at it, which is done in an attempt to slow down or subdue the threat. It was only when faced with a high threat — pinching along the entire length of their body — that the spiders turned to biting (and venom).

The researchers found that the spiders are not only choosy about when to bite, but also about when to inject venom or flick silk.

Both venom and silk are costly for the spider to replace, metabolically speaking, so they "represent limited commodities that should be used judiciously," the researchers explained. They continued in the journal *Animal Behaviour*:<sup>5</sup>

*"Spiders modulated venom expenditure at two levels. First, spiders chose whether to use venom, frequently delivering dry bites (>50% of interactions) independent of venom depletion.*

*Second, spiders metered venom quantity, delivering 1.8-fold more venom per bite when pinched on the body versus a leg, and 2.3-fold more venom when successive target presentations were separated by a lengthy (5 min.) compared to a brief (5s) interval.*

*These findings suggest that spiders make decisions about silk and venom use for defense."*

## **Black Widow Bites Are Rarely Fatal to Humans — But Can Be Deadly to Pets**

Despite their lethal reputations, getting bitten by a black widow spider is not an automatic death sentence, at least for healthy humans. For starters, the spider may just give you a "dry" bite, which means it bites you but doesn't inject any venom.

If venom is injected, you may experience symptoms including muscle aches, nausea and paralysis of your diaphragm, making it difficult to breathe. Even so, fatalities in humans are rare and are most likely to occur in small children, the elderly or people who are ill due to other conditions.

Most people recover within 24 hours, often without treatment (although sometimes hospital care is necessary). For instance, out of the 1,866 **black widow bites** reported to the American Association of Poison Control Centers in 2013, only 14 caused severe symptoms and no one died as a result.<sup>6</sup>

In fact, not only are you unlikely to be seriously harmed by a black widow spider, but you're also extremely unlikely to even be bitten, given their shy nature.

Your pet, however, is another story. Curious pets can easily disturb a black widow spider to the point of attack, and a dog or cat bitten by a black widow spider must be treated with anti-venom, supportive therapy and other medications as necessary.

Younger and older pets are at increased risk for severe symptoms due to their typically weaker immune systems. Animals with systemic high blood pressure are also at increased risk of fatal complications from black widow spider bites.

### **A Dog or Cat Bitten by a Black Widow Spider Needs Immediate Medical Care**

If you suspect your pet has been bitten by a black widow spider, contact your veterinarian or emergency animal hospital immediately. You can also administer the homeopathic remedy *Latrodectus mactans* as soon as possible. A pet that has been poisoned by the bite of a black widow spider will be hospitalized and given supportive care. This may include oxygen to assist breathing and intravenous (IV) fluids to lower blood pressure.

Muscle spasms and pain will be controlled with IV muscle relaxants and painkillers. Anti-seizure medications will be given as needed. Anti-venom drugs should be administered very carefully, with constant monitoring for reactions.

Without the anti-venom or correct, aggressive and consistent integrative therapy (homeopathy being your best bet in these situations), a black widow bite is usually fatal in cats and also in many dogs. Your veterinarian will monitor the wound site until it has completely healed.

The prognosis is often uncertain for days after treatment begins and symptoms can persist for many months. Symptoms of a venomous black widow bite in pets include the following:

- Early marked paralysis
- Muscle tremors and cramping
- Rigid and painful abdomen
- Severely painful muscles in the back, chest, and abdomen

- Difficulty breathing and/or respiratory collapse resulting from paralysis of the abdominal muscle
- Excessive drooling
- Restlessness
- Increased blood pressure and heart rate
- Loss of coordination and the ability to stand
- Vomiting and diarrhea

It can be difficult to diagnose a venomous spider bite in pets because the symptoms can mimic many other conditions. Your veterinarian will do a chemical blood profile, a complete blood count (CBC), a urinalysis, and a thorough physical examination to look for marks on your pet's skin that may indicate the location of the spider bite.

Be sure to give as much information as possible, including if you've noticed black widow spiders around your home (indoors or out). They're easy to spot, especially the females, which are shiny black and have a red hourglass-shaped mark on the underside of the abdomen.

## Sources and References

<sup>1, 6</sup> [Live Science May 29, 2015](#)

<sup>2</sup> [National Geographic, Black Widow Spider](#)

<sup>3</sup> [Discovery News January 6, 2015](#)

<sup>4, 5</sup> [Animal Behaviour March 2014, Volume 89, Pages 107-114](#)

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