

# The Cleopatra Project



Poisonous and Venomous Animals  
in Virginia



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## Poisonous and Venomous Animals in Virginia

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# The Cleopatra Project - Poisonous and Venomous Animals in Virginia

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(The Cleopatra Project Team of Virginia Master Naturalist volunteers who contributed to this publication: Chris Allgyer, Kathleen N. Aucoin, Bonnie Beers, Margaret Clifton, Ed Coleman, Heather Dionne, Kathy Fell, Alfred Goossens, Don Hearl, Gareth Hunt)

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# Introduction and Acknowledgments

Every year hundreds of exposures from contact with poisonous and venomous animals are reported to the University of Virginia Health's Blue Ridge Poison Center in Charlottesville, and other poison centers in Virginia. These numbers may be shocking, yet exposure numbers are actually much higher due to the fact that many cases are never reported.

This project was initiated in 2021 by the Virginia Master Naturalists, after *The Socrates Project – Poisonous Plants in Virginia* was successfully published in December 2020. That publication, dealing with poisonous plants, is available on the website of The University of Virginia under: <https://med.virginia.edu/brpc/socrates>

As with the previous publication, we want to reach as broad an audience as possible. Therefore, it is written clearly and simply. Technical words used are **bolded**, defined in text where possible and in the glossary at the back of this publication. The publication also includes a preface titled “Poison and Venom in Animals: A General Introduction,” which gives a perspective to this issue as seen by the Master Naturalists.

This publication deals with the poisonous and venomous animals that live in the wild in Virginia and are the most dangerous to humans. There are a number of other animals in Virginia, the sting or bite of which may be very annoying and sometimes even very painful, but the actual poison or venom may not be a serious threat to one's health. Typical examples are the cow killer wasp or red velvet ant (*Dasymutilla occidentalis*), the wheel bug (*Arilus cristatus*) and the bronze blister beetle (*Lytta aenea*), as well as some of the centipedes and millipedes. The list of animals that we cover in this publication may be seen as an intersection of toxicity, potential human exposure, and the frequency of presentation at poison control centers and emergency rooms.

Bronze blister beetle



Cow-killer wasp/Velvet ant



Wheel bug



Photos: Matt Bertone, North Carolina State University

This publication does not cover the effect of bites from bed bugs, chiggers, fleas, lice, mosquitos, ticks and scabies. In all these cases the effect of the venom in humans is minimal, although very annoying. The medical danger from these animals may not be the venom injected into a human, but rather the diseases that these animals may carry. Ticks may carry Lyme disease and mosquitoes may carry malaria, dengue and West Nile virus. To deal with such diseases is outside the scope of this publication.

This publication is the result of a strong partnership between the Virginia Master Naturalist program and the Division of Medical Toxicology of the University of Virginia School of Medicine.

We would like to acknowledge the support by the Division of Medical Toxicology – Department of Emergency Medicine, University of Virginia School of Medicine and the University of Virginia Health’s Blue Ridge Poison Center. In particular we would like to acknowledge Drs. Chris Holstege, Ryan Cole, Aaron Frey, Will Goodrich and Avery Michienzi for their guidance and the review of this publication, and Ms. Heather Collier for her invaluable administrative support.

The Cleopatra Project Team of Virginia Master Naturalist volunteers who have contributed as researchers and authors of this edition are: Chris Allgyer, Kathleen N. Aucoin, Bonnie Beers, Margaret Clifton, Ed Coleman, Heather Dionne, Kathy Fell, Alfred Goossens, Don Hearl and Gareth Hunt. The IT manager, who also created the layout was Bonnie Beers; the collector of the many photographs was Don Hearl; Heather Dionne wrote “Poison and Venom in Animals: A General Introduction.” All haiku are the original work of Kathleen Neff Aucoin.

We owe an enormous debt of gratitude to Trish Crowe of the Firnew Farm Artists’ Circle in Madison County, for designing the cover for The Cleopatra Project. This beautiful original artwork is a watercolor rendition of various poisonous and venomous animals that live in Virginia and which are included in this publication.

We would also like to thank the many photographers who have given us permission to use their photos in this publication. Their names and affiliations are given with each photo credit.

Peer review of this publication was conducted by:

- Peter F. De Lisle, PhD. Marine Science. President of Coastal Bioanalysts, Inc.
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- Michelle D. Prysby, MS. Virginia Master Naturalist Program Director and Extension Associate, Virginia Tech Department of Forest Resources and Environmental Conservation

We are extremely grateful for their time, expertise, and input to this publication.

This publication is available on the following website of The University of Virginia Health’s Blue Ridge Poison Center:

<https://med.virginia.edu/brpc/the-learning-center/the-cleopatra-project/>

Find information about the Virginia Master Naturalist program at:

[www.virginiamasternaturalist.org](http://www.virginiamasternaturalist.org)

For suggestions and comments please contact: [cleopatra.socrates@gmail.com](mailto:cleopatra.socrates@gmail.com)

*Alfred E. Goossens  
Project Director  
The Cleopatra Project  
December 2022*

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## ***Poison and Venom in Animals: A General Introduction***

Many of the animals in this publication are commonly thought of as scary, mean, or even evil, but they are not! The purpose of their poison and venom is to capture prey and ward off predators, not to injure humans. They will defend themselves against a perceived threat to their homes or their safety, so situations arise where humans may have painful or dangerous encounters with them. In this publication we hope to provide information to help people avoid provoking uncomfortable or dangerous interactions.

Despite their ability to cause us pain, in a larger sense poisonous and venomous animals are hugely beneficial to mankind. All animals are part of a complex web and eradicating any one may have unpredictable, potentially disastrous effects. Venomous animals are often predators of creatures that we consider pests, like rats and mice, and insects like aphids and caterpillars. Without stingers, it would be more dangerous for bees to forage in the daytime, and therefore more difficult for them to pollinate our flowers and food crops.

The actual poisons and venoms are valuable to us too. Because they contain so many different components that have very specific effects on the body, they are a rich source of raw material for medical and biological research; eleven drugs derived from animal venom are currently in use for human diseases.

Only a small percentage of all animal species is poisonous or venomous, but the group is hugely diverse; it includes the animals we commonly think of like spiders, snakes, and scorpions, as well as a huge range of others, from jellyfish to primates. Because toxins evolved separately thousands of times across the animal kingdom in response to specific survival pressures, poisons and venoms from different animals are very different in their functions, effects, and chemical makeups.

Poison and venom are distinguished by how they enter the victim. In general, poison is ingested or absorbed through the skin, while venom is injected into the victim through a specialized body part of the venomous animal; a fang, stinger, spine or claw. Poisons are usually present more generally throughout the animal, for example, secreted in the skin of salamanders.

In general, poisons are used for defense against predators, as protection against being eaten. Since they need to pass through the lining of the predator's digestive tract, or through its skin, poisons tend to be small molecules, but they include many different kinds of chemicals. Animals either generate poison in some specialized part of their body, or acquire it from their food. For example, monarch butterflies are poisonous because, as caterpillars, they eat milkweed, a poisonous plant.

Venoms are sometimes used for defense, but are primarily for subduing or killing prey. They are complicated mixtures of hundreds of components. Because they are injected, venom can contain large molecules like enzymes and proteins, instead of only the smaller chemicals found in poisons. They target specific parts of a victim, like the nervous system or the circulatory system, or promote bleeding and prevent blood from clotting. Many venoms also contain compounds that cause inflammation and an increased heart rate, which amplifies the toxins' spread. In animals that use venom defensively, like wasps and honey bees, venoms often include components that directly activate pain receptors.

*Continued ...*

## ***Poison and Venom in Animals: A General Introduction***

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Each animal's venom is suited to its needs. The venom a mosquito injects when feeding (to prevent blood from clotting) causes no immediate pain - which reduces the likelihood of being swatted. The honey bee's venom has the opposite goal - to quickly deliver as much pain as possible to discourage an invader from approaching the hive. In snakes, a more diverse diet with a range of types of prey seems to favor more complex venom, while snakes that specialize in one prey have a simpler venom. Even within individuals of the same species, venom components can vary geographically or seasonally. Many fascinating details of these complicated processes are not yet understood.

It takes energy for animals to produce poison and venom - they wouldn't produce them if there wasn't an important benefit. A specific predator/prey relationship creates this evolutionary pressure. For example, many newts produce a potent poison called tetrodotoxin, but in a few specific locations, one newt might contain enough tetrodotoxin to kill 20 people. Why would a newt need so much poison? It makes sense once you know that one of their predators, the garter snake, has been able to develop resistance to high levels of tetrodotoxin. As the snakes became more resistant, only the more poisonous newts survived and now those places that have the most tetrodotoxin-resistant garter snakes also have the most toxic newts!

Because of their extra protection from predators, poisonous and venomous animals can be bolder in appearance and behavior. Poisonous animals don't have to hide if they have bright colors reminding everyone that they are not good to eat; it's easy to notice red-spotted newts while hiking because their bright orange color stands out against the forest floor. Monarch butterflies have a long way to travel but their boldly patterned black and orange wings warn off potential predators along the way. You might be less inclined to swat an insect off your hot dog if you recognize the bright colors of a yellowjacket; in turn the yellowjacket can be much less shy about approaching a picnic.

The biological details and chemical components of the majority of animal toxins are unexplored. Most drugs derived from venom are from snakes, partly because their venom is present in larger quantities than that of smaller animals, and is therefore easier to acquire and study - but there are thousands of other venoms and poisons. If people fail to protect these animals and their habitats, or ultimately allow their extinction, any potential benefits, which are not yet fully known, will be lost to us forever. Virginia has many unique habitats, hosting a diverse collection of poisonous and venomous creatures; by understanding more about them we can dispel our fears and learn to live together safely, to ensure their survival and ours.

*Heather Dionne  
Virginia Master Naturalist*

# Ants Introduction

Ants have been on Earth for at least 145 million years; they evolved along with flowering plants. Many plants have seeds that are spread by ants. Ants are found in most ecosystems and, on average, form 15 to 20 percent of the total **terrestrial** animal **biomass** (the combined weight of all living organisms on Earth). The total biomass of ants worldwide is approximately the same as that of the entire human race. There are between 1 and 10 quadrillion ants, or at least a million for every human.

Ants have elbowed **antennae** (their feelers) and a three-segment body: head, **thorax**, and **abdomen**; the abdomen is connected to the thorax by a **petiole** (narrow waist). The head has two **mandibles** (jaws) for carrying food, manipulating objects, constructing nests, and defense. All workers are females and in many species, their egg-laying organs have become stingers used for subduing prey and defending nests. Ants communicate with each other using sound, touch, and **pheromones** (chemical secretions). Most ants are colored from red to black.

All ants form social colonies, from a few dozen to many millions. Larger colonies usually consist of infertile female workers and soldiers, fertile male **drones**, and fertile queens. Immature ants, **larvae**, are tended by the workers. Workers and soldiers will respond to defend the nest if it is attacked. In almost all ant species, fertile queens and males (drones) have wings and most are harmless; drones are stingless, but some queens can sting.

Experts have identified 164 species of ants in Virginia, but most are not dangerous and will sting or bite if threatened. There are a few species that can be aggressive and are venomous. These are: the Asian needle ant, the little fire ant (or electric ant), *Pseudomyrmex pallidus* (no common name), and the red imported fire ant, or RIFA. These are all discussed in detail in this publication. The black imported fire ant (*Solenopsis richteri*), a close relative of the RIFA, has not been confirmed in Virginia.

About 70 percent of ant species can sting. In most cases, if you are bitten or stung by an ant it will likely be harmless though it may cause some discomfort. Ant venoms have been found to contain many different chemicals which are responsible for local allergic reactions. Mild swelling and redness are common at the bite site; the pain may last ten minutes and the bite site may itch for several days. **Anaphylaxis**, an allergic reaction, is much more serious. Very few people are allergic to ant venom, but a single sting in some people, and multiple stings in others can trigger symptoms such as difficulty breathing; intense itching; lip, throat or tongue swelling; confusion; dizziness; chest pain; nausea, vomiting; seizures; loss of consciousness; and potentially death. An allergic reaction can start immediately, but usually occurs within 30 minutes of the sting. *Get emergency medical help immediately* if there is a known allergy or if allergic symptoms begin to appear.

If stung, wash the area with soap and water, apply an antiseptic, and then a soothing ointment such as hydrocortisone cream or calamine lotion, and cover with a dry bandage. Victims are *strongly warned against* using their hands to try to see and identify the ant, let alone to collect it as a sample.

If you notice that the ground you have just walked on turns reddish-black with ant activity within 10 seconds, you probably stepped on a hidden fire ant mound. Move away and brush any ants from your legs and clothing.



# Asian Needle Ant

*Brachyponera chinensis*

## Description

The Asian needle ant is native to areas of East Asia but has invaded the southeastern U.S., including Virginia. A small-to-medium sized ant, workers measure around 3.5 mm ( $\frac{1}{8}$  in) and queens are as large as 6.5 mm ( $\frac{1}{4}$  in). The body is black to brown with orange-brown legs, mouthparts and antennae. Workers have a well-defined stinger that can inject venom. Though not aggressive, the needle ant has a painful sting that can induce a severe allergic reaction in some people.

## Where They may be Found

The Asian needle ant is found throughout Virginia in a variety of habitats. In forested areas it nests in damp places like the insides of rotting logs or soil beneath rocks and leaves. In suburban and urban neighborhoods, it nests in piles of mulch, potted plants, pavement cracks, and under statues and other structures. Termites are their favorite food and a nest close to a termite colony has a convenient, abundant, high quality, renewable energy source. The needle ant will also scavenge dead insects and even human garbage. It has been discovered around food in home kitchens and school cafeterias.

## What Makes This Animal Venomous

The venom likely contains **formic acid** which causes a stinging sensation, and **histamines**, which cause allergic reactions. Most stings are accidental, usually outdoors in wooded areas. Stings can also occur when a winged queen falls into a swimming pool or is trapped in clothes or hair.

Do I startle your stitching, needle ant, as I stride the forest floor?



Photo credit: Matt Bertone  
NC State University



Photo credit: Matt Bertone  
NC State University



Photo credit: Matt Bertone  
NC State University



Most stings are on the legs and most occur during warmer months (April to September) when they are most active.

### Common Symptoms

Stings have been described as an intense pain that faded away and returned frequently over several hours. The pain was frequently reported in areas not confined to the original sting site.

Reactions can include swelling near the sting site, recurring pain, skin redness, and hives. These symptoms can last less than an hour, but may continue for 2 hours to 5 days. Larger swellings with further symptoms lasting 3 to 14 days are also possible. Severe allergic reactions can occur in 1 to 2 percent of cases. The victim should be monitored for these, and *medical attention* sought if they occur. For more details of symptoms that may develop after a sting and how to manage them, please refer to the Ants Introduction.

### Notes

This ant was likely introduced to the U.S. from East Asia in a shipment of plants sometime in the early 1930s. In addition to the painful sting and ability to infest homes, they may crowd out native ants which play an essential role in forest ecosystems. Needle ants will eat the natives, eat their food, and can take over nest sites.

Fun fact: Needle ant workers can physically transport nestmates; a strategy used in foraging and relocating nests called “tandem carrying.”



Photo credit: Matt Bertone  
NC State University



Photo credit: Jessica Louque,  
Smithers Viscient, Bugwood.org

***Additional information may be found in the bibliography at the end of the publication.***

Contact with poisonous or venomous animals can be dangerous.  
For appropriate medical advice, call your local poison center at **1-800-222-1222**.



# Little Fire Ant (LFA) or Electric Ant

*Wasmannia auropunctata*

## Description

This is a very tiny ant: workers are about 1 to 1.5 mm ( $\frac{1}{20}$  in) and queens are approximately 4.5 mm in length ( $\frac{1}{4}$  in). Originally native to Latin America, it is light to golden brown in color. Its exact shape cannot easily be seen, since a worker's size is less than half that of a sesame seed; it appears more like a slowly moving orange dot. This species is well known for a painful sting, out of proportion to its tiny size, and about as severe as the red imported fire ant (also described in this publication).

## Where They may be Found

Little fire ants establish colonies under rocks and plant litter, as well as inside homes in furniture, food, and clothing. Humans are frequently stung by ants that have fallen out of trees, or are crawling across lawn chairs, or floating on the surface of swimming pools. They populate human-disturbed landscapes such as areas of deforestation. In their native range, they can form noticeable clusters (3 to 10) of nests, located 2 to 10 m (6 to 30 ft) from each other, in a single super-colony. They cannot survive in cold environments, but they can find refuge in large buildings and greenhouses. In Virginia there has been only a single reported sighting, in 2016 in Lee County, in the southwestern part of the state. However, where there is one ant, there will almost certainly be an entire colony.

A tiny fire moves  
up my arm, fiercely burning-  
flames rage for an hour



Photo credit: Melody Euaparadorn



Photo credit: Melody Euaparadorn



Photo credit: Melody Euaparadorn

### What Makes This Animal Venomous

The exact nature of the venom of the electric ant has not been completely investigated. The little fire ant can induce injuries to the **cornea** on the surface of the eye that cause white discolorations in humans as well as domestic and wild animals. **Keratopathy**, an eye disease which affects domestic pets (dogs, cats, horses and birds), is induced by repeated stings. If untreated, it leads to blindness and reduced life expectancy.



Photo credit: Melody Euaparadorn

### Common Symptoms

The good news is that worker ants are so small they cannot sting through the thicker skin of an adult's hands; the bad news is that children are more at risk. Pets, domestic and wild animals and birds are also susceptible. Stings cause **welts**, raised red marks, about 2.5 cm (1 in) long that are itchy and very painful. The severe pain continues for about an hour and then gradually subsides. If the eye is stung the pain is extremely intense and can last more than 12 hours. The victim should be monitored for severe allergic reactions, and *medical attention sought immediately* if they occur. For more on symptoms and how to deal with them, refer to the *Ants Introduction*.



Photo credit: Scott Bauer  
USDA Agricultural Research Service

### Notes

This ant is a global problem and a serious threat to all native species on the Galapagos Islands.

Fun fact: A whole little fire ant nest can be transported in a single Macadamia nut!

*Additional information may be found in the bibliography at the end of the publication.*

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For appropriate medical advice, call your local poison center at **1-800-222-1222**.





## (No Common Name)

*Pseudomyrmex pallidus*

### Description

Sometimes called the “tree ant” or “pallid twig ant,” this species is native to Mexico. They are very small: workers are about 2.5 mm ( $\frac{1}{10}$  in) long, and are orange-brown. They are slender with large eyes and a well-developed stinger. The head is shiny due to the lack of any fine-hair covering. The combination of color, head-shape, and eyes is unique in North America. They do not hibernate, and reproduce throughout the year.

### Where They may be Found

In the U.S. this ant is found mainly in the southeastern states, reaching as far west as New Mexico. Virginia is probably their northern limit but only one has been identified in 2016 in Virginia Beach. *Pseudomyrmex pallidus* shows a preference for hollow stalks or stems of plants, and will also nest in dead twigs or the branches of shrubs and trees, generally where grassy and wooded habitats meet -- for shade in warmer months and sun in colder months. Large colonies with several nests are common. Nesting spaces inside plants can be 10 to 50 cm (4 to 20 in) long. The entrance to the nest is a tiny opening on the plant stem which is easily plugged by the body of a single worker to prevent access by predators.

Precautionary:

Bug, twiggy, outta sight? Cool!  
Bug out? Beat feet. Split!



Photo credit: Matt Bertone  
NC State University



Photo credit: Matt Bertone  
NC State University



### What Makes This Animal Venomous

To sting, a worker uses its **mandibles** to get a grip on its prey, then arches its midsection so that the stinger is bent under and forward. Symptoms may last for 30 seconds or more, but there is usually only one sting. This little ant is only moderately aggressive, unlike other *Pseudomyrmex* species. The venom gland of *Pseudomyrmex pallidus* is similar to that of the fire ants (the red imported fire ant, the RIFA, also covered in this publication). The precise chemical composition of the venom has not been determined; for most ants, except the RIFA, there has never been a vital need to do so.

### Common Symptoms

A sting causes a **welt**, a red mark that spreads for 5 to 10 minutes, and is followed by itching. Intense throbbing pain may also be present; this generally decreases within an hour and is usually gone in two. Redness disappears within an hour, leaving the welt, which may last for up to 24 hours. The welt can get bigger and have a narrow red halo. After 48 hours, the puncture area may become a discolored depression, which may persist for up to two weeks. The victim should be monitored for severe allergic reactions, and *medical attention sought immediately* if they occur. For more details on symptoms please refer to the *Ants Introduction*.

### Notes

These ants are probably too small to be distinguished from other ants by the human eye.



Photo credit: Matt Bertone  
NC State University



Photo credit: Matt Bertone  
NC State University

***Additional information may be found in the bibliography at the end of the publication.***

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# Red Imported Fire Ant (RIFA)

*Solenopsis invicta*

## Description

These are small ants, 2 to 6 mm ( $\frac{1}{16}$  to  $\frac{1}{4}$  in) long, with elbowed antennae and two smaller segments between the head and abdomen, which gives ants (and wasps) their narrow "waist." They have two strong horizontally-pinching mouthparts on the head, and a stinger on the rear of the body which is connected to an internal venom sac. They are usually dull red to reddish-black.

A fire ant nest can be as large as 45 cm (18 in) across. Most of it is underground, so it may be barely noticeable. Fire ants are very aggressive when their nest is disturbed. The first sign of their presence may be a sting. The RIFA is one of the most aggressive insects in the U.S.

## Where They may be Found

In Virginia their nests are usually found in sunny moist places such as riverbanks, pond shores, watered lawns, highway shoulders, sidewalk cracks, and against buildings. Usually not visible, they hide under logs, rocks, bricks, etc. The ants often appear after it rains. First found in Virginia's Tidewater counties in 1989, they have since spread west and north mainly through the counties bordering on North Carolina. Fire ants do not hibernate and do not survive cold well, so are not a problem in places that experience extended freezing temperatures, such as the mountains. They are mostly found between elevations of 5 to 145 m (15 to 475 ft).

**Called unconquered—  
contemplate defeat against  
this blistering foe**



Photo credit: S.D. Porter  
USDA-ARS (ret)



Photo credit: M. Waldvogel  
NC State University

### What Makes This Animal Venomous

Fire ants use their jaws to get a grip, then swivel their stingers forward between their legs to sting. The venom is composed mainly of a **piperidine** alkaloid called **solenopsin**. *Piper* is Latin for pepper and piperidine is the source of the “fire” in the fire ant sting. Stings usually occur on the feet or legs after stepping on a mound. When disturbed, fire ants release a **pheromone**, an airborne chemical alarm that summons other ants to defend the nest. They respond very quickly, and can swarm the perceived attacker. They are famous for multiple simultaneous stings: step away as quickly as possible, and brush off all ants. During the summer, fire ants have the most venom and therefore the worst stings.

### Common Symptoms

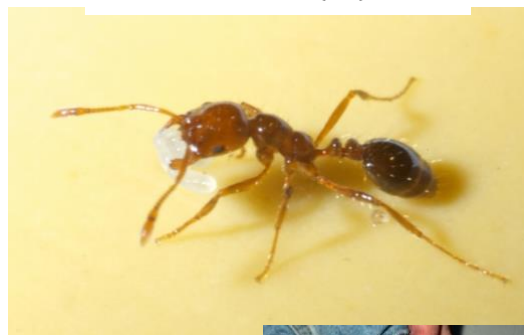
A sting causes a **welt** (a raised red mark) and then a burning sensation lasting 5 to 10 minutes. Early symptoms also include local swelling, itching, and burning. The welt may form a white blister, which is not infectious and should be left intact. These blisters may last up to 2 weeks. Many people cannot resist popping the blisters which can lead to an infection. To avoid this, wash with soap and water. Complications are rare (only one percent of the population is hypersensitive to ant venom). Watch carefully for an allergic reaction, which may start within 30 minutes. *An allergic reaction can be life threatening and requires prompt medical attention.* Effective treatment is available. For more details on sting symptoms refer to the *Ants Introduction*.

### Notes

Since entering the country RIFAs have infested 15 southern states and caused significant economic damage to agriculture. To report new occurrences in Virginia go to the website of Virginia Department of Agriculture and Consumer Services (VDACS) (see bibliography for web address).



Photo credits: S.D. Porter  
USDA-ARS (ret)



*Additional information may be found in the bibliography at the end of the publication.*



Contact with poisonous or venomous animals can be dangerous.  
For appropriate medical advice, call your local poison center at **1-800-222-1222**.





## Caterpillars Introduction

A caterpillar is a **larva** of either a moth or a butterfly -- it is the immature, wingless, crawling, and nonstop-feeding form of an insect which undergoes a complete **metamorphosis**. Its life cycle takes it from an egg to the larva to a **pupa** and then to the moth (or butterfly). The caterpillar stage is the growth stage, in which they eat constantly and go through several **molts** by shedding the outer skin, the **exoskeleton**. The caterpillars between molts are called **instars**. The first instar hatches from the egg, and the final instar of most moth caterpillars sheds its skin to become a pupa. Encased inside a silk cocoon (some moth caterpillars burrow into the ground or hide in leaf litter to do this), the pupa becomes a moth, emerging to lay eggs and start the process over again.

Caterpillars are very important as food for other animals: Small rodents, toads and frogs, lizards, spiders, wasps, bats, and other insects will feed on caterpillars. They are an essential resource for many songbirds during nesting season as hatchlings will consume thousands. It is estimated that fewer than 10 percent of caterpillars survive to become moths. Both caterpillars and moths also play an important role as pollinators.

Caterpillars have developed various defenses against being eaten, such as camouflage, spinning protective silk tents, or hiding between and under leaves. Some have developed chemical defenses -- they may have bristly, venom-filled spines that can deliver potent "stings." These spines can inject compounds that cause local pain, itching, rash, and even more severe reactions in people who are allergic or hypersensitive. Some moth caterpillars are covered with irritating hairs, giving them a furry appearance.

Caterpillars with stinging spines include flannel moths, some of the slug caterpillars, and buck and Io moths. Caterpillars that use irritating hairs as a defense include some dagger moths, tussock moths, and some tiger moths. In this publication the most dangerous and/or most likely caterpillars to be encountered in Virginia are profiled.

Most caterpillars are safe to handle, but before picking one up you should try to identify it. Children, especially, should be taught to be careful when handling caterpillars. If you are not sure if they are safe to touch, always take precautions, such as wearing gloves.





# Black-waved Flannel Moth Caterpillar

*Megalopyge crispata*

## Description

These caterpillars vary in color and size based on their stage of development. Early instars are white, later they are orange to gray. All have venomous spines hidden among non-venomous hairs, and each time they molt (shed the old skin), the number of hairs increases. Later instars are completely covered with long hairs which look soft like cat fur. Their bodies are shaped like tear-drops, can grow up to 3 cm ( $1\frac{3}{16}$  in), and are said to resemble a man's toupée. The final instars may wander away from their host plants to make cocoons that are grayish or light brown. In the cocoon the final instar pupates (transforms into a moth).

Moths usually appear around May or June, lay their eggs in rows or clusters and cover them with hairs. The moth has a total length of about 13 to 20 mm ( $\frac{1}{2}$  to  $\frac{3}{4}$  in) and a plush, furry body with cream-colored wings and black-tipped legs.

## Where They may be Found

Black-waved flannel moths are common from Massachusetts south to Florida and west to Arkansas and Texas. In Virginia they occur in woodlands, forests, and fields, feeding on a wide variety of woody plants, including alder, apple, birch, hackberry, oak, poplar, and willow. Humans typically encounter them by accident when they brush by a tree or shrub where they are feeding. Because the caterpillars may wander or drop from trees, they can be found on other surfaces, such as cars, campers, tents, fences, etc.

A gray cloud conceals  
the bolt of venom waiting  
for my fingertip



Photo credit: Judy Gallagher



Photo credit: Judy Gallagher



Photo credit: Seth Ausubel

### What Makes This Animal Venomous

Stings of flannel caterpillars are said to be among the most potent of any of North America's caterpillars. The hairs hide the venomous spines, which have the potential to seriously harm large mammals, including humans. To avoid stings wear long sleeves and pants in areas the caterpillars frequent.

### Common Symptoms

Contact with spines causes immediate burning pain, redness, and swelling that may last hours to days. Symptoms are usually limited to this local reaction but some people may experience headache, nausea, vomiting, wheezing and a widespread rash. The spines of cast-off skins and dead caterpillars or their cocoons may also cause a reaction.

For first aid, immediately wash the site of a sting with soap and water, air dry (do not rub), and use sticky tape to peel off remaining spines. Place an ice pack on the skin to reduce swelling. Seek emergency medical attention if eyes are affected or for facial swelling or difficulty breathing. Do not brush the caterpillar off, which may embed spines in the skin. Do not rub a sting area in case spines remain on the skin.

### Look-alikes

The puss caterpillar (*Megalopyge opercularis*), also described in this publication, is similar in appearance but it has a "tail" of hairs extending from its rear.



Photo credit: Seth Ausubel



Photo credit: Seth Ausubel

***Additional information may be found in the bibliography at the end of the publication.***

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# Buck Moth Caterpillar

*Hemileuca maia*

Once gregarious,  
the brushy line disperses  
seeking earth and change

## Description

This caterpillar has a black body with a reddish-brown head. It is heavily covered with tiny white spots, and the later instars may be covered with so many white spots that they appear more white than black. They can reach 5 to 6.5 cm (2 to 2 ½ in) in length, and have multi-branched, venomous spines in multiple rows along the body. The spines on top are longer and more branched than those along the sides.

Buck moths mate in late fall, and the female deposits eggs in a spiral cluster on an oak twig. When the eggs hatch, usually in late spring, the small caterpillars group together, often moving in a line along a branch. After the third instar, they begin to move away from the group to other plants. When they reach the sixth and final stage, they burrow into leaf litter or a few inches of soft soil at the base of a tree to pupate (become a moth). They may remain at this stage for up to 2 years.

Only one generation of the buck moth occurs each year. The moths emerge in the fall and are dark brown or black with a prominent white band on each wing. The wingspan is 8 to 10 cm (2 to 3 in); the male is smaller than the female and has a red-tipped abdomen.

## Where They may be Found

Buck moth caterpillars are found in the eastern U.S. from Maine to Florida, including all of Virginia, in woodlands and oak-dominated areas. They prefer oak but have been observed on other woody deciduous plants, such as poplar, willow, hazelnut, cherry, and rose. Humans



Photo credit: Chris Holstege, MD UVA



Photo credit: Judy Gallagher



Photo credit: Chris Holstege, MD UVA

typically encounter them by accident when they brush by a tree, shrub, or other surface where larvae are feeding or migrating to a site to pupate.

### **What Makes This Animal Venomous**

The spines of the caterpillar are hollow and connected to underlying venom glands. When the caterpillar is touched, its spines pierce the skin and release the venom. Spines may remain lodged in the skin until removed. Reactions from contact with the hairs or spines of these caterpillars may be due to the release of histamine and other chemicals, or from direct irritation by hairs that become embedded in the skin. The precise causes of these reactions are unclear.

### **Common Symptoms**

Contact with the spines causes immediate pain; a burning sensation similar to a bee sting, as well as redness and swelling at the site that may last several hours or days. Reactions may include nausea within the first hour. Contact with spines of cast-off skins and dead caterpillars, which can contain venom, may also cause a reaction. Do not brush a caterpillar off the skin, which can cause spines to embed in the skin. Do not rub a sting site if spines remain as this may cause the spines to embed deeper. Use tape to remove spines. Severe reactions are rare, but seek emergency medical attention immediately for swelling beyond the site of the sting or any difficulty breathing. To avoid stings, wear long sleeves and pants in places where the caterpillars frequent and when they are active.

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For appropriate medical advice, call your local poison center at 1-800-222-1222.*

### **Look-alikes**

The buck moth caterpillar may be confused with the non-stinging spiny elm caterpillar (*Nymphalis antiopa*), the larva of the mourning cloak butterfly. The body of the spiny elm caterpillar is black and covered with tiny white speckles with a row of eight red spots on its back between conspicuous spines. The caterpillar of the spongy moth (*Lymantria dispar*), may also be confused with the buck moth caterpillar.



Photo credit: Gerald J. Lenhard  
Louisiana State University, Bugwood.org

***Additional information may be found in the bibliography at the end of the publication.***



# Grapeleaf Skeletonizer Caterpillar

*Harrisina americana*

## Description

These caterpillars have black heads and yellow bodies with black bands across each segment of the body. The black bands have tufts of short, shiny black hairs. They may reach a length of about 1.5 cm ( $\frac{5}{8}$  in). Female moths lay eggs in bunches and the young caterpillars feed side-by-side in groups on the undersides of leaves. When mature they spread out and will overwinter as **pupae** in leaf litter. There can be more than one generation per year. The moth has a black body with an orange collar behind the head. The wings are smoky black and semi-translucent.

## Where They may be Found

Grapeleaf skeletonizer moths range from Missouri to New Hampshire, south to Florida and Texas. In Virginia they can be found in fields and woodland edges. The caterpillars can be pests in vineyards. Host plants include grape, Virginia creeper and redbud. Humans typically encounter the caterpillar by accident when they brush by a tree, shrub, or other surface where they are feeding.

## What Makes This Animal Poisonous

These caterpillars defend themselves with irritating hairs that can cause minor to extreme skin reactions. These caterpillars produce **hydrogen cyanide**, a poison, exposure to which can cause skin and eye irritation. Onset of symptoms may be immediate or delayed for 30 to 60 minutes.

Underneath the leaves,  
black and yellow buses park  
for al fresco lunch



Photo credit: Chris Allgyer  
VMN High Knob Chapter



Photo credit: Thomas Bentley



Photo credit: Judy Gallagher



## Common Symptoms

Contact with the hairs causes immediate burning pain, redness, and swelling that may last hours to days. Symptoms are often limited to this local reaction, however a few people may develop a more severe reaction and experience headache, nausea, vomiting, wheezing and rash across the body. Contact with the hairs of cast-off skins, dead caterpillars, or cocoons, may also cause a reaction. For first aid, immediately wash the site of a sting with soap and water, air dry (do not rub), and apply sticky tape over the affected area to peel off remaining hairs. Place an ice pack on the skin to reduce swelling.

*Seek emergency medical attention* if eyes are affected or for swelling of the face or difficulty breathing. Wear long sleeves and pants in areas which they frequent and consider wearing gloves. If picking grapes, look for caterpillars by carefully turning the leaves over. Do not brush a caterpillar off the skin, an action which may push more hairs onto the skin.

## Look-alikes

The monarch butterfly caterpillar (*Danaus plexippus*) with its black and yellow colors has sometimes been confused with the grapeleaf skeletonizer caterpillar.



Photo credit: Whitney Cranshaw  
Colorado State University, Bugwood.org



Photo credit: Thomas Bentley

***Additional information may be found in the bibliography at the end of the publication.***

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# Hickory Tussock Moth Caterpillar

*Lophocampa caryae*

Timeless, noir, Ascot,  
elegant fascinator,  
fashion is your shield

## Description

These fuzzy caterpillars, or larvae, are white with prominent black tufts and long black lashes on the first and seventh segments of their body. They may reach a length of 4.5 cm (1¾ in). Moths appear in May or June, and eggs are laid in batches of 100 or more. The young larvae feed in large groups on the underside of leaves; mature caterpillars feed alone or in small groups. There is one generation per year and pupae overwinter in fuzzy, light-colored cocoons among leaf litter. The moth has a total length of about 20 to 28 mm (¾ to 1⅛ in) and has tan to light brown forewings with rows of cream-colored spots that extend from side to side

## Where They may be Found

Hickory tussock moths range from southern Ontario, Canada, to North Carolina and Nebraska. Caterpillars can be found in woodlands and forests. In addition to hickory, these caterpillars will eat walnut, ash, elm, maple, oak, willow, and many other woody plants. They have also been seen on shrubs such as raspberry, rose, sumac and blueberry, and on vines such as Virginia creeper. People typically encounter this caterpillar by accident when they brush by a tree, shrub, or other surface where the larvae are feeding. To avoid stings, wear long sleeves and pants in places the hickory tussock caterpillars live and at times of year when they are most frequent.



Photo credit: James Eckert



Photo credit: Brenda Clements Jones  
VMN Old Rag Chapter



Photo credit: Bruce Watt  
University of Maine,  
Bugwood.org

### What Makes This Animal Poisonous

These caterpillars defend themselves with irritating, barbed hairs that can result in minor to extreme skin reactions. The hairs easily detach from the caterpillar and can become embedded in the skin, eyes, or mucous membranes of potential predators. These hairs are also found in and on the surface of their cocoons – even after the moths have emerged.

### Common Symptoms

Contact with the hairs causes immediate burning pain, redness, and swelling that may last hours, possibly days. Symptoms are usually limited to this local reaction, however a few people may experience headache, nausea, vomiting, wheezing or a widespread rash on the body. Touching the hairs of cast-off skins, dead caterpillars, or cocoons may also cause a reaction. *Do not brush* off a caterpillar as this might cause the hairs to get stuck in the skin. *Do not rub* a sting in case some hairs remain on your skin.

For first aid, immediately wash the site of a sting with soap and water, air-dry (*Do not rub!*), and apply sticky tape over the affected area to peel off any remaining hairs. Use an ice pack to reduce swelling. Seek emergency medical attention if eyes are affected, or for serious allergic reactions, including swelling of the face or difficulty breathing.

### Look-alikes

There are several other similar-looking tussock caterpillars found in Virginia that

may produce similar itchy rashes, especially on children. Best to avoid all of them.



Photo credit: Brenda Clements Jones  
VMN Old Rag Chapter



Photo credit: Pennsylvania Department of Conservation  
and Natural Resources-Forestry, Bugwood.org

***Additional information may be found in the bibliography at the end of the publication***

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# Io Moth Caterpillar

*Automeris io*

## Description

The caterpillars, or larvae, of the Io moth are green with a red-and-white stripe on each side of the abdomen. They can reach an overall length of 6.5 cm (2½ in), and their bodies are covered in clusters of green venomous spines with black tips.

The female moth has a wingspan up to 8 cm (about 3 in), and the forewings are reddish-brown in color; those of the slightly smaller male are yellow. Both sexes have prominent hind-wing **eyespot**s, eye-like markings that can scare off potential predators. Female moths lay eggs in clutches. First-hatched caterpillar instars are dark brown and social; they will sometimes march in lines following silk trails. With each molt, the caterpillars get larger and lighter in color, and eventually go it alone.

## Where They may be Found

Io moths are found throughout the eastern U.S., and as far west as Texas. They feed on a wide variety of trees and shrubs including elm, maple, birch, cherry, oak, poplar, willow, hackberry, blueberry, and blackberry. Moths start emerging from cocoons in April or May; there are 2 or 3 generations per year, and they overwinter in thin, papery cocoons found in leaf litter.

## What Makes This Animal Venomous

Almost the entire body of Io moth caterpillars is covered in clusters of venomous spines that can break off and embed themselves in human skin when handled. To avoid stings, wear long sleeves and pants. Wear gloves if touching caterpillars.

**Sporty striped autos—  
if one comes your way, they are  
not fer steppin' on**



Photo credit: Judy Gallagher



Photo credit: Judy Gallagher

## Common Symptoms

People may get stung by this caterpillar by accident when they brush by a tree, shrub, or other surface where the caterpillars are feeding. Touching the spines causes immediate burning pain, redness, and swelling that may last hours to days. *Do not brush* a caterpillar off as this might cause the spines to get stuck. *Do not rub* a sting in case spines remain in your skin. Symptoms are usually confined to a reaction at the sting site, but a few people may experience headache, nausea, vomiting, wheezing and spreading rash. The spines of dead caterpillars, their cast-off skins or cocoons, may also cause a reaction.

If stung, immediately wash the site of a sting with soap and water, air-dry (do not rub), and use sticky tape to peel off any remaining spines. Use an ice pack to reduce swelling. Seek emergency medical attention if eyes are affected, or for face swelling or difficulty breathing.

## Look-alikes

While many small caterpillars might resemble the young Io moth caterpillar, the final Io caterpillar, with its prominent red and white stripes and clusters of spines, sticks out like a sore thumb (so to speak).



Photo credit: Judy Gallagher



Photo credit: Matt Bertone  
NC State University

***Additional information may be found in the bibliography at the end of the publication.***

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For appropriate medical advice, call your local poison center at 1-800-222-1222.*





# Saddleback Caterpillar

*Acharia stimulea*

## Description

The saddleback caterpillar is probably the most notorious member of the slug moth (Limacodidae) family. This distinctive caterpillar is brown on both ends with a brown saddle-shaped spot in the middle of a bright green back. Each end bears a pair of large fleshy growths that support numerous irritating and venomous spines; clusters of smaller spines occur along the sides of the body.

Moths generally appear from June to August. Females lay eggs in clutches of 30 to 50. Early instars stay together in groups, but older instars are usually solitary. They can reach a length of 25 mm (1 in). The moth is dark brown in color with black shading. A single white dot is present near the base of the forewing and one to three additional white dots are present near the tip. The moth may reach a length of 25 mm (1 in).

## Where They may be Found:

Saddleback caterpillars range from Massachusetts, south to Florida, and west to Missouri and Texas. They feed on a wide variety of trees, shrubs, and grasses, including apple, blueberry, maple, oak, locust, beans, and corn. In Virginia they may be seen in fields, edges of woodlands, and in home gardens. The caterpillar is generally found from July to October. Humans typically encounter the saddleback by accident when they brush by a tree, shrub, or other surface where larvae are feeding. To avoid stings, wear long sleeves and pants in places saddlebacks live and at times of year when they are most frequent.

**With venomous spines  
aplenty fore and aft, the  
saddleback stood firm**



Photo credit: Chris Allgyer  
VMN High Knob Chapter



Photo credit: Judy Gallagher



Photo credit: Chris Allgyer  
VMN High Knob Chapter

### What Makes This Animal Venomous

The sting of the saddleback is said to be one of the most potent of the slug caterpillars. The spines are larger than those of other slug caterpillars – especially at the ends of its body. All of the spines are capable of breaking off the caterpillar and getting stuck in human skin. The venom is **hemolytic** (destroys red blood cells) as well as **vesicating** (blister causing), and can result in direct tissue damage. If disturbed, the caterpillar may arch its back inward in an attempt to bring even more spines into contact with its perceived attacker.

### Common Symptoms

Contact with the spines causes immediate burning pain, redness, and swelling at the site that may last hours to days. Contact with the spines of cast-off skins or dead caterpillars and even cocoons may also cause a reaction. Symptoms are usually limited to a local reaction but a few people may experience headache, nausea, vomiting, wheezing and a widespread rash on the body.

For first aid, immediately wash the site of a sting with soap and water, air dry (do not rub), and apply sticky tape over the affected area to peel off remaining spines. Place an ice pack on the skin to reduce swelling. Seek emergency medical attention if eyes are affected, or for swelling of the face or difficulty breathing. *Do not* brush a caterpillar off the skin as this might cause the spines to embed in the skin. *Do not* rub a sting in case spines remain in your skin.

### Look-alikes

The brown saddle-shaped spot in the middle of a bright green back sets this caterpillar apart from all others.



Photo credit: Laurie Spangler  
VMN Roanoke Chapter

***Additional information may be found in the bibliography at the end of the publication.***

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For appropriate medical advice, call your local poison center at **1-800-222-1222**.*



# Southern Flannel Moth Caterpillar (Puss Caterpillar)

*Megalopyge opercularis*

## Description

The puss caterpillar is probably the most infamous member of the family of flannel moths (Megalopygidae). These larvae vary in color depending on the life-stage, or instar. Early instars are pale yellow; later instars are brown to gray. All have venomous spines hidden among non-venomous hairs, and with each molt, the number of hairs increases. Late instars are covered with a thick carpet of long hairs which looks soft like cat fur. Tear-drop shaped, they can reach a length up to 3 cm ( $1\frac{3}{16}$  in), and are said to resemble a man's toupée. The body tapers to a "tail" of hairs that extends from the rear.

Moths usually appear around May or June, and eggs are laid in rows or clusters and covered with hairs from the female. Mature larvae may wander from their host plants to make cocoons that are white or light brown. There can be two or more generations per year. The moth has a total length of about 13 to 19 mm ( $\frac{1}{2}$  to  $\frac{3}{4}$  in) and has a plush, furry body with cream-colored wings and black-tipped legs.

## Where They may be Found

Southern flannel moths range from New Jersey south to Florida and west to Arkansas and Texas. They feed on a variety of woody plants, including apple, birch, hackberry, and oak. In Virginia, they occur in deciduous forests and adjacent areas. Humans typically encounter flannel caterpillars when they brush by a tree or shrub where larvae are feeding. Because the caterpillars may wander or drop from

Wandering in woods,  
shirt sleeves mark the memory  
of a puss cat sting



Photo credit: Judy Gallagher



Photo credit: Lea Plummer  
VMN Central Virginia Chapter



Photo credit: Lea Plummer  
VMN Central Virginia Chapter



trees, they can be seen on other surfaces such as cars, campers, tents, fences, etc.

### **What Makes This Animal Venomous**

Stings of flannel caterpillars are said to be among the most potent of any of North America's caterpillars. The thick carpet of outer hairs hides venomous spines that have the potential to incapacitate large mammals, including humans. In the southern U.S. another common name is the asp caterpillar, since an encounter may feel like a snake bite.

### **Common Symptoms**

Contact with the spines causes immediate burning pain, redness, and swelling at the site of contact that may last hours to days. Symptoms are usually limited to this local reaction, however some people may experience headache, nausea, vomiting, wheezing and widespread rash on the body. Contact with the spines of cast-off skins, dead caterpillars, or cocoons may also cause a reaction.

For first aid, immediately wash the site of a sting with soap and water, air dry (do not rub), and apply sticky tape over the affected area to peel off remaining spines. Place an ice pack on the skin to reduce swelling. Seek emergency medical attention if eyes are affected, or for serious allergic reactions including swelling of the face, or difficulty breathing. To avoid

stings, wear long sleeves and pants. Do not brush a caterpillar off the skin as this might cause the spines to embed in the skin. Do not rub a sting in case spines remain in your skin.

### **Look-alikes**

The black-waved flannel moth (*Megalopyge crispata*) is very similar to the southern flannel moth caterpillar, but lacks the "tail" of hairs extending from the rear.



Photo credit: Donald Hall  
University of Florida

***Additional information may be found in the bibliography at the end of the publication.***

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# Spiny Oak-slug Caterpillar

*Euclea delphinii*

## Description

A member of the slug caterpillar family (Limacodidae), they are quite variable in color; usually green but may be yellow-green, pink, orange, or brown, with a dark, mottled stripe down the back. There are three pairs of **tubercles**, large growths, with black-tipped venomous spines at the head end and two pairs at the other end. Numerous smaller tubercles with venomous or stinging spines are in rows along the back and lower sides. Larvae may reach a length of 2 cm ( $\frac{3}{4}$  inch). Moths are stout and measure 10 to 15 mm ( $\frac{1}{3}$  to  $\frac{1}{2}$  in) in length. They are chocolate brown with a mint green patch near the head and sometimes smaller green spots at the bottom of the wings.

## Where They may be Found:

The spiny oak-slug moth is found in most of eastern North America, from Quebec and New Brunswick, Canada to Florida, and west to Texas. Common food plants, in addition to oak, include apple, ash, basswood, maple, redbud, sycamore, willow, and various other trees and shrubs. The eggs are laid singly or in small clusters. The larvae are often unseen because they commonly rest on the lower side of the leaf. There are usually two generations in the southern U.S.; moths may begin flying in May and their larvae are most often seen August to October. They overwinter in cup-shaped cocoons. Humans typically encounter slug caterpillars by accident when they brush by a tree, shrub, or other surface where larvae are feeding.

What dares attack this armored slug with ten spiked clubs and more? 'Tis not I.



Photo credit: Bruce Watt  
University of Maine, Bugwood.org



Photo credit: Paxton Allgyer  
VMN High Knob Chapter



Photo credit: Chris Allgyer  
VMN High Knob Chapter



### What Makes This Animal Venomous

These caterpillars are equipped with numerous venomous spines. Spiny oak-slugs have more spines than any other slug caterpillar species, but the sting is not as painful as that of the saddleback caterpillar.

### Common Symptoms

Contact with the spines can cause immediate burning pain, redness, and swelling at the site of contact that may last hours to days. Symptoms are usually limited to this local reaction, however some people may experience headache, nausea, vomiting, wheezing and widespread rash. Contact with the spines of cast-off skins, dead caterpillars, or cocoons may also cause a reaction. To avoid stings, wear long sleeves and pants in areas which they frequent. Do not brush a caterpillar off the skin, which can cause the spines to embed in the skin. Do not rub a sting site in case spines remain on skin.

For first aid, immediately wash the site of a sting with soap and water; air dry (do not rub), and apply sticky tape over the affected area to peel off remaining spines. Place an ice pack on the skin to reduce swelling. Seek emergency medical attention if eyes are affected, or for serious allergic reactions including swelling of the face or difficulty breathing.

### Look-alikes

The less common stinging rose caterpillars (*Parasa indetermina*) have a similar shape, come in a multitude of colors, and have stinging spines. However, the tubercles of the stinging rose caterpillar lack black-tipped spines, and it displays a pattern of pinstripes along both the back and sides of the body.



Photo credit: Matt Bertone  
NC State University

***Additional information may be found in the bibliography at the end of the publication.***

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# White Flannel Moth Caterpillar

*Norape ovina*

## Description

This species is a member of the family of flannel moths (Megalopygidae), but the larvae look very different from those of the southern and black-waved flannel moths. The back of the mostly yellow body has a long, dark patch with seven pairs of large yellow, raised areas that bear short venomous spines. At both ends the dark patch is rusty red; pairs of yellow, raised areas bearing venomous spines are found there as well. Dark, long, non-venomous hairs occur sparsely over the entire body.

Unlike the caterpillars of the southern and black-waved flannel moths, those of the white flannel moth actually advertise their venomous nature with **aposematic** coloration of red, yellow, and black, a visual warning to predators. They may reach a length of about 2.5 cm (1 in).

Moths usually first appear around May or June and lay eggs in lines. The larvae stay together in groups when small. When mature they pupate to a moth in a cocoon below the soil surface. There are usually two generations per year. The moth has a total length of about 13 to 18 mm ( $\frac{1}{2}$  to  $\frac{3}{4}$  in) and has a plush, furry white body with white wings.

## Where They may be Found

White flannel moths range from Missouri to Washington, D.C., south to Florida and Texas. Host plants depend on location and include hackberry, redbud, black locust, and elm. Humans typically encounter flannel caterpillars by accident when they

Does the forest know  
our yearning to savor each  
leaf on the journey?



Photo credit: Matt Bertone  
NC State University



Lacy L. Hyche  
Auburn University, Bugwood.org



Photo credit: Matt Bertone  
NC State University

brush by a tree or shrub where they are feeding.

### **What Makes This Animal Venomous**

The venom of flannel caterpillars is said to be among the most potent of any of North America's caterpillars. Short, venomous spines are found in yellow, raised areas along the length of the body.

### **Common Symptoms**

Contact with the spines causes immediate burning pain, redness, and swelling, at the site of contact, that may last hours to days. Symptoms are usually limited to this local reaction, however some people may experience headache, nausea, vomiting, wheezing and widespread rash. Contact with the spines of cast-off skins, dead caterpillars, or cocoons may also cause a reaction. To avoid stings, wear long sleeves and pants in areas the caterpillars frequent. Do not brush a caterpillar off the skin, which may cause a defensive reaction that will embed spines in the skin. Do not rub a sting site in case spines remain on skin.

For first aid, immediately wash the site of a sting with soap and water, air dry (do not rub), and apply sticky tape over the affected area to peel off remaining spines. Place an ice pack on the skin to reduce swelling. Seek emergency medical attention if eyes are affected or for serious allergic reactions including swelling of the face or difficulty breathing.

### **Look-alikes**

The grapeleaf skeletonizer caterpillar (*Harrisina americana*), also described in this publication, has sometimes been confused with the white flannel moth caterpillar.



Photo credit: Matt Bertone  
NC State University



Photo credit: Royal Tyler  
Pro Pest and Lawn Store, Bugwood.Org

***Additional information may be found in the bibliography at the end of the publication.***

*Contact with poisonous or venomous animals can be dangerous.  
For appropriate medical advice, call your local poison center at 1-800-222-1222.*



# Jellyfish Introduction

The Chesapeake Bay is the home of several species of jellyfish. Not really fish, they have a transparent, gelatinous body which is about 90 percent water. They are related to corals and sea anemones. Tentacles hanging from the “bell” (the umbrella-like body) have stinging cells (called **cnidocytes** or **nematocysts**) which contain venom. Humans coming in contact with jellyfish can experience a painful sting by these venom-containing stingers on the tentacles.

In addition to the Bay nettle, covered here, other jellyfish in the Bay include the Atlantic sea nettle (*Chrysaora quinquecirrha*), the moon jellyfish (*Aurelia aurita*), and the lion’s mane jellyfish (*Cyanea capillata*), but the Bay nettle is the most prevalent. In 2017 it was confirmed that the Atlantic sea nettle and the Bay nettle are actually two distinct species. Based on genetic analysis, the Bay nettle was renamed *Chrysaora chesapeakei*. It is approximately one half the size of the sea nettle. The sea nettle has 40 tentacles as compared to 24 for the Bay nettle. The Bay nettle is found in the less salty waters of the Chesapeake Bay.

Jellyfish eat fish, zooplankton, shrimp, and other jellyfish: in turn they are eaten by larger fish and sea turtles. Jellyfish use stinging tentacles to inject paralyzing venom into prey to immobilize and allow for capture. The tentacles then move the food to the mouth located below the center of the bell. Both sea and Bay nettles are beneficial to the Bay as they eat comb jellies (*Beroe ovata*), which eat fish eggs and immature oysters, affecting both populations.

Adult jellyfish release eggs and sperm from their mouths in mid-summer and then die. In most species, fertilization takes place in the water; in others, the sperm swim up into the female's mouth to fertilize the eggs within. After fertilization, eggs develop into tiny, free-swimming larvae called **polyps** which are carried by currents until they attach themselves to a firm surface. The polyps grow over winter and eventually grow tentacles, maturing into adults.

Jellyfish can be found in the Bay from May to October when water temperatures are between 25 - 30° C (78 – 86° F). Some jellyfish can be found in the colder temperature months.





# Jellyfish, Bay Nettle

*Chrysaora chesapeakei*

## Description

The Bay nettle is the most common jellyfish in the Chesapeake Bay during summer, from May to October when water temperatures are between 25 to 30° C (78 - 86° F). The main body or “bell” of the Bay nettle can be as large as 20 cm (8 in) across, with 24 tentacles that can be .5 to 1 m (2 to 3 ft) long. Their color varies, depending on which area of the Bay they inhabit: those living in the upper area of the Bay, which has lower **salinity** (saltiness), tend to be milky white, and those living in the saltier portion of the lower Bay are reddish brown or have purplish stripes. Bay nettles feed on small **crustaceans** (crabs, shrimp, barnacles, etc.) and fish, but their main food is the comb jelly (*Beroe ovata*), which grows and reproduces abundantly in the Bay. Bay nettles contribute significantly in keeping the comb jelly population in check.

Bay nettles reproduce by releasing eggs and sperm in late summer. Fertilized eggs form tiny **spores** called **planula**, which drift around and eventually attach themselves to hard surfaces, where they transform into a **polyp** called a **scyphistoma**. These polyps use their mouths and tentacles to feed on small animals and grow to about 2.5 cm (1 in) long. When water temperature reaches about 17°C (62°F) the polyps can reproduce by branching out, or budding, and cloning; they grow and form a chain of small jellyfish clones called a **strobila**. Periodically, the strobila at the end of the chain will break off and swim away in a process called strobilation. This tiny clone is now free-swimming and called an

Bay nettle, waving  
long ruffled scarf and sheer fringe-  
meddlesome and gel



Photo credit: David Malmquist  
Virginia Institute of Marine Science



Photo credit: David Malmquist  
Virginia Institute of Marine Science

**ephyra**, which eventually grows into a full size jellyfish. During years when the water temperature is warmer, with lower rainfall which increases water salinity, Bay nettles increase in numbers.

### **Where They may be Found**

Bay nettles are found in the Chesapeake Bay and the Atlantic Ocean along the coast of Virginia.

### **What Makes This Animal Venomous**

Bay nettles sting using tentacles covered with stinging cells called **cnidocytes** that are sensitive to changes in pressure or water movement; these cells are laden with spines that act like hypodermic devices to inject venom; they release a tiny harpoon-like structure that discharges explosively, injecting a mixture of compounds into prey or potential predators. The venom is a complex mixture which can have a variety of effects. Bay nettle stings in humans occur when a person brushes against a tentacle, causing just enough pressure for it to release its harpoon and inject its venom.

### **Common Symptoms**

Once venom is injected into skin, the pain, redness and blistering begin. Typically, the sting of a Bay nettle may cause slight pain and burning, lasting 15 minutes or so. In cases where victims are older, very young, or have allergies, effects can be more severe. Although uncommon, swelling or severe allergic reactions can occur, affecting breathing. In these cases victims should immediately seek medical attention.

### **Notes**

Many “so-called” remedies that claim to relieve the pain from jellyfish stings can actually increase pain. When cells containing venom contact the skin, they may not actually release the stinging mechanism. Cold water can actually cause more cells to release venom. Applying full strength vinegar or warm water can inactivate venom.



Photo credit: Jonathan Lefcheck  
Virginia Institute of Marine Science

***Additional information may be found in the bibliography at the end of the publication.***

*Contact with poisonous or venomous animals can be dangerous.*

*For appropriate medical advice, call your local poison center at **1-800-222-1222**.*



## Newts Introduction

Newts are salamanders: all newts are salamanders, but not all salamanders are newts. At first glance, salamanders appear to be a type of lizard, but they are actually **amphibians**. Like other amphibians, salamanders have moist **permeable** skin which allows them to absorb oxygen and other nutrients from their environment. This enables them to survive in a variety of habitats, but also makes them vulnerable to toxic chemicals, especially in water, on which they depend for their reproductive life cycle. This skin distinguishes them from reptiles, mammals and birds.

Virginia is home to more than 50 species of salamanders, with greatest diversity in the Appalachian Mountains region. Some species are fully **aquatic**, spending their entire lives in water, while others are semi-aquatic (such as newts) or even fully **terrestrial**, spending their entire lives on land. Unlike other members of the salamander family, the semi-aquatic newt passes through three distinct life stages after hatching from an egg: the aquatic **larval** stage, the terrestrial **eft** stage, and the final aquatic adult stage.

Salamanders are completely harmless as long as they are only observed and not touched. However, all salamanders are poisonous to humans if eaten. Salamanders secrete toxins through their skin, and poisoning may also occur after handling them and then touching your eyes or mouth. The degree of toxicity varies among salamander species, and may vary from one group to another within the same species. Of the salamander species, newts are the most toxic because they produce and secrete **tetrodotoxin**, a potent poison which deters their predators. Young newts are far more toxic than adults.

Of the seven species of newts found in North America, the eastern newt is by far the most common. There are four recognized subspecies of eastern newts: the broken-striped newt, the central newt, the peninsula newt, and the red-spotted newt. The red-spotted newt is the only newt found in Virginia, and is discussed in detail here.



# Red-Spotted Newt

*Notophthalmus viridescens*

## Description

The red-spotted newt is a small salamander, an amphibian whose appearance evolves throughout its four distinct life stages. In the second, or larval stage, after hatching from an egg, red-spotted newts have fairly smooth, olive green skin, narrow tails and feathery external gills. During **metamorphosis**, transformation into terrestrial eft's (the juvenile stage), gills are replaced by air-breathing lungs and skin turns bright reddish-orange. This coloration serves to warn potential predators of the eft's toxicity. At 7½ cm (3 in) long, the terrestrial eft's body is slender, with fully developed limbs and a round tail. The **dorsal**, or back side, has two rows of red spots, each encircled by a black border. The two rows of encircled red spots persist in adults, and the final metamorphosis back to an aquatic stage leaves them with smooth skin and a flattened tail fin. The dorsal color of adult newts ranges from yellowish-brown to greenish-brown, whereas the **ventral**, belly color, is yellow with black speckles. Adult newts can grow up to 13 cm (5 in) in length.

## Where They may be Found

The red-spotted subspecies of eastern newts are found throughout Virginia. Larvae hatch from eggs laid on underwater vegetation in freshwater ponds, lakes, and marshes. Larvae spend two to five months living in sediment and debris at the bottom of their habitat before metamorphosis into terrestrial eft's. At this stage, because they need moisture to survive, they inhabit the shaded leaf layer under hardwood and pine forests. They

Spotted a newt in  
dappled leaves—a flash of red  
deftly gave warning



Photo credit: Brenda Clements Jones  
VMN Old Rag Chapter



Juvenile  
Chris Holstege, MD UVA



are most often observed after rainfall in warmer months, but hibernate under logs or rocks in the winter. After two to seven years in the terrestrial stage, efts migrate back to fresh water to metamorphose into aquatic adults. Adults can survive on land and may move into a new pool if their aquatic habitat becomes insupportable, especially during dry periods.

### What Makes This Animal Poisonous

The skin, muscles, and internal organs of the red-spotted newt contain **tetrodotoxin (TTX)**, a potent **neurotoxin** that can cause muscle paralysis. While the red-spotted newt is not life threatening unless eaten, anyone who handles them without proper precautions can be at risk. There is no antidote to TTX. The level of the toxin in the eft is ten times greater than that of the adult form of the newt.

### Common Symptoms

Symptoms can occur as early as 20 minutes following ingestion of TTX, which initially causes numbness in the lips and tongue, followed by numbness of the face, arms, and legs. These symptoms can be followed by dizziness, drooling, seizures, irregular heartbeat, and muscle weakness. Muscle paralysis can progress quickly. Paralysis of respiratory muscles can result in death due to the inability to breathe.

### Notes

Adult newts can inhabit water that contains **predaceous** fish because the TTX in their bodies make them inedible to potential predators.



Photo credit: Ed Coleman  
VMN Southwestern Piedmont Chapter



Photo credit: Bruce Grimes  
VMN New River Valley Chapter

***Additional information may be found in the bibliography at the end of the publication.***

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## Scorpions Introduction

Many residents of Virginia may be surprised to learn that scorpions can be found in the state. Typically, scorpions prefer a hot dry climate and are mostly found in the southwestern region of the U.S. Of the approximately 90 species of scorpions in the U.S., only four are found east of the Mississippi River. One, the southern devil scorpion (*Vaejovis carolinianus*), also known as the southern unstriped scorpion, can be found in a very small area of Lee County in the far southwestern region of Virginia.

Scorpions are **arachnids**, like spiders, and are distant cousins to **crustaceans**. With eight legs and two main body parts, they have two large **pincers**, similar to claws, and a tail with a stinger and **venom** glands. The stinger injects venom into its prey to subdue it, and the pincers capture and hold small insects and animals for food. Scorpions have two eyes on the top and two to five pairs of eyes on the side. Their eyesight is generally poor, but the eyes are very sensitive to light and movement.

Scorpions are typically **nocturnal**, active at night; most human encounters happen after dark. One interesting feature of all scorpions is that they glow or **fluoresce** in the dark under a black light, a lamp that emits **ultraviolet** light. Locating scorpions at night is relatively easy using this method. If living in an area inhabited by scorpions, precautions should be taken to check shoes and sleeping bags to make sure they are free of this unwanted guest.

Almost all scorpions are capable of injecting venom using their stingers. The sting from most scorpions is typically similar to a bee sting. There are more than 1,500 species of scorpions worldwide; only about twenty-five are considered life-threatening to humans, and only two of these potentially lethal species are found in the U.S. They are the Stripebacked scorpion (*Centruroides vittatus*) and the bark scorpion (*Centruroides exilicauda*), the more venomous of the two. Neither is in Virginia.



# Southern Devil Scorpion

*Vaejovis carolinianus*

## Description

The southern devil scorpion, also known as the southern unstriped scorpion, is brown in color and approximately 2.5 cm (1 in) long. It has pincers for holding prey, and a stinger at the end of the abdomen, used to inject venom. The scorpion's diet typically consists of insects, millipedes, spiders, and other scorpions. Females can give birth to 25 to 80 offspring, one at a time, a few months after mating. Lighter colored immature scorpions attach themselves to their mother's back for about 4 weeks until they reach their molting stage. At this time, they shed their **exoskeleton** for a larger, tougher one and leave their mother.

## Where They may be Found

The southern devil scorpion is found in a very small area of far southwest Virginia, in Lee County. This species is also found in the neighboring states of Kentucky, Tennessee, and North Carolina. Scorpions are typically **nocturnal**, active at night, when they hunt for prey. During the day they are found outdoors under leaf piles, loose bark of trees and logs, and stones. Around houses scorpions are found in wood piles, under wood debris, and broken stone. Although the preferred habitat is outdoors, they will live indoors where moisture is present.

## What Makes This Animal Venomous

As with all scorpions, this species is equipped with a stinger at the end of the abdomen. Venom, produced by two glands located near the end of the tail, is injected by the stinger. The venom contains a **neurotoxin** that causes the clinically relevant symptoms.

Sparring in moonlight,  
the southern devil makes his  
diminutive point



Photo credit: James O. Howell  
University of Georgia, Bugwood.org



Photo credit: B. Newton  
University of Kentucky Entomology



### Common Symptoms

Reaction to the venom is similar to a bee sting. Symptoms of the sting include a sharp pain that usually lasts for 15 to 20 minutes. Reactions to a sting vary with a person's age or sensitivity to the venom. Allergic people can experience "local" **anaphylactic** symptoms such as hay fever, hives, or stomach problems. A sting occurring in early March or April, just after scorpions emerge from hibernation, may have pain that lasts for several hours, including general numbness in the area of the sting.

### Notes

The best way to locate these scorpions is at night using an ultraviolet light, which causes the exoskeleton to glow green. Scorpions are not aggressive but will raise their pincers and tail to scare away anything that bothers them. They will sting if touched or picked up.



Photo credit: B. Newton  
University of Kentucky Entomology



Photo Credit: Blake Layton  
Mississippi State Extension

***Additional information may be found in the bibliography at the end of the publication.***

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## Shrews Introduction

Venomous animals are among the rarest types of all animals on Earth and venom is even rarer in mammals. Oral venom is only found in the Eulipotyphla order which includes shrews. There are an estimated 100 billion shrews in the world; they are the fourth-most diverse mammal group. Only a few shrew species are known to be venomous, though most have not been tested, and several species that have been tested were found to lack venom.

The most widespread species, the northern short-tailed shrew, *Blarina brevicauda*, can be found from southern Canada to the central Great Plains and the Appalachian Mountains, into Georgia and Alabama, and along the East Coast as far south as southeastern North Carolina. This venomous shrew is found across Virginia and has been studied extensively, probably because it is so common and easy to trap. You are much less likely to encounter its smaller cousin, the southern short-tailed shrew (*Blarina carolinensis*), which is also probably venomous, based on observations of its prey behavior. It occupies a much smaller area in southeastern Virginia.

Shrews dig their own tunnels, but also borrow those of other underground residents. They live underground *and* under snow. Some can climb trees; others swim and hunt underwater. They have small eyes and poor vision, but excellent hearing and smell. Some species use **echolocation**, the location of objects by reflected sound, mostly to navigate. They also startle easily and can die of fright.

All shrews forage nonstop in leaf litter and dense vegetation for insects, worms, snails, mealworms, grubs, even other small mammals. True food-opportunists, they eat whatever is available in their habitat. Their venom can either be used to kill and eat immediately, or to paralyze and store for later. This behavior is likely linked to their hyperactive nature and the fact that they don't hibernate. They eat almost constantly, up to twice their own body weight daily. If a shrew does not eat within a few hours, it will likely die.

Shrew venom is in its saliva, and is injected into the victim with sharp front teeth. The toxin causes paralysis, irregular respiration, and convulsions in prey before death. Shrew venom does not pose a serious threat to humans. A bite from a shrew may result in pain and localized swelling, but no documented cases of medical intervention for shrew bites have been recorded in Virginia.

And in case you were wondering: shrews are not rodents.



# Short-Tailed Shrews

## Northern Short-Tailed Shrew

*Blarina brevicauda*

## Southern Short-Tailed Shrew

*Blarina carolinensis*

### Description

All shrews look extremely similar to each other; only two species in Virginia are venomous. These two differ primarily in size and geographic range. As the common names indicate, their tails are short. Like their relatives, moles and voles, their feet are adapted for digging. They are a major food source for many predators, including snakes, owls, hawks, weasels, foxes and cats, though a cat won't usually eat them. They have an average lifespan of less than two years.

One of the most common small mammals in Virginia and in the eastern U.S., the northern short-tailed shrew (*Blarina brevicauda*) is about 7.5 to 13.5 cm (3 to 5 in) long. It has tiny eyes, gray fur, and small sharp teeth. The southern short-tailed shrew (*Blarina carolinensis*) is much smaller, measuring 7 to 10 cm (3 to 4 in), and weighing less than 14 g ( $\frac{1}{2}$  oz). It has short limbs, a thick neck, a long snout, nearly invisible ears, and gray fur.

Shrews have extremely acute hearing; some use echolocation, primarily for finding their way around underground. Shrews do not hibernate; they eat year round (mice, worms, grubs) and engage in "live-hoarding." This behavior is critical to shrew survival; prey is kept alive until it's ready to be consumed. Paralyzed mealworms are reported to stay fresh-and-crunchy for up to 15 days!

Sated and snacking,  
the shrew sniffs and considers  
an ambling morsel



Photo credit: Larry Master  
([www.masterimages.org](http://www.masterimages.org))



Photo credit: US Government. Public Domain



Photo credit: Larry Master  
([www.masterimages.org](http://www.masterimages.org))

Shrews are extremely active and need to eat every few hours or they will die. Generally nervous, they can startle easily and even die suddenly from a loud noise or other shock. Solitary and anti-social, they can be recognized by a long snout and a strong smell used to mark their territory (and discourage cats).

### **Where They may be Found**

Northern short-tailed shrews are found across Virginia, but the range for the southern short-tailed shrew is limited to the extreme southeastern part, bordering the Atlantic Ocean and North Carolina. Shrews live mostly in damp woods, but also in damp grassy fields. They tend to avoid dry fields and rocky hillsides, but love dense ground cover. They need a reliable food supply and will look for the perfect combination of moisture, cover, and soil; then they will defend their nests fiercely, even to the death.

### **What Makes This Animal Venomous**

To capture prey and defend against predators, shrews use their sharp little teeth and venomous saliva. *Blarina brevicauda* has been shown to be venomous; *Blarina carolinensis* is presumed to be, based on observations of prey behavior such as immobilization. Unlike venomous snakes, whose fangs contain their venom, shrews have a venom-producing gland and grooves in their lower teeth that transmit it to the victim. Shrews' toxic saliva paralyzes or kills within minutes and quickly breaks

down muscle tissue, a useful adaptation for an animal that eats almost constantly.

### **Common Symptoms**

Shrew venom is not a serious threat to humans. A bite might be painful and result in localized swelling. Not aggressive toward humans, shrews will generally run away and avoid contact. In the *extremely* unlikely event of a shrew bite, and if there appears to be a significant reaction, seek medical advice.

### **Notes**

The saliva of the northern short-tailed shrew contains **soricedin**, a paralyzing agent, which is studied for use in treating various human diseases.



Photo credit: Larry Master  
([www.masterimages.org](http://www.masterimages.org))

***Additional information may be found in the bibliography at the end of the publication.***

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For appropriate medical advice, call your local poison center at 1-800-222-1222.*



## Snakes Introduction

About 34 species of snakes can be found across Virginia, ranging from 20 cm (8 in) to over 1.8 m (6 ft) in length. Snakes are shy, cold-blooded **reptiles**. They need to find warm sunny spots to warm up during cold weather and shady places to cool off during hot days. To avoid surprising a snake, keep a sharp eye out for shady areas on warm days and sunny rocks on cool days. Snakes generally make good neighbors. They help control the population of mice and other small rodents and try very hard to avoid humans.

It is too cold during winter in Virginia for snakes to be active. Snakes in Virginia need a warm, dry place to hibernate over the winter months. A snake might look for a cave or animal den, a wood pile, or a corner in a warm garage or basement for winter hibernation. If you find a snake inside a building, it is best not to threaten it. Any cornered snake will try to defend itself and may bite.

Three species of snakes in Virginia are **venomous**. Venomous snakes in Virginia have a triangular shaped head, vertical pupils and heat sensing pits behind their nostrils. These snakes are referred to as **pit vipers**. Some non-venomous snakes, like the eastern hognose, will puff up their head to mimic a rattlesnake when threatened. It is best to not get too close if you can avoid it. The bite of a non-venomous snake can be painful, though not life-threatening. When in doubt, call your local animal control professionals.

Virginia's venomous snakes can cause tissue damage at the site of the bite; this is the most common complication. The components of snake venom vary not only with the different species of snake, but also with individual snakes, depending on season, nutrition, and age. It is therefore impossible to accurately predict the tissue damage a victim might develop following a venomous snakebite. Enzymes in snake venom break down tissue into which it has been injected, which causes damage to blood vessels, and allows leakage of red blood cells into the surrounding tissues. Victims will initially experience swelling which will progressively spread to adjoining tissues. Bleeding under the skin at the site of the bite may also develop and give the area a bluish color. In addition, blood-filled blisters may develop at the site.

To prevent snake bites, do not approach or attempt to handle snakes in the wild. Give the snake space to retreat. Wear tall boots, long pants and leather gloves when working in tall grass, wooded areas, or around woodpiles and rocky areas. Be careful with outdoor activities in the dark during warmer weather, as most snakes are more active at night. Walking with lack of proper shoes in the dark has led to numerous bites when individuals failed to see a snake outdoors. Note that it is illegal to kill snakes in Virginia unless one is posing an imminent danger to a person's safety.





# Eastern Copperhead

*Agkistrodon contortrix*

## Description

The eastern copperhead is a species of **venomous** snake found across eastern North America. They are commonly 60 to 90 cm (24 to 36 in) long and live an average of 18 years in the wild. Copperheads are identified by their triangular head, vertical pupils, heat sensing pits behind their nostrils, and distinctive hourglass-shaped crossbands. They are one of three pit vipers in Virginia. The head and body range from tan to copper to gray. The hourglass-shaped crossbands are a darker brown.

Copperheads eat mostly small mammals, frogs, and birds. In early fall the females give birth to 3 to 15 live baby snakes, with similar markings to the adults except for a bright yellow tip on the end of their tails which they wiggle as a lure to attract prey. Copperheads are non-aggressive and may shake their tail as a warning; they may also strike without warning if they feel threatened. Tail shaking can mimic the sound of a rattlesnake if the copperhead is hiding in dry leaves.

## Where They may be Found

Copperheads are found across Virginia in a wide range of habitats. They can be found in woodlands, fields, swampy areas, and around barns and houses.

## What Makes This Animal Venomous

Copperhead venom is made and stored in venom glands that are located below the snake's eyes. Pit vipers can control the amount of venom delivered to the victim, which depends on the snake's perception of the situation. For more information on

In the leaves, your coiled  
banded and watchful stillness.  
Jolted, we retreat



Photo credit: Matt Bertone  
NC State University



Juvenile  
Photo credit: John White  
Virginia Herpetological Society



Photo credit: Matt Bertone  
NC State University

the venom components, please see the *Snakes Introduction*.

### Common Symptoms

Copperhead bites are considered to be the least toxic of the North American pit vipers, and bites are rarely fatal. A copperhead bite may cause pain, tingling, or burning at the bite site. Local tissue damage occurs with significant venom injection and includes swelling, bruising, and blistering at the site. Nausea and vomiting may occur. Bleeding, although rare, may occur, primarily at the site of the bite.

*Seek immediate medical attention* if a copperhead bite breaks the skin. If needed, the sooner snake antivenom (**antivenin**) is administered, the better the outcome. Note the time of the bite. A photo of the snake may be helpful, but do not delay treatment trying to obtain a picture. Do not attempt to capture the snake. Do not try to cut through the bite site or suck on the bite site in an attempt to remove venom from the bite area. Do not apply a tourniquet. Do not apply ice or heat to the region. It is best to stay calm and seek immediate medical attention.

### Look-alikes

Copperheads may be confused with the harmless juvenile eastern ratsnake (*Pantherophis alleghaniensis*), which has similar coloring. The darker blotch patterns on a ratsnake do not extend around the body of the snake like the hourglass-shaped bands of the

copperhead. The northern watersnake (*Nerodia sipedon*), also harmless, has similar coloring, however the darker bands on a watersnake are narrow on the sides and wider on top, which is opposite to the banding on a copperhead.



Photo credit: John White  
Virginia Herpetological Society



Juvenile and Adult  
Photo credit: John White  
Virginia Herpetological Society

***Additional information may be found in the bibliography at the end of the publication.***

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# Northern Cottonmouth (Water Moccasin)

*Agkistrodon piscivorus*

## Description

The northern cottonmouth is a species of venomous snake found across the southeastern U.S. They are commonly 76 cm to 1½ m (30 to 48 in) long and live an average of 10 years in the wild. They are identified by their triangular head, vertical pupils, heat sensing pits behind their nostrils, and a yellowish-olive to black body with darker crossbands.

Cottonmouths eat fish, small mammals, birds, and amphibians, including other snakes. Females give birth to 5 to 9 live baby snakes in early fall. Juveniles are colored like the adults with the exception of a bright yellow tip on the end of their tail. They wiggle the yellow tip as a lure to attract prey. Cottonmouths are non-aggressive. When threatened, they will coil their body and open their mouth wide, displaying the white inside of their mouth and their sharp fangs. They may also shake their tail in dry leaves, mimicking the sound of a rattlesnake.

## Where They may be Found

Cottonmouths are found in southeastern Virginia in habitats near water, including swamps, marshes, and woods and grasslands near ponds and rivers.

## What Makes This Animal Venomous

Cottonmouth venom is made and stored in glands located below the snake's eyes. The snake can control how much venom is delivered through its fangs when biting. For more information on the venom, please see the *Snakes Introduction*.

**Wide and white, the mouth  
announces incidental  
intent for defense**



Photo credit: John White  
Virginia Herpetological Society



Photo credit: Glen Mitchell



Photo credit: John White  
Virginia Herpetological Society

## Common Symptoms

A cottonmouth bite may cause pain, tingling, or burning at the bite site. Local tissue damage can occur and includes swelling, bruising, and blistering at the site of the bite. Nausea and vomiting may occur. Bleeding rarely occurs. Fatalities are rare.

*Seek immediate medical attention* if a cottonmouth bite breaks the skin. If needed, the sooner snake antivenom (**antivenin**) is administered, the better the outcome. Note the time of the bite. A photo of the snake may be helpful, but do not delay treatment trying to obtain a picture. Do not attempt to capture the snake. Do not try to cut through the bite site or suck on the bite in an attempt to remove venom. Do not apply a tourniquet. Do not apply ice or heat to the region. Stay calm and seek immediate medical attention.

## Look-alikes

Cottonmouths may be confused with other harmless watersnakes such as the northern watersnake (*Nerodia sipedon*) which has a thinner body, narrower head, round pupils and no fangs. The darker bands on a northern watersnake are narrow on the sides and wider on top, whereas the cottonmouth bands are wider at the sides.



Juvenile

Photo credit: John White  
Virginia Herpetological Society



Photo credit: John White  
Virginia Herpetological Society

***Additional information may be found in the bibliography at the end of the publication.***

*Contact with poisonous or venomous animals can be dangerous.  
For appropriate medical advice, call your local poison center at **1-800-222-1222**.*





# Timber Rattlesnake

*Crotalus horridus*

## Description

The timber rattlesnake is a venomous snake found across eastern North America. They are commonly 76 cm to 1½ m (30 to 60 in) long and have an average lifespan of about 20 years. Rattlesnakes are identified by their broad triangular head, vertical pupils, heat sensing pits behind their nostrils, and a rattle on the end of their tail. In southeastern Virginia, body color ranges from pinkish to gray, yellow or light brown, with dark brown to black zig-zag bands. These snakes are also referred to as canebrake rattlesnakes and are becoming very rare.

The timber rattlesnakes found in Virginia's mountain regions have a yellowish-brown to dark brown head and body, with dark brown to black zig-zag bands. All-black timber rattlesnakes have also been seen. The rattle at the end of the tail is the most distinctive feature. Timber rattlesnakes eat mostly small mammals, frogs and birds. Females give birth to 3 to 13 live baby snakes in early fall. Juvenile snakes have similar markings to the adults.

## Where They may be Found

Timber rattlesnakes are found in upland forests of western Virginia, near south-facing rocky ledges where they warm in the sun in spring and fall. In hotter months, they move to open woods and grassy fields. In southeastern Virginia, they are found in hardwood and mixed hardwood-pine forests, and near swampy areas. Timber rattlesnakes are rarely found in the Piedmont region of Virginia.

**A telltale rattle  
shaken in the den sends us  
scrambling off the rocks**



Photo credit: John White  
Virginia Herpetological Society



Photo credit: Chris Holstege, MD UVA



Photo credit: Paul Sattler  
Virginia Herpetological Society

### What Makes This Animal Venomous

Timber rattlesnake venom is made and stored in glands that are located below the snake's eyes. The snake can control how much venom is delivered through its fangs when biting. The chemistry of rattlesnake venom varies depending on numerous factors, as noted in the *Snakes Introduction*.

### Common Symptoms

A timber rattlesnake bite may cause pain, tingling, or burning at the bite site. Local tissue damage occurs with a large venom injection and includes swelling, bruising, and blistering at the site. Nausea and vomiting may occur. Bleeding may occur, primarily at the site of the bite; **platelets**, a component of the blood needed to prevent bleeding, can drop markedly and put the victim at risk for bleeding anywhere in the body. If left untreated, timber rattlesnake venom can cause severe organ damage or death in 2 to 3 days.

*Seek immediate medical attention* if a bite breaks the skin. If necessary, the sooner snake antivenom (**antivenin**) is administered, the better. Note the time of the bite. A photo of the snake may be helpful, but don't waste time trying to get a picture. Do not attempt to capture the snake. Do not try to cut through the bite site or suck on the bite site in an attempt to remove venom from the bite area. Do not apply a tourniquet. Do not apply ice or heat to the region. Stay calm and seek immediate medical attention.



Photo credit: John White  
Virginia Herpetological Society



Photo credit: John White  
Virginia Herpetological Society

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## Spiders Introduction

Most spiders are harmless and bites are rare, but concerns are often raised about spiders biting humans and causing life-threatening emergencies. In the U.S. it is extremely rare for people to die from a spider bite. While spiders will instinctively bite when threatened or touched, only 2 of the 60 species found in Virginia have fangs long enough to penetrate human skin and **venom** (injected toxin) strong enough to cause injury. Among these are the widow and recluse spiders. Bites from black widows or brown recluses are most dangerous to children and the elderly.

Antivenom medicine to counteract black widow spider venom is available in the U.S. but is rarely used since most symptoms can be managed with medications to counteract pain and muscle spasms.

There is no antivenom to treat a brown recluse spider bite. If infection develops, antibiotics are used. If a wound becomes deep and infected, occasionally surgery is needed. Medical professionals cannot diagnose a wound caused by a brown recluse spider bite based solely on the appearance of the bite. Only when a spider is observed in the act of biting can a definitive diagnosis occur. Many **necrotic lesions** (dead tissue), initially attributed to the brown recluse spider, are actually the result of other causes, such as bacterial infections.

While black widow spiders are found throughout Virginia, occurrences of the brown recluse are extremely rare. That said, it's important to remember that the distribution of venomous spiders is subject to change and not determined by state lines, as spiders can easily be transported into new areas.





# Black Widow Spiders

Elegant in black  
patent leather and red bow.  
Stop! Spider, biter.

## Southern Black Widow

*Latrodectus mactans*

## Northern Black Widow

*Latrodectus variolus*

### Description

Of the two black widow spiders found in Virginia, the southern black widow is the most common. The two look almost identical; both have a shiny black roundish body. The only visual difference is that the red hourglass shape on the northern black widow's midsection is broken into two parts, whereas on the southern black widow it is unbroken. The male and all immature black widow spiders can have white spots on their backs in addition to the red hourglass. The adult male is about 1.3 cm (½ in) in length including the legs, and the female is about 3.8 cm (1½ in) in length. Black widow spiders do not make a well-constructed web. They move fast on their web, but are slow-moving on the ground.

### Where They may be Found

Both black widow spiders may be found all over Virginia. They prefer to live in dark undisturbed places such as between rocks, and in wood piles, sheds, barns, attics, basements and crawl spaces. They may enter the house with firewood or to escape the cold in winter. They then look for dark undisturbed spots in the house.

### What Makes This Animal Venomous

The female black widow bites and injects a venom, a **neurotoxin** called **alpha-latrotoxin**. The venom causes a massive release of chemicals in the victim that leads to intense muscle spasms and pain. If



Southern black widow  
Photo credit: Sturgis McKeever  
Georgia Southern University, Bugwood.org



Northern black widow  
Photo credit: Judy Gallagher



you are bitten by a black widow spider, you should seek medical attention. An antivenom is available, but is only needed in rare circumstances.

### Common Symptoms

The bite may feel like a pinprick or go unnoticed. A small puncture wound may develop into a halo (white center with surrounding redness). Heavy sweating may occur at the site. Severe muscle pain can develop in as little as 15 minutes, starting at the site of the bite and spreading towards the center of the body. The muscles of the face, chest, and abdomen can spasm and become rigid, causing intense waves of pain. This pain usually resolves within 12 to 72 hours. Other symptoms include headache, sweating, rapid heart rate, high blood pressure, trouble breathing, nausea, and vomiting.

### Look-alikes

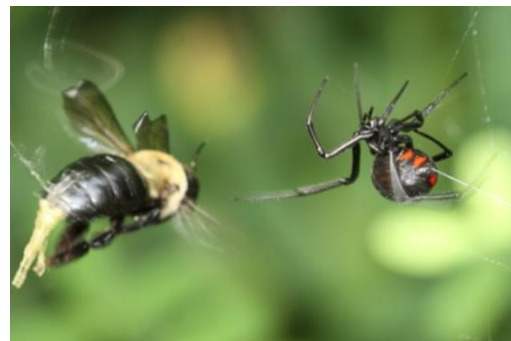
There are a few spiders in Virginia that look like a black widow. Therefore, if you suspect you may have been bitten by a black widow, it is highly recommended, if possible, to capture the spider in a jar and to take it with you to the emergency room.

The false black widow spider or cupboard spider (*Steatoda grossa*) has a similar body shape as the real black widow spiders, but does not have the red hourglass marking on the underside of its abdomen. The bite of a false black widow spider is considerably less severe than the bite of the real black widow spider, without any long-lasting effects. Another look-alike is the triangulated cobweb spider (*Steatoda triangulosa*), a common house spider.

They are considerably smaller than a black widow, have yellowish legs, and do not have the red markings.

### Notes

Black widow spiders are not aggressive, but will bite when disturbed. Wear long sleeves and gloves when working in areas where black widows are living. Be careful moving rocks and wood. Shake out boots, shoes and clothing that have been stored in a garage or outside.



Northern black widow  
Photo credit: Bruce Grimes  
VMN New River Valley Chapter



Southern black widow with egg sac  
Photo credit: Sturgis McKeever  
Georgia Southern University, Bugwood.org

**Additional information may be found in the bibliography at the end of the publication.**

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# Brown Recluse Spider

*Loxosceles reclusa*

About that spider  
with a violin atop,  
a tip. No fiddlin'!

## Description

Brown recluse spiders are light brown, with darker legs that are slender and covered in fine hairs. The heart-shaped **cephalothorax**, the combined head and **thorax** (midsection), displays the characteristic dark brown violin-shaped marking. The bodies of females are 1 cm ( $\frac{3}{8}$  in) long and 0.5 cm ( $\frac{3}{16}$  in) wide; males are slightly smaller and have longer legs. While most spiders have eight eyes, the brown recluse has six.

## Where They may be Found

The infrequently-seen brown recluse inhabits dark, cluttered, undisturbed areas, such as closets, attics, basements, garages, and outbuildings. As such, packed-away shoes, clothing, and linens should always be inspected before use. Its native range extends from southeastern Nebraska to southernmost Ohio and south into Georgia and Texas. Although Virginia is outside of this area, accidental introductions may occur from the transportation of items originating in areas where populations exist.

## What Makes This Animal Venomous

The venom of the brown recluse rarely causes a lot of damage because of the small quantity injected. It contains compounds that cause blood clots, blockage of small blood vessels and destruction of red blood cells. This leads to local skin and tissue death, **necrosis**, due to an insufficient supply of oxygen. For most victims, the bite will heal over the next few days or weeks but infections can also develop and become life-threatening. Occasionally the reaction will become severe, with skin-reddening and blistering, discoloration,



Photo credit: Matt Bertone  
NC State University



Photo credit: Matt Bertone  
NC State University



Photo credit: Matt Bertone  
NC State University

and ultimately a wound with dead tissue and scarring. Infections can also develop and become life-threatening. Severity of effects are influenced by the victim's age, health, and location of the bite.

### Common Symptoms

Bites can be painless or can develop a stinging sensation. Usually the only evidence of a bite is a small welt. If a larger amount of venom is injected, then blistering, bleeding, and infection can occur 2 to 8 hours following the bite. The wound slowly increases in size over the next 1 to 3 days and has a distinctive red, white, and blue bull's-eye pattern. The tissue at the center of the wound dies in 3 to 4 days, then turns into an **eschar**, a crusty scab, in 5 to 7 days, which ultimately falls off in 7 to 14 days. It leaves behind an open sore that usually heals on its own over a period of a few weeks. Necrosis may be more extensive if the bite occurs on a part of the body with more fatty tissue. Rarely, bites cause effects including fever, chills, weakness, nausea, vomiting, and bleeding complications. If these symptoms develop or if a necrotic wound is expanding in size, medical attention should be sought.

### Look-alikes

The long-legged cellar spider and the pirate spider also have dark markings on the cephalothorax which may look like the violin marking of the brown recluse, but these spiders have eight eyes instead of

six. Spitting spiders and woodlouse spiders have six eyes, but spitting spiders have black stripes on the dorsal side and the woodlouse spider's abdomen is cream colored.

### Notes

Many necrotic wounds are blamed on the brown recluse due simply to its bad reputation: conditions similar to a brown recluse bite include bacterial, viral, or fungal infections, as well as reactions from tick, flea, and bedbug bites. Lyme disease can cause a bull's-eye pattern similar to a recluse bite.



Photo credit: Chris Holstege, MD UVA

***Additional information may be found in the bibliography at the end of the publication.***

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# Toads and Spadefoots Introduction

*Anaxyrus* and *Scaphiopus* species

Twenty-eight species of frogs, an order (Anura) which includes toads and spadefoots, live in Virginia. These **amphibians** breed and spend their first stages of life in **aquatic**, watery, environments ranging from shallow, temporary pools to ponds and lake edges. As they reach mature stages they move to land, where they can be found primarily in moist, cool settings. Adult males call in the spring to establish territory and to attract females. During or after breeding the female deposits eggs in the water. Eggs hatch as tadpoles, entirely aquatic, and feed on **algae**, aquatic plants, and other organic material in the water. As they mature, they develop lungs and legs and move onto land.

Toads and spadefoots have a varied diet, eating primarily insects such as beetles, ants, and crickets. Lacking teeth, they swallow their prey whole. Rather than drinking, they absorb water through their skin and need a moisture source for soaking. In colder months they are less frequently seen, sheltering underground in burrows or beneath cover above ground.

Toads and spadefoots protect themselves from threats in various ways. Their ground burrows and coloring help them hide or avoid predators. When confronted or handled, both toads and spadefoots may inflate their lungs to appear larger, or release secretions from skin glands. The toads discussed in this publication have toxic compounds in their skin secretions, including **bufotoxin**, a **cardioactive steroid**. Ingestion of toads, though rare in humans, may cause stomach and gut problems or changes in heart rate. Effects on humans are most often through contact with mucous (eyes, nose and mouth) membranes, which become irritated. It is important to note that eggs and tadpoles may also contain bufotoxins. Washing hands after touching toads and spadefoots can help prevent possible exposure and irritation.

As amphibians, frogs and toads have some similar physical characteristics. Toads and spadefoots have a shorter, chunkier body; skin that looks dry and bumpy, shorter legs that give a hopping movement pattern, mostly non-webbed feet, and non-breeding habitats farther from water sources.





# Eastern American Toad

*Anaxyrus americanus americanus*

## Description

The eastern American toad grows to between 5 and 11 cm (2 and 4¼ in) in length. A medium to large toad, often with a light-colored stripe down the middle of its back, its skin color can vary from brown to gray, olive, or brick red and may be affected by color in its habitat, as well as humidity, stress, and temperature. External skin glands, the **parotoid glands**, are located behind the eye, separated from the prominent **cranial crests** (bony structures along the midline of the skull) or connected by a short spur. Scattered dark spots may appear on the chest and front of the abdomen. One or two large spiny warts appear on dark spots on the backside, as well as on the lower leg. Males are smaller and have dark throats.

Eastern American toads breed in **vernal** pools, semi-permanent shallow water where they live as tadpoles after hatching from eggs. The breeding male's call is a high trill that lasts 6 to 30 seconds. Mating usually occurs in March or April; eggs hatch in 3 to 12 days; and tadpoles reach adult stage in 50 to 60 days. Mostly **nocturnal**, active at night, they feed primarily on insects including crickets, spiders, moths, ground beetles, and ants, as well as on earthworms, slugs, and other small animals.

## Where They may be Found

The eastern American toad lives throughout Virginia. Adults may be seen in areas that provide dense vegetative cover and food-hunting opportunities such as grasslands, fields, lawns, barnyards, and forests. In winter they hibernate in

**Majestic chieftain  
with a tenor's soaring trill-  
dearest voice of home**



Photo credit: Jason Gibson  
Virginia Herpetological Society



Photo credit: Brenda Clements Jones  
VMN Old Rag Chapter

burrows, often in their warm-season habitat.

### What Makes This Animal Poisonous

As a defensive response when threatened, eastern American toads secrete **bufotoxin** from the parotoid glands. Bufotoxin is a **cardioactive steroid**, a toxin that can lead to gastrointestinal symptoms such as nausea and vomiting, and can interfere with heart function if ingested. Eggs and tadpoles may also contain some level of the toxin. The primary danger to humans is contact with hands or clothing that transfers the substance to eyes, nose, or mouth. It is important to wash your hands after touching a toad, both adults and tadpoles.

### Common Symptoms

Bufotoxin may cause irritation to human eyes, nose and mouth, and is dangerous to smaller animals (such as dogs) if eaten. Symptoms may include heavy salivation, head shaking and pawing at mouth (dogs), and retching. Flushing with water of the affected area is immediate first aid. If eaten, it is recommended to contact a poison control center or seek medical attention.

### Look-alikes

Fowler's toad (*Anaxyrus fowleri*) resembles the eastern American toad but has three or more warts on the largest dark spots, lacks a spotted belly, and has a different movement pattern - a fast hop versus the eastern American toad's typical "walking" pace. The eastern American toad may also be confused with the southern toad (*Anaxyrus terrestris*), which

is distinguished by prominent cranial ridges with club-like knobs.

Because poisoning risks and symptoms are similar, the same precautions and treatment apply to all three species. (Fowler's and southern toads are also described in this publication.)

### Notes

Eastern American toads may "play dead" when handled roughly.



Photo credit: Bruce Grimes  
VMN New River Valley Chapter



Photo credit: Judy Gallagher

***Additional information may be found in the bibliography at the end of the publication.***

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# Eastern Spadefoot

*Scaphiopus holbrookii*

## Description

The eastern spadefoot is 4.4 to 5.7 cm (1¾ to 2¼ in) long, with a squat body ranging in color from light to dark brown, gray or black, often mottled in appearance. It has small **parotoid glands**, which secrete poison, on the shoulders, and moist skin textured with small bumps, or **tubercles**. Its distinctive features are the golden eyes with vertical **pupils** like a cat's eye. Additionally, this species has two light or yellowish curved stripes running from the eye down the back and a black spur or "spade" on each hind foot, used for burrowing.

Spadefoots are adapted for digging and spend most of their lives underground. During periods of drought they may remain underground for months. The eastern spadefoot is **nocturnal**, active at night, and eats ground-dwelling insects, such as ants, beetles, spiders and millipedes. Heavy rains trigger "explosive" bouts of breeding; adults emerge from the ground and congregate in large numbers for very short periods of time in temporary pools, flooded areas, or ditches. The breeding males call while floating in the water with a short, nasal "waaah" repeated in short bursts. Young spadefoots develop rapidly in these fleeting aquatic environments: eggs can hatch within one day and tadpoles develop into young toads in 14 to 60 days.

## Where They may be Found

The eastern spadefoot prefers sandy or loose soils and may be found in forest areas or old fields. It has been observed in Virginia's Coastal Plain, with some recorded observations in the Piedmont

The scrap! He hopes his  
golden eye and lyre beguile.  
Buoyant chorus-waaah-



Photo credit: Jason Gibson  
Virginia Herpetological Society



Photo credit: Jason Gibson  
Virginia Herpetological Society



Photo credit: Jason Gibson  
Virginia Herpetological Society

and Blue Ridge Mountains. Adults, eggs or tadpoles may be observed in shallow, temporary pools during or after heavy rains.

### **What Makes This Animal Poisonous**

As a defensive response when threatened, the eastern spadefoot secretes a musty, peppery liquid from the parotoid glands. This liquid can cause irritation if transferred from hands or clothes to eyes, mucous membranes, or open wounds on the skin. Always wash hands thoroughly after handling this species, including the tadpoles and eggs, and closely monitor young children and pets to prevent accidental contact with the poisonous secretions.

### **Common Symptoms**

Mainly affecting the membranes of the eyes and nose, the liquid secretion may cause irritation or an allergic reaction in some humans. Washing an affected area with water is initial first aid -- seek further medical treatment if irritation persists.

### **Look-alikes**

Based on size and coloring the eastern spadefoot may be mistaken for the eastern American toad (*Anaxyrus americanus americanus*), Fowler's toad (*Anaxyrus fowleri*) or southern toad (*Anaxyrus terrestris*), all of which are also described in this publication. Look for the eastern spadefoot's distinctive vertical pupil, curved light or yellow stripes down the back, and black "spades" on the rear feet.

### **Notes**

The eastern spadefoot belongs to the *Scaphiopus* genus, unlike the four toads of the *Anaxyrus* genus in this publication.



Photo credit: John White  
Virginia Herpetological Society



Photo credit: John White  
Virginia Herpetological Society

***Additional information may be found in the bibliography at the end of the publication.***

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# Fowler's Toad

*Anaxyrus fowleri*

## Description

Ranging from 5 to 9.5 cm (2 to 3¾ in) in length this small to medium-sized toad is usually brown or gray, sometimes greenish or even brick red, has a light-colored stripe on its **dorsal** or back side and three or more warts on each of the largest dark spots on either side of the stripe. Its belly is usually unspotted. Males are smaller, with a dark throat. The **parotoid glands**, the source of its poison, touch a small **cranial crest** (ridge on the top of the skull).

Fowler's toads breed in late spring, in semi-permanent pools, flooded low ground, and the shallow water of permanent ponds, quiet streams and rivers, where they lay their eggs and the tadpoles develop. Eggs hatch in about a week; tadpoles become full-grown toads in 40 to 60 days. The male call is a buzzy-nasal sound that has been compared to a baby's cry or sheep's bleat, and lasts about 5 seconds. Active at night, adults feed primarily on beetles and ants. They do not eat earthworms. Fowler's toads may interbreed with eastern American and southern toads.

## Where They may be Found

Found throughout Virginia, adults live in a variety of habitats; woodlands, sandy grasslands, river and stream banks, and beaches. During daylight, and in winter when the toads are usually inactive, they burrow into the ground or hide under rocks and vegetation.

Both of us seeking,  
a pale, straight stripe scoots away  
from my startled light



Photo credit: Bruce Grimes  
VMN New River Valley Chapter



Photo credit: Judy Gallagher



Photo credit: Jason Gibson  
Virginia Herpetological Society

### What Makes This Animal Poisonous

As a defensive response when threatened, Fowler's toads secrete **bufotoxin** from the paratoid glands, which can lead to gastrointestinal symptoms, such as nausea, vomiting, and abdominal cramps. If eaten it can damage the heart and affect blood pressure. Eggs and tadpoles may also contain some level of the poison. The primary danger to humans is from contact with hands or clothing, which may transfer the poisonous substance to eyes or mucous membranes. It is important to wash hands after touching a toad, in both adult and tadpole stages.

### Common Symptoms

Bufotoxin, the primary poison, may cause irritation to human eyes and mucous membranes, and is dangerous to smaller animals (such as dogs) when eaten. Symptoms may include heavy salivation, head shaking and pawing at mouth (dogs), and retching. Flushing of the affected area with water is initial first aid. If ingested, it is recommended to contact a poison center or seek medical attention.

### Look-alikes

Fowler's toads interbreed with and may be confused with eastern American toads (*Anaxyrus americanus americanus*) and southern toads (*Anaxyrus terrestris*). Fowler's toads have small leg warts, more warts per dark dorsal spot, and generally move faster -- hopping faster when startled -- than the eastern American toad. They may also be confused with the southern toad (*Anaxyrus terrestris*), which is distinguished by prominent ridges on the head, with club-like knobs.

Both the eastern American and the southern toads are described in this publication. Because the poisoning risks and symptoms are similar, the same precautions and treatment apply to all three species.



Photo credit: Jason Gibson  
Virginia Herpetological Society



Photo credit: Judy Gallagher

***Additional information may be found in the bibliography at the end of the publication.***

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# Oak Toad

*Anaxyrus quercicus*

## Description

The oak toad, only 1.9 to 3.3 cm ( $\frac{3}{4}$  to  $1\frac{1}{2}$  in) long, has gray, black or brown-colored skin and may have four to five pairs of black or darker spots on the backside. The skin has fine warts, which may be red on the backside, and are reddish-orange on the undersides of the fore and hind feet. This toad has **parotoid glands**, which appear as enlarged bumps behind each eye. These glands are the source of the poison the toad secretes through its skin. The oak toad sports a distinctive light stripe down the center of its back, which may be white, cream, yellow or orange.

Oak toads eat insects, such as ants, small spiders, mites and beetles, often foraging for food during the day. As defense against predators, they can inflate their bodies, urinate, and secrete poison. Oak toads breed in aquatic environments. Heavy rains from April to October trigger mating. The breeding male's call is a chirp that sounds like a peeping chick. Oak toad eggs hatch within 36 hours and the tadpoles become tiny young toads in 30 to 60 days.

## Where They may be Found

This toad inhabits a small portion of Virginia's far southeastern Coastal Plain, south of the James River. Non-breeding adults favor sandy soils and may be found in areas of pine or oak trees, including grassy plains, scrub, open-canopied woods with grassy areas and maritime forests. In winter and colder weather, oak toads occupy underground burrows or shelter under oak logs or pine bark.

Oaken toad with stripe  
tiny, sodden, seeking-cheep-  
Dismal spring delight



Photo credit: Paul Sattler  
Virginia Herpetological Society



Photo credit: Judy Gallagher



### What Makes This Animal Poisonous

As a defensive response when threatened, oak toads secrete a milky white, highly irritating poison, **bufotoxin**, through the parotoid glands. The oak toad's poison can affect the gastrointestinal system and heart function if eaten. Any oak toad poison on hands or clothing may cause irritation if transferred to eyes, mucous membranes, or open cuts or scratches on the skin. Always wash hands thoroughly after handling toads, tadpoles or eggs, and closely monitor young children and pets to prevent accidental contact.

### Common Symptoms

Bufotoxin introduced to human eyes or mucous membranes may cause irritation. Flushing with water or washing an affected area with water is initial first aid, taking care not to swallow. Effects if eaten include nausea, vomiting, abdominal cramps, changes in cardiac function and blood pressure. In these cases, treatment at a poison control center or hospital is advised.

### Notes

The oak toad is North America's smallest toad species.



Photo credit: Paul Sattler  
Virginia Herpetological Society



Photo credit: Jason Gibson  
Virginia Herpetological Society

***Additional information may be found in the bibliography at the end of the publication.***

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For appropriate medical advice, call your local poison center at **1-800-222-1222**.*



# Southern Toad

*Anaxyrus terrestris*

## Description

The southern toad is 4.1 to 7.5 cm (1½ to 3 in) long. Its back is typically brown, but may range from red or gray or black, sometimes with a light stripe down the center. These toads may also have dark spots with one or more bumps or “warts” that may be spiny. The chest is spotted and the belly is grayish or cream-colored. The southern toad’s key identifying features are the bony ridges near each eye, called **cranial crests**. On older females, the crest is raised at the rear into a club-shaped knob that extends to the **parotoid gland** (the source of its poison), near the shoulder.

Southern toads are **nocturnal**, active at night, passing daylight hours in their burrow or under logs or debris piles. Their highly diverse diet includes snails, crickets, ants and beetles. These toads breed in freshwater environments, including shallow seasonal pools, ditches, swamps, and pond and lake edges. Mating occurs from March through September; males gather and call to females in a high trill lasting 5 to 10 seconds. Eggs hatch in a few days and tadpoles become tiny young toads in 1 to 2 months.

## Where They may be Found

Southern toads are found in Virginia’s southeastern Coastal Plain, in diverse habitats, from agricultural fields, pine woodlands and maritime forests to residential yards and gardens. They prefer sandy or soft crumbly soils suitable for burrowing in.

**Crested southern king  
greet March and chilly love—brrrrrrrrr—  
the hushed burrow waits**



Photo credit: Judy Gallagher



Photo credit: Paul Sattler  
Virginia Herpetological Society



Photo credit: Todd W. Pierson



### What Makes This Animal Poisonous?

As a defensive response when threatened, southern toads secrete a milky white, highly irritating poison that contains **bufotoxins** that are mild to moderate **cardioactive steroids**, affecting the gastrointestinal system and heart function if eaten. Any southern toad poison on hands or clothing may cause irritation if transferred to eyes, mucous membranes, or open cuts or scratches on the skin. Always wash hands thoroughly after handling toads, tadpoles or eggs and closely monitor young children and pets to prevent accidental contact.

### Common Symptoms

Bufotoxin introduced to human eyes or mucous membranes may cause irritation. Flushing or washing an affected area with water is initial first aid, taking care not to swallow. Effects if eaten include nausea, vomiting, abdominal cramps, changes in heart function and blood pressure. Contacting a poison center or seeking medical attention at a hospital is advised.

### Look-alikes

Based on size and coloration southern toads may be mistaken for the eastern American toad (*Anaxyrus americanus americanus*) or Fowler's toad (*Anaxyrus fowleri*), also described in this publication.

### Notes

Southern toads are comfortable in human environments with nearby freshwater sources. They have been observed after dark beneath outdoor lights eating insects attracted to the light source.



Photo credit: Paul Sattler  
Virginia Herpetological Society



Photo credit: Todd W. Pierson

***Additional information may be found in the bibliography at the end of the publication.***

Contact with poisonous or venomous animals can be dangerous.  
For appropriate medical advice, call your local poison center at **1-800-222-1222**.





# Wasps and Bees Introduction

Virginia is home to a large variety of bees and wasps, from big round fuzzy bumble bees and giant cicada-killer wasps, to barely visible tiny parasitic wasps that lay their eggs inside the bodies of other tiny insects. Although most of these wasps are capable of stinging, and will do so to defend themselves, the majority forage for food and raise their young in natural areas where they have few encounters with people. The species covered in detail in the following pages are the few responsible for most of the stings; their habits bring them into contact with humans more often, either because they tend to build their nests near human structures or forage for human food and trash.

## Wasps

Wasps are flying insects with a narrow waist (**petiole**) between the **thorax** and abdomen. They are usually shiny, not fuzzy, and tend to be some combination of brown, black, or yellow. Hornets are a type of wasp, in the genus *Vespa*, that tend to be larger and have a more painful sting. There are no hornets native to the U.S.; in Virginia there is an introduced species, the European hornet (*Vespa crabro*). The bald-faced hornet (*Dolichovespula maculata*) is actually a species of yellowjacket, not a true hornet.

Wasps can be solitary, with a single female building a small nest for her eggs, or social, living in colonies of hundreds of individuals. Colonies are seasonal, founded by a single queen in spring and growing in size over the summer. Most wasps will die when winter comes; only the following year's queens survive. Due to the number of wasps in a colony and their instinct to defend it, social wasps are more likely to sting than solitary species, especially in late summer and fall when large populations are foraging energetically to raise next year's queens. Wasps do not reuse nests so it may not be worth the danger of removing an inconveniently-placed nest if it can be tolerated for one season.

The ancestor of stinging wasps was a prehistoric parasitic wasp that used a long thin **ovipositor** (a tube-like organ) to deposit eggs in or on a host insect. Venom evolved from chemicals that were delivered with the eggs to paralyze or subdue the host. In modern species of stinging wasps, eggs are released at the base of the modified ovipositor; the thin, tubular portion is used only to deliver venom. Only female wasps can sting. Social wasps use their stingers primarily to defend themselves or their colony.

Wasps forage for carrion, insects, pollen and nectar. They play an important ecological role by preying on aphids, caterpillars, beetle larvae and other pest species, and they pollinate flowers. It is sensible to have a healthy respect for wasps and give them their space, because they *are* an important part of the ecology of our area.

## Honey Bees and Native Bees

Bees evolved from wasps, but unlike wasps, they have stockier bodies and look fuzzier due to hairs that help collect pollen. Honey bees and native bees rely on nectar and pollen for food. Since they do not hunt prey, bee stings are exclusively for defense, and the primary purpose of bee venom is to cause pain.

The most commonly known bee, the western, or European honey bee (*Apis mellifera*), is not native to Virginia. Honey bees were introduced by colonists in 1622 and eventually naturalized across the U.S. There are an additional 450 native species of bee in Virginia, including bumble bees, carpenter bees, sweat bees, mason bees, and many others. They are important pollinators of both wild plants and many farmed fruits and vegetables.

Most native bee species are solitary: a female builds a nest, usually underground, where she deposits her eggs. Without colonies to defend, they are unlikely to sting unless grabbed or handled. The degree of pain caused by a native bee sting varies by species. Unlike honey bees, which die after one sting, native bees can sting repeatedly, as their ovipositors are needlelike and not barbed like those of the honey bee.

In Virginia, dozens of native species are threatened by habitat loss, including the rusty-patched bumble bee (*Bombus affinis*), which is on the federal endangered species list. Native bees prefer native flowers; replacing lawns with native plants, limiting use of pesticides, and preserving bee habitats can help save them.

### Bee and Wasp Stings

Bee and wasp venoms are complicated mixtures that vary across species. Some venoms cause more pain than others, but the most painful venoms are not necessarily the most toxic. For example, the red velvet ant or “cow killer” (*Dasymutilla occidentalis*), which is actually a wasp, has an extremely painful sting, yet its venom is one of the least toxic.

The first sign of any sting will be a sharp, burning pain. If the stinger is stuck in the skin, it should be removed immediately; use whatever works quickest: it can continue to deliver venom for up to a minute. Most people will experience pain, redness and mild swelling at the sting site, lasting 4 to 6 hours. Some people will have a slightly more severe reaction, involving swelling that increases over the next few days and can last for 5 to 10 days. The swelling may look red, feel hot, and be itchy, but will typically stay localized. An infection can develop in the area of a sting if scratched repeatedly.

Medical attention is required for more severe reactions; the most serious, which can be life-threatening, occur when there is a significant allergy to the venom. A whole-body reaction, called **anaphylaxis**, can result from a single sting, and can occur at any age even if a person has had mild reactions previously. Allergic symptoms can develop within seconds or hours. Signs that medical attention is necessary include hives, flushed or pale skin, swelling of the throat and tongue with difficulty breathing, a weak, rapid pulse, nausea, vomiting, diarrhea, headache, dizziness or fainting, and fever, convulsions, or loss of consciousness.

Wasp venom is toxic but an individual sting doesn’t deliver a big enough dose to be dangerous, unless a person is allergic. However in cases of multiple stings, toxicity can reach damaging levels. Medical attention is often recommended for 25 or more stings; when a child, older person, or a person with heart or breathing problems receives multiple stings; or especially if any of the above systemic symptoms are present.



# Bald-faced Hornet

*Dolichovespula maculata*

## Description

A species of yellowjacket wasp, the bald-faced hornet is black with a characteristic white-striped or "bald" face. White markings are also noticeable near the tip of their rear end next to their stinger. They are larger than most wasps at 19 mm ( $\frac{3}{4}$  in) in length, and queens are slightly larger than the workers. Bald-faced hornets eat fruit, as well as flies, caterpillars, spiders and other yellowjackets, thus helping control insect populations. Adults also gather pollen and drink flower nectar, helping with pollination.

## Where They may be Found

Bald-faced hornets are found throughout the U.S. but are most common in the southeastern U.S. Found across Virginia, they create aerial, egg-shaped paper nests up to 45 cm (18 in) across and 58 cm (23 in) long. The nests have a mottled gray paper covering. In forested areas and vegetated urban areas, nests can be found in bushes and tree branches, occasionally under rock overhangs, on buildings, even on utility poles; at least 3 feet off the ground they can reach heights of 20 m (65 ft).

Multiple layers of **cellulose** (a stringy, fibrous substance) around the core of the nest allow hornets to stay warm at night and then start out earlier in the day than most other insects. A new nest is founded in the spring or early summer by a single queen; this new colony can start in late March and last until September or October; the workers, and the old queen die at the end of this cycle. Fertilized

In flight overhead  
a barrel roll of the dice-  
lucky for today



Photo credit: Bruce Grimes  
VMN New River Valley Chapter



Photo credit: Judy Gallagher



Photo credit: David Stephens  
Bugwood.org



queens hibernate alone till the next spring. Nests are not reused.

### What Makes This Animal Venomous

Bald-faced hornets are highly territorial and easily disturbed by loud noises, such as lawn mowers and leaf blowers. If you walk within a few feet of the nest they may swarm and chase you. Their very defensive nature is what makes them a potential threat to humans. Workers can sting repeatedly, and have another, unique, defense: they can spray venom from their stinger onto an intruder, resulting in temporary blindness in humans and other **vertebrates**. Away from the nest they will not attack unless provoked. Spring is an especially dangerous time for homeowners, when a new nest may be threatened by normal gardening activities. If attacked, it's best to walk away quickly, avoiding sudden movements.

### Common Symptoms

Bald-faced hornets have a very painful sting that will swell, hurt, and itch for about 24 hours, sometimes days. If possible, ice the area. If stung on an arm or leg, keep it elevated. Remove any jewelry because if swelling occurs, rings, bracelets, etc. may become difficult to take off. Stings are painful: some people are allergic to the venom released and may need to seek medical attention. Keep the area clean to prevent infection. If signs of an allergic reaction occur, seek medical attention immediately.

### Look-alikes

There is a black-and-white ground-nesting species known as the blackjacket (*Vespula consobrina*), that looks almost identical to the bald-faced hornet except for an extra bit of white on the abdomen, but it nests underground. The Sandhills hornet, or common yellow hornet (*Dolichovespula arenaria*) builds the same type of nest as bald-faced hornets. This hornet is black and yellow but otherwise shares most of the physical characteristics of the bald-faced hornet.

### Notes

Bald-faced hornets seem to exhibit collective memory behavior; they have been known to fly past other intruders to sting a previous invader of their nest territory.

The red-eyed vireo (*Vireo olivaceus*), a small songbird, decorates the outside of its nest with pieces of hornet paper, perhaps to confuse predators.



Photo credit: Judy Gallagher

**Additional information may be found in the bibliography at the end of the publication.**

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# European Hornet

*Vespa crabro*

A marvel, really,  
of paper engineering—  
built without permits

## Description

The European hornet is noticeably larger than common wasps; workers are typically about 25 mm (1 in) long, and queens can reach lengths of 36 mm (1½ in). They are brown-bodied with yellow stripes on their abdomen and a light-colored face. The wings are reddish-orange, and although they have hairs on their body, they are not as hairy as most bees. European hornets are largely **carnivorous**, hunting other insects, such as honey bees, beetles, wasps, moths, dragonflies, and mantises. They also feed on sugary sources, such as fallen fruit.

## Where They may be Found

The European hornet is found throughout Virginia, and from the eastern seaboard west to the Dakotas, and south through Iowa and Illinois to Louisiana. A social species, it builds and lives in paper nests, with as many as 1,000 members. Nests consist of an inner paper comb and an envelope with a single entry hole on the outside, made from a paper-pulp mixture created by workers chewing up various plant materials and mixing it with their saliva. Nests are usually above ground in dark crevices such as hollow tree trunks, wall voids, building cavities, and even abandoned honey bee hives. The size of the nest depends completely on the size of the space used, and can be as large as 60 cm (2 ft) across. Only fertilized queens survive over winter, hibernating until the following year when temperatures warm up in spring. Nesting boxes for birds may also be used by the European hornet; they seem to prefer new boxes (with fresh wood) rather than old ones. In urban areas up to 20 percent may become occupied.



Photo credit: Bruce Grimes  
VMN New River Valley Chapter



Photo credit: Matt Bertone  
NC State University



Photo credit: Matt Bertone  
NC State University

### What Makes This Animal Venomous

The European hornet is fairly shy and generally avoids conflict but will sting if stepped on or grabbed. It defends its nest very aggressively, and can be aggressive around food sources, when it may sting without warning.

### Common Symptoms

The sting is about as painful as one from a honey bee but European hornets can sting multiple times. The local effects from a sting typically fade in a few hours without complications. However, there have been reported cases of deaths due to **anaphylaxis** (allergic reaction) or due to numerous stings. A sting site should be cleaned and the victim watched for allergic reactions. If significant symptoms occur, seek medical attention immediately. The risk of a life-threatening reaction to the sting is three times that of a bee or a yellowjacket.

### Look-alikes

The European hornet is sometimes mistaken for the much larger Asian giant hornet (*Vespa mandarinia*), which has never been seen in the eastern U.S.

### Notes

Social wasps are ecologically important as the natural spreader of a species of yeast (*Saccharomyces cerevisiae*) used in bread, winemaking, and brewing. The the only true hornet (genus *Vespa*) found in North America, the European hornet was introduced in New York City between

1845 and 1860 as a predator of some forest-damaging caterpillars. Though usually considered a pest, many of its prey are also considered pests; misguided fear of this hornet has led to destruction of the nests and a subsequent decline of the species. In some places it is legally protected, such as Germany.

Honey bees defend against European hornets by creating a packed formation of bees near their hive opening. The bees can knock down the approaching hornets, who are then totally swarmed. This behavior causes the hornet to overheat, and it dies.



Photo credit: Judy Gallagher

***Additional information may be found in the bibliography at the end of the publication.***

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# Paper Wasps

*Polistes* species

## Description

Paper wasps are large social wasps, around 13 to 25 mm (½ to 1 in) long. They are reddish-brown in color with varying yellow or dark markings. They are often seen visiting flowers -- native paper wasps are beneficial to gardens; they collect nectar and pollen and prey exclusively on caterpillars to feed their young.

Nests are constructed out of a papery material made from chewed plant fibers from wood and dry, woody plant stalks. Nests are umbrella-shaped and look like a cluster of individual cells attached to a surface by a thin stalk. They have no outer papery covering, as seen with bald-faced or European hornet nests. Generally calm, paper wasps don't defend their nests unless an intruder approaches very closely or disturbs it. Often built in hidden places, like inside gas grills or birdhouses, nest disturbance can happen accidentally. Like other social wasps, the overwintered queen will start building her nest alone in spring.

A nest in an undesirable spot (for humans) at this point can be removed while the queen is away, and she will likely give up and build somewhere else. Over the summer paper wasp colonies grow to about a hundred individuals. The metric paper wasp, (*P. metricus*), sometimes maintains multiple nests or shares a nest with other paper wasp species. Virginia's native *Polistes* species build new nests each year, but European paper wasps will reuse their old nests.

With hands and apron  
she gently shoos you-away-  
from her tiny porch



Photo credit: Bruce Grimes  
VMN New River Valley Chapter



Photo credit: Joseph Berger, Bugwood.org



Photo credit: Bruce Grimes  
VMN New River Valley Chapter

### Where They may be Found

There are over 20 species of paper wasps found in North America, but only about seven are found in Virginia. Paper wasps often nest on human structures such as porch overhangs. Virginia has one non-native *Polistes* species, the European paper wasp (*P. dominula*), which is black and yellow and often mistaken for a yellowjacket. Only the European paper wasp preys on other types of insects in addition to caterpillars.

### What Makes This Animal Venomous

Like other social wasps, female paper wasps have stingers on the ends of their abdomens that deliver a painful venom used to protect their nest. Paper wasps use alarm and sex **pheromones**, chemicals that can deter predators as well as communicate within the colony.

### Common Symptoms

Most people will experience only mild or moderate local effects from a sting but should be monitored for symptoms of an allergic reaction. Medical attention should be considered for individuals who suffer multiple stings or when a child, elderly person, or someone with pre-existing health problems receives multiple stings.

### Look-alikes

Paper wasps might be confused with yellowjackets because they are somewhat similar in color but their bodies are more slender than those of yellowjackets. In addition, paper wasps can be identified by how they fly: their long legs dangle below their bodies. The European paper wasp

(*P. dominula*) is black and bright yellow, like a yellowjacket, but the color of their antennae are different: paper wasps' are orange and yellowjackets' are black.

Paper wasp and yellowjacket nests can look similar when they are very small, but larger yellowjacket nests are covered by an envelope of paper, while paper wasp nests have the cells open and visible. Paper wasps are more likely to nest on porches and overhangs, while yellowjackets seem to prefer bushes and trees.



Photo credit: Bruce Grimes  
VMN New River Valley Chapter

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# Western Honey Bee

*Apis mellifera*

## Description

The Western honey bee is a striped, winged insect with a stocky body covered in fuzzy hairs, about 2.5 cm (1 in) long. The color can be variable but is usually a dull yellow with dark brown stripes on the abdomen.

## Where They may be Found

Most honey bees living in Virginia are kept by beekeepers, but **feral** (escaped) colonies can live in hollow tree trunks or in crevices inside the walls of buildings. Each honey bee colony contains tens of thousands of worker bees, hundreds of males, and a single queen. In addition to pollen and nectar, honey bees collect water, so may visit birdbaths and other water sources, and are attracted to sweet food or drinks. Away from their hive, honey bees are not aggressive and will usually only sting if caught or stepped on. Near their hive they are defensive, especially at the entrance. An angry honey bee produces an alarm **pheromone** which recruits more bees to the attack. The same pheromone is also released when a honey bee is crushed, so do not swat or squash honey bees. Avoid disturbing or too closely approaching hives or wild colonies, and if you do encounter upset honey bees, quickly and calmly leave the area. They will usually stop chasing after a fairly short distance.

During summer you may see a **swarm**, a large clump of honey bees hanging from a tree branch or other surface searching for a location to start a new colony. With no hive to defend, swarming bees are not aggressive. A swarm will leave once its scouts find a good spot for a permanent

At pond's edge, I share  
a moment with the sisters  
sipping cool water



Photo credit: Matt Bertone  
NC State University



Photo credit: Arthur Tsang



Photo credit: Matt Bertone  
NC State University



home (or it can be reported to your local beekeeping association for collection by a local beekeeper).

### **What Makes This Animal Venomous**

The honey bee's stinger has backward-facing barbs on the end that keep it moving forward as it digs into the surface of its victim. Honey bees can sting other insects repeatedly, but their barbed stinger gets caught in human skin, so the entire sting apparatus (stinger, venom sac, and attached muscles) rips out of the bee's abdomen (which kills the bee), but it may continue to act aggressively. The detached stinger can inject venom for up to a minute so it is important to remove it immediately. Honey bee venom is complex, but **melittin** makes up about 50 percent of the active ingredients. Melittin disrupts cell membranes and is responsible for most of the pain. Other components of the venom are responsible for the allergic reaction.

### **Common Symptoms**

After a honey bee sting, the stinger will usually remain lodged in the skin: it should be removed immediately, using whatever method is quickest, and the site washed with soap and water. Most people will experience only mild or moderate local effects that resolve on their own, but should be monitored for symptoms of an allergic reaction. No successful antivenom has been created.

### **Look-alikes**

Some flies, such as those in the Syrphidae family, look like bees and visit flowers but

they do not sting or bite. Carpenter bees (genus *Xylocopa*) and bumble bees (genus *Bombus*) are larger and rounder, with more black coloring. Yellowjackets and other wasps are shiny and much less fuzzy, have a narrower waist, and may be more brightly colored.

### **Notes**

Africanized honey bees (*Apis mellifera scutellata*), sometimes called "killer bees," are not currently present in Virginia. They look the same and their venom is similar but their behavior is dangerously aggressive as they have a tendency to pursue any perceived threat with many attackers. If you are attacked by Africanized honey bees, run away in a zig-zag pattern and seek shelter indoors or in a car. Report suspected Africanized honey bees to the Virginia Department of Agriculture and Consumer Services (see the bibliography for the web address).



Photo credit: Arthur Tsang

***Additional information may be found in the bibliography at the end of the publication.***

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# Yellowjackets

*Vespula* species

## Description

“Yellowjacket” is a common name that refers to 11 species of wasp in the northeastern U.S. Most species of yellowjacket in Virginia are in the genus *Vespula*, and nest underground. The two species in the *Dolichovespula* genus are known as aerial yellowjackets because they build nests high above ground in trees or on structures (they are described in the bald-faced hornet section). Yellowjackets are small, about 1.3 cm (½ in) long, with a distinct “wasp waist” between the **thorax** and abdomen. They are boldly patterned in black and either bright yellow or white.

## Where They may be Found

Yellowjackets are present throughout Virginia. They are social wasps and build paper nests out of plant fibers. Ground-nesting yellowjackets build their nests underground or within crevices of buildings. Nests in lawns can be disturbed by a lawnmower, and in forested areas hikers can accidentally step on them. Bears, skunks and raccoons like to eat the **larvae** and will destroy nests, so yellowjackets defend their home aggressively. Yellowjackets forage boldly in daytime: their painful stings are advertised by bright yellow and black colors which discourage predators. Although some yellowjacket species exclusively prey on insects, several species are attracted to other protein-rich foods like meat, and carbohydrates like fruit, beer, and sweets, so are often pests at picnics. Keep food, drinks and trash covered outdoors and leave the area if possible. Don’t swat at yellowjackets.

Our summer rumble  
ended with stinging remarks  
and a slammed front door



Photo credit: Judy Gallagher



Photo credit: Brenda Clements Jones  
VMN Old Rag Chapter

### What Makes This Animal Venomous

Female yellowjackets have a stinger at the end of their abdomen attached to a **venom** sac. Unlike a honey bee, each yellowjacket can sting more than once. The primary chemicals in yellowjacket venom are **kinins**, which cause pain and cell damage; other components cause swelling.

### Common Symptoms

If the stinger is still in the skin, it should be removed immediately. Most people will experience only mild or moderate local effects but should be monitored for symptoms of an allergic reaction. Since yellowjacket colonies can contain thousands of individuals and each one can sting repeatedly, it is common to receive multiple stings after an encounter with a nest. Medical attention should be considered for more than about 25 stings, or when a child, elderly person, or someone with pre-existing health problems receives multiple stings.

### Look-alikes

Compared to bees, yellowjacket colors are much brighter and their bodies are shiny, not fuzzy, due to a lack of hairs. The bald-faced hornet (*Dolichovespula maculata*, also discussed in this publication) is a yellowjacket, but has distinctive black and white coloring. The Sandhills hornet, otherwise known as the common aerial yellowjacket (*Dolichovespula arenaria*) looks very much like a ground-nesting

yellowjacket but it builds smooth paper nests above ground, usually in trees. The European paper wasp (*Polistes dominula*) also looks very similar to a yellowjacket, but it has orange antennae rather than black, and builds a different type of nest (see *Polistes* section). There are also many species of solitary wasps that have yellow and black coloration, but they will not be seen in large numbers zooming in and out of a hole in the ground. Some native bees nest underground, but their nests, usually located in areas of bare soil with a mound of loose soil at the entrance, have fewer individuals and are not defended aggressively.



Photo credit: Bruce Grimes  
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## Glossary

### *Abdomen*

One of the three main body segments of insects; also one of the two main body parts of spiders. The rear-most of the segments, the abdomen contains the heart, reproductive organs, gut and other digestive organs.

### *Alate*

Having wings or winglike appendages.

### *Algae*

Aquatic plants.

### *Alkaloid*

A class of basic, naturally occurring organic compounds; most of the known functions of alkaloids are related to protection.

### *Alpha-latrotoxin*

A neurotoxin found in the venom of certain spiders.

### *Amphibian*

An ectothermic (cold-blooded) vertebrate animal that spends its larval stage in water (gill-breathing) and lives on land (lung-breathing) as an adult.

### *Anaphylaxis*

A severe and potentially life-threatening reaction to a trigger such as an allergen. Anaphylactic reactions can be systemic (whole-body), or localized, such as hives.

### *Antenna (pl. antennae)*

One of a pair of feelers connected to the front segments of crustaceans and insects.

### *Antivenin*

Also known as anti-venom, treatment for venomous bites and stings

### *Aposematic*

Coloration or markings that serve to warn or repel predators.

### *Aquatic*

Relating to water.

### *Arachnid*

A class of animals that includes spiders, scorpions, mites, and ticks.

### *Biomass*

The total mass of living organisms, including plants, animals, and microorganisms, usually in a given area. Biomass is determined by multiplying an estimated population by its members' average weight.

*Bufotoxin*

A moderately potent poisonous compound present in the skin of many frogs and toads. The milky fluid contains several components: bufagin, with effects on the heart similar to those of digitalis; bufotenine, a hallucinogen; and serotonin, a vasoconstrictor. The composition of the poison varies with the species of toad. If eaten the poison causes a severe, even fatal reaction in many predators, but some animals (e.g., hognosed snakes) are unaffected. The poison does not normally affect human skin, but will irritate the eyes and mucous membranes.

*Cardioactive Steroid*

Animal and plant-derived compounds with a specific effect on heart muscle contraction, rate, rhythm, and electrical impulses.

*Cardiotoxic*

Toxicity that affects the heart.

*Carnivore*

An animal that feeds primarily or exclusively on animal matter.

*Cellulose*

A stringy, fibrous substance that forms the main material in the cell walls of plants.

*Cephalothorax*

The rear body section of arachnids (spiders) consisting of the head and thorax fused together. Appendages to the cephalothorax include the eyes, mouth and legs.

*Chrysalis*

A hard-shelled pupa in which the transition of the butterfly takes place.

*Cnidocytes*

Stinging cells of jellyfish.

*Cornea*

The transparent layer that covers the iris and the pupil and allows light to enter the inside of the eye.

*Cranial crest*

Bony ridge-like structure behind the eye, along the midline of the skull.

*Crustacean*

An animal with a hard shell and several pairs of legs, which usually lives in water.

*Dorsal*

The upper, or back side of an animal, plant or organ.

*Echolocation*

Using reflected sound to locate objects or prey.

*Ectothermic*

Cold-blooded.



*Edema*

Swelling caused by excess fluid trapped in body tissues.

*Eft*

The juvenile stage of a newt.

*Epinephrine*

More commonly known as adrenaline; epinephrine injection is used along with emergency medical treatment to treat life-threatening allergic reactions caused by insect bites or stings.

*Envenomation*

The process by which venom is injected by the bite or sting of a venomous animal.

*Ephyra*

In jellyfish, the ephyra is an immature stage in the life cycle.

*Erythema*

Type of skin rash caused by injured or inflamed blood capillaries. It usually occurs in response to a drug, disease, or infection.

*Eschar*

A dry, dark scab caused by a spider bite.

*Exoskeleton*

The external skeleton that supports and protects an invertebrate animal's body.

*Exudate*

Fluid that leaks out of blood vessels into nearby tissues. Called pus, exudate may ooze from cuts or from areas of infection or inflammation.

*Eyespot*

An eye-like marking on some animals, such as the Io moth.

*Feral*

Animals or plants that are not domesticated, cultivated or captured; existing in a natural or wild state.

*Fluoresce, Fluorescence*

Glow - emit a steady even light. Emission of light by a substance that has absorbed light or other electromagnetic radiation.

*Formic Acid*

A colorless liquid having a pungent penetrating odor, found in some insects, especially ants, and also in the stinging nettle plant (*Urtica dioica*).

*Gregarious*

Instinctively or temperamentally seeking and enjoying the company of others, such as young caterpillars that like to feed together.

*Hemolytic*

Relating to or involving the rupture or destruction of red blood cells.

*Instar*

A phase between two periods of molting in the development of an insect larva or other invertebrate animal.

*Invertebrate*

An animal lacking a backbone.

*Keratopathy*

A disease of the cornea.

*Kinins*

A group of substances formed in body tissue in response to injury.

*Larva, (pl. Larvae)*

The immature form of an animal; a distinct juvenile form many animals undergo before metamorphosis into adults.

*Lesion*

An injury; hurt; wound: abnormal body tissue.

*Mandible(s)*

The jaw or jaws of an animal.

*Mastoparans*

A peptide toxin from wasp venom. Also a potential antibiotic due to antimicrobial activity.

*Medusa, (pl. medusae)*

The typical form of the adult jellyfish. The body is bell- or umbrella-shaped with a mouth that opens into the main body cavity. The medusa is a free-swimming form, moving by rhythmic muscular contractions of the bell.

*Melittin*

A toxic protein in bee venom that causes localized pain and inflammation but also has a moderate antibacterial and antifungal effect.

*Metabolism*

The physical and chemical processes that occur within a living organism in order to maintain life.

*Metamorphosis*

The process of transformation from an immature form to an adult form, in two or more distinct stages.

*Necrotic lesion*

A large area of tissue that has died such as a wound, ulcer, abscess, or tumor.

*Necrosis*

The death of cells in living tissue caused by external factors such as infections, trauma, or toxins from animal bites.

*Nematocyst*

A specialized cell in the tentacles of jellyfish containing a barbed or venomous coiled thread that can be projected in self-defense or to capture prey.

*Neurotoxin*

Toxins that are destructive to nerve tissue.

*Nocturnal*

Active at night.

*Ovipositor*

A tube-like organ used by some animals, especially insects, for the laying of eggs.

*Parotoid gland*

A raised skin gland on the head or shoulders of toads and some frogs and salamanders, which secretes milky alkaloid substances known collectively as bufotoxins, which function to deter predation.

*Permeable*

Something that allows liquids or gasses to pass through it; the skin of amphibians is permeable.

*Peptide*

A short chain of amino acids connected to one another in a sequence by bonds called peptide bonds.

*Petiole*

The narrow waist of some insects, especially ants, bees, and wasps.

*Pheromones*

A secreted or excreted chemical that triggers a response in members of the same species. They can be important in a number of social responses, including aggression, alarm, territorial and sex.

*Pincers*

The claw-like appendage on an insect or crustacean that allows it to grab things, particularly food.

*Piperidine*

An organic compound present in solenopsin, the primary toxin in the venom of fire ants.

*Pit viper*

A venomous snake distinguished by visible sensory pits on the head that can detect heat emitted by their prey. They are found in both America and Asia.



*Platelets*

A tiny, disc-shaped piece of cell found in the blood and spleen. Platelets are pieces of very large cells in the bone marrow. They help form blood clots to slow or stop bleeding and to help wounds heal.

*Poison*

A substance that is capable of causing illness or death of a living organism when ingested or absorbed.

*Polyp*

In jellyfish, the polyp is the second stage in the growth cycle following the fertilized egg. The upper end of the body has a mouth surrounded by extensible tentacles with stinging structures called nematocysts. The lower end of the polyp typically is adapted for attachment to a surface.

*Porin*

Porins are proteins across a cell membrane that act as a pore through which molecules can pass.

*Predaceous*

Living by seizing or taking prey; predatory.

*Pupa, Pupae (pl)*

An insect in its inactive immature form between larva and adult.

*Pupate*

To become a pupa; pass through a pupal stage, usually in a cocoon or chrysalis.

*Pupil*

The black area in the center of an eye, through which light enters.

*Purulent*

Containing, consisting of, forming, or discharging pus.

*Reptile*

A class that includes snakes, lizards, crocodiles, turtles, and tortoises. They have a dry scaly skin and typically lay soft-shelled eggs on land. A few lizards and snakes give birth to live young.

*Salamander*

A lizard-like amphibian with an elongated body and tail and short limbs.

*Saline*

A solution of salt in water.

*Salinity*

Saltiness or the amount of salt dissolved in a body of water.

*Scyphistoma*

In jellyfish, a polyp stage that breaks off young medusae, becomes an ephyra and then grows into an adult.

*Seta, Setae*

Hair or bristle-like structure on living organisms, such as some caterpillars.

*Solenopsin*

The primary toxin in ant venom which may be the component responsible for the cardiorespiratory failure in people who experience excessive fire ant stings.

*Soracidin*

A paralyzing agent in the shrew's saliva that has been synthesized and studied for cancer treatment.

*Spore(s)*

A small organism or single cell that is able to grow into a new organism: structures that are used by organisms to survive a period of unfavorable environmental conditions, and can subsequently regenerate into the adult form once the environment again becomes favorable for growth.

*Steroid*

Any of a group of lipids (fats) that have a certain chemical structure. Steroids occur naturally in plants and animals or they may be made in the laboratory.

*Strobila*

A chain of small jellyfish clones.

*Swarm*

A large or dense group of insects, especially flying ones.

*Terrestrial*

Of, on, or relating to the earth.

*Tetrodotoxin*

An extremely potent poison mainly found mainly in the liver and sex organs of some fish (such as puffer fish, globefish, and toadfish) and in some amphibian, octopus, and shellfish species. Tetrodotoxin interferes with signals from nerves to muscles and causes an increasing paralysis of the muscles of the body. Tetrodotoxin poisoning can be fatal.

*Thorax*

The part of an animal's body between its head and its midsection.

*Toupée*

A small wig or artificial hairpiece worn to cover a bald spot.

*Toxin*

A toxin is a poisonous substance produced within living cells or organisms.

*Tubercle*

A small, knobby projection on a plant or animal

*Ultraviolet (UV)*

Light has shorter wavelengths than visible light. Invisible to the human eye, some insects, such as bumblebees, can see them. Black light is a type of UV light.

*Urticating*

Irritating; causing a stinging or prickling sensation.

*Venom*

A toxic substance secreted by some animals and typically injected into prey or an aggressor. Venoms from animals such as spiders, wasps, scorpions, and snakes contain a mix of bioactive proteins, peptides, and small molecules that are deadly to intended prey.

*Ventral*

The underside of an animal or plant; abdominal.

*Vernal pool*

A seasonal or semi-permanent pool of water that has periods of standing water.

*Vertebrates*

Animals with backbones or spinal columns, including mammals, birds, reptiles, amphibians, and fishes.

*Vesicating*

To raise blisters on.

*Volatile*

Evaporates quickly.

*Welt*

A raised, red area of skin.

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