

American Toad (*Bufo americanus*)

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Introduction

The American toad is a common amphibian that can be found in the woods just as easily as a suburban backyard. They are easy to catch and a welcome addition to any garden because of their amazing appetite for garden pests. Contrary to the popular myth, toads will not give you warts if you pick them up, but their skin does contain secretions that can be irritating to mucous membranes. After handling any toad you should avoid touching your face until you wash your hands with soap and water. Toads are easy to distinguish from true frogs by their dry warty skin and low hopping method of movement. However, like true frogs they hatch from an egg as a tadpole and go through a metamorphosis before turning into a toad. In the springtime and early summer it is not uncommon to see thousands of tiny toads hopping along the ground as they leave their natal ponds, especially right after a warm rain.

Taxonomy

Family Bufonidae
Genus *Bufo* – true toads

The family Bufonidae contains about 400 species of true toads within 31 genera, which occur almost worldwide. In North America, there are 18 known species and all are within the genus *Bufo*. Georgia is home to only 4 species of true toads: the American toad (*Bufo americanus*); Fowler's toad (*Bufo foweri*); the oak toad (*Bufo quercicus*); and the southern toad (*Bufo terrestris*).



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Status

The American and southern toads are common throughout their ranges in Georgia and neither has federal or state protection status. Some populations of other species of toads have shown evidence of decline in recent years, possibly due to habitat loss or pollution.

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Description

Some of the key characteristics of the American toad include a stout body with short, stocky legs, four toes on each of the front feet, and five webbed toes on the rear feet. One way to distinguish the American toad from other toads is by the dark spots on its back with 1 or 2 brown or orangey warts inside each spot. Another distinguishing characteristic is the large, elongated paratoid gland (it looks like a bubble under the skin and produces the toxins that coat a toad's body) behind each eye. While other members of the genus *Bufo* have this gland, the American toad's paratoid gland does not touch the cranial crests (the upraised ridges on the edge of the top eyelids) or it may be connected by a small spur on only one side.

American toads also have oval pupils and a gold iris, and enlarged warts on backs of the tibia (thigh). The skin color of the American toad can change depending on temperature, humidity, and stress level. It is usually shades of brown or brick red with gray or olive patches and there are also usually black or dark-colored spots encircling warts. The belly and chest can be white or yellow with varying levels of pigmentation and splotching. Also, American toads often have a light stripe down the middle of their back. Individual toads may vary in color based on the geographic region in which they are found. American toads are usually 2 to 3.5 inches in length, and the largest toad recorded was about 4.4 inches. Males and females do exhibit some sexual dimorphism. Females are usually larger than males and a little lighter in color. They also usually have white or light-colored throats. Males have dark, usually brown or black, throats and are smaller in size.

Distribution

The American toad inhabits most of the eastern United States except for the extreme south. It can be found from Minnesota south to Arkansas, east through the northern half of Georgia, and then northeast through the western half of North Carolina and into New England. In Georgia, the American toad can be found in the northwestern 1/2 of the state including the Ridge and Valley, Blue Ridge Mountain, and Piedmont physiogeographic regions. In the southern 1/2 of Georgia, where the American toad does not occur, the southern toad takes its place.

Form and Function

The American toad is most often confused with Fowler's toad but can be differentiated by the fact that Fowler's toad has paratoid glands that definitely touch its cranial ridges. However, this identification technique may not always work because the American toad has been known to hybridize with Fowler's toad.

Male American toads have larger front legs than females. In addition to helping them eat larger prey, their large front legs also help them to grasp the females in amplexus (during mating). Darkened, rough pads also appear on their 1st and 2nd toes to help grip the female toad.

Like all amphibians, American toads have highly permeable, glandular skin. It allows the toad to absorb all the water that it needs through its skin. It can also absorb oxygen from the air through its skin (this is in addition to gas exchange through the lungs). However, because moisture can enter the toad's body through its skin, it can also leave if conditions are too dry. This fact is why the American toad needs a moist hiding place during the day and is usually only active when it is humid. The toad's permeable skin also makes it highly vulnerable to pollution and chemicals. Anything that touches a

toad's body can potentially be absorbed into its body. In many cases, die-offs of toads and other amphibians are believed to indicate that their environment has been contaminated.

American toads have two enlarged areas of skin on the head behind the eyes called the paratoid glands. These glands produce the milky secretion, called bufotoxin, which makes the toad taste bad to would-be predators (though some are not affected by it). Unfortunately the toxin also may cause some animals to get sick if they ingest a toad. It is not extremely toxic to people but can irritate mucous membranes and should not be ingested. Many other toads produce variants of bufotoxin, with each one having a slightly different chemical makeup. Two compounds that have been identified in bufotoxin include a cardiovascular stimulant and a hallucinogen.

Ecology

Reproduction: In Georgia, male American toads begin to call with a high-pitched, musical trill in February and March from any (even non-permanent) water source. They have a round vocal sac under their chin which expands with air that is released as they call. The stretchy skin on the throat of the male toad becomes darker due to its constant expansion and reduction during mating season. American toad males often sing together in choruses, and each male's call can last as long as 30 seconds. It is thought that synchronous calling is more effective at attracting females.

When a female American toad arrives at the breeding pool the male grasps her around the body right behind the forearms in the amphibian mating posture called amplexus. As the female releases her 3,000 to 20,000 eggs in the shallow water, they are fertilized by the smaller male. Because fertilization takes place outside the body it is called external fertilization. The eggs, which are usually attached to underwater vegetation, are arranged in double strings covered in a clear, gelatinous material.

The eggs, which are usually laid in shallow pools, incubate for up to two weeks before hatching. The incubation time varies depending on the water temperature—warmer temperatures lead to shorter incubation times. The eggs hatch into aquatic, herbivorous tadpoles that have a tail, gills, and no legs. Within a few hours, the gills become reduced and are covered over, and a single opening called a spiracle is formed. Over the course of 5 to 10 weeks the tadpoles grow larger, develop legs, lose their tails, and begin to eat more animal material until they finally look just like miniature toads. These toadlets usually leave the water by May and are sexually mature by the next spring.

Feeding: Adult toads are carnivorous and eat a variety of insects and other invertebrates—almost anything smaller than them that moves! Unlike many other toads, they do not have to ambush their prey. They are able to rapidly extend their sticky tongue and catch insects in midair. They are also well known for their ability to keep garden pests like slugs, grubs, beetles, and other herbivorous insects at low numbers. Toads have been called “bats of the ground” for their amazing ability to eat huge numbers of insects, many considered detrimental to humans—up to 10,000 a season.

Behavior: American toads are primarily nocturnal and are usually most active at warm humid times of the year. As night falls they emerge from their hiding spots to hunt for food. This is the time that they are most vulnerable to predators as well as automobiles. Toads are often able to find an abundance of insects in the open areas around roads and often put themselves in direct danger of being hit by cars while hunting for a meal.

American toads have a couple ways of defending themselves when they feel they are in danger. The first line of defense is their skin toxins, which make most animals (including domestic dogs that mess with them) quite sick. Also, if picked up by a predator or handled by a human they will excrete a great deal of urine, which supposedly tastes bad to most predators. Sometimes they will also puff up their bodies with air to appear larger.

Habitat: American toads are habitat generalists that can live practically anywhere with some moist hiding spots or vegetative cover, a semi-permanent water source (for breeding and early development), and a food source (of insects and small invertebrates). Within their range they can be found from forests to suburban yards, and most places in between. They are often found around human habitations because they are so adaptable. They will use anything, such as upturned flower pots, loose flagstones, or wooden porches as hidey holes. During the winter they only need some moist soil and cover to bury themselves in to stay moist and keep from freezing.

Enemies: American toads have many enemies that will prey on them including small alligators, birds, small mammals, and occasionally fish. However, there are many animals that do not feed on American toads (even though it seems like they would) because they do not like the taste of their skin secretions. Fish are not usually a major predator to adult toads, but occasionally if the eggs are laid in water that is too deep in a pond with fish they will quickly be eaten. It is for this reason that toads often breed in ephemeral ponds (they do not hold water year-round)—those ponds do not sustain fish populations. But the most common predators of toads are snakes. There are even some snakes, such as the eastern hognose snake (*Heterodon platyrhinos*), which are predatory specialists that feed only on toads.

In addition to their predators, American toads are also put at risk by many human activities. Cars, bikes, and even joggers often smash toads that happen to be crossing a road at night. Because of their permeable skin, American toads may be vulnerable to the negative effects of chemicals and other types of pollution. The four main types of chemical stressors thought to affect amphibians are pesticides, nitrogen pollutants, acidification, and heavy metals. At this point, we are only beginning to understand how environmental pollutants affect the multitude of amphibians that live here in the southeast United States.

Populations: American toads are common throughout their range and may be locally present in high numbers. If there are moist hiding spots and multiple prey species present, toads may be very abundant. Often after a warm spring rain large numbers of American toads will emerge and flock to shallow breeding ponds. At this time populations appear to be healthy.

Disease

American toads are not known to transmit any diseases to humans. However, the toxins within their skin secretions can be irritating to human mucous membranes. Make sure to wash your hands well after handling a toad.

American toads may pose more of a risk to domestic dogs and cats. Most animals that pick up an American toad will immediately spit it back out due to its bad taste. They also may foam at the mouth, but they usually recover unharmed. If the pet actually swallows the toad however, it may be in more danger of getting very sick or worse. In either case, it is a good idea to call your veterinarian, particularly if you are not certain on which species of toad to which the animal was exposed.

Economic Value

Because the American toad is so widespread and a common urban and suburban inhabitant, as well as being an amphibian, it has been used to study the effect of numerous types of chemicals and industrial toxins on wetland environments and their inhabitants. The environmental toxicity topic is currently a very popular area of research.

In addition, American toads play important roles as predators and prey within many different ecosystems. They are also known for their ability to consume large numbers of agricultural pests and

are beneficial animals to have in the home garden, as well as on farms. However, because of their physiology they are highly susceptible to harmful chemicals including pesticides. Where pesticides are used in high quantities, their populations may be limited or nonexistent.

Damage

American toads do not cause any damage to human agriculture, livestock, or structures. Occasionally droppings will be found on patios or porches. These are from toad feeding on insects attracted to lights. Simply turning off lights at night will reduce this activity. Skin secretions of toads could be mildly toxic if ingested but this is rarely a problem. Pets, especially cats and dogs, rarely ever consume toads and quickly learn to avoid or ignore them.

Medicinal Value

There are many compounds that make up the bufotoxin that is produced by the American toad. Some of these compounds are currently being investigated for use as cardiovascular drugs, pain killers, and organ glues.

Legal Aspects

There are currently no laws that protect the American toad.

Control to Reduce

Because American toads are usually beneficial yard visitors, population reduction is not usually necessary. However, because domestic animals may become sick after biting these toads, some people may prefer to keep their populations low. Unfortunately, because they are such adaptive creatures they may remain in and around your yard if they can find places to hide, food to eat, and a breeding pond within the vicinity. Removal of water sources and any ground cover (including rocks, pots, wood, etc.) will probably make the habitat less preferable to American toads.

Management to Enhance

The first steps to enhance your American toad population are to make sure there is acceptable habitat with hiding spots in moist areas, plenty of prey species, and a semi-permanent water source. Make sure there is a layer of leaf litter or mulch in moist areas. Dig small holes in the litter and partially cover them with rocks, logs, or even upside-down flower pots. If you are even more ambitious you may want to consider building a small pond—this will attract even more small beneficial predators like frogs and salamanders. The most important thing you can do to attract toads and keep them in your yard is to limit your use of pesticides and encourage those around you to do the same. Pesticides kill the creatures that toads eat and they also may harm the toads themselves, either directly or indirectly.

Human Use

Native Americans – Toads were respected as important parts of nature by many Native American cultures. In at least one culture the toad played an important role in their story of the earth's creation. In the Huron story of the woman who fell from the sky, the toad was the only creature that was able to

collect dirt, which the woman then put over the shell of a turtle and created the earth. The toad also was the source of all the earth's fresh water.

Some reports say that Native Americans in the southeastern United States used the toad's skin toxins to put on the tips of their arrows.

Colonists – They may have used skin toxins on the tips of weapons for hunting.

Further Reading

Conant, R. and J. T. Collins. 1998. *A Field Guide to Reptiles and Amphibians of Eastern and Central North America*. 3rd Edition, expanded. New York: Houghton Mifflin Company. 616 p.

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