

The Fascinated Naturalist's Guide to



# SNAILS & SLUGS

## OF CLEVELAND METROPARKS

*Text by Joel Kavaras*

*Photography by Stuart Pearl and Joel Kavaras*

*Illustrations and edits by Stefanie Verish*

*Graphic Design by Sal Perconti*

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# Credits

**For use of their stunning photography,  
we offer our enormous thanks to:  
Stuart Pearl and Joel Kavaras**

**Text by  
Joel Kavaras**

**Illustrations and Edits by  
Stefanie Verish**

**Graphic Design by  
Sal Perconti**

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help on this book.**



# Introduction

On a stroll through the forest, it is easy to pass by the rotting log on the forest floor or the strands of loose bark clinging to a long-dead tree, but if one takes the time to investigate, a treasure trove of life reveals itself. First, the mad dash for cover as spiders, salamanders, and insects frantically seek shelter. Once they have fled, the careful observer may notice that a few animals have not moved at all— animals with spiraled shells and slimy bodies. These are the land snails, a diverse group occupying a variety of habitats worldwide, with over 100 species in Ohio.

Slugs and snails share the phylum Mollusca with squid, clams, and scallops. They belong to the class Gastropoda, the “stomach-foot” molluscs. They are soft-bodied creatures that move by waves of muscular contraction along a single “foot” that extends the length of their body. Mucus is secreted from a gland near the head and acts as a lubricant to aid in locomotion. All species of land snail found in Cleveland Metroparks breathe using a lung and have two pairs of retractable tentacles. Some species have a shell (*snails*), and others lack a shell or have only a small, vestigial shell (*slugs*). All species are hermaphrodites, with both male and female reproductive anatomy, and many are capable of self-fertilization to produce viable offspring if they cannot find a mate.

When naming gastropods, scientific names are most accurate because common names vary from place to place. This guide includes both common and scientific names, either at the genus level or the species level if individual species are identifiable in the field.



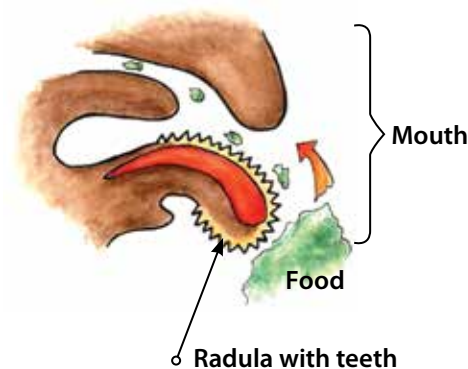
# Food and Feeding Habits

The majority of native land snails in Cleveland Metroparks feed on plants, lichens, fungi, and decaying plants and animals. Non-native species will also feed on a variety of cultivated plants and are considered crop and garden pests.



Radula patterns on bark

Land snails have a mouth which contains a tongue-like structure known as a radula. The radula is made of chitin— the same material as insect exoskeletons— and is covered in thousands of tiny teeth arranged in rows. It is used to scrape or rasp food particles against the cartilage of the mouth, breaking them down into manageable pieces for the snail’s digestive system.





# Life Cycle and Reproduction

Most land snails are hermaphrodites, possessing both male and female reproductive organs, so after mating, both snails can lay eggs. In scattered populations, some species can self-fertilize. Certain land snails have mating rituals that employ “love darts.” The darts are sharp, spear-shaped structures launched from the dart sac, into the mating partner’s flesh. The dart transfers reproductive hormones that increase the odds of fertilization. In the case of the Leopard Slug (*Limax maximus*), partners coil around one another while suspended from a slime cord.

Copulation involves extrusion of the reproductive organs through an opening on the right side of the animal’s head. For this reason, mating pairs align facing opposite directions, then expel and entwine their reproductive organs, which are sky-blue in color. In Cleveland Metroparks, mating is tied to seasonal weather patterns, so many species will mate in early summer when it is warm and damp, though mating can occur whenever conditions are viable. After mating, the snails separate and lay eggs, ovipositing either single eggs or clusters of eggs (*depending on species*) in damp, sheltered locations. Some species mate once before dying at the end of the season; others mate several times throughout their lives and may live for many years.



Slugs copulating



Slug eggs



Snail ovipositing (laying eggs)



Snail eggs

Land snails begin their lives as eggs, either with a soft, jellylike coating (*slugs*) or a harder, calcified coating (*snails*). All land snails found in Cleveland Metroparks lay eggs in early summer and sometimes throughout the warmer months. Eggs are laid underneath a log or deep in leaf litter, where they are shielded from the sun. The eggs hatch after a few weeks, and a miniature version of the adult emerges. Snails have a small shell known as the protoconch. The shell is initially pliable to allow easy hatching, but it soon hardens. The snail will consume its own eggshell as a calcium-rich first meal.

# Predators and Defenses

Land snails are small, slow, and soft-bodied, so they are often prey for other animals. Common predators include beetles and their larvae, flies, nematodes, mice, shrews, birds (*especially ground foragers like wild turkey*), turtles, and other snails. Land snails, however, are not defenseless and have evolved a variety of mechanisms to thwart predators.

For snails, defense against fellow invertebrates includes thick shell apertures (*openings*), and sometimes a set of teeth known as denticles that guard the aperture. Denticles are an effective means of blocking entry to the snail's shell, protecting the animal inside. For larger predators like birds, who can peck through the shell, the snail relies upon camouflage to avoid them. Most snail shells are dull shades of green, brown, or are translucent by design, and some have minute hairs which snare cobwebs and other debris to hide the animal.

Defensive mucus is a common adaptation amongst all land snails, and some species utilize showy colors to advertise their unpalatability. For example, the Dusky Arion slug is bright orange or yellow-- a warning to predators that it produces a revolting and toxic mucus. In contrast, most native slugs are cryptically colored to blend in with the tree bark upon which they forage.

A snail may not escape the grasp of a predator unscathed. Cracks in the shell and severed tentacles are common injuries, but land snails are resilient. They use their shell-building mantle to repair damage, and severed tentacles can be regenerated.



# Where to Find Them

Land snails are found in a variety of habitats, each niche therein harboring a different assortment of species. The best land snail diversity is in forested river valleys and floodplains. Snails abound under rotting logs, loose bark, and among leaf litter. If it is especially humid or raining, you will see them crawling up the trunks of trees.

Other suitable habitats include swamp forests, the edges of fields and prairies, and even graveled roadsides, railroad tracks, and paved trails. The edges of wetlands and ponds are a niche for Amber Snails, which can be found on the stems of cattails and other emergent plants.

When looking for land snails, it is important to remember that a certain level of moisture is required for these animals to thrive. Even during dry spells (*and winter*), it is possible – though not easy – to find land snails. They survive difficult conditions by receding completely into their shell and forming a leathery film of mucus called an **epiphragm** over the aperture (*opening*), which retains moisture but has a tiny hole for gas exchange. Look for dormant snails deep in leaf litter or fastened to a rock or tree via their epiphragm. Searching for dormant slugs can be a challenge, as they retreat deep into crevices in rocks or rotting logs, where their surroundings retain moisture.





# Snails, Slugs and You

For those in Northeast Ohio, daily interactions with snails and slugs may consist of seeing slime trails on the sidewalk or combating a slug infestation in one's garden. It is important to note that the "pest" species that prefer to dine on garden plants are non-native, introduced from Europe. The non-native species struggle to survive beyond the habitats of human influence, whereas the native species inhabit woodlands, fields, and marshes, feeding on algae, lichens, fungi, and detritus that are usually not found in cities and suburbs.

Non-native snails and slugs are resilient and multiply quickly. Vigilant gardeners might remove dozens of slugs each night (*when the animals are most active*) and have no noticeable impact on the slug population. An array of anti-slug products is marketed, but the best way to protect one's garden is to use simple home remedies. Try attracting toads, or use a beer trap — a shallow tub dug into the ground and filled with beer— to deter or eliminate slugs without adding harmful poisons to your garden. The beer trap attracts and drowns nearby slugs, and toads feast on slugs at night.

If you have handled or picked slugs off your plants, you have probably wondered, "*How do I get this slime off my hands?*" The mucus produced by land snails absorbs water, so trying to wash it off is not very effective. Use a dry paper towel to rub off most of the mucus, then wash with soap and water afterwards. Before you get mad at the snail for sliming you, consider this: the mucus has cosmetic applications. There is an entire heliciculture (*snail farming*) industry based on harvesting snail slime for use in skincare products.



Beer Trap



# Using This Guide


Common and scientific name


Adult size comparison

## Flamed Disc

*(Anguispira alternata)* Native Species


Distinctive pinwheel pattern






Shell diameter  
18 - 23 mm

Reddish-orange coloration  
on the lower and back parts  
of the foot



Pattern is more  
vibrant in juveniles



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Habitat: Forests, ravines and roadsides

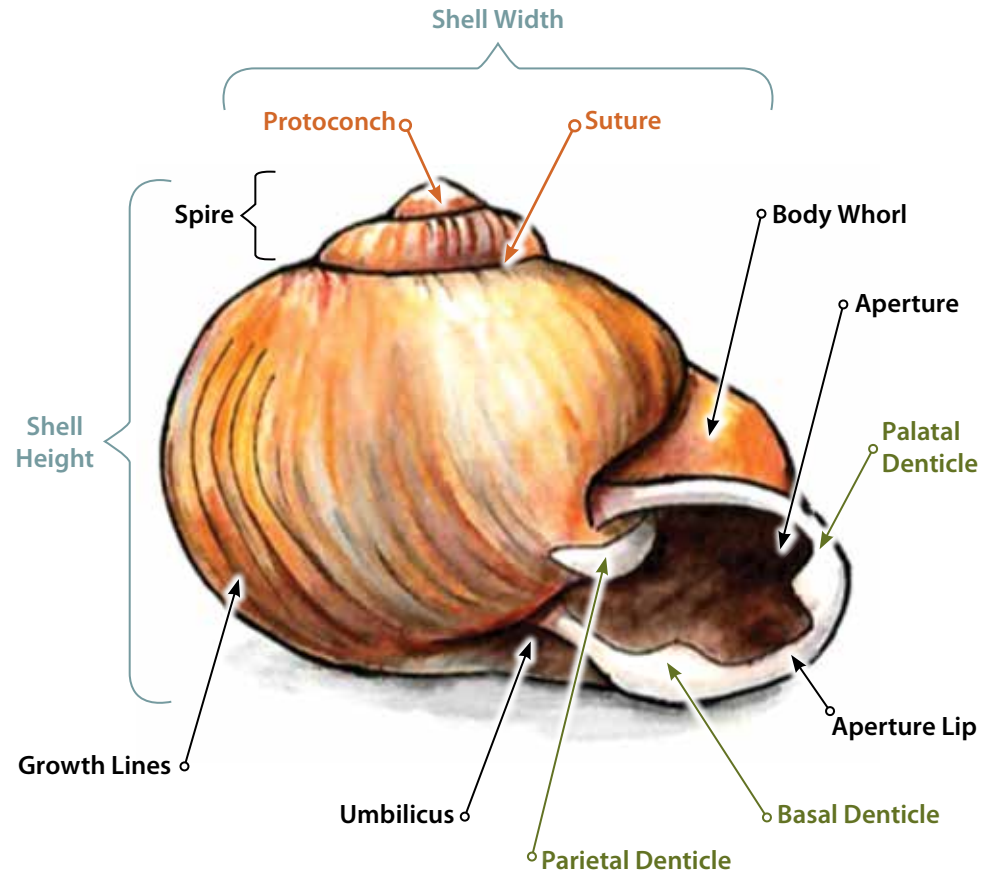
The Flamed Disc, also called the Flamed Tigersnail, produces a thin, orange mucus. They are often found under rocks and logs or climbing the trunks of trees, where they feed on algae.

Snails & Slugs of Cleveland Metroparks

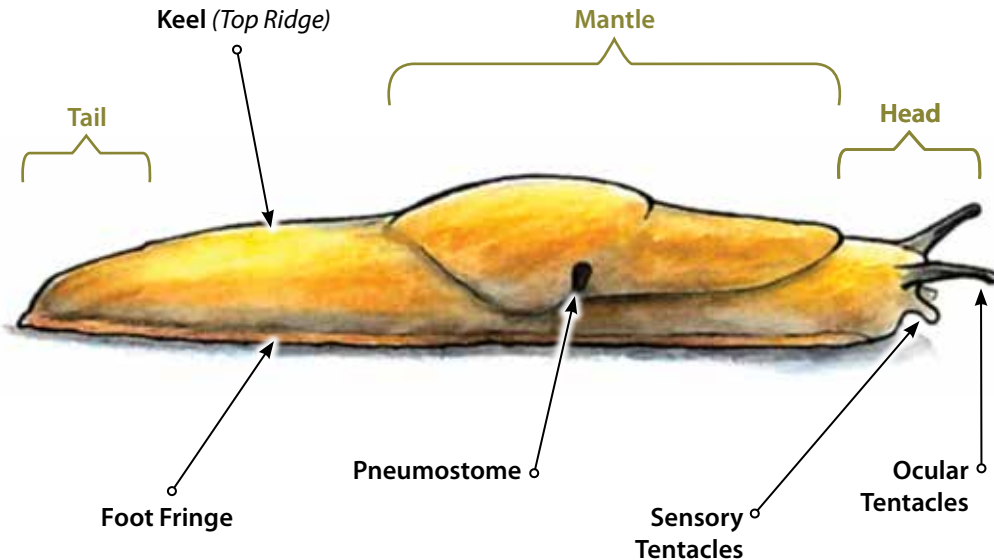
Habitat and species information

Field marks

# Using This Guide: Snail Anatomy



# Using This Guide: Slug Anatomy



# Glossary

**Denticle:** a calcium carbonate “tooth” inside the opening of a snail’s shell, typically for predator defense or calcium storage.

**Epiphragm:** a film of mucus secreted across the opening of a snail’s shell to prevent desiccation during long periods of dry weather.

**Keel:** a ridge that runs along the top of a snail or slug’s tail.

**Love Dart:** a tiny spear-like structure that carries reproductive hormones and is thrust into a mate’s body during copulation.

**Mantle:** the membranous organ that produces the shell in snails and protects the dorsal surface in slugs.

**Pneumostome:** an opening in the mantle that allows gas exchange; the breathing pore.

**Protoconch:** the larval shell of a snail when it hatches; the original shell from which the rest will grow throughout the snail’s life.

**Radula:** the chitinous tongue-like organ in the mouth that is covered in tiny teeth and is used to rasp at food.

**Tentacles:** retractable sensory appendages on the snail’s head. They function as chemical sensory receptors; the longer tentacles also contain the eyespots.

**Tubercles:** the raised sections on a snail or slug’s body that appear as small elongated bumps.

**Umbilicus:** a depression or opening at the base of the snail’s shell. The umbilicus can be large enough to see up into the spire of the shell, small as a pinhole next to the aperture, or completely covered by the lip of the aperture.



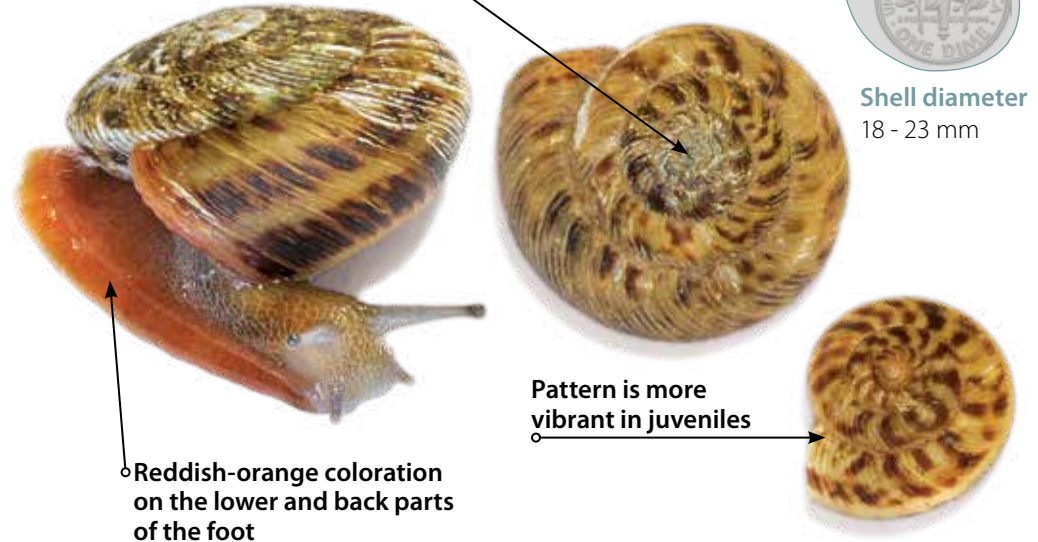


# Flamed Disc

(*Anguispira alternata*)

Native Species

Distinctive pinwheel pattern



Shell diameter  
18 - 23 mm

Reddish-orange coloration  
on the lower and back parts  
of the foot

Pattern is more  
vibrant in juveniles



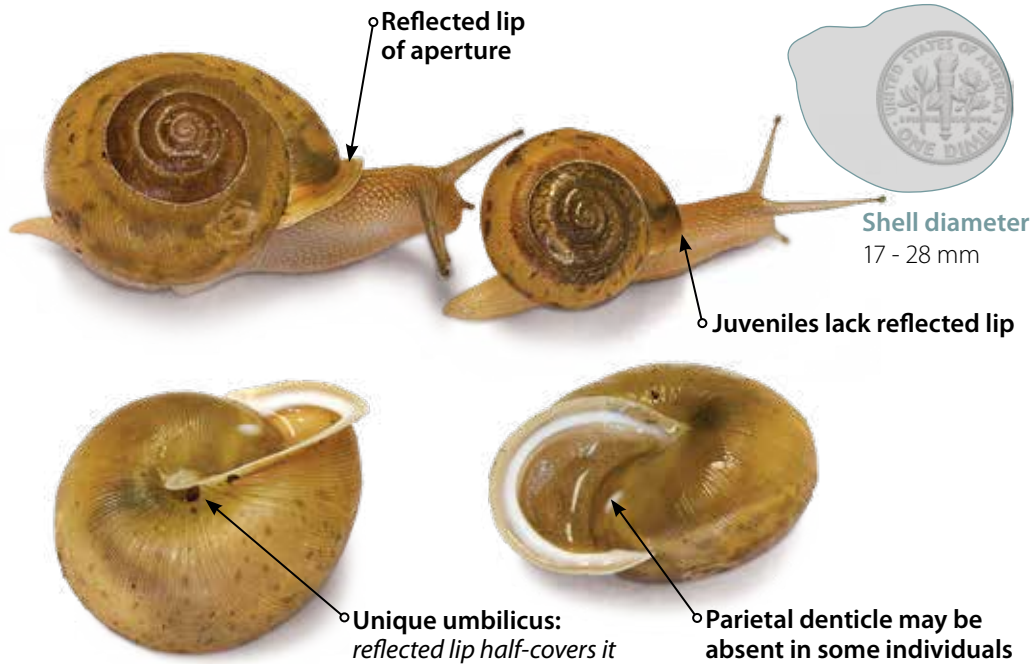
**Habitat:** Forests, ravines and roadsides

The Flamed Disc, also called the Flamed Tigersnail, produces a thin, orange mucus. They are often found under rocks and logs or climbing the trunks of trees, where they feed on algae.

# White-lip Globe

(*Mesodon thyroidus*)

Native Species



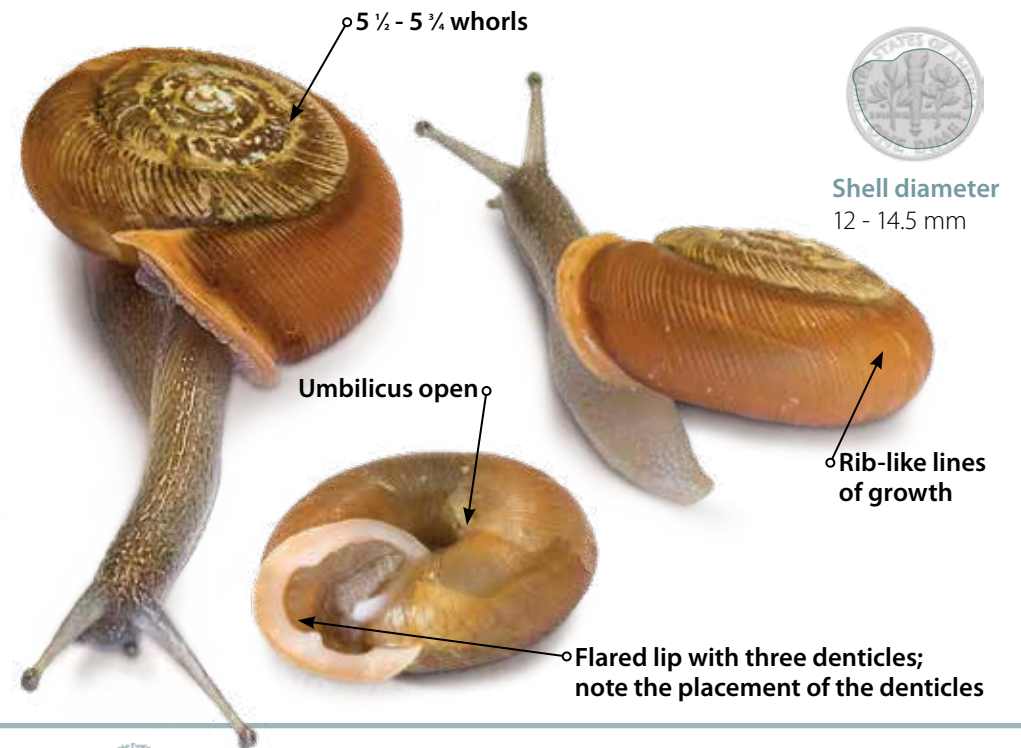
**Habitat:** Forests, floodplains and wetlands

The White-lip Globe is one of the most common forest snails in Cleveland Metroparks. It feeds mostly on fungi.

# Northern Threetooth

(*Triodopsis tridentata*)

Native Species



**Habitat:** Forests, meadows and roadsides

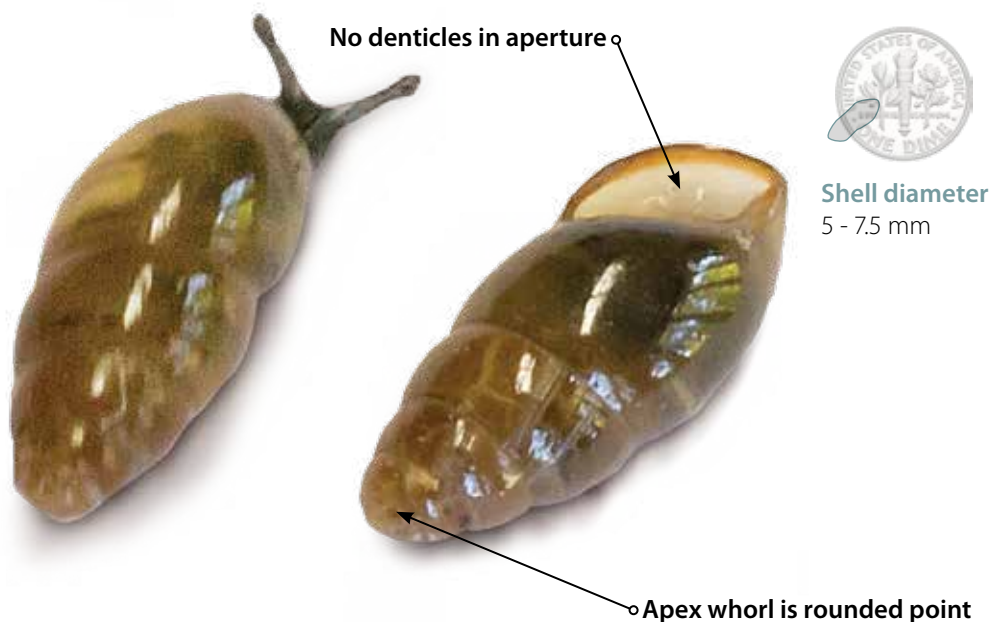
Northern Threetooth snails are common in leaf litter and under rotting logs.



# Glossy Pillar

(*Cochlicopa lubrica*)

Native Species



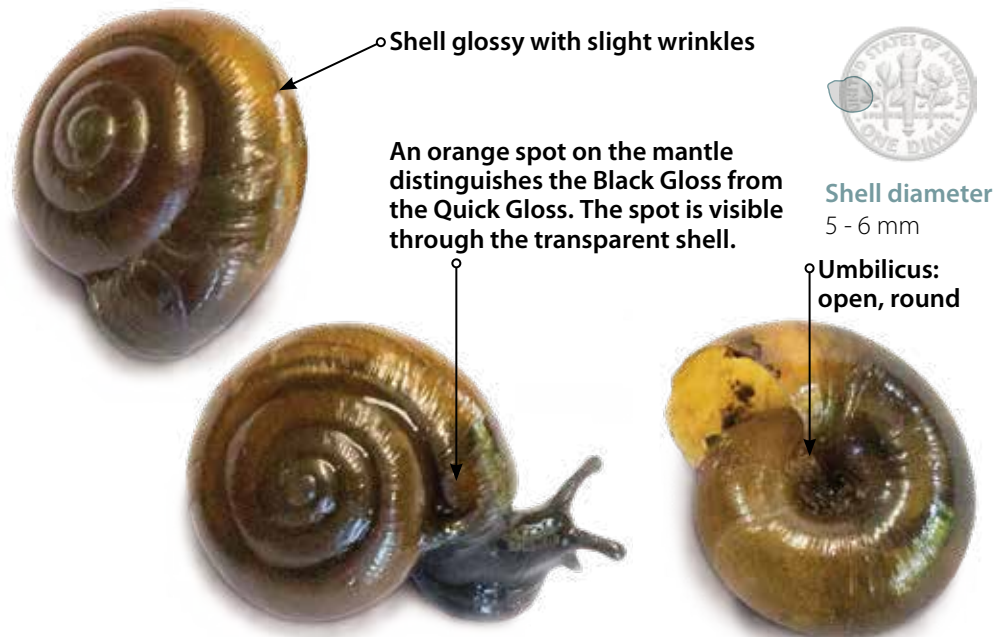
**Habitat:** Wetlands, forests, meadows and roadsides

The Glossy Pillar is one of two land snails found in Cleveland Metroparks that have cylindrical, pillar-shaped shells. The Thin Pillar is a non-native species from Europe that is nearly identical except that it is slightly smaller, with a more cylindrical shell.

# Gloss Snails

(*Zonitoides* spp.)

Native Species



**Habitat:** Floodplains, wetlands, edges of lakes and ponds

Two species of gloss snail are common to Cleveland Metroparks: the Black Gloss (*Z. nitidus*) and the Quick Gloss (*Z. arboreus*). The Black Gloss is carnivorous— even cannibalistic. The Quick Gloss, named for its speed, moves rather quickly for a snail.



# Dome Snails

(*Ventridens* spp.)

Native Species



Dome snails have relatively tall shells, some species with shells as tall as they are wide.

6 - 7 whorls



Shell diameter  
11 - 16 mm

Umbilicus is small and narrow, like a pinhole



**Habitat:** Forests, floodplains, meadows and roadsides

Dome snails occupy a wide range of habitats and may be found in clusters under leaf litter, around rotting logs, and even next to roads or parking lots.

# Amber Snails

(Family *Succineidae*)

Native Species



A common habitat for amber snails is among cattails.



Shell diameter  
3 - 17 mm

Amber snails have a unique shape to their shell: higher than it is wide, with a long, elongate aperture.



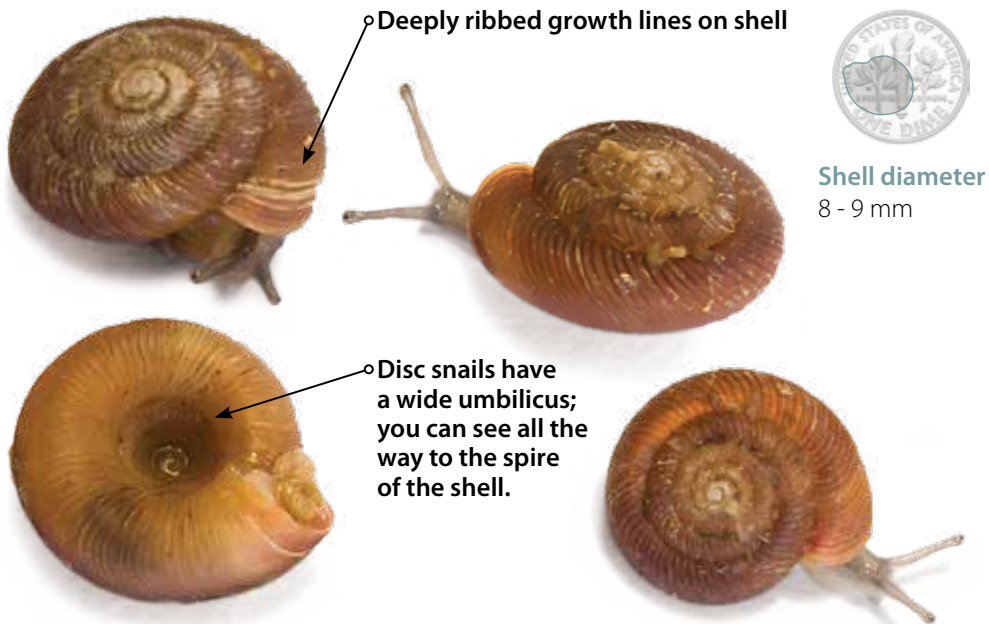
**Habitat:** Wetlands, pond edges, floodplains and marshes

Amber snails are named for their thin, amber-colored shells that often barely cover the body of the snail. They are moisture-loving, often found where standing water is present throughout the warmer months.

# Disc Snails

(*Discus spp.*)

Native Species



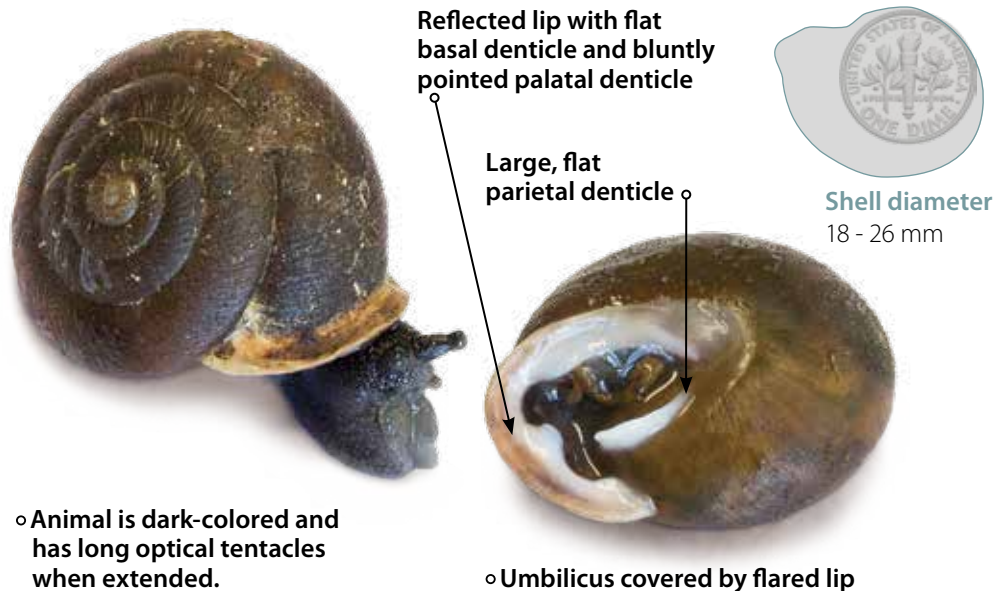
**Habitat:** Forests and ravines

Snails in the genus *Discus* are small forest-dwellers with flat, disc-shaped shells. They are often found in large colonies around rotting logs, stumps, or under leaf litter. The Domed Disc (*D. patulus*, above) has 5 - 6 whorls on its reddish-brown shell.

# Velvet Wedge

(*Xolotrema denotatum*)

Native Species



**Habitat:** Forests, ravines and floodplains

The Velvet Wedge has a dark shell covered with tiny, hair-like projections that give it its velvety texture. These hairs pick up cobwebs and other debris that will camouflage the snail. The hairs are part of a living layer of "skin" over the shell and will not be present in long-dead shells.

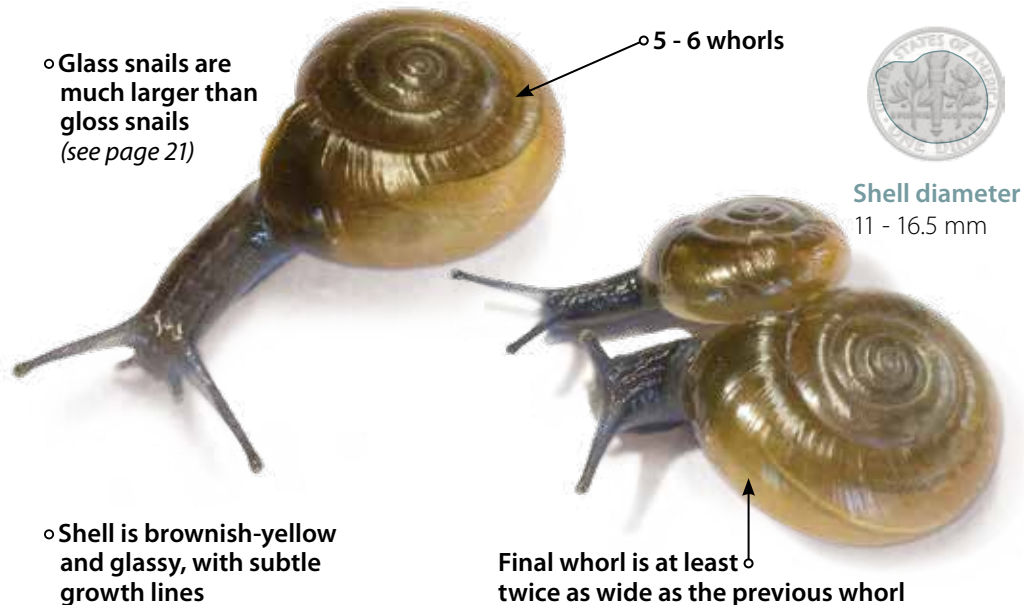


# Glass Snails

(*Oxychilus* spp.)

Non-Native Species

- Glass snails are much larger than gloss snails (see page 21)



Shell diameter  
11 - 16.5 mm

- Shell is brownish-yellow and glassy, with subtle growth lines

Final whorl is at least twice as wide as the previous whorl



**Habitat:** Yards, gardens, waste sites and urban parks

Glass snails (*genus Oxychilus*) were introduced from Europe and are found in urban parks near the lakefront. Two species are found locally: the Cellar Glass-snail (*O. cellarius*) and Draparnaud's Glass-snail (*O. draparnaudi*). The latter is carnivorous, preying on other snails.





# Dusky Arion

(*Arion subfuscus*)

Non-Native Species

Length  
50 - 70 mm



◦ Lateral band on right side of animal arches over pneumostome

◦ Colors range from orange-brown to olive to yellow to gray-brown, with sticky orange or yellow mucus.



◦ Lacks keel, but tubercles are present



**Habitat:** Yards, gardens, forests, fields, floodplains and urban areas

The Dusky Arion is one of the most common slugs found in eastern North America. Native to northwest Europe, it thrives in a variety of habitats and feeds on a wide range of food. Look for them under rocks, logs, garden pots, and around tree roots in yards and forests.

# Garden Arion

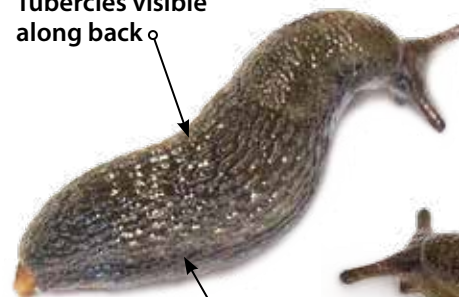
(*Arion hortensis*)

Non-Native Species

Length  
25 - 40 mm



Tubercles visible along back

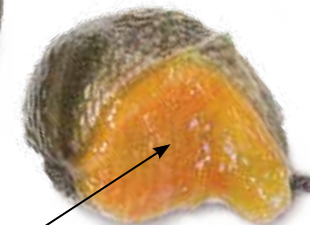


◦ Head and body black or gray-black

Dark lateral bands on either side of animal



Sole of foot is bright orange, yellow, or reddish, with yellow-orange mucus



**Habitat:** Gardens, yards, forests, fields and urban areas

The Garden Arion is smaller and darker in color than other Arion species, with a distinguishing bright orange sole. This slug can be a garden or crop pest.

# Hedgehog Slug

(*Arion intermedius*)

Non-Native Species

Length  
20 mm



Dark gray head, body white to pale gray



Slime and sole of foot bright yellow

Dark lateral bands may be present or absent



When contracted, tubercles resemble tiny spines



**Habitat:** Forests, ravines, yards, floodplains and urban areas

The Hedgehog Slug is small and distinctly colored. It is named for how the tubercles stick out when the animal contracts, making it look like a tiny hedgehog. These "spines," however, are just as soft as the rest of the slug's body.

# Leopard Slug

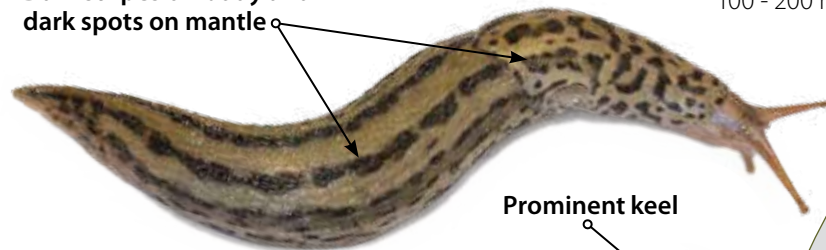
(*Limax maximus*)

Non-Native Species

Length  
100 - 200 mm



Dark stripes on body and dark spots on mantle

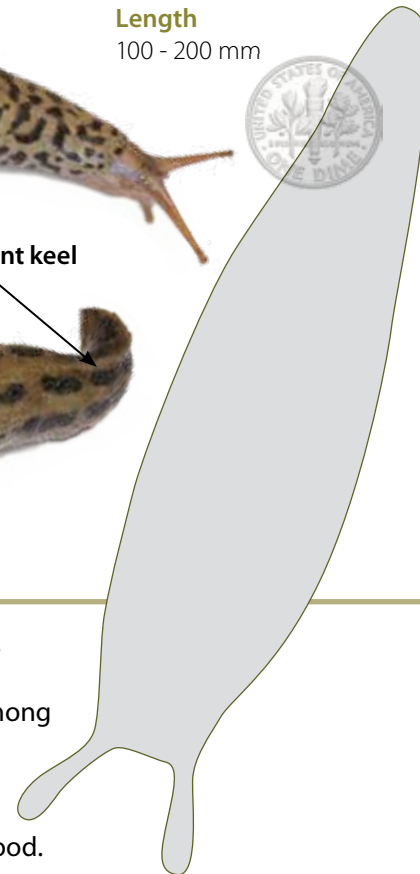


Prominent keel



**Habitat:** City parks, urban areas, forests and yards

Leopard slugs are the largest slugs in Ohio and among the largest in the world. Their black spots, stripes, and size have given it other names: "Tiger Slug" or "Great Gray Slug." These nocturnal slugs search for fungi or plant matter, but also other slugs, as food.



# Threeband Gardenslug

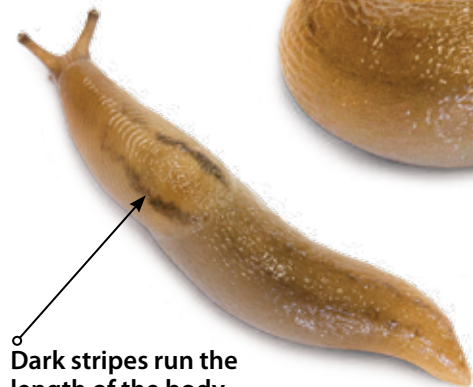
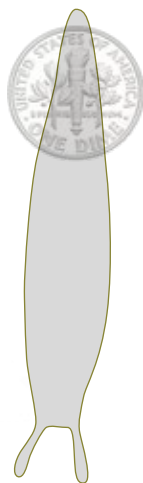
(*Ambigolimax valentianus*)

Non-Native Species

◦ Copious amounts of clear, watery mucus

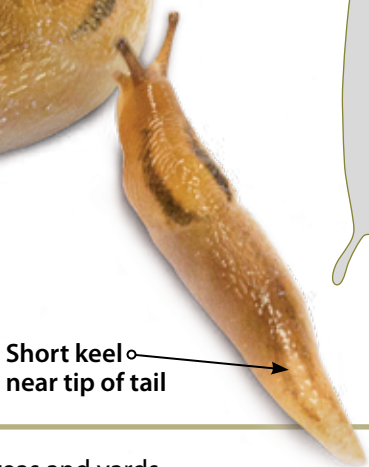
◦ Pale yellow-gray color

Length  
60 mm



◦ Dark stripes run the length of the body

◦ Short keel near tip of tail



**Habitat:** City parks, urban areas and yards

The Threeband Gardenslug is a non-native species that makes its home in human-modified habitats. These slugs often congregate in moist hideouts, under rocks or even in storm drains. They feed on plants and algae and can be pests in gardens and greenhouses.

# Gray Fieldslug

(*Deroceras reticulatum*)

Non-Native Species

Length  
35 - 50 mm

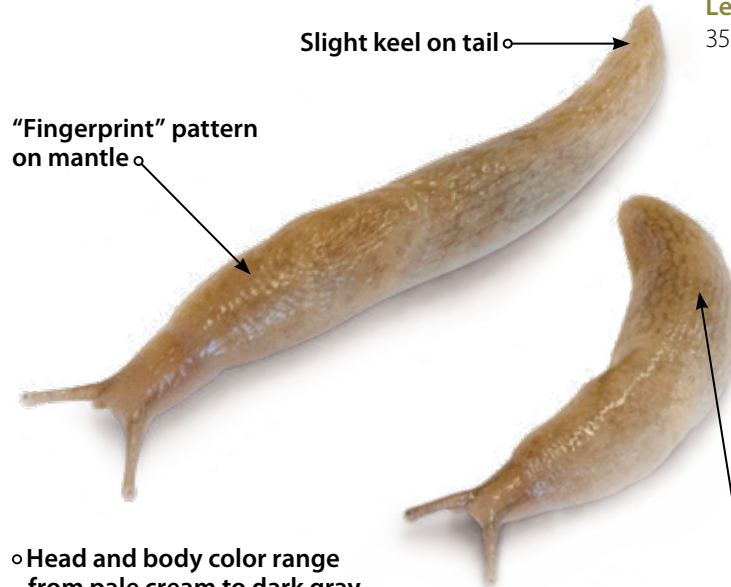


◦ Slight keel on tail

◦ "Fingerprint" pattern on mantle

◦ Head and body color range from pale cream to dark gray

◦ Darker splotches on body and mantle (sometimes absent)



**Habitat:** Yards, gardens, fields and forests

Gray Fieldslugs are some of the most common slugs you will encounter. Though it is an omnivore, this slug mostly eats live plants, making it a pest to crops. When disturbed, they produce a milky white mucus, earning them the nickname "milky slugs".



# Marsh Slug

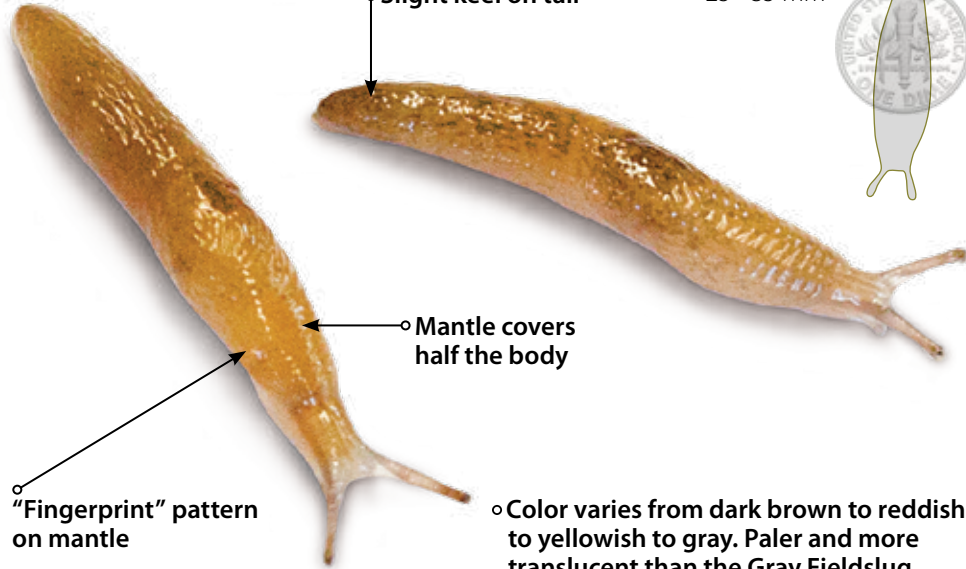
(*Deroceras laeve*)

Native Species

Length  
25 - 35 mm



○ Slight keel on tail



○ Mantle covers half the body

○ Color varies from dark brown to reddish to yellowish to gray. Paler and more translucent than the Gray Fieldslug.



**Habitat:** Wetlands, fields, floodplains, yards and gardens

This widespread species prefers wet habitats and is not likely to be a garden pest. Small and almost translucent, it appears to have an irregularly shaped body – not streamlined or rounded like other slugs. The mucus is clear, thin, and watery.

# Carolina Mantleslug

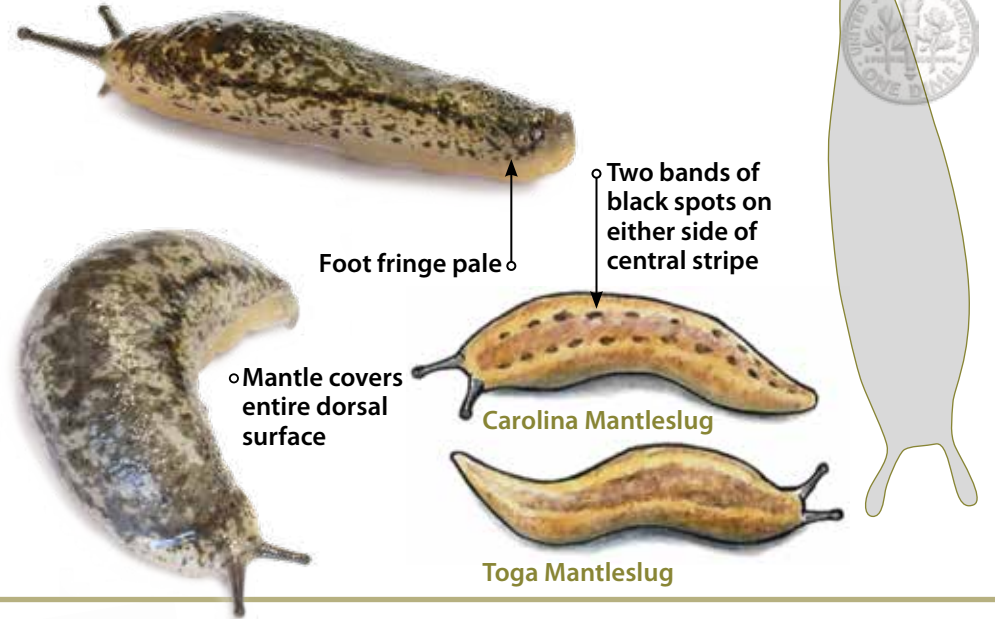
(*Philomycus carolinianus*)

Native Species

Length  
50 - 100 mm



○ Color tan to light gray with darker blue-gray tentacles



○ Foot fringe pale

○ Two bands of black spots on either side of central stripe

○ Mantle covers entire dorsal surface

Carolina Mantleslug

Toga Mantleslug



**Habitat:** Forests, floodplains and wetlands

The Carolina Mantleslug is one of the most common mantleslugs, often seen on tree roots or trunks during or immediately after a summer rain. Their pattern is distinct from other mantleslugs (*see illustration*).

# Toga Mantleslug

(*Philomycus togatus*)

Native Species

Length  
50 - 80 mm



May have dark lateral bands

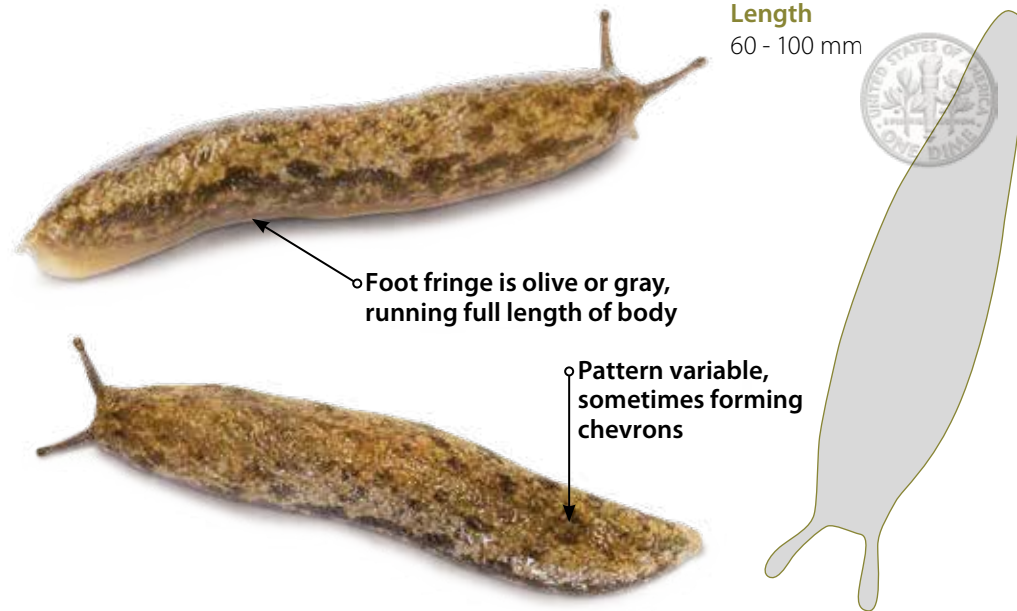
Defensive mucus is orange or yellow, and foot fringe is often the same

# Changeable Mantleslug

(*Megapallifera mutabilis*)

Native Species

Length  
60 - 100 mm



Foot fringe is olive or gray, running full length of body

Pattern variable, sometimes forming chevrons



**Habitat:** Forests

The Toga Mantleslug is another large mantleslug with variable coloration. The defensive mucus is orange in this species, while it is milky in Carolina Mantleslugs. When mating, this species uses love darts.



**Habitat:** Forests and floodplains

Changeable Mantleslugs are large, tree-loving slugs that often climb high on trunks during a rain and find shelter under loose bark or in damp tree holes or crevices. Their pattern is variable but is typically tan to gray-brown, sometimes with a dorsal chevron pattern.







# Checklist: Slugs



**Toga Mantleslug** (pg. 36)



**Leopard Slug** (pg. 31)



**Changeable Mantleslug** (pg. 37)



**Gray Fieldslug** (pg. 33)



**Threeband** (pg. 32)



**Dusky Arion** (pg. 28)



**Hedgehog Slug** (pg. 30)



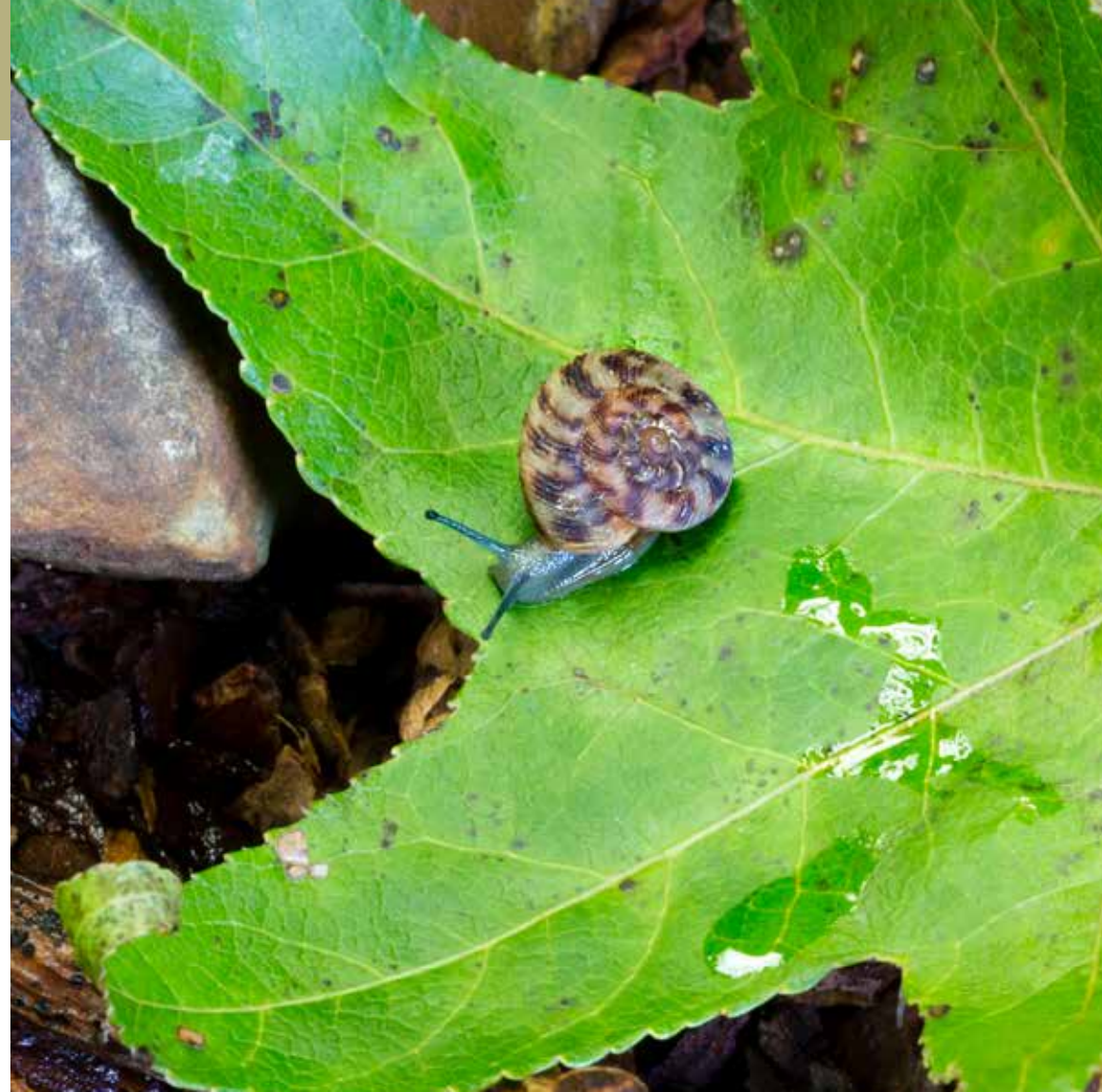
**Carolina Mantleslug** (pg. 35)



**Garden Arion** (pg. 29)



**Marsh Slug** (pg. 34)



# Cleveland Metroparks

Cleveland Metroparks, Cleveland's Emerald Necklace®, was established on July 23, 1917 to provide an open space of natural beauty and diversity for the people of Greater Cleveland, as well as to conserve and preserve the area's natural valleys. The Park District is dedicated to conservation, education and recreation and offers an array of facilities and opportunities. Today, Cleveland Metroparks consists of over 23,000 acres of land in 18 reservations, over 300 miles of trails and Cleveland Metroparks Zoo.

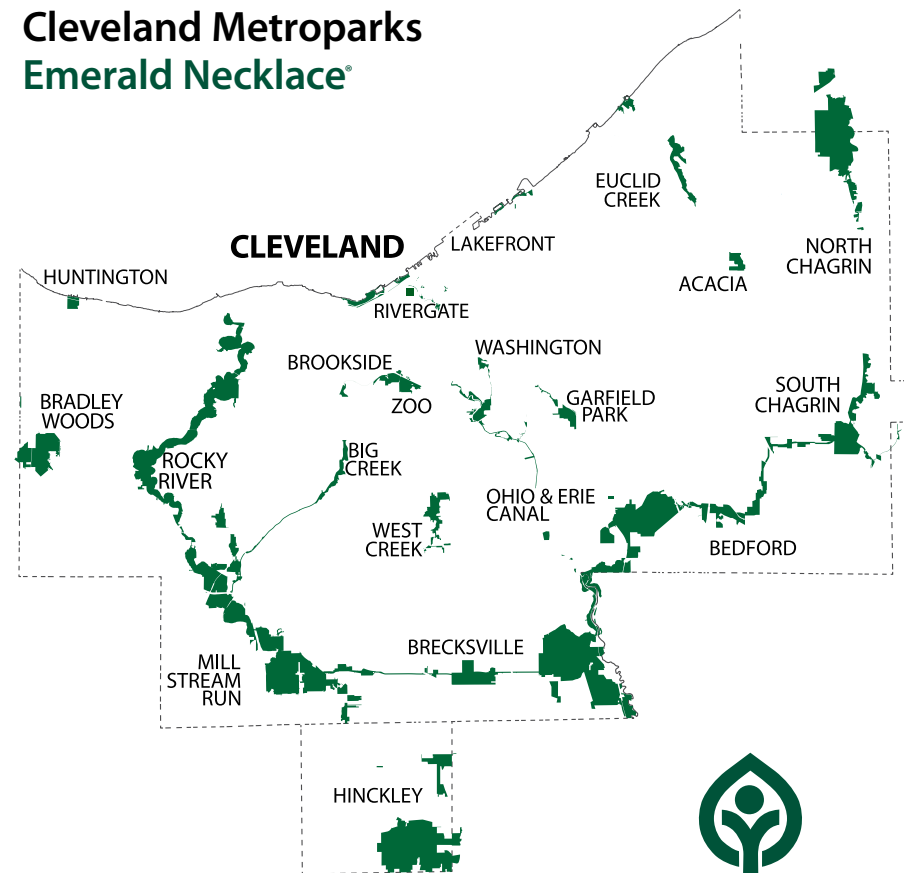
## Administrative Offices

4101 Fulton Parkway  
Cleveland, Ohio 44144-1923  
216-635-3200  
clevelandmetroparks.com

## Outdoor Experiences Facilities

Outdoor Experiences Administration	216-954-3401
Brecksville Nature Center	440-526-1012
CanalWay Center	216-206-1000
North Chagrin Nature Center	440-473-3370
Rocky River Nature Center	440-734-6660
Watershed Stewardship Center	440-887-1968

## Cleveland Metroparks Emerald Necklace®



**Cleveland  
Metroparks®**  
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# SNAILS & SLUGS

## OF CLEVELAND METROPARKS

Features 20 of Cleveland Metroparks most commonly found Snails & Slugs.  
Over 60 photos illustrate key field marks for quick and easy identification.



*Text by  
Joel Kavaras*

*Photography by  
Stuart Pearl and Joel Kavaras*

*Illustrations and edits by  
Stefanie Verish*

*Graphic Design by  
Sal Perconti*



**Cleveland  
Metroparks**