Checklist of The Land Snails of Kansas
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Checklist of the Land Snails of Kansas

by Joe Arruda

Introduction

There are over 500 species of land snails in eastern North America. Land snails (and slugs) can be found almost everywhere. They are especially abundant in forests. The wooded areas of eastern Kansas are at the western edge of the range for many eastern, northeastern, and southeastern species.

Land snails are also found in grasslands, but the lack of habitat and the nature of the physical environment limit the number of species found in grasslands compared to woodlands.

Humans have an important role in providing habitat for snails and slugs and for moving them around. Our homes and gardens are good places for gastropods. Not long ago, a friend brought me some snails from his backyard. I was surprised to find they were a Kentucky area species. The family had moved here from Kentucky and brought some little friends with them, probably in potted plants.

Changes in the landscape, both natural and due to human activity, can all affect the distribution and abundance of land snails. Unfortunately, we lack basic information about the biodiversity of land snails to adequately assess or understand the effects of changes in the landscape on these land molluscs.

We especially do not know enough about the distribution and abundance of land snails (and slugs) in Kansas.

Hopefully this edition of the Kansas School Naturalist will help inspire more collections and understanding.

Where Do You Find Land Snails?

You can look in your backyard around vegetation, especially dead grass or leaves, at the edge of rock walls, or around the garden. Take a walk in the woods and look in the forest floor among leaf litter and woody debris. Some may be found climbing a tree or weeds. Turn over branches or decaying bark. Look in grass clumps or under thatch (dead grass). Don’t stop at the first place you find, look on, snail distribution is very patchy. More success will come after rains.

It is OK to pick up and collect shells, but if you pick up live snails, return them to where they came from. You should also sanitize your hands after touching a live snail or slug (a slug is just a snail without a shell). If you keep them for a short while (as in a classroom), be sure to return them to where you found them and no other place.

As well, always be careful in the field and do not tear up the forest floor looking for snails. Be respectful of the habitat and replace bark and leaves when you have to disturb them to look for snails.

Keeping Land Snails

Live snails are best kept where you found them – in the field. They should not
be kept for pets. For a short while in a classroom, any simple container will work for a terrarium – clear is best for viewing. Add a small layer of sand if you can at the bottom for drainage then a few inches of potting soil or good garden soil on top to make a good home. A screen on top for air tops it off. Keep the soil moist (use distilled water or “aged” tap water) and use any lettuce for food. A few fish flakes for dessert rounds it out. Add the lettuce during or at the end of the day and remove what’s left the next morning to avoid flies. Return them soon to where you found them.

**Ecological Roles**

Land snails serve an important role in ecosystems. They consume both the living and the decomposing. “Food” may be fungi growing in or on decaying wood, the wood itself, decomposing plant matter, living plants, or other snails. Yes, a few are predaceous and some harbor parasites.

Snails eat by scraping surfaces with a specialized structure called a radula. It is a long strip of tissue with hundreds of replaceable teeth. The radula is drawn back and forth over surface, scraping food into the mouth.

The only specialist predatory snail in Kansas is *Haplotrema concavum*, the Gray-footed lancetooth. It has only been collected in three eastern counties bordering Missouri – none recently.

In turn, land snails are prey for a wide variety of reptiles, small mammals, birds (Figure 1), and insect larvae.

![Figure 1. Snails shells broken by birds on a trash can lid, with flies cleaning up.](photo: Suzanne Arruda)

There is even a snake that specializes in eating snails. The front teeth in the upper jaw of the snake grab the snail, and the lower jaw and teeth bring out the snail’s body from its shell. It is found in Mexico and South America.

Several Kansas land snails and slugs harbor the brainworm nematode, *Parelaphostrongylus tenuis*. White-tailed deer pick up infected snails as they browse. In the deer’s stomach, the parasite moves through the stomach wall, finding nerves to travel to the spinal cord and on to the deer’s brain.

In the brain, the worm becomes an adult and produces eggs that travel in the blood to the lungs. Here it gets interesting. The eggs hatch into larvae in the lung and travel up the deer’s trachea to be coughed-up and swallowed and then eliminated in the deer’s feces. A snail or a slug will pick up the parasite as it enjoys the plant matter in the feces. The snails and slugs are not affected by the parasite.
What is a Snail’s Life Like?

Land snails start as eggs – about 1-2 mm in diameter, usually laid in groups buried in loose soil, sometimes laid singly. There may be a few or up to 24 or more in a batch.

The egg nourishes the developing snail at first as it builds the first few coils of the shell (the protoconch). Finally, it's time to leave the egg, some by eating the shell (it may have needed calcium) or just breaking through. Now the hatchling is out and crawling along with two things in mind, perhaps – food and shelter (Figure 2). If the snail does not become prey or fall to a natural death along the way, it will grow, add more coils, and become reproductively mature.

Figure 2. Neonate Flamed tiger snails (*Anguspira alternata*) next to unhatched eggs.

Most land snails are hermaphrodites with internal fertilization. They can even display courtship behaviors. Typically, sperm are stored in small packets called spermatophores. These will be exchanged between two individuals – some head-to-head and some side-to-side (Figs. 3 and 4).

When the eggs are ready, the snail will find a decaying vegetation and lay their eggs. So the life cycle continues.

Figure 3. *Neohelix allenii* (Western whitelip) snails mating head-to-head in a lab setting.

Some snails inject a dart made of calcium carbonate into their mating partner. The role of the so-called “love dart” is debated, but it may increase the chance the eggs will be fertilized by the sperm of the injector (snails can mate more than once before laying eggs).

Figure 4. Two Giant garden slugs (*Limax maximus*) mating in a typical embrace. (photo: Nancy Middendorf)

Are Land Snails Endangered or Threatened?

There is one Kansas-listed endangered snail – the Slender Walker snail (*Pomatiopsis lapidaria*). You won’t find it on our list since it is considered an aquatic snail in Kansas. It is actually amphibious. It has gills, but also an
operculum or “door” that seals the opening when it is out of water.

There are no Kansas land snails on the federal threatened or endangered list, although there are some from other states. Land snails can have very small ranges and so face the dangers of habitat loss. Recently, an interesting Arkansas snail, the Magazine Mountain shagreen (Inflectarius magazinensis), was removed from the federal endangered species list.

Are Land Snails Pests?

For some gardeners, slugs and snails can be pests. Being “pesty” is one thing, being an invasive species is another and there are invasive land snails in North America. The biggest concern now is the Giant African land snail (as big as your fist), escaped from the pet trade and spreading in Florida. While there are invasive aquatic snails in Kansas (the “Mystery” snails), there are no invasive land species here.

Kansas does have one introduced land snail – the Giant garden slug, Limax maximus – but there may be a second. Our meadow slug (Derocerus leafe) has a relative – D. reticulatum, the Gray fieldslug, which is an introduced species. It has been found in Missouri in counties on the KS-MO border (Oesch et al. in press) and is probably here waiting to be found.

Who Are Snails Related To?

Snails are Gastropods, a large and important group of Molluscs. You are probably most familiar with sea shells – the marine Gastropods. Two other major groups of molluscs are the Bivalves – clams and mussels and Cephalopods – squid and octopus (Figure 5). Kansas once had a rich fauna of fresh-water mussels and while many remain, some are still threatened or endangered.

Figure 5. Relationships among the molluscs.

Terrestrial snails are thought to have a varied evolutionary origin. There are two main groups today. One, the more common, breathes with a pseudo-lung and has a small hole on the side of the body for air exchange that can open and close. The other, with far fewer species, still uses gills and has a gill cover (operculum) for protection.

Major Features

1. Shell terminology

- Spire
- Nuclear Whorls (protoconch)
- Apex
- Suture
- Parietal Wall
- Outer Lip
- Umbilicus
- Columella
- Aperture
2. **Shell lip.** Some species reflect (fold back) their apertural lip when they reach reproductive maturity (upper right). The lips of other species never reflect. Snails of the family Polygyridae have unreflected lips as juveniles (lower row).

3. **Shell umbilicus.** The coiling of the snail’s shell produces a central core – the umbilicus (think of coiling a garden hose). The umbilicus may be open (umbilicate) widely or narrowly, it may be open as a tiny hole (perforate), or completely covered (imperforate).

4. **Shell form.** Shell shape varies from the typical heliciform (upper left) through dome-shaped and pupilliform.

5. **Shell spire height.** The height of a shell’s spire varies. The tall round shells are termed globose. Less tall are sub-globose. But the terms “slightly depressed” and “subglobose” are fuzzy at best. Depressed spires are not as flat as pancake (those are discoidal), but have very little rise.
6. Shell sculpture – teeth. Land snails have teeth (or lamellae – not for eating with). The tooth on the inner wall of the aperture is the parietal tooth. It may be only a nub, or larger and longer. The apertural teeth are also useful for identification – their location (basal or palatal - at the outer edge) and sizes. The purpose of the “teeth” is debated.

This preliminary checklist of Kansas land snails comprises the species found after reviewing existing records and conducting new collections.

The checklist contains 70 species of land snails and slugs from 19 families (depending on classification scheme). The most species (18) are found within the family Polygyridae (polygyrid snails) - mostly larger forest snails that are commonly associated with woody debris and leaf litter. These species range in size from the smaller Liptooth and Pill snails (about 9 mm diameter) to the larger Allogona, Mesodon, and Webhelix (over 20 mm).

The other family with numerous species are the Vertiginidae with 14 species. This family includes two genera – Gastrocopta (snaggletooth snails) and Vertigo (vertigo snails), all less than about 4 mm in height with a taller-than-wide pupae-shaped shell and most with several teeth within the aperture. They can be found in leaf litter and associated with the very upper layer of soil. Some species also are found in grasslands or grassy and meadow-like areas where other forest snails do not extend.

There are three slugs on the list. The Meadow slug, Deroceras leave (Figure 6) and the Carolina mantleslug, Philomycus carolinianus are native species. The third species, the Giant garden slug Limax maximus, is an introduced species found associated with houses and gardens.

About The Kansas Checklist

The first surveys of land snails in Kansas were published in the late 1880’s into the early 1900s (Binney and Gray 1885, Call 1886, Call 1887, Ferris 1907, Baker 1909, Hanna 1909a, Hanna 1909b), some as a part of the initial biological surveys of Kansas conducted by the Washburn College of Natural History.

Through the 1940-1960s, A.B. Leonard and others at the University of Kansas published further survey work throughout the state (Fitch 1956, 1965; Fitch and Lokke 1956; Franzen 1944; Franzen and Leonard 1942, 1943; Goble 1949, Gugler 1963; Leonard and Goble 1952, Leonard 1943; Miles 1956).

In 1959, the “Handbook of Gastropods in Kansas”, Leonard (1959) provided a synthesis of collections of both aquatic and terrestrial gastropods. Since then, there has been no comprehensive review of Kansas land snails and slugs.
Checklist of Kansas Land Snails (and Slugs)

Agriolimacidae
   Deroceras laeve (Meadow Slug)
Carychiidae
   Carychium exiguum (Obese Thorn)
   Carychium exile (Ice Thorn)
Cochlicopidae
   Cochlicopa lubrica (Glossy Pillar)
   Cochlicopa lubricella (Thin Pillar)
Discidae
   Anguispira alternata
      (Flamed Tigersnail)
Euconulidae
   Euconulus dentatus (Toothed Hive)
   Euconulus fulvus (Brown Hive)
   Euconulus trochulus (Silk Hive)
Gastrodontidae
   Striatura meridionalis (Median Striate)
   Striatura milium (Fine-ribbed Striate)
   Ventridens ligera (Globose Dome)
   Zonitoides arboreus (Quick Gloss)
Haplotrematidae
   Haplotrema concavum
      (Gray-foot Lancetooth )
Helicodiscidae
   Helicodiscus notius (Tight Coil)
   Helicodiscus parallelus
      (Compound Coil)
   Lucilla inermis (Oldfield Coil)

Lucilla singleyanus (Smooth Coil)
   Limacidae
Limax maximus (Giant Garden Slug)
   Orthalicidae
Rabdopus dealbatus
   (Whitewashed Rabdotus)
Oxychilidae
   Glyphyalinia indentata (Carved Glyph)
   Mesomphix capnodes (Dusky Button)
   Mesomphix friabilis (Brittle Button)
   Nesovitrea electrina (Amber Glass)
   Paravitrea significans
      (Domed Supercoil)
   Paravitrea simpsoni (Amber Supercoil)
Philomycticidae
   Philomyctes carolinianus
      (Carolina Mantleslug)
Polygyridae
   Allogona profunda
      (Broad-banded Forestsnail)
   Daedalochila dorfeuilliana
      (Ozark Liptooth)
   Daedalochila jacksoni
      (Ozark Liptooth)
   Euchemotrema fratrum
      (Upland Pilsnail)
   Euchemotrema leai
      (Lowland Pillsnail)
   Euchemotrema leai aliciae
      (Alice's Pilsnail)
   Inflectarius inflectus (Shagreen)
   Linisa texasiana (Texas Liptooth)
   Mesodon clausus (Yellow Globelet)
   Mesodon thyr (White-lip Globe)
   Neohelix alleni (Western Whitelip)
   Neohelix divesta (Ozark Whitelip)
   Stenotrema barbatum
      (Bristled Slitmouth)
   Stenotrema stenotrema
      (Inland Slitmouth)
   Triodopsis cragini
      (Post Oak Threetooth)
   Triodopsis neglecta
      (Ozark Threetooth)

Figure 6. Meadow slug.
Webbhelix multilineata  
(Striped Whitelip)

Xolotrema fosteri (Bladetooth Wedge)

Punctidae

Punctum minutissimum (Small Spot)

Pupillidae

Pupoides albilabris  
(White-lip Dagger)

Strobilopsidae

Strobilops labyrinthicus  
(Maze Pinecone)

Succineidae

Catinella vermeta  
(Suboval Ambersnail)

Catinella wandae (Slope Ambersnail)  

Novisuccinea ovalis (Oval Ambersnail)  

Oxyloma retusum  
(Blunt Ambersnail)

Succinea forsheyi (Spotted Ambersnail)  

Succinea grosvenori  
(Santa Rita Ambersnail)

Succinea indiana (Xeric Ambersnail)  

Valloniidae

Vallonia parvula (Trumpet Vallonia)

Vertiginidae

Gastrocopta abbreviata  
(Plains Snaggletooth)

Gastrocopta armifera  
(Armed Snaggletooth)

Gastrocopta contracta  
(Bottleneck Snaggletooth)

Gastrocopta corticaria  
(Bark Snaggletooth)

Gastrocopta cristata  
(Crested Snaggletooth)

Gastrocopta holzingeri  
(Lambda Snaggletooth)

Gastrocopta pellucida  
(Slim Snaggletooth)

Gastrocopta pentodon  
(Comb Snaggletooth)

Gastrocopta procera  
(Wing Snaggletooth)

Gastrocopta similis  
(Great Lakes Snaggletooth)

Gastrocopta tappaniana  
(White Snaggletooth)

Vertigo milium (Blade Vertigo)  

Vertigo ovata (Ovate Vertigo)

Vertiginidae

Vertigo tridentata (Honey Vertigo)

Vitrinidae

Hawaiiia minuscula (Minute Gem)

Note: nomenclature based on Bouchet and Rocroi 2005, with the exception of the family Carychiidae as in Oesch et al. (in press).

Common Kansas Land Snails

Land snails can probably be found in all Kansas counties, although formal collections include only 85 of the 105 counties (Figure 7). The greatest number of species, by county, is in the forested and moister eastern part of the state. Of course, this is also the more well-collected part of the state.

Figure 7. Numbers of species estimated from each Kansas county. Counties with no number have no recorded species.

Pupoides albilabris (C. B. Adams, 1841), the White-lip Dagger (Figure 8), has the widest distribution of all species and was found in 64 counties (Figure 9) – the most of any species. P. albilabris is a small pupa-shaped snail, 4-5 mm tall.
Figure 8. The White-lip dagger, *Pupoides albilabris*. About 4-5 mm high.

This snail can be found in grassy areas, even if among some woody vegetation.

Figure 9. Distribution of the White-lip dagger in Kansas using historical records and recent collections.

Other common or interesting species include (all scale = mm):

White-lip globe, *Mesodon thyroidus* (17-22 mm, semi-globose shell, usually with a parietal tooth, peristome partially covers the umbilicus; woodlands and edges; south-central and eastern Kansas)

Bladetooth wedge, *Xolotrema fosteri* (14-20 mm, shell slightly depressed, umbilicus closed, lip reflected, long parietal tooth; woodland species found primarily in woodlands adjacent to flowing water; south-central and eastern Kansas)

Flamed tiger snail, *Anguispira alternata* (15-30 mm; around the garden and garages, rocky and moist wooded areas; lip not reflected, open umbilicus, no teeth; eastern third of state)
Western whitelip, *Neohelix alleni* (18-45 mm; reflected lip, no teeth, closed umbilicus; associated primarily with woody debris, the “friendliest” of the large woodland snails, it will easily come out of its shell and walk about your hand or finger; eastern third of state in woodlands)

Carved glyph, *Glyphyalinia indentata* (4-7 mm; perforate umbilicus, lip not reflected, no teeth; in surface litter of grassy and wooded areas, roadsides, meadows in surface litter; eastern half of state)

Compound coil, *Helicodiscus parallelus* (+/- 3 mm; wide umbilicus, three small teeth deep in aperture, noticeable raised spiral threads – looks like a small tire; in leaf litter, detritus, and soil of wooded areas; distribution uncertain, perhaps eastern half of state or more)

Maze pinecone, *Strobilopsis labyrinthicus* (about 2.5 mm, very ornate, one of two parietal tooth obvious at opening of aperture, lip reflected, umbilicus slightly covered; woodland leaf litter and detritus; eastern third of state)
Trumpet vallonia, *Vallonia parvula* (2 mm or slightly less; shell with prominent ribs, lip reflected and thickened, umbilicus open; woodland and grassland; eastern half of Kansas)

Oakwood liptooth, *Daedalochila dorfeuilliana* (about 7-9 mm in diameter, disc-shaped, aperture thick and reflected, large squarish parietal tooth and two smaller teeth recessed from the outer lip of the aperture; a forest species, likes rocky areas (including rock walls), can be found associated with large woody debris or leaf litter, limestone outcrops; south half of eastern Kansas)

Amber supercoil, *Paravitrea significans* (4-5 mm; unique smooth rounded profile with domed spire, shiny, tight coils, body whorl enlarges more than earlier whorls; wooded areas, among and under leafy and woody debris; extreme southeast Kansas)

Quick gloss, *Zonitoides arboreus* (4-6 mm, glossy shell, irregular growth lines, umbilicate, thin lip not reflected; habitat generalist, woodlands, some grasslands, leaf litter, woody debris (look in the crevices; eastern half of Kansas)
Upland pillsnail, *Euchemotrema fraternum* (8-10 mm, shell sub-globose, shell surface covered with short hairs, narrowly perforate or imperforate, aperture transverse, single large parietal tooth, no marginal teeth; likes moist woodlands and their humid conditions, along roadsides; eastern third of Kansas, possibly more).

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Armed snaggletooth, *Gastrocopta armifera* (3-4 mm, pupa-shaped, largest of the snaggletooth snails in Kansas; grassy areas, under leaf litter in soil; found in a variety of open habitats including roadsides, along railroads, cedar glades, and open woods; eastern half of Kansas)

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A penny picture: clockwise from Abe’s ear: *Zonitoides arboreus, Euconulus trochulus, Paravitrea simpsoni, Strobilops labyrinthica*, and *Gastrocopta armifera*.

How to Identify Land Snails?

There are no simple guides to identify land snails. The “Land Snails and Slugs of Missouri” (Oesch et al., in press), soon to be published, will be a good source. Most of the species encountered in Kansas can be identified with that book. An older book called “How to Know the Eastern Land Snails” (Burch 1962) is also usable, although the scientific names of some species have changed.

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