

In defense of slugs

September 4 2024, by Christopher Terrell Nield



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Slugs. They eat your lettuces, chew your cabbages, [defoliate your dahlias](#) and assassinate your asters. Even the name "slug" is unpleasant. It comes from the Middle English "*slugge*", from a [Norwegian word for a heavy](#), slow-moving or sluggish person. Slugs clearly have an PR problem, so let's try and put things right.

First, they have a wilder lifestyle that some people give them credit for. Most land-based gastropods, (a class of mollusks slugs belong to) are hermaphrodite, meaning an [exchange of sperm fertilizes](#) both partners. They also have some extraordinary mating rituals. Leopard slugs, for example, descend from a branch on a mucus rope and entwine their bodies as they copulate.

That mucus allows them to ascend and cling to vertical surfaces like champion rock climbers. Mucus is mostly water but with [carbohydrate and an absorbent protein](#). It absorbs moisture from the air which stops it evaporating. Mucus is secreted from the foot and acts like a glue when at rest, but liquefies when muscular stress is applied as the slug moves. When stress is removed the [mucus re-solidifies](#).

The slime trail persists as the protein prevents it drying out, and the slug can use it to find its way back to base. Unfortunately, other slugs can follow the trail, and [predatory leopard slugs](#) (*Limax maximus*) may chase and eat them (top speed 0.25cm per second).

Mucus is a pretty amazing substance as it prevents slugs from drying out, makes it difficult for predators to grasp them, and contains a complex cocktail of [protective molecules](#). These provide tissue hydration, microbial defense, and in some species a protective [layer for their eggs](#).

That slimy mucus has benefits for us too as it seems to speed up cell processes such as tissue regeneration and wound healing. It's been developed as [super-sticky adhesives](#) (hydrogels) [for use in surgery](#), and some scientists think it holds potential as a [treatment of neurological disorders](#).

The evolution of the slug

Gastropods include sea slugs such as nudibranchs, and one genus of slug

[lives in freshwater](#). Some slugs have a [much reduced external shell](#) but in most cases it is there internally. So today's slugs probably evolved from land-based gastropods that had shells. As some sea slugs have partly reduced shells, the same seems to have happened in the ocean, with shell-less gastropods evolving from ancestors with shells in a process that has been called ["sluginisation"](#).

In snails, shells are part of the animal's body. They provide attachment for the columellar muscle that contracts to pull the snail into its shell. Shells provide protection from damage, predators and drying out (important for land-based gastropods). Yet shell-less slugs have [evolved from snails](#) more than a dozen separate times, one clue being that some slug families are closer to snails than to other slugs.

Slugs are incredibly ancient. An August 2024 paper studied a [Chinese fossil slug](#) from about 514 million years ago that doesn't have a shell. So it is possible that a slug body may have [evolved first](#), and that mollusks with shells came later. Then some snails lost the external [shell](#) as they colonized new habitats, including the land. For example, [fossil evidence](#) shows a large expansion of gastropods after the asteroid impact that wiped almost all the dinosaurs [65 million years ago](#). This suggests mollusks adapted and changed even as much animal life went extinct.

Slugs can teach us about evolution. They are an excellent example of repetitive invention. This is when the same body shape or structure evolves separately often in completely unrelated groups of organisms many times over, because it works so well. It's known as convergent evolution.

In the UK we have about 40 slug species, although molecular analysis indicates [there are more](#) to be discovered. Only a few such as the gray field slug (*Deroceras reticulatum*) are serious pests.

Most eat decaying vegetation and help with recycling, without which an ecosystem begins to degrade and change. In woodlands [more than 80%](#) of plant growth each year is decomposed as dead organic matter. As they feed, slugs help to improve soil by increasing nutrients. They can also increase aeration, which allows plant roots to grow more vigorously, by burrowing.

Slugs also [assist pollination](#) as pollen sticks to their mucus. When they eat ferns, for example, they ingest spores which are later defecated and germinate into fern seedlings.

They are food for many species. Hedgehogs, foxes, shrews, mice, moles, squirrels, blackbirds, thrushes and jackdaws eat them, as will beetles, including [glowworm larvae](#), which is why slug pellets can have such devastating consequences for the ecosystem.

Some species of slugs are only found in specific areas. This means they can tell us about the health of a habitat because slugs would only be there if it was meeting their particular preferences. In a [recent mollusc survey](#) of an ancient woodland in south Nottinghamshire, UK, one of my students identified eight slug species, including the fungus-feeding lemon slug, which only lives in ancient deciduous or coniferous woodland. So the species' presence suggests the woodland is of high quality.

Still not convinced that slugs can be good? They can be controlled. Ground beetles are being used [for slug control](#) in conservation agriculture, so to help manage [slugs](#) in your garden, attract predators like ground beetles by leaving wild areas and building habitat piles of wood, cuttings and decaying leaf litter.

There is plenty of advice available on slug management, including guidance from the [Henry Doubleday Research Association](#). So, put down

the slug pellets and investigate the more nature-friendly ways to protect your plants.

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