

Giant pill-millipede



Derivation of scientific name

The name millipede comes from the Latin word *mille* meaning thousand and *pedis* meaning foot. Even though these animals are called millipedes, they don't have a thousand legs; most of the species have between 36 and 400 legs with the exception of the rare species called *Illacme plenipes*, which was recorded to have 750 legs. The order name Sphaerotheriida comes from the Latin word *sphaerium*, meaning ball, which reflects the ability of pill-millipedes to roll up into a ball.

The giant pill-millipede belongs to a unique group of millipedes that differ in appearance from the usual long, worm-like and numerous-legged millipedes that most people are familiar with. Instead, pill-millipedes are characterised by an unusual round and stout body profile with few inconspicuous legs. The body is covered by a strong exoskeleton comprised of curved shields (tergites) that are used as a passive defensive mechanism when threatened. Pill-millipedes are able to roll themselves into a tight ball with the vulnerable soft underbelly tucked inside and protected by the outer, tough exoskeleton. In order to attract females for breeding, male pill-millipedes produce sounds and vibrations through an act known as stridulation. The giant pill-millipede is ground dwelling and occurs in moist habitats under leaf litter on the forest floor and under trees. It is widely distributed in South Africa with records from the higher-altitude, forested parts of Limpopo, KwaZulu-Natal and the Eastern Cape. Currently, pill-millipedes in South Africa are not formally protected and they may be vulnerable to habitat loss and degradation, as well as overexploitation for use in traditional medicine.

Description

The giant pill-millipede is the largest species of pill-millipede that occurs in South Africa. Its total length when unrolled and walking can be as long as 5 cm, and when rolled up, the giant pill-millipede can be as large as a ping-pong ball. The body is short, stout and composed of 11–13 segments and each segment has two pairs of legs. It has one pair of antennae and a pair of kidney-shaped eyes. The body segments are specifically designed

to be able to completely encase the millipede when it rolls itself up into tight ball. The head and first segment are very small and can be easily tucked in under the very large second segment that has a raised rim that closely fits and engages the last segment when rolled up. The last segment is large and has a distinctive appearance of a half bell. The giant pill-millipede is chestnut brown with black posterior edges to each segment, giving it a brown and black banded appearance.

Getting around

Giant pill-millipedes, like other members of the genus, have about 42 legs and this, together with their wide body and heavy cuticle, cause them to move very slowly. Giant pill-millipedes are also able to burrow into the soil and leaf litter.

Communication

Sphaerotherium species are unusual in their ability to produce sound and vibrations by rubbing together certain body parts, an act known as stridulating. This is normally done by males during mating. In males the last two pairs of legs on the last segment are modified and are called telopods (clamp-like structures). These telopods have an area with a series of sclerotised ridges that are rubbed against knobs on the underside of the anal shield. Each species has a different number and width of ridges on the telopods, and so the stridulating sound and vibrations produced are unique to each species. The female can therefore detect suitable mates based on the vibrating patterns. The specific frequency of the stridulation seems to stop the female from rolling up and allow the male to mate with her. Since pill-millipedes have no hearing organs, they must be picking up vibrations rather than hearing the sound.

Distribution

The giant pill-millipede is widely distributed in South Africa with records from Limpopo, Mpumalanga, KwaZulu-Natal and Eastern Cape. It has not been recorded outside of South Africa.

Habitat

Giant pill-millipedes occur mostly in forest and in densely wooded savanna. They prefer habitats with high moisture and dense leaf litter such as forest floors. They also prefer loam soil because the texture allows infiltration of water and air and is easy for the millipedes to move around in.

Food

Millipedes are herbivores and they are classified as deposit-feeders, which feed on dead organic matter such as decaying leaves, wood and fruits in the soil and leaf litter.

Life cycle

Not much is known about the life cycle of pill-millipedes. Some records exist of pill-millipedes living as long as eleven years with females estimated to have produced dozens of batches of eggs during their life span. There are, however, no published studies on the life cycle of the giant pill-millipede and we do not know how long the juveniles take to reach maturity, how long they live for or how long they take to reach their maximum size.

Sex

Sex organs are situated on the legs closer to the head. The mating behaviour of pill-millipedes can be grouped into four phases. The first phase is when a male detects a female, and orientates itself by positioning its anal shield towards the potential partner. Second, once the male is in contact with the female it starts to make stridulation sounds and vibrations. If the female recognises the male and is receptive, she will open up from her rolled-up position, or not roll up, and the male will then move below the female and grab her front legs with his telopods. The male then ejects sperm from his penises (he has one small penis at the base of each of the first pair of legs on the second segment), and transfers the sperm backwards along his legs and into the female opening which is on her second pair of legs. The two millipedes will then separate. After that, the female lays her eggs in the soil and covers them with a mud layer for protection. The eggs hatch into very small, pale pill-millipedes.



Family life

Pill-millipedes do not appear to have any form of family life and they live independently. The females do not protect their eggs or young.

THE BIG PICTURE

Friends and Foes

Giant pill-millipedes are mostly eaten by birds and small mammals such as mongooses and tortoises. They have also been reported to be preyed upon by the carnivorous slug, *Chlamydophorus*, in the coastal forests of KwaZulu-Natal.

Smart Strategies

Giant pill-millipedes are terrestrial and mostly active at night. They spend most of the time underground. The burrowing strategy is thought to have evolved as a defence mechanism against predators. They are also capable of rolling into a tight ball, which protects them from predators because it makes them difficult to grasp. Rolling into a ball also enables them to survive in dry conditions.

Poorer world without me

Pill-millipedes play a major role in the ecosystem by contributing to the transformation of detritus into humus. This process contributes to soil fertility by increasing the availability of nutrients such as nitrogen and phosphates for plant growth.

People & I

Millipedes are harmless to humans. Some of the pill-millipede species have been recorded from traditional medicine markets where they are traded.

Conservation status and what the future holds

Few studies have been conducted on the population status of southern African millipedes. Since the giant pill-millipede is quite habitat specific, the main threats would be loss of habitat through development, especially along the coast. Overharvesting for the traditional medicine trade may be an additional threat. The pill-millipedes have not been assessed according to the IUCN Red List criteria.

Relatives

Pill-millipedes (Order: Sphaerotheriida) are widely distributed in tropical and sub-tropical environments where more than 200 species are known to occur in Madagascar, Australasia, Southeast Asia and southern Africa. The genus *Sphaerotherium* is endemic to Africa and 54 species have been described from southern Africa. Most of these species are found in coastal areas with the highest number recorded in KwaZulu-Natal. *Glomeris* is another genus of pill-millipede that occurs in the northern hemisphere, but it is not related to *Sphaerotherium* and it

belongs to a different order, Glomerida. The *Glomeris* species are distinct from sphaerotheriids in that they have poison glands that secrete chemicals to repel predators, while the sphaerotheriids do not have such glands.

References and further reading

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- Wesener, T., Köhler, J., Fuchs, S. & Spiegel, D. 2011. How to uncoil your partner—‘mating songs’ in giant pill-millipedes (Diplopoda: Sphaerotheriida). *Naturwissenschaften*, 98,11: 967–975 DOI:10.1007/s00114-011-0850-8.

Read more:

Links – accessed on the 23 May 2014:

- http://en.wikipedia.org/wiki/Ilacme_plenipes
- <http://en.wikipedia.org/wiki/Millipede>
- <http://www.ncbi.nlm.nih.gov/pubmed/21971844>
- <http://www.biomedsearch.com/article/Invertebrate-animals-as-component-traditional/208746207.html>
- <http://en.wikipedia.org/wiki/Loam>.
- <http://animals.jrank.org/pages/2552/Millipedes-Diplopoda-PILL-MILLIPEDE>
- http://en.wikipedia.org/wiki/Sphaerotheriida#cite_ref-8
- <http://animals.jrank.org/pages/2552/Millipedes-Diplopoda-PILL-MILLIPEDE-Glomeris-marginata-SPECIES-ACCOUNTS.html#ixzz2z8f4Fvz9>

Author

Thembile Khoza

Biosystematics

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