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Predation by a geophilid chilopod on juvenile door trap snails

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Abstract: Observations on the centipede species *Geophilus electricus* (LINNAEUS 1758) feeding on juvenile *Alinda biplicata* (MONTAGU 1803) were made in a garden in Cologne, North Rhine-Westphalia, Germany. *Geophilus electricus* seemed only to predate on juvenile specimens. This preference is discussed in the light of the apertural barrier of adult *Alinda biplicata*.

Key words: Chilopoda, clausilium, feeding, Geophilidae, Myriapoda, predation pressure

Zusammenfassung: In einem Garten in Köln wurde der Hundertfüßer *Geophilus electricus* (LINNAEUS 1758) beim Fressen von unausgewachsenen *Alinda biplicata* (MONTAGU 1803) beobachtet. *Geophilus electricus* schien nur juvenile Schnecken zu erbeuten. Diese Präferenz wird im Hinblick auf die Mündungsbarriere der adulten *Alinda biplicata* diskutiert.

Introduction

Being slow movers, snails have only a few options once being detected by a predator. The basic strategy might be described as 'withdraw and hope that the predator is unable to enter the shell'. BARKER (2004) compiled the vast knowledge on predation on gastropods, amongst others showing that there are only occasional reports on snail-feeding centipedes. One group of centipedes are the blind and usually subterranean Geophilidae. There is one published account of geophilid predation on molluscs. The observation was made on a *Geophilus vittatus* (RAFINESQUE 1820) (syn. *G. rubens* SAY 1821) and *Pachymerium ferrugineum* (C. L. KOCH 1835) in a laboratory and only concerned snail eggs (JOHNSON 1952). The following field observations thus add to our knowledge on centipede snail predators.

Observations and discussion

On two occasions (06.09.2014, 14.09.2014), a slender and short-legged centipede was observed in the act of feeding on a juvenile and subadult *Alinda biplicata* (MONTAGU 1803), respectively, when turning shelters (plastic trays, stones) in a garden in suburban Cologne (Fig. 1B). The geophilomorph chilopod was identified as the luminous centipede *Geophilus electricus* (LINNAEUS 1758), with “> 59 leg bearing segments” (Fig. 1A) and “visible pores on the ventral side of the last segment” being characteristic features (STRESEMANN 1992). The species tends to inhabit dry habitats irrespective of vegetation cover (VOIGTLÄNDER 2005). It has a predominantly suburban/urban distribution in Great Britain (BARBER 1992) and also was found in some cities in North Rhine-Westphalia (DECKER & HANNIG 2011).

Alinda biplicata was the most abundant snail around the places where the feeding was observed. Both times, some more fresh empty juvenile shells (three and six, on 06.09.2014 and 14.09.2014, respectively) but no fresh empty adult shells were found. Provided that *G. electricus* is the cause of the snails' death, *G. electricus* might prefer juvenile over adult *Alinda*.

This preference might have a simple cause. The juveniles have a plain aperture, whereas adult *Alinda* have complex apertural obstructions. The role of apertural structures as barriers against snail predators has repetitively been noted (e. g. LIEW & SCHILTHUIZEN 2014 and references therein). The clausilium and its associated structures reduce the diameter of the passage between the penultimate whorl and the aperture in the adult snail to only about 1.3 mm at its narrowest point (SULIKOWSKA-DROZD & al. 2014). This approximately equals the size of the juveniles that are brooded inside the snail. In rest or under harassment, however, the snails withdraw and the 'door' snaps close. Comparing the diameter of the centipede with the size of the embryonic shell in Figure 1B, it becomes obvious that the centipede

would find it difficult or impossible to pass the narrowest part of the obstruction even if it could somehow push the clausilium open. The size comparison further suggests that freshly born *Alinda* might too tiny to be entered by *Geophilus*. Vulnerability of half-grown specimens has also been put forward for the snail genus *Plectostoma* and its slug predator (LIEW & SCHILTHUIZEN 2014). Hence, a generalized hypothesis might be proposed: clausiliids are sensitive to centipede predation only at intermediate shell sizes. To support or falsify this assumption, more observations on centipede predation are welcome.



Fig. 1: *Geophilus electricus*, (A) specimen escaping after being disturbed during feeding (06.09.2014) and (B) another specimen with its head and roughly 15 leg bearing segments immersed in a shell of a juvenile *Alinda biplicata*, while foraging under a plastic tray (shelter removed, 14.09.2014) (Photos: H. KAPPES).

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Literature

- BARBER, A. D. (1992): Distribution and habitat in British centipedes (Chilopoda). — Berichte des naturwissenschaftlich-medizinischen Vereins in Innsbruck, Supplement **10**: 339-352, Innsbruck.
- BARKER, G. M. (2004): Natural enemies of terrestrial Mollusca. — 644 S., Wallingford (CABI).
- DECKER, P. & HANNIG, K. (2011): Checkliste der Hundert- und Tausendfüßer (Myriapoda: Chilopoda, Diplopoda) Nordrhein-Westfalens. — Abhandlungen aus dem Westfälischen Museum für Naturkunde, **73**: 1-48, Münster.
- JOHNSON, B. M. (1952): The centipedes and millipedes of Michigan. — 472 S., PhD thesis, University of Michigan, Ann Arbor.
- LIEW, T.-S. & SCHILTHUIZEN, M. (2014): Association between shell morphology of micro-land snails (genus *Plectostoma*) and their predator's predatory behaviour. — PeerJ, **2**: e329, Corte Madera, California.
- STRESEMANN, E. (1992): Exkursionsfauna, Vol. **1** (8th ed.). — 637 S., Berlin (Volk und Wissen).
- SULIKOWSKA-DROZD, A., WALCZAK, M. & BINKOWSKI, M. (2014): Evolution of shell apertural barriers in viviparous land snails (Gastropoda: Pulmonata: Clausiliidae). — Canadian Journal of Zoology, **92**: 205–213, Ottawa.
- VOIGTLÄNDER, K (2005): Habitat preferences of selected Central European centipedes. — Peckiana, **4**: 163-179, Görlitz.

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