

## On the variability of the distal genital tract of *Cylindrus obtusus* (DRAPARNAUD, 1805) (Gastropoda: Helicidae)

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### Abstract

A total of 52 specimens of *Cylindrus obtusus* (DRAPARNAUD, 1805) from two localities in Austria (Gesäuse/Styria and Schneeberg/Lower Austria), were studied in respect to their genital anatomy. All specimens from Gesäuse had one stylophore and two equally developed mucus glands at least twice the length of the stylophore. Within the Schneeberg sample the size ratio of the stylophore and mucus gland(s) differed considerably and there were one or two mucus glands.

### Zusammenfassung

Insgesamt 52 Exemplare von *Cylindrus obtusus* (DRAPARNAUD, 1805) von zwei Fundorten in Österreich (Gesäuse/Steiermark und Schneeberg/Niederösterreich), wurden hinsichtlich der Anatomie des Genitaltraktes untersucht. Alle Exemplare vom Gesäuse hatten einen Pfeilsack und zwei gleich entwickelte Schleimdrüsen, mindestens doppelt so lang wie der Pfeilsack. Bei den Exemplaren vom Schneeberg waren 1-2 Schleimdrüsen ausgebildet, das Größenverhältnis von Pfeilsack und Schleimdrüse(n) variierte beträchtlich.

### Introduction

*Cylindrus obtusus* (DRAPARNAUD, 1805) is a landsnail endemic to the northeastern Alps of Austria, where it is found between 1100 and 2680 m altitude (KLEMM 1974), mainly at sites with black humid soil on limestone (KÜHNELT 1937, BOETTGER 1949). Because of its restricted distribution, all localities known to date have been recorded and numbered (comp. FREITAG 1991, FREITAG & DESCH 1996). The first anatomical description of *C. obtusus* was given by MARTENS (1895). The genital apparatus pictured there has one stylophore (dart sac) and only one mucus gland, both approximately of the same shape and length. MARTENS placed the species near the (old) genus *Helix* ("...nach Kiefer, Radula und Geschlechtsorganen näher zu *Helix*, als zu *Buliminus* oder *Pupa*...") (MARTENS 1895: 107).

A somewhat different picture of the genital anatomy was presented by STURANY & WAGNER (1914), who found one short dart sac and two long mucus glands, very similar to those of *Arianta* species. According to these anatomical features, *C. obtusus* was placed into *Campylaeinae* by STURANY & WAGNER (1914) and *Ariantinae* by NORDSIECK (1987) and SCHILEYKO (1991) respectively.

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The drawings of STURANY & WAGNER (1914) were based on material from "Schneeberg", the easternmost high mountain (2075 m a.s.l.) of the Alps and the easternmost point of the distribution area of *C. obtusus*. If MARTENS' anatomical investigations are also based on material from "Schneeberg" (MARTENS 1895), is not clearly indicated in his article.

Dissection of six specimens from Schneeberg by SCHILEYKO (1996) revealed the following: none of the six specimens had two mucus glands as depicted by STURANY & WAGNER (1914), but five of them were similar to the drawing of MARTENS (1895).

Here the genital anatomy of additional specimens from both Schneeberg and the Gesäuse, a mountain stock in central Austria, Styria (90 straight line km W of Schneeberg), were studied and the results presented.

### Material and methods

*Cylindrus obtusus* specimens were obtained from following localities:

- 1.) Gesäuse, Heshütte (1680 m above sea level): 23 specimens (leg. H. Baminger, A. Baur, B. Baur, M. Baur, T. Meier, H. Sattmann, A. Schileyko & I. Wenger; 21 September 1996)
- 2.) Schneeberg, Waxriegel (appr. 1800 m above sea level): 29 specimens (leg. K. Edlinger, H. Sattmann & A. Schileyko; 1 October 1996)

Only adults as defined by KERNEY & CAMERON (1979: 13), showing the shell features "...the area round the mouth ... strengthened, with a ... lip...", were used for dissections. Snails were drowned in warm water, fixed in 60% ethanol and preserved in 75% ethanol. Soft bodies were removed from the shell and dissected. Shells and soft part specimens are stored under the numbers 89.787 and 89.789 in the mollusc collection of Naturhistorisches Museum in Vienna, Austria.

### Results

All 23 specimens from the locality Gesäuse/Heshütte had one stylophore accompanied by two equally developed mucus glands, approximately twice the length (or even more) of the stylophore (fig. 1 A), similar to that depicted in STURANY & WAGNER (1914). In the 29 specimens from the locality Schneeberg/Waxriegel the length of the mucus glands varied considerably and numbered 1 or 2. These specimens can be subdivided into two groups:

- 1.) Specimens with two mucus glands (fig. 1 B). In many cases, the length of the two glands was unequal, the right one shorter than the left one (right and left is determined with the specimen in a standard position, the penis turned to the right, as drawn by SCHILEYKO 1996: 38, fig. 1 B).
- 2.) Specimens with a single mucus gland, rather variable in length (fig. 1 C), 6 of them rather similar as the one depicted in MARTENS (1895).

Apparently, the sample from Schneeberg is rather variable in both size and number of mucus glands, whereas the Gesäuse sample was very uniform in this respect. This surprising preliminary result is presented here as a short note without discussion. In order to interpret this intraspecific and surprising intrapopulation variability, the authors plan to investigate samples of other populations of *C. obtusus*.

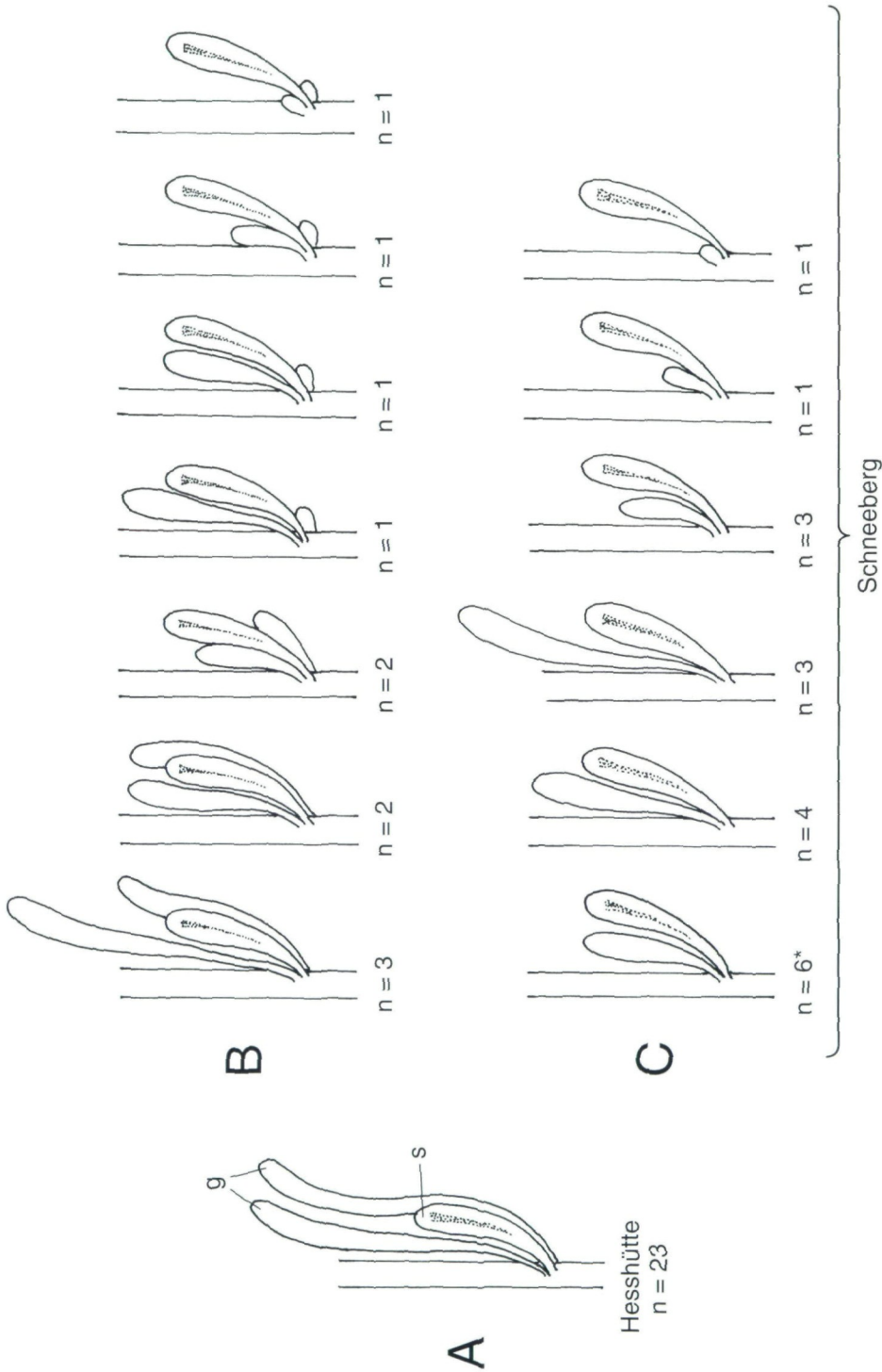


Fig. 1: Distal female tracts of *Cylindrus obtusus* from A: Gesäuse, Hesshütte; B - C: Schneeberg, Waxriegel. n = number of specimens; s = stylophore; g = mucus gland; \* = situation depicted by MARTENS (1895).

## References

- BOETTGER, C.R. 1949: Die Entstehung der Schallengestalt der ostalpinen Landschnecke *Cylindrus obtusus* (Draparnaud). – Archiv für Molluskenkunde 78 (4/6): 157-158.
- DRAPARNAUD, J.P.R. 1805: Histoire Naturelle des Mollusques Terrestres et Fluviatiles de la France. – Colas, Paris, 164 pp.
- FREITAG, B. 1991: Erstellung einer vollständigen Fundortliste von *Cylindrus obtusus* (DRAPARNAUD, 1805) mittels Computer mit dafür notwendigen Änderungen. – Mitteilungen der Abteilung für Zoologie des Landesmuseum Joanneum 44: 53-72.
- FREITAG, B. & DESCH, W. 1996: *Cylindrus obtusus* (DRAPARNAUD 1805) - Futterpflanzen, neue Fundorte und Assoziationen mit anderen Gehäuseschnecken, sowie Vergleiche mit früheren Gehäusevermessungen. (Gastropoda: Helicidae). – Mitteilungen der deutschen malakozoologischen Gesellschaft 58: 1-16.
- KERNEY, M.P. & CAMERON, R.A.D. 1979: A field guide to the land snails of Britain and North-west Europe. – Collins, London, 288 pp.
- KLEMM, W. 1974: Die Verbreitung der rezenten Landgehäuseschnecken in Österreich. – Denkschriften der Österreichischen Akademie der Wissenschaften, mathematisch-naturwissenschaftliche Klasse 117: 1-503.
- KÜHNELT, W. 1937: Biologische Beobachtungen an *Cylindrus obtusus*. – Archiv für Molluskenkunde 69 (1/2): 53-56.
- MARTENS, E. VON 1895: Die Gattung *Cylindrus* FITZ. – Archiv für Naturgeschichte 1895: 103-108.
- NORDSIECK, H. 1987: Revision des Systems der Helicoidea (Gastropoda: Stylommatophora). – Archiv für Molluskenkunde 118(1/3): 9-50.
- SCHILEYKO, A.A. 1991: Taxonomic status, phylogenetic relations and system of the Helicoidea sensu lato (Pulmonata). – Archiv für Molluskenkunde 120 (4/6): 187-236.
- SCHILEYKO, A.A. 1996: On the peculiar features of the reproductive anatomy of *Cylindrus obtusus* (DRAPARNAUD, 1821) (Pulmonata, Helicidae). In: H. SATTMANN, A. BISENBERGER & H. KOTHBAUER (eds): Arianta II. – Naturhistorisches Museum in Wien, pp. 37-38.
- STURANY, R. & WAGNER, A.J. 1914: Über schalentragende Landmollusken aus Albanien und Nachbargebieten. – Denkschriften der Akademie der Wissenschaften Wien, mathematisch-naturwissenschaftliche Klasse 12: 269-287.