

Attempted cannibalism by adult smooth snakes *Coronella austriaca* in France and Switzerland

PRZEMYSŁAW ZDUNEK^{1,2,3*}, GRÉGOIRE MEIER⁴ & GRÉGORY DESO³

¹Association du Refuge des Tortues, 2920 Route de Paulhac, 31660 Bessières, France

²NATRIX Herpetological Association, ul. Opolska 41/1, 52-010 Wrocław, Poland

³AHPAM- Association Herpétologique de Provence Alpes Méditerranée, F-84100 Orange, Vaucluse, France

⁴Via degli Orti 3, 6809 Medeglia, Switzerland

*Corresponding author e-mail: zdunek.komodo@gmail.com

The smooth snake *Coronella austriaca* (Laurenti, 1768) is a small colubrid snake rarely reaching 90 cm in length (Speybroeck et al., 2016). It has a wide distribution in Europe, as far north as southern Scandinavia and in the south it reaches the Balkan, Iberian, and Italian peninsulas and the Mediterranean islands of Elba and Scilly (Speybroeck et al., 2016).

The diet of *C. austriaca* consists mainly of small mammals, insects, eggs and reptiles, including sometimes other snakes (Goddard, 1984; Rugiero et al., 1995; Reading & Jofré, 2013; Kolanek et al., 2020; Di Nicola et al., 2020; Escalante et al., 2023). The first evidence of cannibalism was collected from the study of faeces and stomach contents (Drobenkov, 1995; 2000; 2014; Luiselli et al., 1996). It was only recently that the first direct observations of cannibalism were reported from Poland between two juveniles (Kolanek & Bury, 2020) and between adults in England and Germany (Jofré & Reading, 2020; Rowland et al., 2021).

On 5 September 2020 at 17:47 h an adult male smooth snake was filmed attempting to subdue and ingest an adult female (BHS Video, 2023a). The observation was made on the edge of a mountainside forest in St Amarin town (47° 52' N 7° 01' E), near the Vosges mountains, on land surrounded by hedges, with wild and managed spaces. It was a sunny day without wind, the sky was partly cloudy. The snakes were on the cover of a gully pot containing water. The fight lasted 15 minutes where the male (estimated at 45 cm) tried to capture the head of the female with numerous bite attempts (Fig. 1). Eventually, the female managed to break free and moved away and the male went in the opposite direction. The environment seems conducive to snakes as others had already been seen in this location: two observations of *C. austriaca* (May 2015 and May 2019), and a barred grass snake *Natrix helvetica* in May 2009.

On 4 July 2023 at 19:50 h on a pedestrian path on the edge of the forest in Medeglia, Switzerland (46° 06'57" N 8° 58'09" E), two snakes were observed. It was a stormy day, the sky was periodically very cloudy, without wind, and temperatures approx. 18° C. The largest snake (approx. 60 cm) was biting near the neck of the second smaller snake (approx. 40 cm), probably trying to swallow it (Fig. 2). The victim coiled and squirmed, moving its tail rapidly in response to the attack, trying to free and defend itself (BHS Video, 2023b). As the snakes were on a path that was frequented by people and dogs the observer



Figure 1. Attempted predation of an adult female smooth snake (*Coronella austriaca*) by an adult male – **A.** The male initiates the attack by grabbing the female in the tail area, **B.** Then in the middle of the body, **C.** In defence the female bites the male, and **D.** The female finally escapes (see BHS video, 2023a)

took the decision to move them some 15 m away. As a result, they stopped fighting, separated, and took refuge in a dry-stone wall. For this reason, we do not know the outcome of their interaction.

To the best of our knowledge, these are the first direct observations of attempted cannibalism between adult smooth snakes filmed in France and Switzerland. Jofré & Reading (2020) suggest that cannibalism in *C. austriaca* is a rare behavioural trait that can occur when an individual's body condition is low, possibly due to periods of food scarcity. At least in the case of the observation in France, it would seem to be a male attempting to eat a female. In European snakes, predation by males on adult females are known in other species such as the Montpellier snake *Malpolon monspessulanus* and the Aesculapian snake *Zamenis longissimus* (Glaudas & Fuento, 2022; Major et al., 2023).

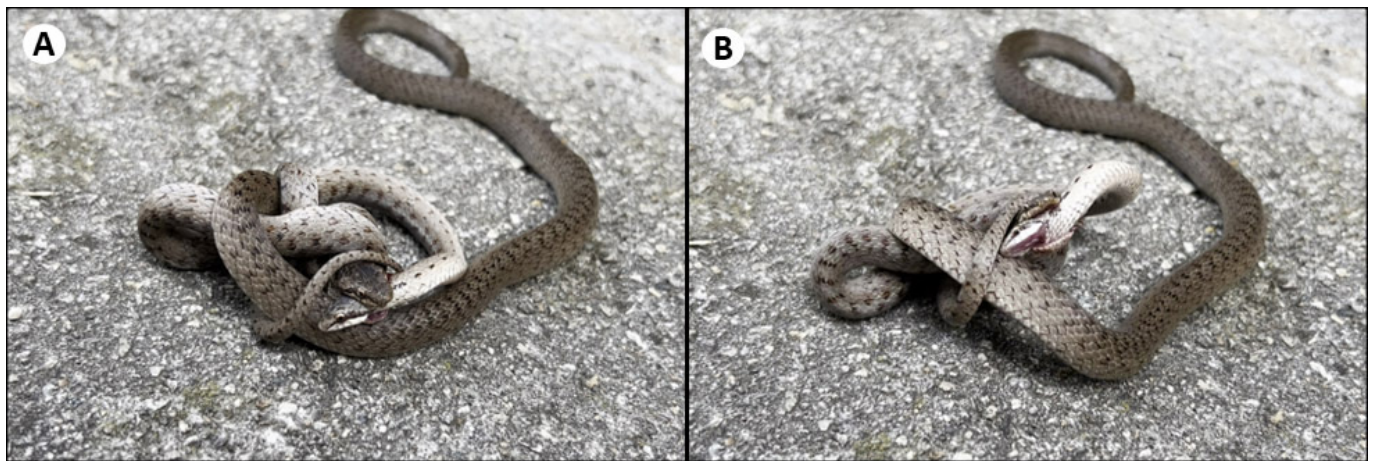


Figure 2. Attempted predation between two smooth snakes (*Coronella austriaca*) in Switzerland – **A.** The larger individual holds the smaller one around the neck, **B.** Then it attempts to ingest its victim (see BHS video, 2023b)

ACKNOWLEDGEMENTS

We thank René Brylka and Isabelle Brylka for sharing their observation, details and video footage with us and for giving us permission to use it in this note. Special thanks to Matthieu Berroneau for helpful suggestions to improve this manuscript.

REFERENCES

- BHS Video (2023a). Attempted cannibalism by an adult male smooth snake *Coronella austriaca* in France. Recorded by René Brylka. <https://youtu.be/4GepYrcLrSE>.
- BHS Video (2023b). Attempted cannibalism by an adult smooth snake *Coronella austriaca* in Switzerland. Recorded by Grégoire Meier. <https://youtu.be/8DlccefAis4>.
- Di Nicola, M.R., Zecchin, L., D'Amico, M. & Faraone, F.P. (2020). Ophiophagy in *Coronella austriaca*: first case of predation on *Hierophis viridiflavus* and first direct observations of predation on *Vipera aspis*. *Herpetology Notes* 13: 1107–1110.
- Drobenkov, S.M. (1995). Comparative analysis of nutrition of sympatric snakes *Vipera berus* (L.), *Natrix natrix*, and *Coronella austriaca* (Laur.). *Ekologiya* 1995: 222–226.
- Drobenkov, S.M. (2000). Ecology of Smooth Snake (*Coronella austriaca* LAUR.) in Belarus. *Russian Journal of Herpetology* 7: 135–138.
- Drobenkov, S.M. (2014) Distribution, ecological traits and conservation of the smooth snake (*Coronella austriaca*) in Belarus. *Acta Biologica Universitatis Daugavpiliensis* 14: 1407–8953.
- Escalante, E.I., Zdunek, P. & Kolanek, A. (2023). Predation by a smooth snake *Coronella austriaca* of an aspic viper *Vipera aspis* in Spain. *The Herpetological Bulletin* 163: 44–45.
- Glaudas, X. & Fuento, N. (2022). The strange occurrence of male cannibalism on adult females in snakes. *Ethology* 128: 94–97.
- Goddard, P. (1984). Morphology, growth, food habits and population characteristics of the Smooth snake *Coronella austriaca* in southern Britain. *Journal of Zoology* 204: 241–257.
- Jofré, G.M. & Reading, C.J. (2020). Cannibalism in smooth snakes, *Coronella austriaca*. *The Herpetological Journal* 30: 168–172.
- Kolanek, A. & Bury, S. (2020). Natural History Notes. *Coronella austriaca* (Smooth Snake). Diet/Cannibalism. *Herpetological Review* 51(3): 612.
- Luiselli, L., Capula, M. & Shine, R. (1996). Reproductive output, costs of reproduction, and ecology of the smooth snake, *Coronella austriaca*, in the eastern Italian Alps. *Oecologia* 106: 100–110.
- Major, T., Bracegirdle, R., Gandini, A., Limia Russel, G., Pozzi, A.V., Morgan, R., Mulley, J.F. & Wüster, W. (2023). Mate today, gone tomorrow: male-on-female cannibalism in *Zamenis longissimus* (Laurenti, 1768) in North Wales. *Herpetology Notes* 16: 51–54.
- Reading, C. & Jofré, G. (2013). Diet composition changes correlated with body size in the smooth snake, *Coronella austriaca*, inhabiting lowland heath in southern England. *Amphibia-Reptilia* 34: 463–470.
- Rowland, H.M., Nollert, A. & Durso, A.M. (2021). Natural History Notes. *Coronella austriaca* (Smooth Snake). Cannibalism and prey size. *Herpetological Review* 52(1): 152.
- Rugiero, L., Capula, M., Filippi, E. & Luiselli, L. (1995). Food habits of Mediterranean populations of the smooth snake (*Coronella austriaca*). *The Herpetological Journal* 5: 316–318.
- Speybroeck, J., Beukema, W., Bok, B. & Van Der Voort, J. (2016). *Field Guide to the Amphibians & Reptiles of Britain and Europe*. London, United Kingdom: Bloomsbury Publishing Plc. 432 pp.

Accepted: 22 May 2023