

## Predation by a smooth snake *Coronella austriaca* of an aspic viper *Vipera aspis* in Spain

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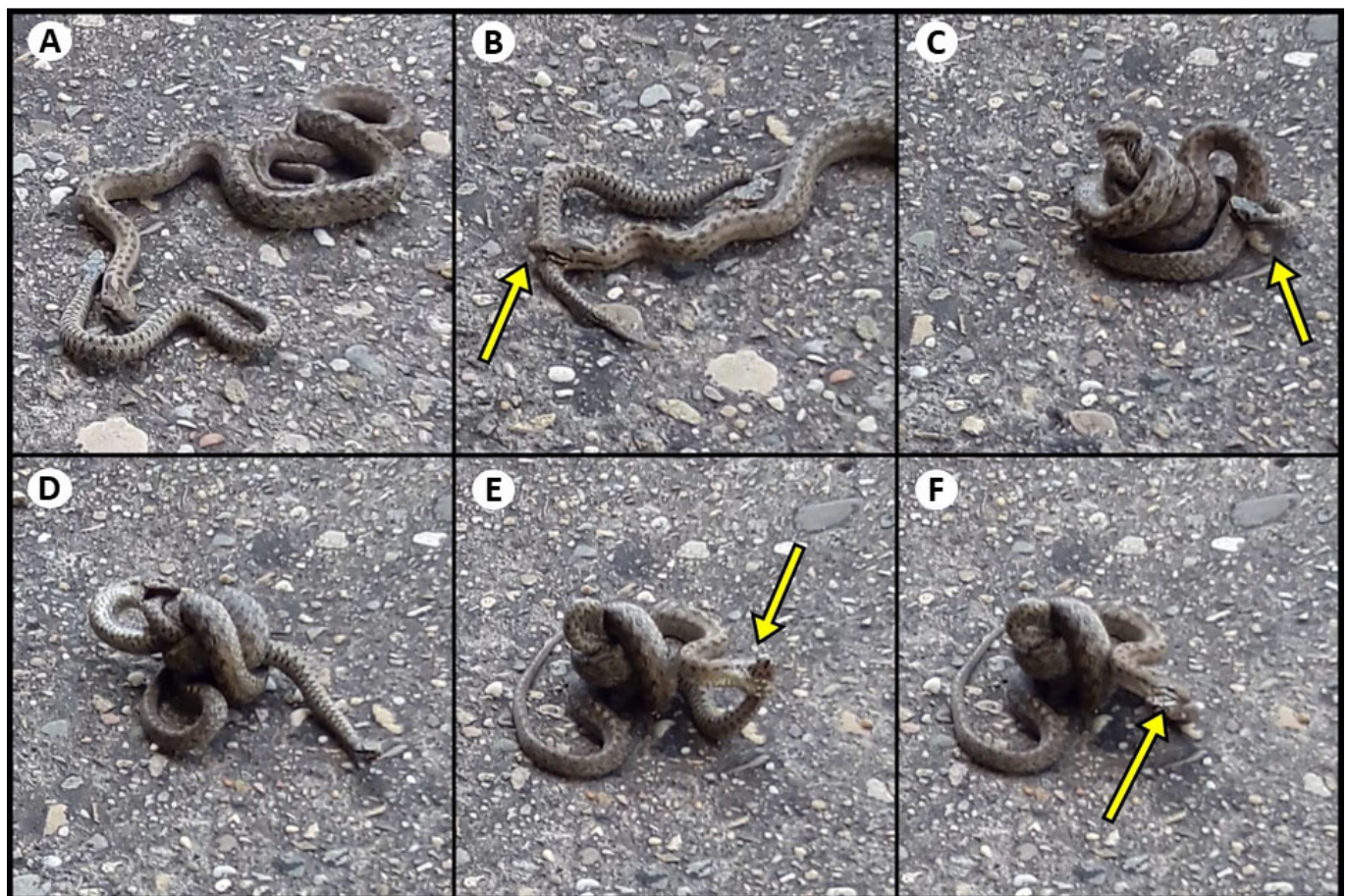
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The smooth snake *Coronella austriaca* Laurenti, 1768, is a medium-sized colubrid snake with a total length rarely up to 90 cm (Muratet, 2015). It is distributed across most of Europe, from Portugal in the west to the Ural Mountains in the east, and northwards to southern Scandinavia. It reaches the Balkan, Iberian and Italian Peninsulas, and also some Mediterranean islands (Speybroeck et al., 2016; Di Nicola et al., 2020). The diet of the smooth snake consists mainly of lacertid lizards, shrews, and small rodents, less often young snakes and slow-worms (Goddard, 1984;

Rugiero et al., 1995; Reading & Jofré, 2013; Kolanek et al. 2020; Kolanek & Bury, 2020). Snakes represent part of the diet of *C. austriaca* (Rugiero et al., 1995; Reading & Jofré, 2013). Genus *Vipera* was previously documented in the diet of this species (Rugiero et al., 1995; Luiselli et al., 1996; Reading & Jofré, 2013; Groen, 2018). To the best of our knowledge, ours is the first direct observation of predation by a smooth snake on *Vipera aspis* (L. 1758) in Spain and beyond the borders of Italy (Rugiero et al., 1995; Di Nicola et al., 2020).



**Figure 1.** Predation by an adult smooth snake *Coronella austriaca* on a juvenile aspic viper *Vipera aspis*, yellow arrows indicate where the smooth snake has grasped the aspic viper with its mouth

On 13 June 2022, at 13:42 h about 30 kilometers east of Burgos, Spain (42.36709° N, -3.317816° W, WGS 84), while on the hiking circuit Presa de Alba, we saw an adult smooth snake and a juvenile aspic viper close together. The area around the observed scene was very humid due to the nearby dam and the Embalse de Alba river flowing alongside. The surrounding environment was densely overgrown with brush and low vegetation, but the observation took place on a concrete road and we made a video recording of it (BHS Video, 2023). It was a sunny warm day with a cloudless sky and no wind. At the start of the observation, it seemed as if the snakes would ignore each other and go their own way, but they did not (Fig. 1A). The smooth snake initiated an attack by grabbing the aspic viper near its tail (Fig. 1B). In defence, the viper bit its opponent a few times (Fig. 1C), which caused the smooth snake to wrap around the viper, initiating a struggle (Fig. 1C&D). The aspic viper bit two more times and then gave up the defence. Continuing the constriction, the smooth snake moved to grab the victim by its head (Fig. 1E), and then begun to swallow it whole (Fig. 1F).

The account of predation presented here increases the knowledge of the Spanish herpetofauna and adds details to the known behaviour of *C. austriaca* preying upon *V. aspis* already recorded in Italy (Rugiero et al., 1995; Di Nicola et al., 2020). It is noteworthy that initially the viper tried to avoid a confrontation by moving its body back from the smooth snake and only bit the smooth snake once it had been attacked. It would appear that it did not perceive the other snake as a predator until it was attacked.

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