It’s a snake-eat-snake world: Predation on an adder (*Vipera berus*) by a smooth snake (*Coronella austriaca*) in a nature reserve in the north of the Netherlands

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\(Vipera berus\) (Linnaeus, 1758), the adder, is a medium-sized viper (total length usually up to 65 cm, rarely up to 90 cm) that has the widest distribution of all terrestrial snakes. It is also the northernmost snake in the world with populations north of the Arctic Circle (Anderson, 2003). Its range extends from the Atlantic coasts of Great Britain and France in the west to Sakhalin Island north of Japan in the east, and from northern Scandinavia in the north to the Balkan Peninsula in the south (Schiemenz, 1985; Mallow et al., 2003; David and Vogel, 2010). Within Europe the adder has a patchy distribution within the southernmost parts of its range, where populations are often confined to higher elevations (Schiemenz, 1985; Speybroeck et al., 2016). In the Netherlands this species is restricted to specific areas on sandy soils in the eastern part of the country where it mostly inhabits heathlands and moorlands (Creemers and van Delft, 2009; van Delft and Janssen, 2015). *Coronella austriaca* Laurenti, 1768, the smooth snake, is a medium-sized colubrid (total length usually up to 70 cm, rarely up to 90 cm). Its range extends from Portugal in the west to the Ural Mountains in the east, and northwards to southern Scandinavia. Towards the south, it reaches the Balkan, Iberian and Italian Peninsulas, and also some Mediterranean islands such as Sicily (Santos et al., 2008; Speybroeck et al., 2016). Like the adder this species is confined to mountainous areas within its southernmost part of its range in Europe (Speybroeck et al., 2016). In the Netherlands the smooth snake, like the adder, is confined to sandy soils and mostly found in heathlands and moorlands with the adder covering 43% of the 1x1 kilometre grids that are inhabited by the smooth snake (Creemers and van Delft, 2009). This rather elusive snake is known to detect its prey by means of chemosensory perception of preferred prey types (Amo et al., 2004; Pernetta et al., 2009). The diet of the smooth snake mainly consists of lacertid lizards, shrews and small rodents (Goddard, 1984; Rugiero et al., 1995; Reading and Jofré, 2013). The typology of consumed prey changes depending on snake size, with small snakes usually taking more lacertids than small mammals and vice versa for large snakes (Reading and Jofré, 2013). Although this species is known to occasionally feed on other snakes, including vipers (Rugiero et al., 1995; Luiselli et al., 1996; Reading and Jofré, 2013), the predatory behaviour is rarely observed and not much is known about the specific predation process. In the present contribution, the author reports a rare observation of an adult smooth snake feeding on a juvenile adder. On 5 September 2017, at 15:04, the author made the observation during a survey for a long-term population study on both species. The survey took place in the Fochteloërveen in the border area between the Province of Friesland and the Province of Drenthe (the Netherlands). The Fochteloërveen is a large peat moor area where smooth snake and adder habitats overlap almost entirely. The habitat where this event took place consists of old heathland on a sandy ridge with dominating plants being common heather (*Calluna vulgaris*) and purple moor grass (*Molinia caerulea*). The two snakes were completely exposed in a narrow clearing in the heather. Based on the time of year and body size the adder was at most a couple of weeks old and approximately 15 cm long. The smooth snake was an adult with a total length measuring approximately 55 cm. Both snakes were not handled and distance was kept to prevent disturbing the predation process while recording the event. On encountering both snakes, the smooth snake had just grabbed its prey by the back

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of the head attempting to constrict it, and the adder was struggling to release itself (Fig. 1A). The smooth snake seemed to have difficulties subduing its prey by constrictions, resulting in the snake loosening its grip with the upper half of its body, enabling it to stretch and twitch its prey’s neck, slowly immobilising it while retaining the same position (Fig. 1B-D). Eight minutes after the approximate initial attack, only the adder’s tail was still moving. The smooth snake didn’t loosen its grip any further during the remainder of the attack. Caudal movements of the prey stopped more than an hour after the initial attack. Only after this, the smooth snake fully loosened its grip (Fig. 1E) and the adder was swallowed (Fig. 1F); a process that was completed in three minutes. The process from the moment of the initial attack to consumption of the prey took 1 h 21 min.

Figure 1A-F. A Smooth snake (Coronella austriaca), total length approximately 55 cm, observed while predating on a juvenile adder (Vipera berus), total length approximately 15 cm, in the nature reserve Fochteloërveen, Province of Friesland, the Netherlands.
To the best of the author’s knowledge, this is the first detailed report of a smooth snake predating on an adder. It is not known, if the way the smooth snake immobilised the adder is typical behaviour for this species. An anecdotal but similar observation (Peter Keijers, personal communication) suggests that at least in some cases no constriction occurs and a juvenile adder might be swallowed without any effective form of immobilisation, completing the process in a much shorter time frame, but with a higher risk of being bitten for the smooth snake. Future records can shed more light on this question.

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References


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