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Interaction between two Japanese Ratsnakes, *Elaphe climacophora* (Boie, 1826), at the nest of a Eurasian Wren, *Troglodytes troglodytes*

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Recent studies have revealed that reptiles, which are generally considered solitary and non-social, exhibit diverse social behaviours across different taxa (Doody et al., 2021). Reptiles have now become one of the key taxonomic groups for understanding the evolution of social behaviour in vertebrates (Doody et al., 2013). However, there are still only a few studies on social behaviour in snakes, except for mating, because of their secretive nature. Documenting interactions between snakes may provide new insights into the growing research area of reptile sociality. Here, I present observations on an interaction between two Japanese Ratsnakes, *Elaphe climacophora* (Boie, 1826), as captured by a trail camera in the Ashiu Research Forest, Kyoto, Japan (35.3094°N, 135.7169°E).

The trail camera was placed in front of a nest of the Eurasian Wren, *Troglodytes troglodytes*, to conduct a breeding ecology survey on this bird. The nest was constructed in a domed shape with a 2-cm diameter entrance hole in a crevice of a fallen tree about 0.4 m above the ground. The nest contained three nestlings, each estimated to be ten days old, based on daily observation of the inside of the nest using an inspection camera. The camera records 15-s videos whenever motion was detected to capture bird activity. On 10 July 2024 from 19:45–20:04 h, 12 videos of snake behaviour were recorded. I identified the snake species as *E. climacophora* based on their size, colour pattern, and head shape.

The first video (Movie_1, all videos available at: https://doi.org/10.57723/292224) shows that at 19:45:44 h, a snake (S_1) was positioned on the fallen tree with its head and roughly half of its body outside the nest and its posterior inside (Fig. 1A). A second snake (S_2), larger than S_1 based on a visual inspection of the video (e.g., head and body width), is seen on top of the fallen tree. S_2 bit the midsection of S_1, which was near the nest entrance, and dragged S_1 outside the nest. At this point, a bulge in the midsection of S_1 became visible, strongly suggesting that one or more nestlings had been consumed (Fig. 1B). S_2 continued holding onto S_1 while the latter attempted to wrap itself around S_2 in an attempt to escape (first 6 s of Movie_2; Fig. 1C). S_2 grabbed and pulled S_1 to the top of the tree trunk, and S_2 seemed to have lost its grip because it was now holding S_1 closer to its tail (Movie_3). Because S_1 does not appear after the fifth video (12 in total), it is assumed that S_2 released it in order to enter the nest. The fifth video ended at 19:47:26 h, making the length of the interaction between the two snakes 1:42 min.

Additional videos, beginning after about a 6-min interval at 19:53:15 h, show only S_2. This snake explored the nest from the sixth to the tenth video recording, frequently flicking its tongue and positioning the middle of its body inside the nest (Movie_4). After another 6-min interval, in the eleventh video, S_2 is seen pulling its head out of the nest (Movie_5). S_2 is seen leaving the nest in the twelfth video, which ends at 20:04:11 h (Movie_6). In this last video recording, a bulge in the body of S_2 is visible, suggesting that it ate one or more of the remaining nestling(s). The exact location of the bulge cannot be determined from the video (Fig. 1D). No additional snakes were captured by this trail camera.

There are three possible explanations for why S_1 and S_2 interacted. (1) Because snakes largely depend on chemical cues to identify prey (Schwenk, 1995), S_2 may have mistakenly identified S_1 as a bird. It is possible that the body of S_1 retained the birds' odour after entering the nest and swallowing nestlings. (2) S_2 may have tried to eat on S_1. Although the majority of observations of cannibalism in snakes have been recorded in captivity, several reports have documented that cannibalism does

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occur in the wild (Franch and Sebastián, 2013; Morais et al., 2020; Jofré, 2020; Glaudas and Fuento, 2022; Lüddecke, 2023). Adult Japanese Ratsnakes primarily eat mammals and birds, but juveniles also eat frogs and lizards (Mori and Moriguchi, 1988; Hamanaka and Mori, 2014; Fukuyama and Mori, 2017). Although *E. climacophora* rarely preys on other snakes, there is one documented case of cannibalism in which a juvenile attempted to consume another conspecific juvenile in the wild (Terada, 1985). This snake is a typical constrictor (Mori, 1996) so S_2 should have constricted S_1 if it intended to eat it. However, S_2 made no attempt to constrict S_1 and therefore it is unlikely that the interaction between the two snakes involved cannibalism. (3) S_2 may have purposefully removed S_1 from the nest to gain access to the nestlings as a food resource. It was recently discovered that some snakes compete with conspecifics for food resources (Huang et al., 2011; Mori et al., 2019; Matsumoto and Mori, 2024). For example, individuals of the insular colubrid, *Lycodon semicarinatus* (Cope, 1860), perform a ritual combat dance to repel conspecifics from sea turtle nests, thus, these snakes defend a food resource (Mori et al., 2019; Matsumoto and Mori, 2024). In theory, when food resources are distributed locally, fighting with other individuals to have access to those resources can provide benefits that outweigh the costs of fighting (Dubois and Giraldeau, 2005). In this case, the nestlings may be a valuable food resource worth competing over. Although it is unclear whether S_2 fought S_1 with the intention of robbing the nest of nestlings, the interaction could be interpreted as a competition for food resources because S_2 appears to have eaten nestlings as a result of the encounter.

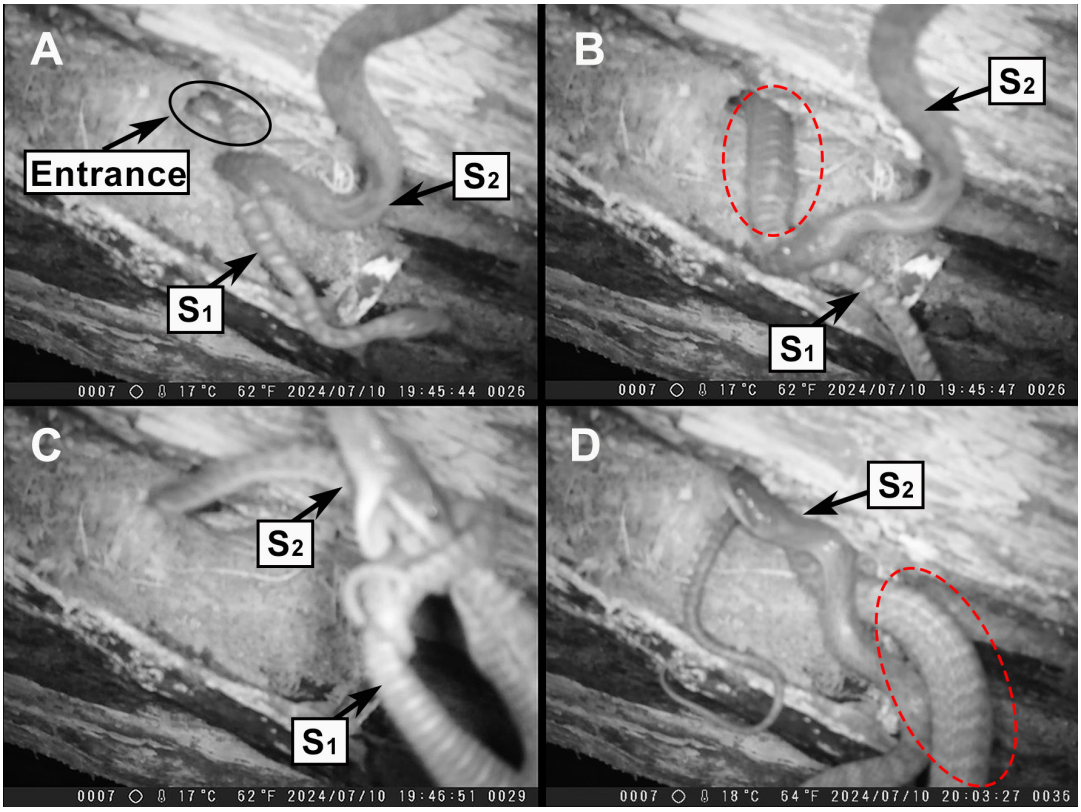

Figure 1. Video frames of an interaction between two *Elaphe climacophora* (S_1 and S_2) at a wren's nest (*Troglodytes troglodytes*) in Ashiu Forest, Japan. (A) S_2 bites and pulls S_1. (B) S_1 has a bulge in its midsection (red dashed circle), suggesting that it had swallowed one or more *T. troglodytes* nestlings. (C) S_2 continued to repeatedly bite S_1 for about 1:42 min. (D) After forcing S_1 away from the nest, S_2 investigated it, possibly looking for prey. The bulge on S_2's body (red dashed circle) indicates that it may have swallowed some or all of the remaining nestling(s).

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