



Predation by a Horseshoe Whipsnake (*Hemorrhois hippocrepis*) on a Kuhl's Pipistrelle (*Pipistrellus kuhlii*)

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Predation on bats has been observed in a variety of animal taxa, including large arthropods, fishes, amphibians, snakes, birds, and other mammals (Sparks et al. 2000; Molinari et al. 2005; Nyffeler and Knörnschild 2013). Most documented cases of bat predation are viewed as opportunistic, with only a few predators known to target bats (Lima and O'Keefe 2013). Among vertebrates, birds and mammals, followed by reptiles, are more consistently represented than amphibians and fishes (Gillette and Kimbrough 1970; Sparks et al. 2000; Ancillotto et al. 2013; Mikula 2015; Mikula et al. 2016). Among reptiles, bat predation is largely restricted to snakes, with only rare instances reported for lizards (Gillette and Kimbrough 1970). Snakes known to prey on bats are mostly medium-to-large scansorial colubrids and boids, with the majority of reports originating in Neotropical and Nearctic regions, with relatively few from the Palearctic (Schätti 1984; Sparks et al. 2000; Esbérard and Vrcibradic 2007; Barti et al. 2019). The few records of bat predation by snakes in the western Palearctic have thus far involved only three colubrids: the Aesculapian Ratsnake (*Zamenis longissimus*), the Western Whipsnake (*Hierophis viridiflavus*), and the Horseshoe Whipsnake (*Hemorrhois hippocrepis*) (Barti et al. 2019).

Hemorrhois hippocrepis (Linnaeus 1758) is native to the Ibero-Maghrebian Region, with introduced populations on the Balearic Islands and the Italian islands of Sardinia and Pantelleria (Silva-Rocha et al. 2015; Uetz et al. 2026). Average total lengths are 100–140 cm, exceptionally reaching a size of 185 cm. Primarily rupicolous, *H. hippocrepis* also occurs in agricultural and periurban environments, frequently sheltering in stone walls and rock piles (Geniez 2015). It is an active forager, with a diet comprising predominantly small vertebrates, mainly rodents, reptiles, and birds (Capula et al. 1997; Pleguezuelos and Moreno 1990; Pleguezuelos and Fahd 2004; Hinckley et al. 2017).

At 1050 h on 11 December 2021, L.T.-C. fortuitously encountered a subadult *H. hippocrepis* (~60 cm total length) bearing a prominent prey bulge, about 5 m from the entrance of a natural cave in Taxlent, Batna Province, northeastern Algeria (35.54050, 5.77830; elev. 1,289 m asl) (Fig. 1). In response to the observer's presence, the snake ceased movement and initiated regurgitation, which continued even after the observer withdrew. The snake was consequently captured and gently palpated to recover the ingested item, following the standard technique employed in snake dietary studies (e.g., Tuttle and Gregory 2009; Glaudas et al. 2019; Ghezellou et al. 2021; Nafus et al. 2021), which has been demonstrated to cause no adverse long-term effects on body condition or survival (e.g., Fauvel et al. 2012). The snake was subsequently released at the point of capture.

The regurgitated prey was a freshly ingested bat. It was preserved in 70% ethanol and later identified by Petr Benda as Kuhl's Pipistrelle, *Pipistrellus kuhlii* (Kuhl 1817) (Fig. 2), a widely distributed and commonly encountered species across the western Palearctic (Van Cakenberghe and Benda 2013; Amichai and Korine 2023). *Pipistrellus kuhlii* has been reported as prey of cats, hawks, and owls (Fenton et al. 1977; Benda et al. 2006; Ancillotto et al. 2013; Szép et al. 2019) but to the best of our knowledge no records document snakes preying on this species.

Although predation was not witnessed, multiple lines of evidence strongly support a predation event rather than scavenging. The bat showed no external injuries or signs of decomposition and its recovery in close proximity to a known bat roosting site, a cave regularly used as both maternity and hibernation roosts by several species of bats (authors' pers. obs.), reinforces this hypothesis. *Hemorrhois hippocrepis* is a proficient climber capable of scaling vertical rocky surfaces, including cave walls (Hammer and Arlettaz 1998; Garrido-García et



Figure 1. Subadult Horseshoe Whipsnake (*Hemorrhois hippocrepis*) with a visible prey bulge near the entrance of a natural cave in Taxlent, Batna Province, northeastern Algeria (left); entrance of the cave (~3 x 3.5 m, 30 m deep) (center); and landscape view of the study site, a rocky canyon with an intermittent riverbed and sparse Mediterranean scrub (right). Photographs by Larbi Tahar-Chaouch (left) and Idriss Bouam (center–right).



Figure 2. Dorsal (top) and ventral views of a Kuhl's Pipistrelle (*Pipistrellus kuhlii*) regurgitated by a Horseshoe Whipsnake (*Hemorrhois hippocrepis*) near the entrance of a natural cave in Taxlent, Batna Province, northeastern Algeria. Photographs by Idriss Bouam.

al. 2013). Its slender morphology and known foraging behavior targeting crevice-dwelling reptiles such as Common Wall Geckos (*Tarentola mauritanica*) and Spanish Wall Lizards (*Podarcis hispanicus*) (Pleguezuelos and Moreno 1990) suggest that it might opportunistically prey on hole- and crevice-roosting bats such as *P. kuhlii* (Amichai and Korine 2023). Consequently, we believe that the snake captured the bat in the cave and was encountered when leaving the site.

The diet of *H. hippocrepis* has been documented from 674 individuals across much of its range, including Spain, Italy, Morocco, and the Balearic Islands (Pleguezuelos and Moreno 1990; Capula et al. 1997; Pleguezuelos and Fahd 2004; Hinckley et al. 2017). None of these dietary studies listed bats as prey, suggesting that such events are rare. However, isolated records from Spain and Morocco have reported predation on Meridional and Isabelline Serotines (*Eptesicus serotinus* and *E. isabellinus*), Lesser Mouse-eared Bats (*Myotis oxygnathus*) [= *Myotis blythii* fide Ruedi 2023], Maghrebian Mouse-eared Bats (*M. punicus*), Common Pipistrelle (*Pipistrellus pipistrellus*), and Grey Long-eared Bats (*Plecotus austriacus*) (Hammer and Arlettaz 1998; Migens et al. 2002; Garrido-García et al. 2013), clearly indicating that bat predation by *H. hippocrepis* occurs more frequently than indicated by the broader dietary studies and that, at least in some populations, particularly those situated near bat roosts, chiropterophagy could represent a locally recurrent foraging strategy (Schätti 1984).

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