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Novel observations of arachnid predation on the Mountain Skink, *Chalcides montanus* Werner, 1931, and the Algerian Sand Gecko, *Tropiocolotes algericus* Loveridge, 1947, in Morocco

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Predation is a fundamental ecological interaction that shapes community structure, regulates population dynamics, and contributes to ecosystem stability (O'Gorman and Emmerson, 2009; Curtsdotter et al., 2019; Liu et al., 2024). Arachnids, particularly spiders and scorpions, are well known as prey for various vertebrates, including reptiles (e.g., Polis et al., 1981; Hill, 2022), but they also function as vertebrate predators (McCormick and Polis, 1982; Reyes-Olivares et al., 2020; Nyffeler and Gibbons, 2022). Globally, reptiles constitute the second most frequently reported vertebrate prey group for arthropods, after amphibians, with lizards being the primary targets (Valdez, 2020).

Despite increasing documentation of arachnid predation on reptiles, a pronounced geographic bias persists. Most published cases originate from the Americas and Australia (Valdez, 2020; Nyffeler and Gibbons, 2021), whereas records from North Africa remain scarce. To our knowledge, only three published accounts are known: frequent predation of *Stenodactylus petrii* Anderson, 1896 by scorpions and solifuges (*Galeodes*) reported by Schleich et al. (1996); predation of an *Acanthodactylus* sp. by *Androctonus amoreuxi* (Audouin, 1826) in Algeria (Sadine and El Bouhissi, 2021); and predation of *Stenodactylus mauritanicus* Guichenot, 1850 by an adult *Eusparassus* spider in Morocco (Martínez del Mármol et al., 2019). Thus, additional records from this region are needed to refine global predator–prey datasets.

Here, we report three novel cases of arachnid predation on reptiles from Morocco, spanning two contrasting environments: the montane Central High Atlas and the arid desert of Tinghir Province. These include predation by the scorpion *Buthus lienhardi* Lourenço, 2003 on *Chalcides montanus* Werner, 1931, as well as two interactions involving the African Fat-tailed scorpion (*Androctonus amoreuxi*) and the White Widow Spider, *Latrodectus pallidus* O. Pickard-Cambridge, 1872, with *Tropiocolotes algericus* Loveridge, 1947.

On 3 June 2023, during daylight herpetological fieldwork on the Yagour Plateau, Central High Atlas Mountains (31.2916°N, 7.6570°W; elevation 2200 m; Fig. 1A), two adult *B. lienhardi* – a scorpion species endemic to the High Atlas Mountains of Morocco (Touloun et al., 2024) – were found beneath a stone, one grasping a *C. montanus* and actively feeding on it (Fig. 1B). The site is characterised by fractured sandstone outcrops, montane shrub vegetation, and plant species of alpine and boreal affinities. The climate corresponds to a subhumid mountain regime, consistent with cold temperate conditions, with mean minimum temperatures in the coldest month of -3.09 °C, mean maximum temperatures in the warmest month of 27.3 °C, and mean annual precipitation of 542 mm (Fick and Hijmans, 2017).

This appears to be the first documented case of arachnid predation on *C. montanus*, and only the second record of any *Chalcides* species preyed upon by an arachnid, the first being *Latrodectus tredecimguttatus* (Rossi, 1790) preying on a juvenile *Chalcides ocellatus* (Forskål, 1775) in Italy (Colombo, 2013). In our observation, the scorpion was notably smaller than the skink, suggesting that envenomation likely played a decisive role in subduing the prey prior to consumption. *Buthus lienhardi* venom is known to be highly potent, with cardiotoxic, nephrotoxic, hepatotoxic, and pneumotoxic effects (Ait Laaradia et al., 2018), potentially enabling the capture of prey of substantial size. The high abundance of *B. lienhardi* at high elevations in the High Atlas (pers. obs.) may increase the frequency of such predation events.

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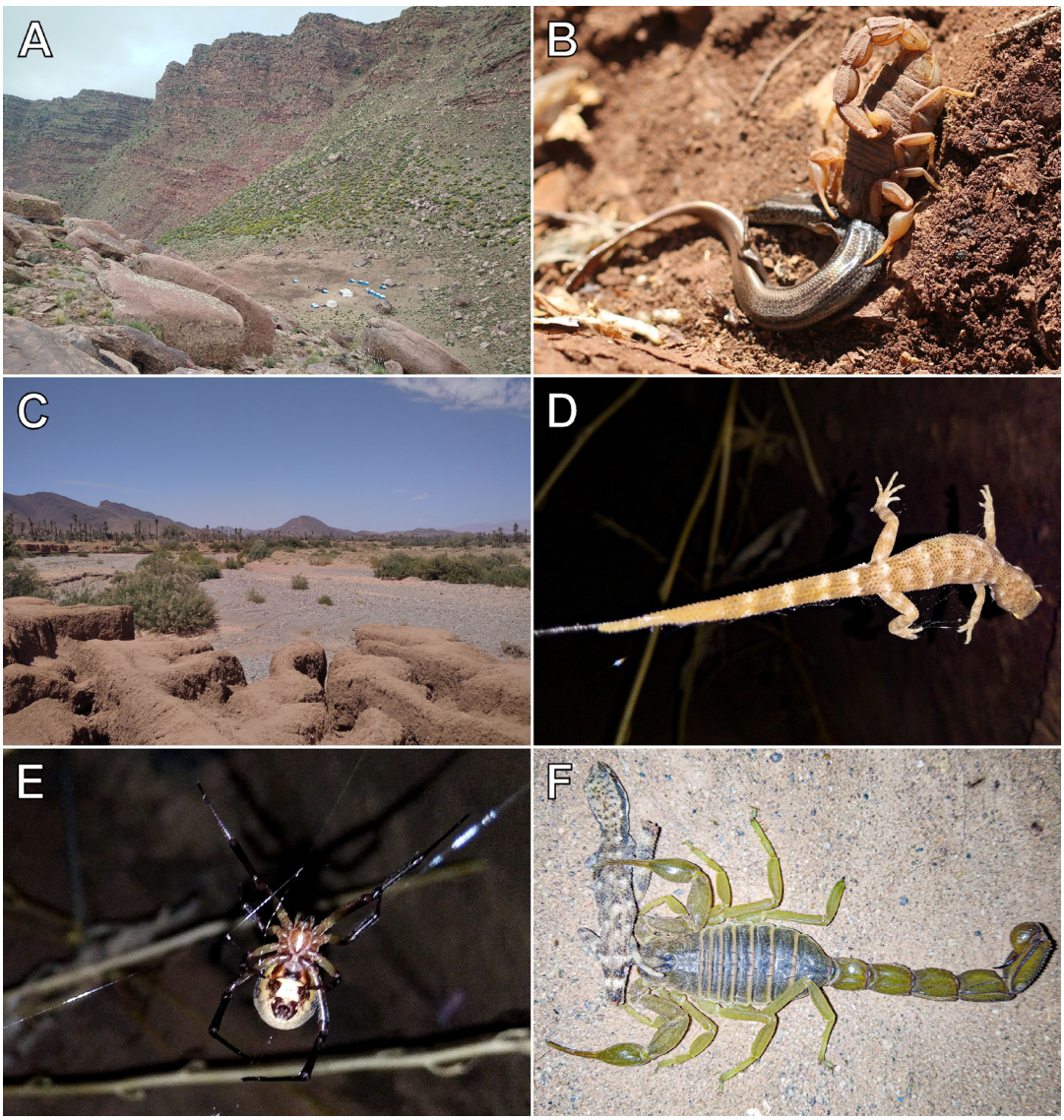

Figure 1. (A) Landscape view of the Yagour Plateau, High Atlas Mountains; (B) *Buthus lienhardi* feeding on *Chalcides montanus*; (C) Landscape view of Taghzoute N'Ait Atta, Tinghir Province; (D) *Tropiocolotes algericus* entangled in the web of *Latrodectus pallidus*; (E) Adult *L. pallidus* positioned within its web; (F) *Androctonus amoreuxi* feeding on *T. algericus*. Photos by Abdellah Bouazza (A, B) and Mohamed Mousaid (C–F).

The second and third observations were made in the Toudgha Valley, Taghzoute N'Ait Atta, Tinghir Province (31.4400°N, 5.4200°W; elevation 1200 m; Fig. 1C). On 5 April 2024, a *T. algericus* was found entangled in a web of *L. pallidus* (Fig. 1D). The spider was observed wrapping the gecko in silk, but retreated to the upper part of the web when disturbed during photography (Fig. 1E). One hour later, the gecko remained alive, suggesting that envenomation had not yet occurred. Later, on 30 June 2024, during nocturnal fieldwork in the same region, a female *A. amoreuxi* – identified by its pectinal tooth count and the shape of the genital operculum – was observed approximately 50 cm from its burrow, feeding on a *T. algericus* (Fig. 1F). The detached tail, positioned adjacent to the gecko's body, is indicative of caudal autotomy likely triggered

during the predation event; however, its proximity to the scorpion suggests that this antipredator mechanism was unsuccessful in enabling escape. The habitat at both sites is typical of arid desert environments with sparse shrub vegetation. The climate corresponds to a desert regime, with a mean annual precipitation of 151 mm, mean minimum temperatures of 1.2 °C in the coldest month, and mean maximum temperatures of 36.6 °C in the warmest month (Fick and Hijmans, 2017).

These records represent the second documented case of *A. amoreuxi* preying on a reptile (Sadine and El Bouhissi, 2021) and the first for both *L. pallidus* and *A. amoreuxi* involving *T. algericus*. They also illustrate two contrasting predation strategies in arachnids against this gecko: *Latrodectus* species adopt a predominantly passive strategy, relying on robust webs to ensnare prey, combined with potent venom to kill reptiles (O'Shea and Kelly, 2017; van Blerk et al., 2021), whereas the large desert scorpion *A. amoreuxi* is an active nocturnal forager whose highly toxic venom likely enables the swift immobilisation of reptiles (Abbas et al., 2009; Zouatine et al., 2024). Given that *Tropiocolotes* geckos are nocturnal, ground-dwelling reptiles (Machado et al., 2019), their activity period and microhabitat use overlap extensively with those of *A. amoreuxi*, thereby increasing their susceptibility to scorpion predation.

By expanding the known spectrum of arachnid–reptile interactions in North Africa, these observations contribute to a more balanced global dataset and provide new insights into predator–prey dynamics in extreme habitats, from humid alpine zones to arid deserts. Such environments, with their unique ecological constraints, offer valuable opportunities to study the behavioural and physiological adaptations that underpin survival in both predators and prey.

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