



## OPEN ACCESS

## EDITED BY

Jing Chen,  
Institute of Zoology (CAS), China

## REVIEWED BY

Darrell Acuña,  
University of Santo Tomas, Philippines

## \*CORRESPONDENCE

Manokaran Kamalakannan  
✉ kamalakannanm1@gmail.com

RECEIVED 23 May 2025

ACCEPTED 09 July 2025

PUBLISHED 28 July 2025

## CITATION

Kamalakannan M, Mondal R and Banerjee D  
(2025) Centipede predation on vertebrates:  
a review with the first bat case from Asia.  
*Front. Ecol. Evol.* 13:1634037.  
doi: 10.3389/fevo.2025.1634037

## COPYRIGHT

© 2025 Kamalakannan, Mondal and Banerjee.  
This is an open-access article distributed under  
the terms of the [Creative Commons Attribution  
License \(CC BY\)](#). The use, distribution or  
reproduction in other forums is permitted,  
provided the original author(s) and the  
copyright owner(s) are credited and that the  
original publication in this journal is cited, in  
accordance with accepted academic  
practice. No use, distribution or reproduction  
is permitted which does not comply with  
these terms.

# Centipede predation on vertebrates: a review with the first bat case from Asia

Manokaran Kamalakannan<sup>1\*</sup>, Rahul Mondal<sup>2</sup>  
and Dhriti Banerjee<sup>3</sup>

<sup>1</sup>Mammal and Osteology Section, Zoological Survey of India, Kolkata, West Bengal, India, <sup>2</sup>Hemiptera Section, Zoological Survey of India, Kolkata, West Bengal, India, <sup>3</sup>Zoological Survey of India, Kolkata, West Bengal, India

Centipedes (Chilopoda: Scolopendromorpha), long regarded as generalist arthropod predators, are increasingly recognized for their capacity to subdue and consume small vertebrates. This review synthesizes over a century of published accounts documenting centipede predation on amphibians, reptiles, birds, mammals, and occasionally fish, emphasizing the ecological breadth, behavioral strategies, and taxonomic diversity of both predators and prey. Notable cases include *Scolopendra gigantea* preying on bats in Venezuelan caves, *Scolopendra subspinipes* capturing snakes in urban environments, and *Cormocephalus coynei* exerting top-down control on seabird populations on predator-free islands. We also present the first confirmed case of bat predation by a centipede in Asia, where a *Rhysida* species was observed consuming a *Pipistrellus* bat in a fig tree hollow in West Bengal, India. This observation expands the known biogeography and ecological context of vertebrate predation by centipedes. Our synthesis highlights the underappreciated role of scolopendrid centipedes as mid-level predators capable of influencing small vertebrate populations, particularly in resource-limited or insular ecosystems, and calls for a re-evaluation of their functional position within terrestrial food webs.

## KEYWORDS

bat, centipede, prey, predation, *Pipistrelles*

## 1 Introduction

Predation is a central ecological force shaping trophic dynamics, influencing population regulation, species distributions, and evolutionary trajectories (Begon et al., 2006). While classical food web models often depict vertebrates preying upon invertebrates, an emerging body of literature emphasizes the importance of reverse trophic interactions where invertebrates act as predators of vertebrates (Nyffeler and Knörnschild, 2013; Nyffeler and Gibbons, 2022).

Across a range of taxa including arachnids, insects, myriapods, and crustaceans, invertebrates have been documented preying on vertebrate animals in both aquatic and terrestrial ecosystems (McCormick and Polis, 1982; Formanowicz and Bradley, 1987; Mori

and Ohba, 2004; Nyffeler and Knörnschild, 2013; Valdez, 2020; Nyffeler and Gibbons, 2022; etc.). Among invertebrate predators, centipedes (class Chilopoda) represent a particularly intriguing and underappreciated group capable of subduing vertebrate prey (Undheim and King, 2011; Dugon and Arthur, 2012; Clark, 1979). Members of the order Scolopendromorpha, especially within the genus *Scolopendra*, are large, nocturnal, and venomous generalists that use modified forelegs (forcipules) to inject venom, immobilize prey, and initiate extra-oral digestion (Undheim and King, 2011; Dugon and Arthur, 2012). Although their primary diet consists of arthropods, accumulating evidence reveals that scolopendrid centipedes frequently prey on small vertebrates across diverse environments (Cloudsley-Thompson, 1968; Forti et al., 2007; Bauer, 1990; Molinari et al., 2005; Srbek-Araujo et al., 2012, etc.).

These interactions between centipede and vertebrate are often overlooked due to the secretive and nocturnal habits of centipedes, yet they may exert significant top-down pressures on small vertebrate populations, particularly in resource-limited habitats or insular ecosystems (Halpin et al., 2021). Unlike most terrestrial invertebrates, large scolopendrid centipedes are capable of overpowering prey exceeding their own body mass (Dugon and Arthur, 2012). This functional capacity positions them uniquely in terrestrial food webs, where they may occupy mid-level predator niches and influence vertebrate community composition. Their role in nutrient transfer and energy flow, especially in tropical and subtropical regions, is only beginning to be understood (Nyffeler and Gibbons, 2022).

This review synthesizes over a century of records on centipede predation on vertebrates, emphasizing the diversity of prey, attack strategies, ecological contexts, and the evolutionary implications of such interactions. By integrating published literature and novel observations, including the first documented case of bat predation by a centipede in Asia, we aim to expand the ecological narrative surrounding centipedes and highlight their role as key, albeit cryptic, predators of vertebrates.

## 2 Literature review

### 2.1 Overview of invertebrate-driven vertebrate mortality

A diverse array of invertebrates have been documented preying on vertebrates, often in ecologically impactful ways. For example, odonate larvae (dragonfly nymphs) are major predators of amphibian larvae and exert strong selective pressures on anuran life history traits (Morin, 1983; McCollum and Leimberger, 1997). In tropical ecosystems, army ants (*Eciton burchellii*) are known to kill and consume nestling birds and small reptiles during raids (Rettenmeyer et al., 2011). Similarly, wasps and spiders have been recorded depredating avian nestlings (Henriques, 1998; Nyffeler and Knörnschild, 2013).

These interactions are not merely incidental; they contribute significantly to mortality regimes and influence prey behavior and

habitat use (Sih et al., 1998; Preisser et al., 2005). Importantly, they underscore the need to reassess traditional trophic hierarchies and recognize the diverse roles of invertebrates as apex or mesopredators in certain ecological contexts (Nyffeler and Birkhofer, 2017).

### 2.2 Centipede predation on amphibians

Predation events of centipedes have been documented across a range of amphibian taxa. In the Caribbean, *Scolopendra alternans* was observed attacking and consuming the toxic cane toad (*Rhinella marina*), a species known for its chemical defenses (Carpenter and Gillingham, 1984). This highlights the centipede's resistance or indifference to amphibian toxins in some cases. Similarly, in tropical Australia, native centipedes (*Ethmostigmus rubripes*) have been reported killing invasive cane toads, indicating a remarkable reversal of expected predator-prey dynamics (Pomeroy et al., 2021). In Brazil's Atlantic Forest, *Otostigmus tibialis* has been recorded preying on the small arboreal tree frog *Dendropsophus elegans*, showcasing centipede predation within vertical forest strata (Forti et al., 2007). These observations provide crucial insights into centipedes as opportunistic and generalist predators capable of subduing toxic or agile amphibian prey across diverse ecosystems.

Although quantitative studies on the frequency and ecological impact of centipede-amphibian interactions are lacking, the available evidence suggests that centipedes play a significant, if under-recognized, role in amphibian mortality particularly among juveniles and small-bodied species.

### 2.3 Centipede predation on reptiles

Reptilian prey, especially small lizards and snakes, form a notable component of centipede diets. Species like *Cormocephalus coynei*, *Scolopendra viridicornis* and *Scolopendra subspinipes* have been recorded attacking geckos, skinks, and colubrids using venom injection and powerful mechanical restraint (Halpin et al., 2021; Vieira et al., 2021; Deb et al., 2023). These interactions occurred in microhabitats such as leaf litter, under logs, and within rock crevices, where reptiles are abundant and centipedes can ambush effectively.

Multiple field observations illustrate the breadth of reptilian predation. In India, *Scolopendra hardwickei* has been reported preying on *Oligodon taeniolatus*, a small snake (Smart et al., 2010), while in Thailand's Sakaerat Biosphere Reserve, *Scolopendra dawydoffi* consumed *Sibynophis triangularis* (Chiacchio et al., 2017). In the Andaman Islands, *S. dehaani* was documented subduing *Lycodon hypsirhinoides* in forest habitats (Vazifdar et al., 2021), and *Lycodon zawi* in urban Guwahati (Deb et al., 2023), suggesting adaptability to varied landscapes.

In urban Singapore, *Scolopendra subspinipes* was recorded preying on multiple fossorial snakes such as *Calamaria schlegeli*, *Calamaria pavementata*, and *Pseudorabdion longiceps* within green spaces embedded in city infrastructure (Pwa et al., 2023). Elsewhere, *Scolopendra gigantea* has been observed attacking *Leptodeira bakeri*, a colubrid snake (Goessling et al., 2012; van





FIGURE 1

Bat predation by a centipede: (a) the predator *Rhysida* sp. centipede, (b) the prey *Pipistrellus* sp. bat, (c) the centipede immobilizes the bat using its forcipules while the bat is still alive; the open eye suggests it remains conscious, (d) damage to the bat's wing membrane caused by the centipede, (e) the bat's mouth is open as the centipede feeds, indicating a potential struggle or distress response. All images were taken under natural conditions using a flashlight during nighttime observations.

Buurt and Dilrosun, 2017). Additionally, *Scolopendra* sp. captured *Calliophis melanurus*, a venomous elapid, in Mumbai's rocky outcrops (Mirza and Ahmed, 2009), indicating their ability to handle dangerous prey.

These accounts underscore the ecological versatility of large centipedes and their ability to exploit a wide range of reptilian prey across diverse habitats, from pristine forests and islands to anthropogenic settings such as cities and agricultural margins.

TABLE 1 Documented instances of centipede predators and their vertebrate prey species (amphibians, reptiles, birds, mammals and fishes).

Centipede predator species	Vertebrate prey species	Common name	Habitat	Location	Setting	Reference
 Amphibians						
<i>Ethmostigmus rubripes</i>	<i>Rhinella marina</i>	Cane toad	—	Australia	Field	<a href="#">Pomeroy et al. (2021)</a>
<i>Otostigmus tibialis</i>	<i>Dendropsophus elegans</i>	Elegant forest tree frog	Forest	São Miguel Arcanjo, Brazil	Field	<a href="#">Forti et al. (2007)</a>
<i>Scolopendra alternans</i>	<i>Rhinella marina</i>	Cane toad	—	Caribbean (not specified)	Field	<a href="#">Carpenter and Gillingham (1984)</a>
<i>Scolopendra</i> sp.	<i>Kaloula pulchra</i>	Banded bullfrog	Forest	Thailand	Field	<a href="#">Hodges and Goodyear (2021)</a>
	<i>Scinax fuscovarius</i>	Fuscous-blotched treefrog	Forest	Brazil	Field	<a href="#">Folly et al. (2019)</a>
 Reptiles						
<i>Cormocephalus coynei</i>	<i>Oligosoma lichenigera</i>	Lord Howe Island skink	Island	Phillip Island, Norfolk Island, Australia	Field	<a href="#">Halpin et al. (2021)</a>
	<i>Christinus guentheri</i>	Günther's island gecko				
<i>Cormocephalus</i> sp.	<i>Oedura lesueurii</i>	Lesueur's gecko	Rock crevices	Australia	Field	<a href="#">Pike et al. (2010)</a>
<i>Scolopendra cingulata</i>	<i>Dalmatolacerta oxycephala</i>	Sharp-snouted rock lizard	Rocky area	Korčula Island, Croatia	Field	<a href="#">Zimić and Jelić (2014)</a>
<i>Scolopendra dawydoffi</i>	<i>Sibynophis triangularis</i>	Triangulate collared snake	Biosphere reserve	Sakaerat, Thailand	Field	<a href="#">Chiacchio et al. (2017)</a>
<i>Scolopendra dehaani</i>	<i>Lycodon hypsirhinoides</i>	Andaman wolf snake	Forest	Andaman Islands	Field	<a href="#">Vazifdar et al. (2021)</a>
	<i>Lycodon zawi</i>	Zaw's wolf snake	Urban	Guwahati, India	Field	<a href="#">Deb et al. (2023)</a>
<i>Scolopendra galapagoensis</i>	<i>Pseudalsophis biserialis</i>	Galápagos racer	Island	Galápagos Islands	Field	<a href="#">Ortiz-Catedral et al. (2021)</a>
<i>Scolopendra gigantea</i>	<i>Leptodeira bakeri</i>	Baker's cat-eyed snake	—	Aruba	Field	<a href="#">Goessling et al. (2012); van Buurt and Dilrosun (2017)</a>
<i>Scolopendra hardwickei</i>	<i>Oligodon taeniolatus</i>	Streaked Kukri snake	—	India	Field	<a href="#">Smart et al. (2010)</a>
<i>Scolopendra heros</i>	<i>Rhinocheilus lecontei</i>	Long-nosed snake	Desert	Texas, USA	Field	<a href="#">Easterla (1975)</a>
<i>Scolopendra</i> sp.	<i>Ameivula ocellifera</i>	Spix's whiptail lizard	Natural monument area	Grota do Angico, Sergipe, Brazil	Field	<a href="#">Moura et al. (2015)</a>
	<i>Calliophis melanurus</i>	Slender coral snake	Rock crevices	Mumbai, India	Field	<a href="#">Mirza and Ahmed (2009)</a>
<i>Scolopendra spinosissima</i>	<i>Hemibungarus mcclungi</i>	McClung's Philippine coral snake	—	Luzon Island, Philippines	Field	<a href="#">Acuña et al. (2021)</a>
<i>Scolopendra subspinipes</i>	<i>Calamaria pavimentata</i>	Collared reed snake	Urban greenery	Singapore	Field	<a href="#">Pwa et al. (2023)</a>
	<i>Calamaria schlegeli</i>	Red-headed reed snake				
	<i>Pseudorabdion longiceps</i>	Dwarf reed snake				
<i>Scolopendra viridicornis</i>	<i>Gymnodactylus geckoides</i>	Naked-toed gecko	Semiarid environment	Northeastern Brazil	Field	<a href="#">Vieira et al. (2021)</a>
<i>Scolopendra morsitans</i>	<i>Tympanocryptis tetraporophora</i>	Eyrean earless dragon	Road	Australia	Field	<a href="#">McFadden and McFadden (2025)</a>

(Continued)



TABLE 1 Continued

Centipede predator species	Vertebrate prey species	Common name	Habitat	Location	Setting	Reference
 Birds						
<i>Cormocephalus coynei</i>	<i>Pterodroma nigripennis</i>	Black-winged petrel (Nestlings)	Island	Phillip Island, Norfolk Island, Australia	Field	Halpin et al. (2021)
<i>Scolopendra</i> sp.	Bird	Unidentified bird	—	Not specified	Field	Cumming (1903)
	Bird	Unidentified bird	—	Not specified	Field	Cloudsley-Thompson (1968)
	Bird	Unidentified bird	—	Not specified	Field	Anonymous (1985)
 Mammals						
<i>Rhysida</i> sp.	<i>Pipistrellus</i> sp.	Bat	Tree hollow	India	Field	This study
<i>Scolopendra galapagoensis</i>	<i>Oryzomys bauri</i> (= <i>Aegialomys galapagoensis</i> )	Galápagos rice rat	Island	Galápagos Islands, Ecuador	Field	Clark (1979)
<i>Scolopendra gigantea</i>	<i>Mormoops megalophylla</i>	Ghost-faced bat	Caves	Venezuela	Field	Molinari et al. (2005)
	<i>Lionycteris curasoae</i>	Southern long-nosed bat				
	<i>Pteronotus davyi</i>	Davy's naked-backed bat				
<i>Scolopendra heros</i>	<i>Eptesicus fuscus</i>	Big brown bat	Rock crevices	Texas	Field	Lindley et al. (2017)
<i>Scolopendra</i> sp.	Rodent	Unidentified rodent	—	Not specified	Field	Shugg (1961)
<i>Scolopendra subspinipes</i>	<i>Mus musculus</i>	House mouse	—	China	Experiment	Luo et al. (2018)
<i>Scolopendra viridicornis</i>	<i>Eptesicus furinalis</i>	Argentine brown bat	Mosaic floor	Southeastern Brazil	Field	Srbek-Araujo et al. (2012)
	<i>Molossus molossus</i>	Velvety free-tailed bat	Roof	Brazil	Field	Noronha et al. (2015)
 Fishes						
<i>Cormocephalus coynei</i>	Marine fishes from seabird regurgitates	Fish	Coastal	Phillip Island, Norfolk Island, Australia	Field	Halpin et al. (2021)

## 2.4 Centipede predation on birds and fish

Although uncommon, centipede predation on birds is best exemplified by *Cormocephalus coynei* on Phillip Island, Norfolk Island, Australia where it functions as a top terrestrial predator in the absence of mammals. This species preys on thousands of black-winged petrel (*Pterodroma nigripennis*) chicks annually by entering their burrows and using venom to subdue them (Halpin et al., 2021). *Cormocephalus coynei* also scavenges regurgitated marine fish from seabirds, demonstrating notable dietary flexibility (Halpin et al., 2021).

Historical reports suggest other *Scolopendra* species may occasionally prey on small birds (Cumming, 1903; Cloudsley-Thompson, 1968), though such accounts lack detailed verification. While active predation on fish has not been documented, scavenging behaviors particularly in island or predator-limited ecosystems reveal the trophic adaptability of some centipedes. These interactions challenge conventional views of invertebrate predators and warrant further ecological investigation.

## 2.5 Centipede predation on mammals

Mammalian predation by centipedes, particularly involving bats, is well-documented for *Scolopendra gigantea* in Venezuelan caves, where it preys on molossid and mormoopid bats (Molinari et al., 2005). Similar predation events involving *Scolopendra viridicornis* have been reported in Brazil (Srbek-Araujo et al., 2012; Noronha et al., 2015). In the United States, *Scolopendra heros* has been observed preying on *Eptesicus fuscus* in rock crevices in Texas (Lindley et al., 2017). In addition to bats, rodents have also been recorded as prey. For instance, *Scolopendra galapagoensis* has been observed preying upon the Galápagos rice rat *Oryzomys bauri* (= *Aegialomys galapagoensis*) (Clark, 1979), and unidentified rodents have been found in the diet of other large scolopendrid centipedes (Shugg, 1961). These observations expand the known mammalian prey base of centipedes and highlight their role as opportunistic vertebrate predators. The behavioral and ecological implications of such predation particularly concerning roost site selection, foraging behavior, and predator avoidance remain poorly studied but are likely to be significant.

### 3 Case study: centipede predation on a bat, a new record from Asia

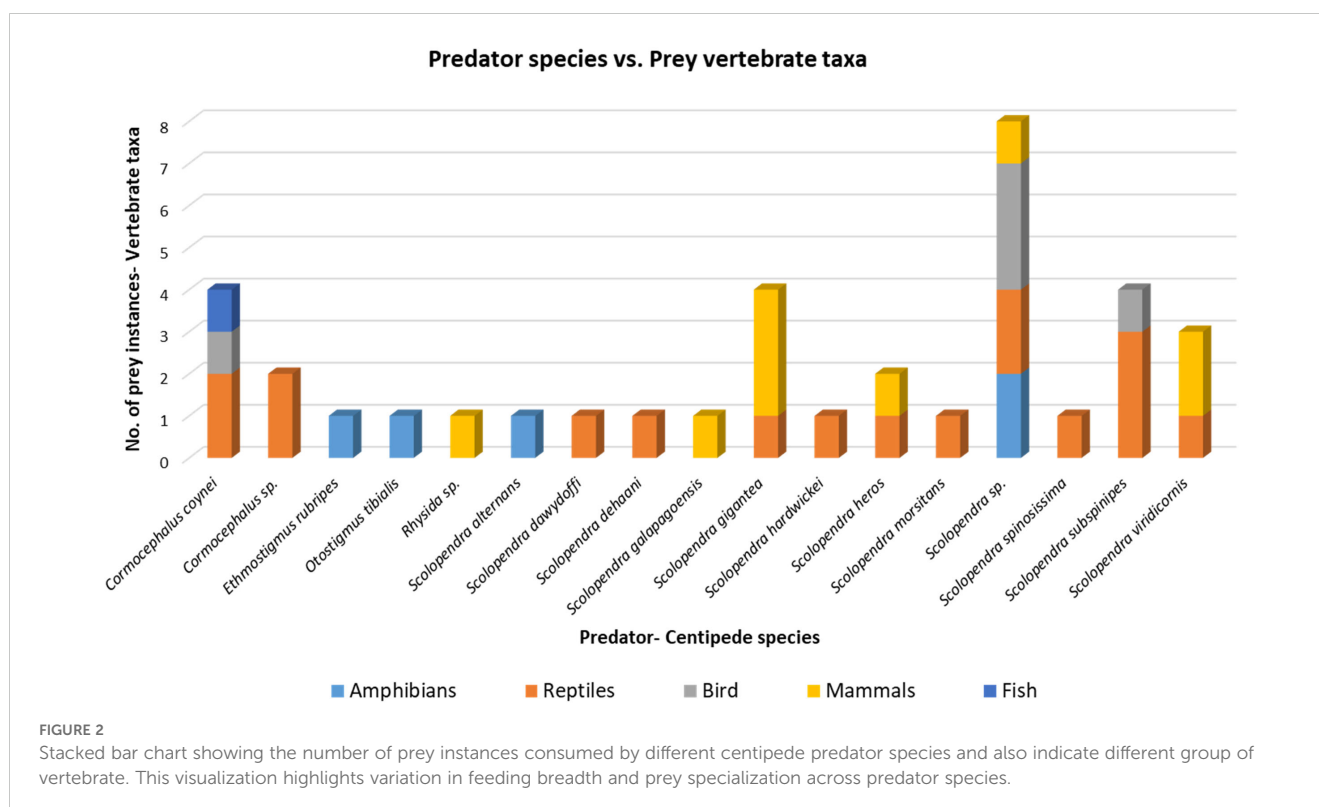
Recently, a team of scientists of Zoological Survey of India carried out a faunal survey in the dry tropical forests of West Bengal, India. The study area, Nakpur a village situated in the Nalhathi Block of Birbhum district of West Bengal state in India (24.295684°N, 88.011694°E) which is primarily occupied by crop agricultural fields. During the insect survey in the study area, a centipede was observed preying on a bat in the hollow of a Sacred Fig (*Ficus religiosa*) tree at 20:30 h on 19 June 2024. This rare interaction was captured through photographs (Figure 1) and video (Supplementary material) to provide significant documentation. The centipede was identified as a species belonging to the genus *Rhysida* (Chilopoda: Scolopendromorpha: Scolopendridae), based on its head, dorsal body, ultimate legs and leg color, body profile (Figure 1a), and spiracle formula one of the diagnostic characters of the genus against other scolopendrids (Joshi et al., 2020; Sureshan, 2024; Bonato et al., 2025), while the bat was identified as a species belonging to genus *Pipistrellus* (Mammalia: Chiroptera: Vespertilionidae) due to its small size ( $\approx 6$  cm), body shape, and internarial groove (Figure 1b) (Bates and Harrison, 1997; Sharma et al., 2024). Due to logistical constraints in the field and the non-invasive nature of the observation, molecular confirmation of species identity was not feasible. Both the bat and centipede were observed at the lower part of the tree, approximately 5 feet above the ground, and the tree was home to the Indian flying fox (*Pteropus medius*), spotted house gecko (*Hemidactylus parvimaculatus*), Asian common toad

(*Duttaphrynus melanostictus*), and bee nests. The weather during this observation was warm and humid, reaching a high of around 36°C (96.8°F)- West Bengal's monsoon season. The centipede was notably longer than the bat ( $\approx 10$  cm). The centipede began to feed on the bat's wing membrane (Figure 1c) and proceeding deeper into the body of the bat (Figure 1d) while it was still alive (Figures 1c, e). The authors noted that the predatory actions occurred after the bat had been immobilized, yet its head continued moving while the centipede was feeding. After capturing a one-minute video and taking some photos, the researchers stepped back from the spot to prevent disrupting the centipede's hunting behavior.

### 4 Discussion

Previous studies (Molinari et al., 2005; Srбек-Araujo et al., 2012; Noronha et al., 2015; Lindley et al., 2017) have reported bat predation by *Scolopendra* species in the Americas, mainly in caves and artificial structures. This new record suggests that arboreal predation on bats by centipedes may be more widespread than previously thought.

Our analysis on centipede predation on vertebrate reveals a clear taxonomic bias in centipede predation towards reptiles, particularly snakes (Table 1; Figure 2). Among the 16 centipede species with documented vertebrate predation, reptiles constitute the most frequently reported prey class. This trend is especially evident in large-bodied *Scolopendra* species such as *Scolopendra subspinipes*, *Scolopendra gigantea*, and *Scolopendra heros*, which have been recorded subduing snakes often comparable to their own



size (Valdez, 2020; Easterla, 1975; van Buurt and Dilrosun, 2017; Pwa et al., 2023). The elongated, limbless morphology of snakes may facilitate subjugation and consumption by centipedes using their powerful forcipules and envenomation tactics (Lewis, 1981). Moreover, snakes often inhabit microhabitats also frequented by centipedes such as forest floors, under logs, or leaf litter thereby increasing encounter rates. This dietary inclination suggests that scolopendrid centipedes, though generalist predators, may exert predatory pressure on certain reptile populations, especially in insular or disturbed ecosystems where snakes are among the few available vertebrate prey.

## 5 Conclusion

Vertebrate predation by centipedes, though often overlooked, is neither rare nor ecologically insignificant. Our review reveals that large scolopendrid centipedes occupy a unique trophic niche, with documented ability to subdue vertebrate prey ranging from amphibians and reptiles to birds and mammals across diverse habitats worldwide. The new record from India involving a *Rhysida* centipede feeding on a live bat in an arboreal setting represents the first such case from Asia and challenges prior assumptions that such interactions are confined to cave or ground environments. Collectively, these findings underscore the ecological versatility, behavioral sophistication, and predatory impact of scolopendrid centipedes. Future research should prioritize quantitative assessments of their predation rates, prey selection, and ecological consequences, especially in tropical and subtropical ecosystems where they may serve as cryptic yet influential components of vertebrate mortality regimes.

## Author contributions

MK: Conceptualization, Supervision, Writing – review & editing, Methodology, Investigation, Writing – original draft, Data curation, Software, Project administration, Validation, Formal Analysis. RM: Writing – review & editing, Data curation. DB: Visualization, Resources, Funding acquisition, Writing – review & editing.

## References

- Acuña, D., Isagani, N., and Pitogo, K. M. (2021). Predation on a McClung's Philippine False Coralsnake, *Hemibungarus mcclungi* (Weigmann 1835), by a Giant Spiny Centipede, *Scolopendra spinosissima* Kraepelin 1903, on Luzon Island, The Philippines. *Reptiles Amphibians* 28, 417–419.
- Anonymous (1985). *Dangerous Australians* (Sydney: Bay Books). <https://doi.org/10.17161/randa.v28i3.15782>
- Bates, P. J., and Harrison, D. L. (1997). *Bats of the Indian Subcontinent* (Sevenoaks, UK: Harrison Zoological Museum), 258 pp.
- Bauer, A. M. (1990). Gekkonid lizards as prey of invertebrates and predators of vertebrates. *Herpetol. Rev.* 21, 83–87.
- Begon, M., Townsend, C. R., and Harper, J. L. (2006). *Ecology: From Individuals to Ecosystems (4th ed.)* (Oxford: Blackwell Publishing).
- Bonato, L., Chagas-Junior, A., Edgecombe, G. D., Lewis, J. G. E., Minelli, A., Pereira, L. A., et al. (2025). *ChiloBase 2.0 – A World Catalogue of Centipedes (Chilopoda)*. Available online at: <http://chilobase.biologia.unipd.it> (Accessed May 22, 2025).
- Carpenter, C. C., and Gillingham, J. C. (1984). Giant centipede (*Scolopendra alternans*) attacks marine toad (*Bufo marinus*). *Caribbean J. Sci.* 20, 71–72.
- Chiacchio, M., Nadolski, B. S., Suwanwaree, P., Waengsothorn, S., et al. (2017). Centipede, *Scolopendra dawydoffi* (Chilopoda: Scolopendridae), predation on an egg-

## Funding

The author(s) declare that financial support was received for the research and/or publication of this article. This study was supported by the core funding from the Zoological Survey of India, Ministry of Environment, Forest and Climate Change, Government of India.

## Acknowledgments

We thank Dr. P. M. Sureshan, former senior scientist at the Zoological Survey of India, for his valuable assistance in identifying the centipede genus.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Generative AI statement

The author(s) declare that no Generative AI was used in the creation of this manuscript.

## Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

## Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fevo.2025.1634037/full#supplementary-material>

- laying snake, *Sibynophis triangularis* (Squamata: Colubridae), in Thailand. *J. Insect Behav.* 30, 563–566. doi: 10.1007/s10905-017-9642-0
- Clark, D. B. (1979). Centipede preying on a nestling rice rat (*Oryzomys bauri*). *J. Mammal.* 60, 654. doi: 10.2307/1380119
- Cloudsley-Thompson, J. L. (1968). *Spiders, Scorpions, Centipedes, and Mites* (Oxford: Pergamon Press).
- Cumming, W. D. (1903). The food and poison of a centipede. *J. Bombay Natural History Soc.* 15, 364–365.
- Deb, A., Sinha, D., and Purkayastha, J. (2023). Predation on Zaw's Wolfsnake (*Lycodon zawi*) by a Malaysian Cherry Red Centipede (*Scolopendra dehaani*). *Reptiles Amphibians* 30, e18468. doi: 10.17161/randa.v30i1.18468
- Dugon, M. M., and Arthur, W. (2012). Prey orientation and the role of venom availability in the predatory behavior of the centipede *Scolopendra subspinipes mutilans* (Arthropoda: Chilopoda). *J. Insect Physiol.* 58, 874–880. doi: 10.1016/j.jinphys.2012.03.014
- Easterla, D. A. (1975). Predation by *Scolopendra heros* on *Rhinocheilus lecontei*. *Southwestern Naturalist.* 20(3):411.
- Folly, H., Thaler, R., Adams, G. B., and Pereira, E. A. (2019). Predation on *Scinax fuscovarius* (Anura, Hylidae) by *Scolopendra* sp. (Chilopoda: Scolopendridae) in the State of Tocantins, Central Brazil. *Rev. Latinoamericana Herpetol.* 2, 39–43.
- Formanowicz, D. R., and Bradley, P. J. (1987). Fluctuations in prey density: effects on the foraging tactics of scolopendrid centipedes. *Anim. Behav.* 35, 453–461. doi: 10.1016/S0003-3472(87)80270-1
- Forti, L. R., Fischer, H. Z., and Encarnação, L. C. (2007). Treefrog *Dendropsophus elegans* (Wied-Neuwied 1824) (Anura: Hylidae) as a meal to *Otostigmus tibialis* Brölemann 1902 (Chilopoda: Scolopendridae) in the tropical rainforest in southeastern Brazil. *Braz. J. Biol.* 67, 583–584. doi: 10.1590/S1519-69842007000300028
- Goessling, J. M., Lutterschmidt, W. I., Odum, R. A., and Reinert, H. K. (2012). *Leptodeira bakeri* (Aruban cat-eyed snake). Predation. *Herpetol. Rev.* 43, 345.
- Halpin, L. R., Terrington, D. I., Jones, H. P., Mott, R., Wong, W. W., Dow, D. C., et al. (2021). Arthropod predation of vertebrates structures trophic dynamics in island ecosystems. *Am. Nat.* 198, 540–550. doi: 10.1086/715702
- Henriques, R. (1998). Bird predation on nest of a social wasp in Brazilian cerrado. *Rev. Biol. Trop.* 46, 1139–1140.
- Hodges, C. W., and Goodyear, J. (2021). Novel foraging behaviors of *Scolopendra dehaani* (Chilopoda: Scolopendridae) in Nakhon Ratchasima, Thailand. *Int. J. Trop. Insect Sci.* 41, 3257–3262. doi: 10.1007/s42690-021-00431-9
- Joshi, J., Karanth, P. K., and Edgecombe, G. D. (2020). The out-of-India hypothesis: evidence from an ancient centipede genus, *Rhysida* (Chilopoda: Scolopendromorpha) from the Oriental Region, and systematics of Indian species. *Zool. J. Linn. Soc.* 189, 828–861. doi: 10.1093/zoolinnean/zlzl38
- Lewis, J. G. E. (1981). *The biology of centipedes* (Cambridge: Cambridge University Press).
- Lindley, T. T., Molinari, J., Shelley, R. M., and Steger, B. N. (2017). A fourth account of centipede (Chilopoda) predation on bats. *Insecta Mundi* 573, 1–4.
- Luo, L., Li, B., Wang, S., Wu, F., Wang, X., Liang, P., et al. (2018). Centipedes subdue giant prey by blocking KCNQ channels. *Proc. Natl. Acad. Sci. United States America* 115, 1646–1651.
- McCollum, S. A., and Leimberger, J. D. (1997). Predator-induced morphological changes in an amphibian: predation by dragonflies affects tadpole shape and color. *Oecologia* 109, 615–621. doi: 10.1007/s004420050124
- McCormick, S., and Polis, G. A. (1982). Arthropods that prey on vertebrates. *Biol. Rev.* 57, 29–58. doi: 10.1111/j.1469-185X.1982.tb00363.x
- McFadden, M. S., and McFadden, J. M. (2025). Predation of an adult Eyrean Earless Dragon, *Tympanocryptis tetraporophora*, by a Red-headed Centipede, *Scolopendra morsitans*, in Australia. *Herpetol. Notes* 18, 221–223.
- Mirza, Z. A., and Ahmed, J. J. (2009). Note on predation of *Calliophis melanurus* Shaw 1802 (Serpentes: elapidae) by *Scolopendra* sp. *Hamadryad* 34, 166.
- Molinari, J., Gutiérrez, E. E., Ascencio, A. A., Nassar, J. M., Arends, A., and Márquez, R. J. (2005). Predation by giant centipedes, *Scolopendra gigantea*, on three species of bats in a Venezuelan cave. *Caribbean J. Sci.* 41, 340–346.
- Mori, A., and Ohba, S. (2004). Field observations of predation on snakes by the giant water bug. *Bull. Herpetol. Soc. Japan* 2004, 78–81.
- Morin, P. J. (1983). Predation, competition, and the composition of larval anuran guilds. *Ecol. Monogr.* 53, 119–138. doi: 10.2307/1942491
- Moura, L. O. G., Machado, C. M. S., Silva, A. O., Conceição, B. M., Ferreira, A. S., and Faria, R. G. (2015). Predation of *Ameivulla ocellifera* (Spix 1825) (Squamata: Teiidae) by *Scolopendra* sp. (Linnaeus 1758) (Chilopoda: Scolopendridae) in the vegetation of the Caatinga biome, northeastern Brazil. *Herpetol. Notes.* 8, 389–391.
- Noronha, J. C., Battirola, L. D., Chagas-Júnior, A., Miranda, R. M., Carpanedo, R. S., and Rodrigues, D. J. (2015). Predation of bat (*Molossus molossus*: Molossidae) by the centipede *Scolopendra viridicornis* (Scolopendridae) in Southern Amazonia. *Acta Amazonica* 45, 333–336. doi: 10.1590/1809-4392201404083
- Nyffeler, M., and Birkhofer, K. (2017). An estimated 400–800 million tons of prey are annually killed by the global spider community. *Sci. Nat.* 104, 30. doi: 10.1007/s00114-017-1440-1
- Nyffeler, M., and Gibbons, J. W. (2022). Spiders feeding on vertebrates is more common and widespread than previously thought, geographically and taxonomically. *J. Arachnol.* 50, 121–134. doi: 10.1636/JoA-S-21-054
- Nyffeler, M., and Knörnschild, M. (2013). Bat predation by spiders. *PloS One* 8, e58120. doi: 10.1371/journal.pone.0058120
- Ortiz-Catedral, L., Christian, E., Chimborazo, W., Sevilla, C., and Rueda, D. (2021). A Galapagos centipede *Scolopendra galapagoensis* preys on a Floreana Racer *Pseudalsophis biserialis*. *Galapagos Res.* 70, 2–4.
- Pike, D. A., Croak, B. M., Webb, J. K., and Shine, R. (2010). Context-dependent avoidance of predatory centipedes by nocturnal geckos (*Oedura lesueurii*). *Behaviour* 147, 397–412. doi: 10.1163/000579509X12578482408448
- Pomeroy, J., Brown, G. P., Webb, G. J. W., and Shine, R. (2021). The fauna fights back: Invasive Cane Toads killed by native centipedes in tropical Australia. *Aust. Zool.* 41, 580–585. doi: 10.7882/AZ.2021.002
- Preisser, E. L., Bolnick, D. I., and Benard, M. F. (2005). Scared to death? The effects of intimidation and consumption in predator-prey interactions. *Ecology* 86, 501–509. doi: 10.1890/04-0719
- Pwa, V. K. H., Yap, S., Law, I. S., Law, I. T., Wong, J., and Figueroa, A. (2023). Predation on two species of reed snakes (Squamata: Colubridae: Calamariinae) by the giant forest centipede, *Scolopendra subspinipes* Leach 1815 (Chilopoda: Scolopendridae), in Singapore. *Herpetol. Notes* 16, 577–582.
- Rettenmeyer, C. W., Rettenmeyer, M. E., Joseph, J., and Berghoff, S. M. (2011). The largest animal association centered on one species: the army ant *Eciton burchellii* and its more than 300 associates. *Insect. Soc.* 58, 281–292. doi: 10.1007/s00040-010-0128-8
- Sharma, G., Kamalakkannan, M., Saikia, U., Talmale, S., Dam, D., Banerjee, D., et al. (2024). *Checklist of Fauna of India: Chordata: Mammalia. Version 1.0* (Zoological Survey of India). doi: 10.26515/Fauna/1/2023/Chordata:Mammals
- Shugg, H. B. (1961). Predation on mouse by centipede. *Western Aust. Nat.* 8, 52.
- Sih, A., Englund, G., and Wooster, D. (1998). Emergent impacts of multiple predators on prey. *Trends Ecol. Evol.* 13, 350–355. doi: 10.1016/S0169-5347(98)01437-2
- Smart, U., Patel, P., and Pattanayak, P. (2010). *Scolopendra hardwickei* (Newport 1844) feeding on *Oligodon taeniolatus* (Jerdon 1853) in the scrub jungles of Pondicherry, southern India. *J. Bombay Natural History Soc.* 107, 68.
- Srbek-Araujo, A. C., Nogueira, M. R., Lima, I. P., and Peracchi, A. L. (2012). Predation by the centipede *Scolopendra viridicornis* (Scolopendromorpha: Scolopendridae) on roof-roosting bats in the Atlantic Forest of southeastern Brazil. *Chiroptera Neotropical* 18, 1128–1131.
- Sureshan, P. M. (2024). *Fauna of India Checklist: Arthropoda: Myriapoda: Chilopoda* (Zoological 409 Survey of India). doi: 10.26515/Fauna/1/2023/Arthropoda:Myriapoda: Chilopoda
- Undheim, E. A. B., and King, G. F. (2011). On the venom system of centipedes (Chilopoda), a neglected group of venomous animals. *Toxicon* 57, 512–524. doi: 10.1016/j.toxicon.2011.01.004
- Valdez, J. W. (2020). Arthropods as vertebrate predators: A review of global patterns. *Global Ecol. Biogeogr.* 29, 1691–1703. doi: 10.1111/geb.13157
- van Buurt, G., and Dilrosun, F. (2017). Predation by an Amazonian giant centipede (*Scolopendra gigantea*) on a Baker's cat-eyed snake (*Leptodeira bakeri*). *Reptiles Amphibians* 24, 127.
- Vazifdar, N., Khalid, M. A., and D'Costa, M. (2021). A centipede (*Scolopendra dehaani*) feeding on a juvenile Andaman wolfsnake (*Lycodon hypsirrhinoides*) on Havelock Islands, Andaman and Nicobar Islands, India. *Reptiles Amphibians* 28, 326–327. doi: 10.17161/randa.v28i2.15607
- Vieira, W. L. S., Gonçalves, M. B. R., Moraes, E. R., Macedo Júnior, F. V., and Vieira, K. S. (2021). Predation of naked-toed gecko, *Gymnodactylus geckoides* Spix 1825 by giant centipede, *Scolopendra viridicornis* Newport 1844 in northeastern Brazil (Squamata: Phyllodactylidae). *Herpetol. Notes* 14, 671–673.
- Zimić, A., and Jelić, D. (2014). Interspecific illusions: Underestimation of the power of the Mediterranean banded centipede (*Scolopendra cingulata*). *Hyla* 2014, 27–29.