A taste for ants: potential obligate myrmecophagy in *Lasaeola* (Araneae: Theridiidae)

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Abstract. Ant predation (Hymenoptera: Formicidae) by the genus *Lasaeola* Simon, 1881 is a behaviour sporadically reported in the scientific literature and frequently observed in images uploaded to various online platforms. While these scattered observations confirm the existence of this predator-prey interaction, a systematic analysis of these observations has never been undertaken. Here, we present the first formal analysis and compilation of documented cases of myrmecophagy in *Lasaeola*, providing evidence that obligate ant predation is a likely foraging strategy for this genus.

Keywords: Arachnid ecology, myrmecophagy, predatory behaviour, spider-ant interactions, trophic specialization

Zusammenfassung. Eine Vorliebe für Ameisen: Potentielle obligate Myrmekophagie durch die Gattung *Lasaeola* (Araneae: Theridiidae). Die Erbeutung von Ameisen durch die Gattung *Lasaeola* Simon, 1881 ist ein sporadisch berichtetes Verhalten in der wissenschaftlichen Literatur und wird regelmäßig auf Bildern, welche auf verschiedene Onlineplattformen hochgeladen werden, beobachtet. Während diese einzelnen Beobachtungen die Existenz dieser Räuber-Beute-Beziehung bestätigen, fehlt bisher eine systematische Analyse dieser Beziehung. In dieser Arbeit präsentieren wir daher die erste formelle Untersuchung und Zusammenstellung dokumentierter Fälle von Myrmekophagie in der Gattung *Lasaeola* und zeigen, dass das obligate Erbeuten von Ameisen eine wahrscheinliche Jagdstrategie dieser Gattung ist.

Myrmecophagy, the predation of ants by spiders, is relatively rare yet well-documented across families such as Theridiidae, Zodariidae, Gnaphosidae (Michálek et al. 2019) and Salticidae (Cushing 2012, Jackson et al. 1998). A prime example is *Euryopis umbilicata* (Theridiidae), which preys almost exclusively on the ant *Camponotus consobrinus* using high-speed acrobatic manoeuvres, successfully capturing ants in approximately 99% of attempts (Aceves-Aparicio et al. 2022). Similar specialized tactics have been observed in *Zodarion* species, which exhibit venom, morphological, behavioural, and metabolic adaptations targeting Formicinae ants (Pekár et al. 2008, Pekár & Toft 2015). Myrmecophagy is also known from thomisids of the genera *Tmarus* and *Monaeses* (Bauer 2021) or the genera *Coriarachne*, *Heriaeus*, *Runcinia* and many others of this family (Pekár et al. 2025).

Ecologically, ants represent both a challenging and abundant prey: they wield powerful mandibles, chemical defences (e.g., formic acid), armoured exoskeletons, and coordinated group behaviour. Yet, they also constitute up to 20–25% of terrestrial animal biomass (Schultheiss et al. 2022), making them an abundant food source. This dual nature renders ant predation a compelling model of ecological adaptation. Moreover, ant-specialized spiders significantly shape trophic networks within soils and leaf litter, potentially restructuring arthropod communities (Rákóczi & Samu 2014). These interactions may also influence other trophic levels.

Morpho-behavioral adaptations – such as reinforced cuticle, potent venom, and aggressive mimicry (seen in *Zodarion* and ant-mimicking taxa) – highlight sophisticated evolutionary pathways. These systems illuminate coevolution, trophic specialization, and the emergence of narrowly defined ecological niches (Pekár et al. 2013).

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While myrmecophagy is generally rare among spiders – occurring in approximately 0.3% of species (Cushing 2012) – theridiids shows a notable tendency towards ant predation, possibly linked to a long co-evolutionary history since the Cretaceous (Liu et al. 2016). Within Theridiidae, the genus *Euryopis* stands out for its specialization on ants, displaying distinct behavioural and morphological adaptations (Carico 1978, Líznarová & Pekár 2019). Recent observations, including predation on *Tetraponera rufonigra* in India, support this view (Tripathy et al. 2025).

The genus *Lasaeola* Simon, 1881 (family Theridiidae Sundevall, 1833) currently includes 27 recognized species and is widely distributed across Europe, the Americas, and Asia (World Spider Catalog 2025). In Italy, five species are recorded (Isaia et al. 2025), two of which are also present in Sicily: *Lasaeola testaceomarginata* Simon, 1881 and *Lasaeola convexa* (Blackwall, 1870). The latter was only recently reported from Sicily (Dentici et al. 2022).

One evening in March 2021, we were observing the spiders inhabiting our garden during twilight hours when we recorded the first observation of *Lasaeola convexa* (Blackwall, 1870) preying on an ant of the genus *Camponotus*. This behaviour immediately caught our attention. Over the following evenings, we continued our observations, documenting additional occurrences, which were later supplemented with data from other sites across Sicily and Europe. As with most spider taxa, behavioural and trophic information on *Lasaeola* species remains scarce in the scientific literature. The present study, though geographically limited, though provides observations which contribute to the knowledge of the biology of members in the genus *Lasaeola*.

Material and methods

All observations reported by the authors were made directly and took place at various sites across Sicily (Tab. 1), exclusively during evening or night-time hours. The searches were carried out during a six-hour nocturnal period, from 8:00 PM to 2:00 AM. In contrast, attempts to observe the spiders during daytime hours proved unsuccessful, as no active individuals of the genus *Lasaeola* were found. This lack of day-

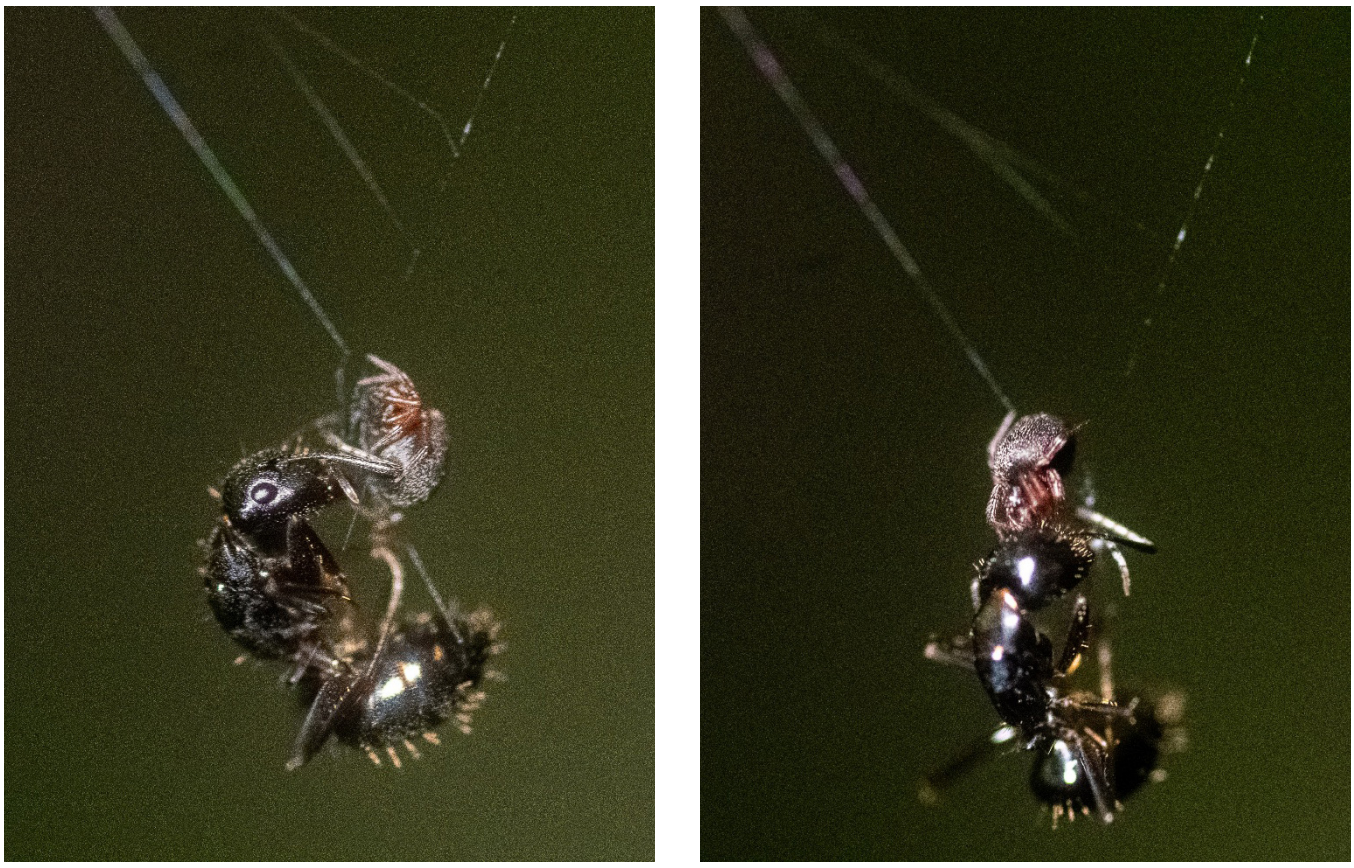

Fig. 1: Predation by *Lasaeola convexa* on *Camponotus* sp. **a.** attacking the prey; **b.** moment in which the spider moves its prey to the side of the web. Both photographs were taken by the authors in their home garden in Sicily (Italy)

time activity supports the hypothesis of the predominantly crepuscular-nocturnal habits. In several cases, the predation events were photographed using a DSLR camera equipped with a 100 mm macro lens.

In addition, all available observations of the genus *Lasaeola* published on the iNaturalist platform, until 13. Feb. 2025, (iNaturalist 2025) were reviewed. Out of 113 records, 13 included documented predatory interactions with ants. Supplementary images were obtained through targeted searches using Google Images, as well as from peer-reviewed articles indexed in Google Scholar and from the publicly accessible Iberian naturalist database, biodiversidadvirtual.org (Biodiversidad Virtual 2025).

Results

In total, 49 individuals of *Lasaeola* were observed preying upon or feeding on ants of the genus *Camponotus*. It was not always possible to collect specimens for identification under a stereomicroscope; however, among the 24 individuals identified with certainty – 15 originating from Palermo and 9 from Geloi Wetland, located in Niscemi, province of Caltanissetta – we recorded both species: 19 specimens of *L. convexa* and five of *L. testaceomarginata*.

Among the 113 *Lasaeola* observations accompanied by photographs retrieved from the iNaturalist platform, 13 show predatory interactions, all involving ants. An additional two ant-predation events were found on biodiversidadvirtual.org (Tab. 2), the prey ants appear to be species of *Camponotus* (or a related genus), as for the observations made in Sicily.

The spider constructs a minimal web structure, typically consisting of a single horizontal silk thread anchored at both ends to form a "Y" shape. In some cases, additional perpendicular threads were observed, anchored to the main thread. The exact predation strategy remains unclear, as it has never been observed from beginning to end. However, one consistent feature is the attack site: the spider bites the ant on the head, between the antennae.

Another notable behaviour is that the prey is suspended during envenomation: after the bite, the spider positions itself in the centre of the main thread, holding the ant with its chelicerae, likely to prevent escape while venom takes effect (Fig. 1a). After some time, or when disturbed, the spider transports the prey – now held by the spinnerets – to one of the anchoring points of the web to consume it in a more sheltered location (Fig. 1b). In six cases, the spider was observed dropping the prey after carrying it to one side of the web, although it remains unclear whether this was due to completion of feeding or external disturbance.

Discussion

Narrow myrmecophagy – the strict predation of ants as primary or exclusive prey – is relatively rare among spiders but well documented in a few taxa. Within Theridiidae, while most genera are opportunistic predators, a few exhibit a clear tendency toward dietary specialization. Species within the *Dipoena* sensu lato group are among these, with several confirmed or suspected ant-specialists (Le Peru 2011, Mezőfi & Markó 2018, Roberts 1985).

Our findings suggest the genus *Lasaeola* represents a lineage of specialized myrmecophagous spiders. Across five

Tab. 1: Observations made by the authors. The species ID for the sampled specimens is reported in the last column, all the others belong to the genus *Lasaeola,* but since the genital characteristics were not observed in these cases the species is not indicated

Situation	Environment	GPS	Locality	Date	Number of sampled specimens	ID of sampled specimens
On fruit trees	Domestic orchard garden	38.046, 13.246	Monreale (PA)	18. Feb. 2023	5	
ibid.	ibid.	ibid.	ibid.	10. Mar. 2023	4 (4)	4 *L. convexa*
ibid.	ibid.	ibid.	ibid.	5.Apr. 2023	5 (4)	4 *L. convexa*
ibid.	ibid.	ibid.	ibid.	2. May 2023	3	
ibid.	ibid.	ibid.	ibid.	12. Mar. 2024	6 (4)	4 *L. convexa*
On *Ceratonia siliqua* L., 1753	Monte Pellegrino Oriented Nature Reserve	38.175, 13.361	Palermo (PA)	8. Apr. 2024	3	
On mandarin trees	Home garden with citrus trees	38.160, 13.231	Torretta (PA)	18. Jun. 2023	4 (3)	1 *L. convexa* 2 *L. testaceomarginata*
On hedge	Communal garden	38.171, 13.200	Carini (PA)	10. Jun. 2024	1	
On a lemon tree	Home garden	38.082, 13.339	Villagrazia (PA)	8. May 2024	1	
On hedge	Small ornamental green area	37.985, 12.983	Alcamo (TP)	30. Jun. 2024	2	
On an olive tree	Valle dei Templi Archaeological Park	37.290, 13.588	Agrigento (AG)	12. Aug. 2023	2	
On an olive tree	Geloi Wetland private nature reserve	37.097, 14.334	Gela (CL)	18. May 2023	8 (5)	2 *L. convexa* 3 *L. testaceomarginata*
On olive and lemon trees	Geloi Wetland private nature reserve	37.097, 14.334	Gela (CL)	13. Jun. 2024	5 (4)	4 *L. testaceomarginata*

Tab. 2: Observations taken from inaturalist.org and biodiversidadvirtual.org.

Username: inaturalist.org (IN) observation.org (OB)	Date	Locality	Species	Prey
(IN) vladimir_bryukhov	11. May 2015	Kirov, Russia	*L. tristis* (Hahn, 1833)	*Camponotus* sp.
(IN) antoniojpizarro	14. May 2017	Andalucia, Spain	*L.* sp.	*Camponotus* sp.
(IN) lutautami	7. Jul. 2017	Minsk, Belarus	*L. tristis* (Hahn, 1833)	*Camponotus* sp.
(IN) lutautami	19. Aug. 2018	Minsk, Belarus	*L. prona* (Menge, 1868)	*Camponotus* sp.
(IN) esant	24. Apr. 2019	Abruzzo, Italy	*L.* sp.	??
(IN) vladimir_bryukhov	12. May 2019	Kirov, Russia	*L. tristis* (Hahn, 1833)	*Camponotus* sp.
(IN) uz45	29. Jun. 2019	Kurgon, Russia	*L. tristis* (Hahn, 1833)	*Camponotus* sp.
(IN) macronocturno	31. May 2020	Cataluña, Spain	*L.* sp.	*Camponotus* sp.
(IN) berzou	15. Jul. 2021	Provence-Alpes-Côte d'Azur, France	*L.* sp.	*Camponotus* sp.
(IN) Katrin_simon	12. May 2022	Bavaria, Germany	*L. tristis* (Hahn, 1833)	*Camponotus* sp.
(IN) xiaodoudou	31. Mar. 2023	Jiangsu, Cina	*L.* sp.	*Camponotus* sp.
(IN) vladimir_bryukhov	3. Jun. 2023	Kirov, Russia	*L. tristis* (Hahn, 1833)	*Camponotus* sp.
(IN) lutautami	24. Aug. 2023	Minsk, Belarus	*L. tristis* (Hahn, 1833)	*Camponotus* sp.
(OB) Antonio José Pizarro	14. May 2017	Rota, Spain	*L.* cf. *tristis* (Hahn, 1833)	*Camponotus* sp.
(OB) Marco de Haas	8. Apr. 2019	Bennekom-Oostereng, Germany	*L. coracina* (C. L. Koch, 1837)	??

species (*L. convexa*, *L. coracina*, *L. prona*, *L. testaceomarginata*, *L. tristis*), we documented predatory interactions with ants, and only ants, across multiple independent observations and photographic records from diverse sources. Notably, all recorded prey items on Sicily represented ants of the genus *Camponotus*, a conspicuous and widespread group of formicine ants.

The absence of documented predation of other non-ant prey – both in field observations and among more than a hundred verified online photographs with 13 predator-prey interactions – suggests a marked degree of stenophagy (Pekár et al. 2012). While it is possible that certain prey types are overrepresented in online records (due to their size or photographic appeal), the consistency and frequency of ant predation across locations and species strongly point towards obligate myrmecophagy and pronounced stenophagy in *Lasaeola*, at least in nature.

Other theridiids, such as *Steatoda*, are known to occasionally prey on ants, but do so within a generalist diet (Dugon 2017, Faúndez & Carvajal 2016). By contrast, *Lasaeola* appears to rely almost exclusively on ants, which implies potential morphological or behavioural adaptations such as specialized web structure or luring strategies and potential prey-specific venom efficacy. For instance, the consistent bite placement between the antennae could indicate an evolved predatory technique that exploits ant sensory behaviour. Some spiders also attract prey using non-visual lures, such as organic volatiles (Ratz et al. 2023). In the well-known case of the bolas spider of the genus *Mastophora,* male moths are attracted by volatile organic compounds produced by the spiders that mimic the pheromones of the female moths (Eberhard 1977, Stowe et al. 1987, Haynes et al. 2002, Nentwig 2013, Stevens 2013). This leads to the hypothesis that *Lasaeola* might also utilize a chemical cue to attract the ant, causing it to approach and investigate with its antennae, at which point the bite is delivered.

In conclusion, the available evidence – while partly circumstantial – supports the view of *Lasaeola* as an ant-specialist within Theridiidae. Its ecological role, predatory behaviour, and prey specificity position it closer to ant-hunting strategies seen in more renowned myrmecophagous spiders such as *Euryopis* or *Zodarion*. Notably, current observations suggest a marked preference for ants of the genus *Camponotus*, raising the possibility that *Lasaeola* may be not only myrmecophagous, but perhaps a specialist predator of *Camponotus* in particular. Future studies on venom composition, prey capture behaviour, and web architecture will be essential to fully understand the extent and mechanisms of this specialization.

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