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Diversity in predatory and silk-associated behaviour of spartaeine jumping spiders: comparative observations of the two genera *Neobrettus* and *Taraxella*

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Abstract. Predatory and silk-associated behaviours are documented for two poorly known spartaeine jumping spiders, *Neobrettus tibialis* and *Taraxella* sp. indet. (Araneae: Salticidae), from Peninsular Malaysia, providing a comparative perspective on behavioural diversity within the subfamily Spartaeinae. Both species incorporated silk into their behavioural repertoires but differed markedly in silk architecture and prey-capture tactics. *Neobrettus tibialis* constructed layered, non-sticky silk platforms and tubular retreats, and captured prey primarily through slow stalking followed by close-range lunging. In a small number of cases, it entered occupied webs and produced vibratory interactions that were followed by successful capture of resident spiders, suggesting occasional use of web-mediated predatory tactics. *Taraxella* sp. indet. built a loose silk network connected to a distinct retreat, but captured prey predominantly through visually guided attacks involving long-distance leaps and showed no evidence of web invasion or interactions with resident spiders. Neither species fits neatly into a simple distinction between web-associated and cursorial predation. Instead, their contrasting behavioural repertoires illustrate the diversity of ways in which silk use, locomotion, and prey-capture behaviour can be combined within Spartaeinae. These findings expand behavioural knowledge of poorly studied spartaeine taxa and highlight the remarkable heterogeneity of silk-associated and predatory strategies in this subfamily.

Key words. behavioural diversity, jumping spiders, prey-capture behaviour, silk-associated behaviour, Spartaeinae

INTRODUCTION

Jumping spiders (Salticidae) are the most species-rich spider family, comprising approximately 7,000 described species worldwide (World Spider Catalog, 2026). They are distinguished from other spiders by their highly developed visual system and distinctively strong reliance on visually guided locomotion and predation (Land, 1969a, b; Blest et al., 1990; Harland et al., 2012; Land & Nilsson, 2012). Unlike typical web-building spiders that depend primarily on prey-capture webs, salticids typically locate, assess, and subdue prey visually, often culminating in a precisely controlled leap (Forster, 1977, 1982, 1985). Although silk is no longer the primary prey-capture tool in most salticids, it remains essential for draglines, retreats, moulting shelters, oviposition sites, and resting structures (Jackson & Blest, 1982; Jackson & Pollard, 1996; Foelix, 2025).

The remarkable visual capabilities of salticids are supported by their unique visual systems. The anterior median eyes provide exceptionally high spatial resolution, colour vision, and detailed object discrimination, whereas the secondary eyes are specialised for motion detection and spatial orientation (Lim & Li, 2006; Lim et al., 2007; Harland et al., 2012; Land & Nilsson, 2012; Zurek & Nelson, 2012). Together, these visual systems support diverse visually mediated behaviours, including prey capture, courtship, threat signalling, predator avoidance, and navigation (Forster, 1977, 1982, 1985; Jackson & Pollard, 1996; Harland et al., 2012; Zurek et al., 2015).

Among salticids, Spartaeinae is particularly notable for its exceptional diversity in silk use and prey-capture behaviour (Wanless, 1984; Su et al., 2007; Harland et al., 2012; Maddison et al., 2015). As one of the earliest-diverging salticid lineages, Spartaeinae provides valuable comparative material for examining behavioural diversity within the family (Su et al., 2007; Maddison et al., 2015).

Spartaeines exhibit a remarkable range of relationships between silk use and prey-capture behaviour. At one extreme, *Portia* constructs three-dimensional funnel-shaped space webs that function as prey-capture devices and platforms from for invading the webs of other spiders using aggressive mimicry, which is mediated through vibratory manipulation of webs (Jackson & Blest, 1982; Jackson & Hallas, 1986a). In contrast, *Spartaeus* builds two-dimensional sheet-like webs

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attached to substrate and captures prey in a manner more typical of web-building spiders but without invading the webs of other species (Jackson & Pollard, 1990). Most other studied genera rely primarily on visually guided stalking, ambushing, or stalking-and-lunging tactics while using silk primarily for retreats, platforms, or other structures (Jackson, 1990a, b; Jackson & Pollard, 1996). For example, *Brettus* constructs loose silk platforms associated with resting, oviposition and bases prey attacks (Jackson & Hallas, 1986b; Jackson, 2000), whereas *Cyrba* combines visual stalking with occasional web invasion (Jackson & Hallas, 1986b; Jackson, 1990a, 2000). *Gelotia* constructs sheet-like silk structures associated with silk-assisted foraging (Jackson, 1990b), where *Phaeacius* builds flattened retreats closely appressed to tree trunks from which it ambushes passing prey (Jackson & Hallas, 1986b). *Paracyrba* is especially unusual, attacking and capturing larval and adult mosquito found on the surface of water-filled bamboo culms while making minimal use of silk (Jackson et al., 2014). Thus, aggressive mimicry, web invasion, and vibratory deception occur in only some spartaeine lineages, while many species rely on other combinations of silk use and visually guided predation (Jackson & Pollard, 1996; Su et al., 2007).

Despite longstanding interest in Spartaeinae, behavioural knowledge remains concentrated in a relatively small number of genera (also species), especially *Portia africana, P. fimbriata*, *P. labiata*, and *P. schultzi* (Jackson & Blest, 1982; Jackson & Hallas, 1986a; Jackson & Pollard, 1996). Many Southeast Asian spartaeines remain poorly studied, and for several genera, even the most basic information on prey-capture behaviour and silk use is lacking. Studies of these neglected taxa are therefore essential for documenting the breadth of behavioural diversity within Spartaeinae and expanding comparative knowledge of salticid behaviour.

Here, we focus on two poorly known Southeast Asian spartaeine genera, *Neobrettus* and *Taraxella*. *Neobrettus* contains five described species distributed throughout Southeast Asia (World Spider Catalog, 2026). The biology of *N. tibialis* was previously known mainly from taxonomic descriptions (Prószyński, 1978; Wanless, 1984; Murphy & Murphy, 2000; Lin et al., 2023), although recent studies from India reported unexpected complex reproductive behaviour, including maternal brood care, mating by brooding females, filial oophagy, and a close association with curled dead banana leaves (Ahmed et al., 2018; Banerjee et al., 2019). More recently, Hou et al. (2026) provides the first detailed study of intraspecific interactions in a Malaysian population. However, its prey-capture behaviour, non-reproductive use of silk, and relationships between silk structures and visually guided predation remain unknown.

Taraxella is another poorly known spartaeine genus, currently containing six described species distributed throughout the rainforests of Southeast Asia (Wanless, 1984; Maddison, 2015; Ni et al., 2025; World Spider Catalog, 2026). Species of *Taraxella* are rarely collected, and their biology and behaviour remain virtually unknown. Our preliminary observations suggested that *Taraxella* differs markedly from *Neobrettus* in both silk use and prey-capture behaviour despite their shared placement within Spartaeinae.

In this study, we present a comparative analysis of prey-capture and silk-associated behaviour in *N. tibialis* and *Taraxella* sp. indet. from Peninsular Malaysia. Specifically, we describe and compare their silk structures, locomotion, and prey-capture behaviour, and interpret these observations within a broader comparative framework of Spartaeinae. By documenting two previously unstudied genera, we aim to expand current knowledge of spartaeine behavioural diversity and provide new comparative evidence on how silk use, locomotion, and visually guided prey capture are combined in jumping spiders.

MATERIAL AND METHODS

Study species and maintenance. We collected *N. tibialis* from Genting Highlands, Pahang, Peninsular Malaysia (3°217′09.2″N, 101°47′18.7″E, 610 m a.s.l.). Consistent with previous observations (Hou et al., 2026), individuals were typically found occupying curled dead banana leaves in plantation and forest-edge habitats. In total, we collected 125 individuals (57 females, 48 males, and 20 juveniles; body length range: 2–4 mm).

We collected *Taraxella* sp. from lowland and montane rainforest sites in Peninsular Malaysia, including Cameron Highlands (4°27′54.54″N, 101°23′10.68″E, 1,350 m a.s.l.), Genting Highlands (3°21′09.2″N, 101°47′18.7″E, 610 m a.s.l.), and Gunung Belumut (2°3′53.24″N, 103°31′41.66″E, 75 m a.s.l.). We obtained 55 individuals (12 females, 13 males, and 30 juveniles; body length range: 3–8 mm). Individuals of *Taraxella* could not be reliably assigned to a known species based on current taxonomic keys; therefore, we refer to them as *Taraxella* sp. indet. (hereafter *Taraxella* sp.). Both sexes were collected, but specieslevel identification remains unresolved.

We transported spiders of both species to the laboratory and housed them individually in transparent cylindrical plastic containers (diameter × height: 45 × 60 mm for *N. tibialis*; 80 × 100 mm for *Taraxella* sp.). *Taraxella* sp. individuals were consistently larger and exhibited more frequent locomotion than *N. tibialis* during laboratory observations; therefore, they were maintained in larger containers to accommodate their body size and activity levels. The housing conditions provided sufficient space for normal locomotion and the construction of silk structures for behavioural observations. We maintained all spiders under controlled laboratory conditions (25 ± 1 °C; 70–90% relative humidity; 12 h light : 12 h dark photoperiod, lights on at 0800 hours). We supplied water continuously using moistened dental rolls. Spiders were fed *Drosophila melanogaster* ad libitum (3–4 per week for *N. tibialis*; 5–7 per week for *Taraxella* sp., reflecting differences in body size), except during standardised starvation periods prior to experimental trials. General experimental procedures, enclosure design and behavioural terminology (e.g., aggressive mimicry, web

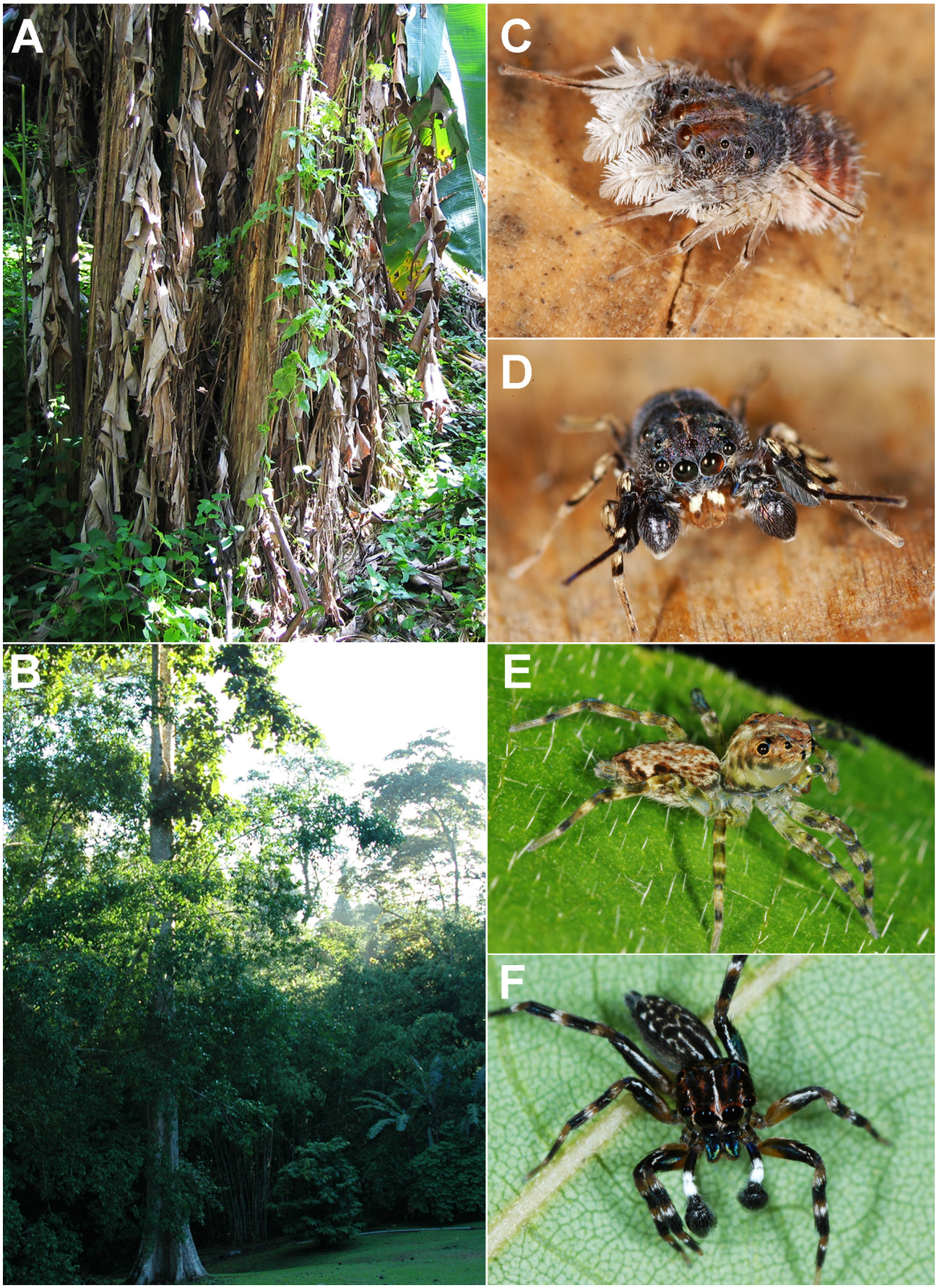

Fig. 1. Field microhabitats of the two spartaeine species studied. A, *Neobrettus tibialis* was consistently found concealed within curled dead banana leaves in plantation and forest-edge habitats at Genting Highlands. B, lowland and montane rainforest habitats in Peninsular Malaysia where *Taraxella* sp. was collected from suspended leaf litter near the ground. C, adult female *N. tibialis* on a dead banana leaf (facing left). D, adult male *N. tibialis* on a dead banana leaf (facing forward). E, juvenile female *Taraxella* sp. (facing right). F, adult male *Taraxella* sp. (facing downward). No silk structures were observed in the field for either species.

Table 1. Potential prey and experimental contexts used in predatory trials of *Neobrettus tibialis* (Nt) and *Taraxella* sp. (Ta). Behavioural abbreviations are listed alphabetically. CS: cribellate dry sticky web. CU: non-salticid cursorial spider. ES: ecribellate wet sticky web. F: free encounter (spartaeine introduced into the test arena with the prey, or prey introduced into the cage with the spartaeine; cage free of nests and/or webs). FT: formal test. IT: informal test. I: insect. S: non-spartaeine cursorial salticid. WB: web-building spider. WS: web occupied by a host spider. Relative prey-size abbreviations: SM: smaller prey (approximately half the body length of the spartaeine). SI: prey approximately similar in body length to the spartaeine. LA: larger prey (approximately 1.5 body length of the spartaeine). Numbers in brackets indicate the number of tests.

Species	Family	Description	Prey size	Type of test	Spartaeine
Acheta domesticus	Gryllidae	I, FT	SM, SI, LA	F	Nt (50), Ta (29)
Aedes albopictus	Culicidae	I, FT	SI	F	Ta (27)
Colyttus sp.	Salticidae	S, FT	SM, SI	F	Nt (47), Ta (16)
Drosophila melanogaster	Drosophilidae	I, FT	SM	F	Nt (75), Ta (41)
Evarcha flavocincta	Salticidae	S, IT	SM	F	Nt
Hippasa holmerae	Lycosidae	CU, FT	SM, SI, LA	F	Nt (35), Ta (21)
Nihonhimea mundula	Theridiidae	WB, ES, FT	SM, SI	WS	Nt (35)
Zosis geniculata	Uloboridae	WB, CS, FT	SM, SI, LA	WS	Nt (37)

invasion, plucking, tapping, drumming on alien webs) followed established protocols for behavioural studies of salticid spiders (Jackson & Hallas, 1986a, b; Lim & Li, 2004; Wee et al., 2017; Zeng et al., 2019; Hou et al., 2026). To describe behavioural frequencies consistently, we used the terms 'usually' or 'generally' for behaviours observed in >80% of observations, 'sometimes' or 'occasionally' for behaviours observed in 20–80% of observations, and 'rarely' for behaviours observed in <20% of observations.

To provide contextual information on the natural occurrence of silk structures, we recorded field observations of retreats, microhabitat associations, and visible silk whenever possible. *Neobrettus tibialis* was consistently associated with curled dead banana leaves in the field, and individuals constructed retreats and silk structures within similar enclosed substrates under laboratory conditions. *Taraxella* sp. was typically found among suspended leaf litter and low vegetation near the forest floor; however, because individuals were collected by beating vegetation, opportunities to observe naturally constructed silk structures in the field were limited. In the laboratory, *Taraxella* sp. constructed silk networks associated with distinct retreats, although whether these structures correspond directly to those under natural conditions remains unknown. These observations provide preliminary ecological context for interpreting laboratory-based observations, but should not be considered a comprehensive assessment of natural silk use.

General experimental procedures. We designed behavioural observations and experiments to allow direct comparisons between the two species across four behavioural domains: (1) silk use and silk-associated behaviour, (2) locomotion and general activity patterns, (3) prey-capture behaviour away from webs, and (4) interactions with occupied webs and web-building spiders. Unless otherwise noted, we used only adult individuals for predatory trials. To standardise hunger levels, we starved focal spiders for at least 3 days (*N. tibialis*) or 7 days (*Taraxella* sp.) prior to testing, reflecting differences in body size and feeding frequency between species.

Prey types and experimental arenas. To characterise predatory behaviour, we presented individuals of both species with a range of prey, including insects, web-building spiders, non-salticid cursorial spiders, and non-spartaeine cursorial salticids. Details of prey species, prey size categories, types of tests and the corresponding experimental designs are summarised in Table 1.

Insect prey consisted of adult fruit flies (*D. melanogaster*), adult mosquitoes (*Aedes albopictus*; *Taraxella* sp. only), and nymphs of the house crickets (*Acheta domesticus*). We obtained fruit flies and mosquitoes from laboratory cultures and purchased crickets from a local supplier (Soon Heng Fish Tanks Tropical Fish Dealer in Yishun, Singapore).
Spider prey included juvenile and adult web-building spiders (Theridiidae: *Nihonhimea mundula*, Uloboridae: *Zosis geniculata*), a non-salticid cursorial spider (*Hippasa holmerae*), and two non-spartaeine cursorial salticids (*Colyttus* sp. and *Evarcha flavocincta*) (used only in informal tests). *Nihonhimea mundula* and *Z. geniculata* commonly occur in the same plantation and forest-edge habitats as *N. tibialis* and frequently construct webs on or among the curled dead banana leaves occupied by *N. tibialis* (pers. obs.). These species were therefore selected as ecologically relevant web-building prey and also enabled comparisons of interactions with both ecribellate (wet sticky silk) and cribellate (dry sticky silk) webs. We collected web-building spiders from Singapore and housed them individually in plastic-framed glass cages suitable for web construction and normal activity (*N. mundula*: 100 × 55 × 100 mm; *Z. geniculata*: 55 × 55 × 85 mm; length × width × height). We categorised webs as cribellate (dry sticky silk) or ecribellate

(wet sticky silk) according to silk properties. We collected *E. flavocincta* and *H. holmerae* individuals from Singapore and housed them individually in transparent cylindrical plastic containers (diameter × height: 80 × 100 mm). We collected individuals of an unidentified species of *Colyttus* belonging to the salticid tribe Euophryini (Maddison, 2015; hereafter *Colyttus* sp.) from Genting Highlands and kept them under conditions identical to those used for *N. tibialis* and *Taraxella* sp. We categorised prey size relative to the focal spartaeine spiders (*N. tibialis* or *Taraxella* sp.) as smaller (~0.5× body length), similar (~1× body length), or larger (~1.5× body length).

Formal and informal tests. We conducted both formal and informal behavioural tests following terminology and procedures established in earlier studies of spartaeine salticids (Jackson & Blest, 1982; Jackson & Hallas, 1986a). Unless otherwise noted, our experimental procedures closely followed these studies.

Formal prey-capture trials were conducted using insects (all species listed in Table 1), wolf spiders (*Hippasa holmerae*), and non-spartaeine cursorial salticids (*Colyttus* sp. only). Trials were carried out individually in clean Petri dishes (diameter × height: 90 × 15 mm). Each trial began by introducing a randomly selected focal spartaeine into an arena containing a single prey item and continued until prey capture, termination of the capture attempt, or a maximum observation period of 60 min. A pursuit was defined as a prey-capture attempt initiated after the spartaeine first visually orientated toward a prey item. Pursuit time was measured as the interval between this initial orientation and the termination of that capture attempt, either by successful prey capture or by abandonment of the pursuit without capture (e.g., the spartaeine moved away or ceased further approach).

Three mutually exclusive outcomes were recognised for each trial: (1) successful capture, in which the spartaeine initiated a pursuit and captured the prey; (2) failed capture, in which the spartaeine initiated a pursuit but the capture attempt ended without prey capture; and (3) no predatory response, in which the spartaeine neither oriented toward nor initiated pursuit of the prey during the observation period. Because the objective of this study was to quantify predator prey-capture behaviour rather than prey behavioural responses, all unsuccessful pursuits were classified as failed captures, regardless of whether the predator abandoned the attack the prey escaped or otherwise avoided capture. Analyses of prey-capture success included only trials in which the spartaeine oriented towards the prey and initiated a pursuit, irrespective of outcome. Trials in which the spartaeine did not orient towards the prey and therefore failed to initiate a pursuit were excluded from analyses of prey-capture success and treated as right-censored observations in survival analyses of pursuit time. All trials were video-recorded for subsequent behavioural analysis.

Informal tests were conducted only with the salticid *Evarcha flavocincta* to determine whether *N. tibialis* would attack and consume this prey species under laboratory conditions. These observations were qualitative and were not included in the quantitative analyses.

Web-based trials. To assess interactions with silk structures and resident web-building spiders, formal tests involving web-building spiders (WS) were conducted in occupied webs containing a resident spider, thereby preserving the natural web architecture. Both *N. tibialis* and *Taraxella* sp. were gently introduced into occupied webs and allowed to move freely within the web. Trials were terminated if the focal spider became entangled in silk or left the arena. These observations were designed to characterise the behaviour of the spartaeines in occupied webs containing resident web-building spiders and were not intended to test whether silk structures constructed by the spartaeines themselves functioned directly in prey capture.

Data analysis. We performed all statistical analyses in R v4.4.2 (R Core Team, 2024). We assessed the pursuit time distribution using Kaplan-Meier survival analyses and compared differences among prey types using log-rank tests implemented in the R packages 'survival' and 'survminer'. Multivariate effects of prey categories (insects vs. spiders; web-building spiders vs. cursorial spiders; non-salticid spiders vs. salticid spiders) on pursuit time were analysed using Cox proportional hazards regression, with hazard ratio and 95% confidence intervals (CI) reported.

Prey-capture outcomes (successful capture vs. unsuccessful attack) were analysed using binary logistic regression, with prey type as a predictor. Trials where the focal spider showed no response were excluded from these analyses but included as censored in survival analysis. Significance was evaluated using likelihood-ratio tests (LRTs).

RESULTS

Habitat and microhabitat use. *Neobrettus tibialis* was consistently associated with curled dead banana leaves in plantation and forest-edge habitats at Genting Highlands (Fig. 1A). Both females (Fig. 1C) and males (Fig. 1D) were typically concealed within the rolled leaf margins and were difficult to detect without disturbing the leaves. Individuals were collected by beating dead banana leaves, a method intended for specimen collection rather than behavioural observation. Consequently, no silk structures were observed on or around occupied leaves at the time of collection. However, because this collecting method was not designed to document silk structures or their placement in-situ, these observations do not allow conclusions regarding the occurrence or architecture of silk structures under natural conditions.

Taraxella sp. was collected by beating the vegetation in lowland and montane rainforest localities in Peninsula Malaysia, including Cameron Highlands, Genting Highlands, and Gunung Belumut (Fig. 1B). Individuals of both sexes (Fig. 1E, F) were typically encountered among suspended litter, vegetation or on vertical substrates close to the ground

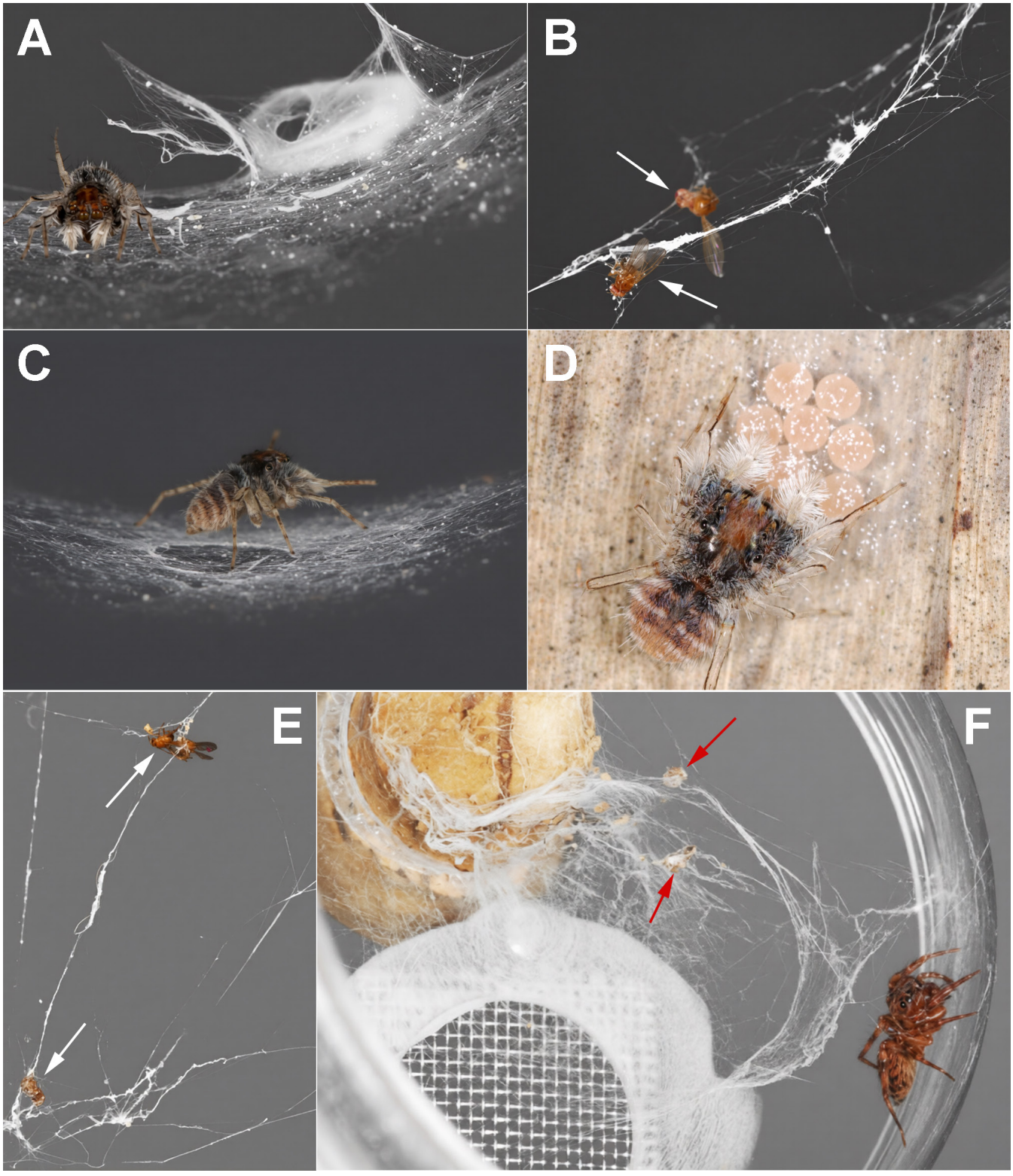

Fig. 2. Silk structures and silk-associated behaviour of *Neobrettus tibialis* and *Taraxella* sp. observed under laboratory conditions. A–D, silk deposited by *N. tibialis* in the laboratory rearing cages, illustrating variation in silk architecture and associated structures. A, adult female *N. tibialis* (facing forward) standing outside an enclosed tubular silk retreat with two terminal openings. B, extensive accumulation of layered silk spanning the lateral walls of a rearing cage (diameter × height: 45 × 60 mm); arrows indicate prey remains suspended on or among the silk. C, multilayered silk platform constructed by an adult female *N. tibialis* (facing right) within its rearing cage. D, oviposition nest with an adult female *N. tibialis* (facing upward and to the right) positioned over the egg sac; note the distinct white tufts embedded within the nest above the egg mass. E, F, silk deposited by *Taraxella* sp., consisting of a loose silk network associated with a distinct retreat. E, loose three-dimensional silk network extending from the ceiling to the base and lateral wall of a rearing cage (diameter × height: 80 × 100 mm); arrows indicate prey remains suspended on or among the silk. F, adult female *Taraxella* sp. (facing upward) resting within a silk retreat connected to the surrounding silk network; arrows indicate prey remains suspended on the silk threads.

(Fig. 1B). Unlike *N. tibialis*, *Taraxella* sp. showed no obvious association with curled dead leaves or comparable shelters. No silk structures were observed at the time of collection. As with *N. tibialis*, the collecting method was intended to obtain specimens rather than document silk structures or microhabitat use in-situ. Consequently, the present field observations do not permit conclusions on whether, or how, *Taraxella* sp. constructs silk structures under natural conditions.

Silk use and silk-associated behaviour. Both species deposited silk in the laboratory, but differed markedly in the architecture of resulting silk structures, and the manner in which the silk was used (Fig. 2). Since these observations were made under laboratory conditions, their correspondence with silk structures constructed under natural conditions remains to be determined.

***Neobrettus tibialis*.** In the laboratory, *N. tibialis* deposited silk through repeated movements over the substrate, resulting in the gradual accumulation of layered silk platforms attached to the walls of the rearing container (Fig. 2A–C). We did not observe a consistent sequence of silk deposition or any repeated construction pattern indicative of a web-building routine. Instead, silk accumulated progressively into layered platforms and enclosed tubular retreats. Some silk threads may have represented draglines deposited during routine locomotion within the enclosure, whereas others formed more conspicuous accumulations associated with resting or reproduction. The amount of silk produced varied substantially among individuals. Some adult spiders produced only sparse silk strands (Fig. 2C), whereas others constructed multiple overlapping layers that partially or completely covered sections of the container wall (Fig. 2B). In a few cases, adult males constructed extensive horizontal and vertical silk layers that occupied much of the available enclosure surface. Prey remains were frequently found resting on or attached to these silk accumulations (Fig. 2B), and additional draglines commonly connected adjacent silk patches and nearby surfaces.

Adult females consistently constructed enclosed tubular retreats (Fig. 2A) and specialised oviposition nests (Fig. 2D). Oviposition nests were typically oval and only slightly larger than the enclosed egg sac, which contained approximately 7–9 eggs suspended centrally within the nest. Small white tufts of densely woven silk were often present above the egg mass and embedded within the surrounding nest silk (Fig. 2D). Females commonly remained within or immediately adjacent to oviposition nests for extended periods, whereas comparable nest attendance was not observed in males. Juveniles and subadults produced simpler silk structures, most often in association with moulting, with exuviae frequently attached to nearby silk patches. Adult males were occasionally observed resting on silk-covered areas, whereas females more often rested on bare substrate or container walls rather than directly on silk.

***Taraxella* sp.** Adult males, females and subadults of *Taraxella* sp. deposited a loose three-dimensional silk network of irregular silk threads associated with a distinct retreat (Fig. 2E, F). The silk threads extended vertically and horizontally throughout the enclosure, forming a more open and spatially extensive arrangement than that observed in *N. tibialis*. Comparable silk structures were not observed in juveniles.

Forms of the retreat varied among individuals. Some spiders constructed fully enclosed tubular retreats resembling typical salticid resting nests, whereas others produced only a thin silk sheet or a sparse covering of strands positioned above or around the body (Fig. 2E). On two occasions, subadults constructed enclosed tubular retreats immediately prior to moulting.

Prey remains were frequently suspended on or among the surrounding silk threads (Fig. 2E, F). Individuals typically rested within the retreat rather than on the surrounding silk network. Unlike *N. tibialis*, *Taraxella* sp. did not construct layered silk platforms, and enclosed oviposition nests were not observed during the study period. The retreat was consistently spatially separated from the surrounding silk network, forming a discrete resting site connected to a more extensive arrangement of silk threads.

Locomotion and general behaviour. Both *N. tibialis* and *Taraxella sp*. exhibited slow, deliberate locomotion characterised by frequent pauses, but differed in posture and movement details.

***Neobrettus tibialis*.** *Neobrettus tibialis* moved primarily by walking short distances (approximately 30 mm) between pauses. During movement, individuals relied mainly on legs II–IV, often raising legs I in front of the palps. During pauses, spiders frequently waved legs I outward and inward in wide arcs while simultaneously quivering the palps. Legs I were also used to probe obstacles and surfaces, functioning as tactile exploratory appendages. Jumping during routine locomotion was rare, although occasional short leaps occurred when crossing gaps or responding to disturbances.

***Taraxella* sp.** *Taraxella* sp. exhibited a stop-and-go locomotor pattern broadly similar to that of *N. tibialis*, but typically advanced in shorter bouts of approximately 10–90 mm before pausing for several seconds. Compared with *N. tibialis,* the transition between movement and pausing appears more continuous, and the movements of forelegs and palps during pauses were generally less conspicuous. Jumping during routine locomotion was rare and occurred even less frequently than in *N. tibialis*.

During walking, *Taraxella* sp. usually held palps stationary and close to the chelicerae. In contrast, palp and leg waving were common during pauses. Palp waving consisted of smooth, circular movements at a frequency of approximately 1–2 cycles/s, beginning from a resting position near the chelicerae and extending downward and outward before returning to rest. Leg waving most often involved raising legs I laterally and upward followed by lowering them back to the substrate. When palps and legs were waved simultaneously, their movements were coordinated but occurred in opposite

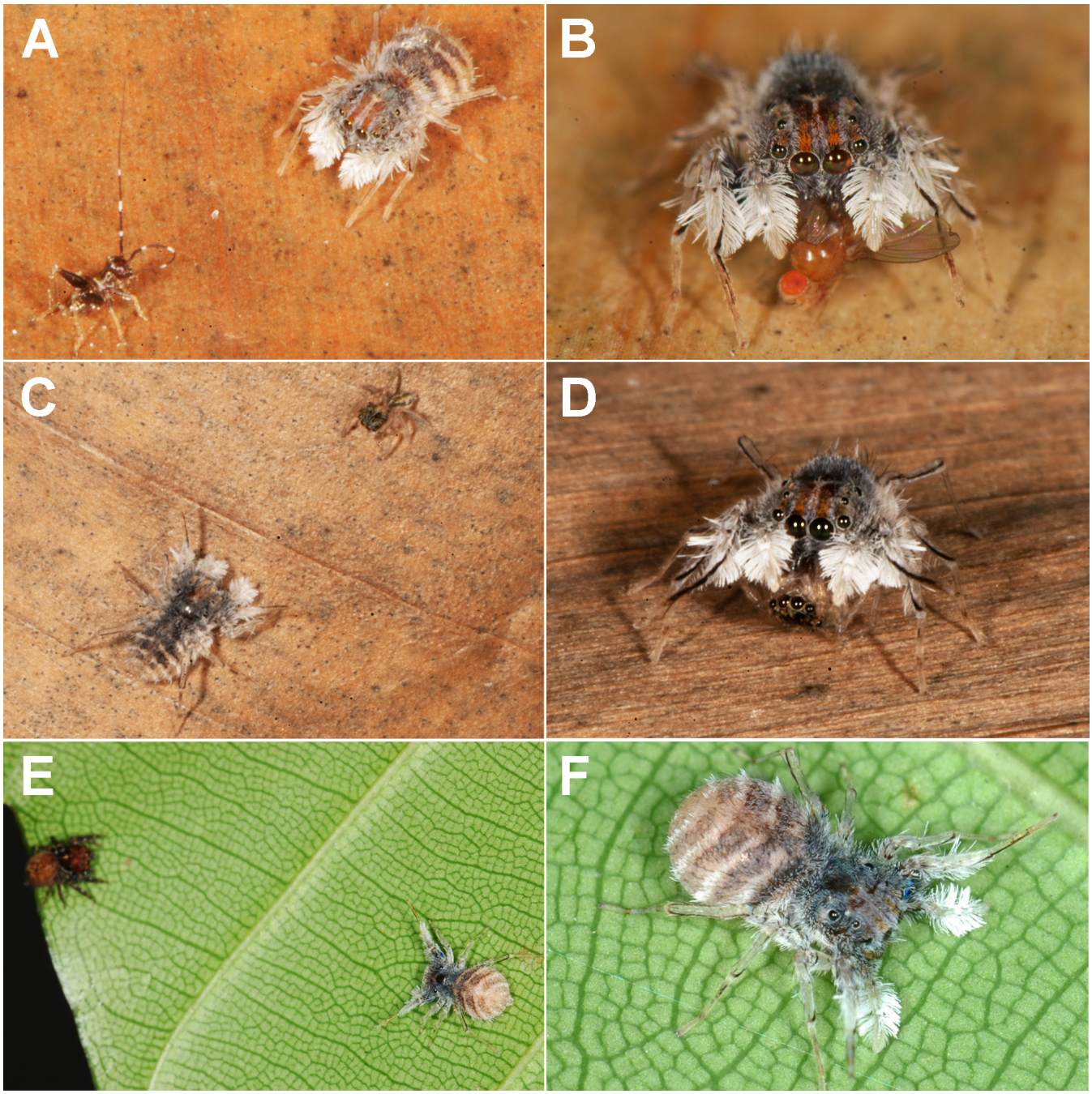

Fig. 3. Prey captures away from silk structures in *Neobrettus tibialis*. Prey are captured by slow stalking followed by a close-range lunging. A, adult female *N. tibialis* (facing downward and to the left) stalking a house cricket *Acheta domesticus* nymph; note that legs I and II are held nearly parallel, without elevation of legs I. B, adult female *N. tibialis* holding *D. melanogaster* between the chelicerae following an attack. C, adult female *N. tibialis* stalking the non-spartaeine cursorial salticid *Evarcha flavocincta*, with legs I raised. D, adult female *N. tibialis* holding *E. flavocincta* between the chelicerae following an attack. E, adult female *N. tibialis* (facing left) stalking a juvenile *Colyttus* sp. (facing right). F, adult female *N. tibialis* raising legs I while stalking *Colyttus* sp.

vertical directions, with palps moving downward while legs were moving upward. Individual bouts of waving lasted 1–5 s. During longer pauses, individuals occasionally performed coordinated lifting of specific combinations of palps and legs, often in rhythmic, in-phase movements at a rate of approximately 1–2 cycles/s. All waving movements were smooth and continuous, without abrupt changes in speed or direction.

Both species were able to move readily across cribellate silk and sticky ecribellate capture threads without becoming visibly adhered to the silk. Locomotion on sparsely woven webs or widely spaced silk threads was generally slower and more cautious than on dense web surfaces. When disturbed, individuals of both species typically paused, oriented the anterior median eyes toward the stimulus, and then either resumed movement or retreated.

Prey-capture behaviour away from webs. *N. tibialis.* Away from silk structures, *N. tibialis* captured prey primarily by slow stalking followed by close-range lunging (Fig. 3). Individuals usually approached prey from distances of

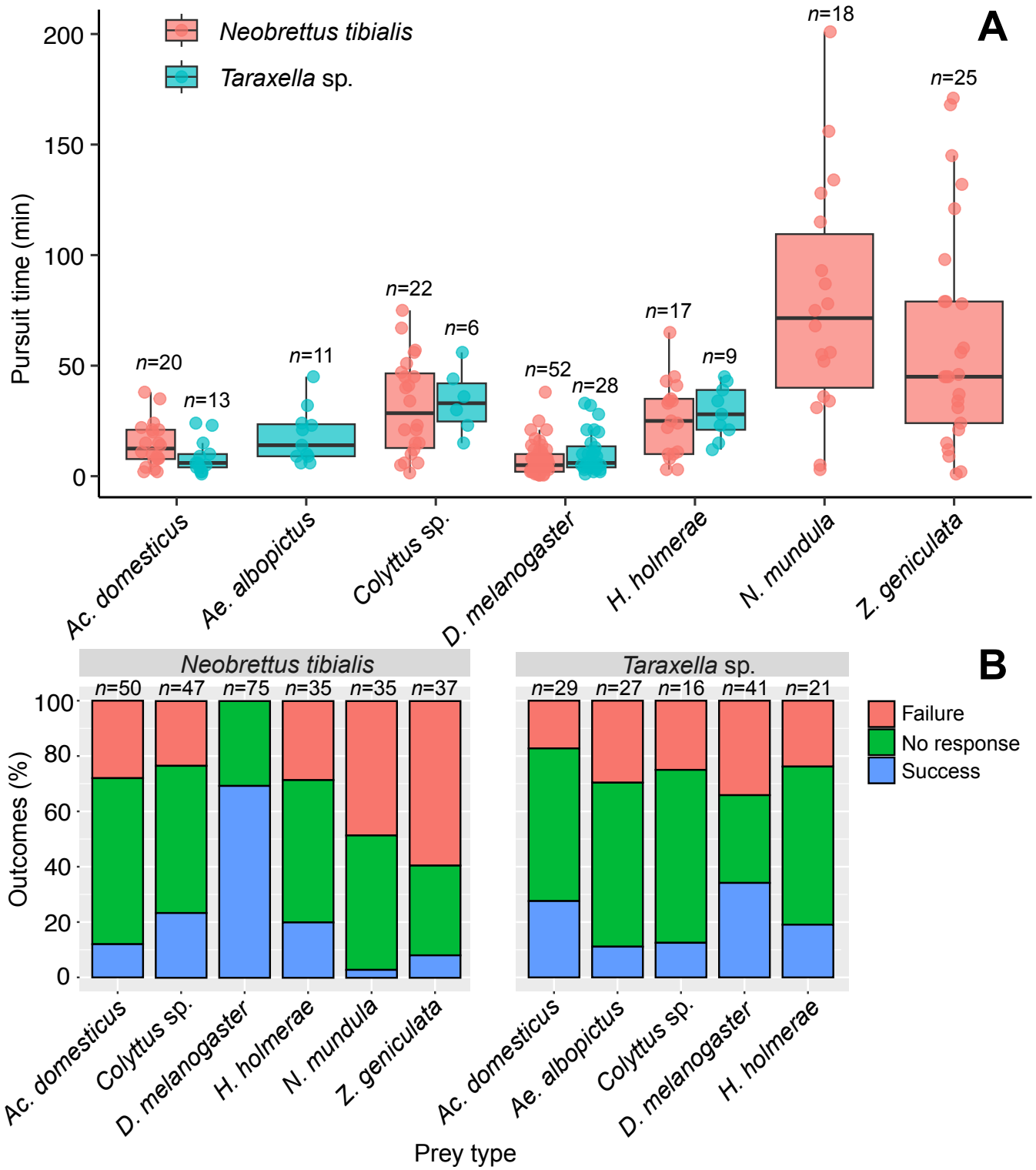

Fig. 4. Boxplots of pursuit time (min) (A) and percentage (%) (B) of prey-capture outcomes (success, failure and no responses) by *Neobrettus tibialis* and *Taraxella* sp. with insects and spiders. Boxplots show the median (central line), first and third quartiles (box), and minimum and maximum values (whiskers).

up to ~50 mm, moving in a manner resembling normal locomotion but with legs I held more widely apart. During the stalking of insect prey, *N. tibialis* maintained continuous visual orientation, holding the forelegs nearly parallel and unraised. In contrast, when stalking cursorial spiders, legs I of *N. tibialis* were held more widely splayed. As individuals closed to within approximately 20 mm of the prey, movement slowed further and pauses became longer. Prior to attack, spiders often observed prey for several seconds to over one minute. During feeding, spiders frequently waved their forelegs and palps. Attacks were usually initiated from distances of less than one body length, and long-distance leaps (3–5 body lengths) were rarely observed. Lunges involved rapid extension of the hind legs, and a dragline was usually attached to the substrate before lunging. When prey was motionless, *N. tibialis* sometimes touched it with legs I before either attacking or retreating.

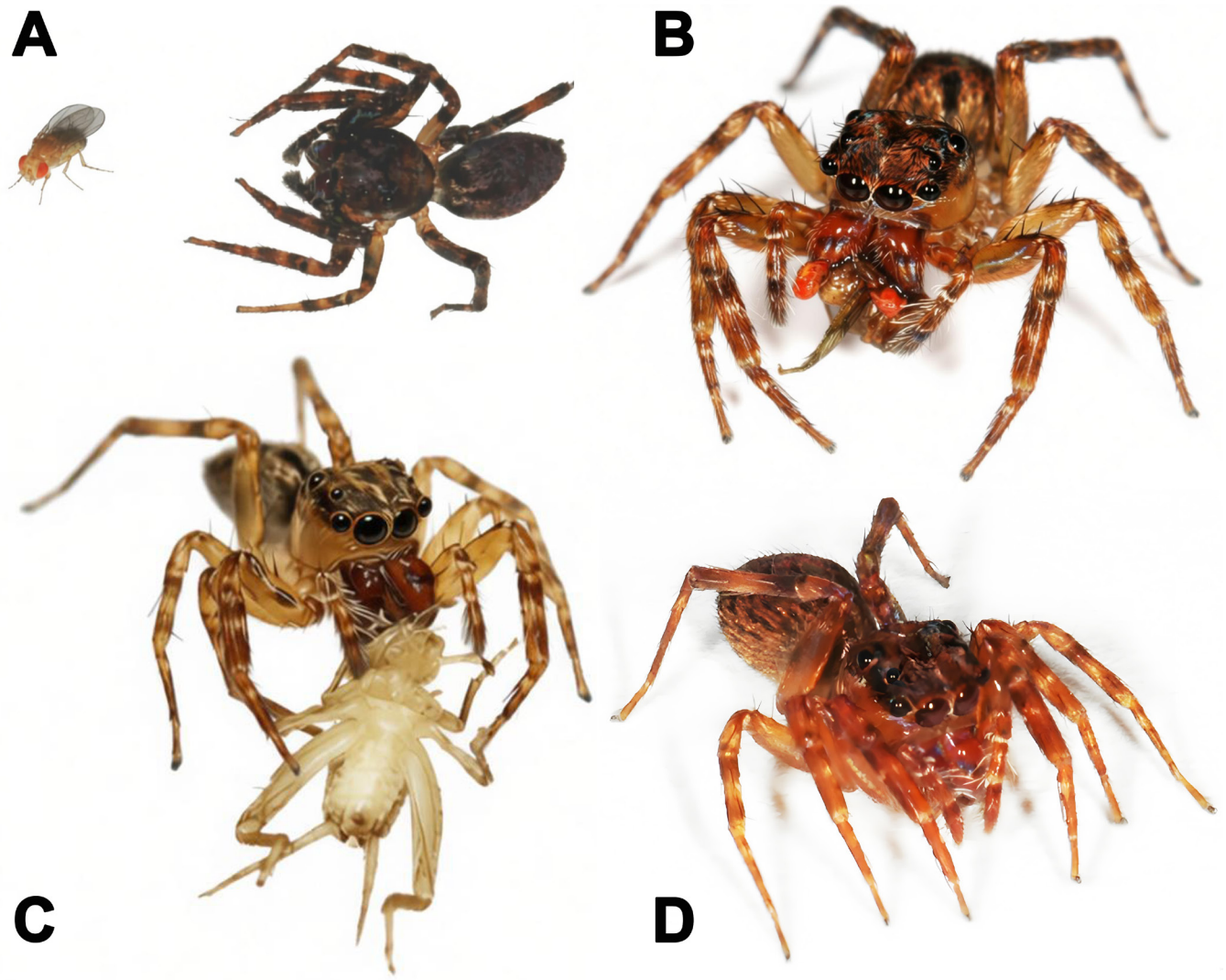

Fig. 5. Prey captures away from silk structures in *Taraxella* sp. Prey are captured by visually-guided leaping from several body lengths away. A, *Taraxella* sp. (facing left) in a pre-leaping posture while targeting *D. melanogaster*; note the forward placement of legs I–III, with the tarsi positioned anterior to the chelicerae. B, *Taraxella* sp. holding *D. melanogaster* between the chelicerae following a leap. C, *Taraxella* sp. holding a house cricket (*Acheta domesticus*) nymph between the chelicerae. D, *Taraxella* sp. in a pre-leaping posture directed toward a cursorial salticid; note that the legs I–III are held nearly parallel. Image viewed obliquely.

When approaching cursorial spiders via slow stalking, *N. tibialis* often halted at greater distances (~30 mm) before retreating. Pursuit time varied significantly among six types of prey tested in *N. tibialis* (Kaplan-Meier analysis; log-rank test: $\chi^2 = 116$, df = 5, $P < 0.0001$; Fig. 4A; Appendix 1). Median pursuit times were shorter for insect prey and longest for web-building spider prey. Cox proportional hazards analysis further showed that pursuit termination occurred significantly faster when attacking insects (median: ~5–12 min, range: 0.5–38 min) than spiders (hazard ratio = 0.16, 95% CI = 0.10–0.24, Wald z = –8.58, $P < 0.0001$, LRT: $\chi^2 = 79.01$, df = 1, $P < 0.0001$). Among spider prey, pursuit termination occurred significantly longer for web-building spiders (median: ~45–71 min, range: 1–201 min) than cursorial spiders (median: ~25–28 min, range: 3–75 min) (hazard ratio = 0.17, 95% CI = 0.08–0.37, Wald z = –4.46, $P < 0.0001$, LRT: $\chi^2 = 23.75$, df = 1, $P < 0.0001$). Although pursuits of non-spartaeine salticid prey tended to be slightly longer than those of wolf spiders, this difference was not statistically significant (hazard ratio = 1.94, 95% CI = 0.89–4.24, Wald z = 1.67, $P < 0.095$, LRT: $\chi^2 = 2.78$, df = 1, $P = 0.1$).

After excluding trials in which *N. tibialis* showed no predatory response (n = 154), prey type significant affected capture success (binary logistic regression, likelihood-ratio test: $\chi^2_5 = 109.22$, $P < 0.0001$). Capture success varied markedly among prey categories, with the highest success rates recorded for *D. melanogaster* (70.7%, n = 75), and the lowest for web-building spiders (Fig. 4B). Relative to the reference prey category, capture success was significantly higher for insects than spiders ($\chi^2_1 = 46.95$, $P < 0.0001$), with insects being approximately 11-fold more likely to be captured successfully (OR = 11.30, 95% CI = 5.40–24.95). Among spider prey, cursorial spiders were captured more successfully than web-building species ($\chi^2_1 = 34.98$, $P < 0.0001$), with capture odds approximately 30-fold higher for cursorial spiders (OR =30.5, 95% CI = 8.66–147.2). Capture success also differed between salticids and wolf spiders ($\chi^2 = 4.10$, $P = 0.043$). Because parameter estimates

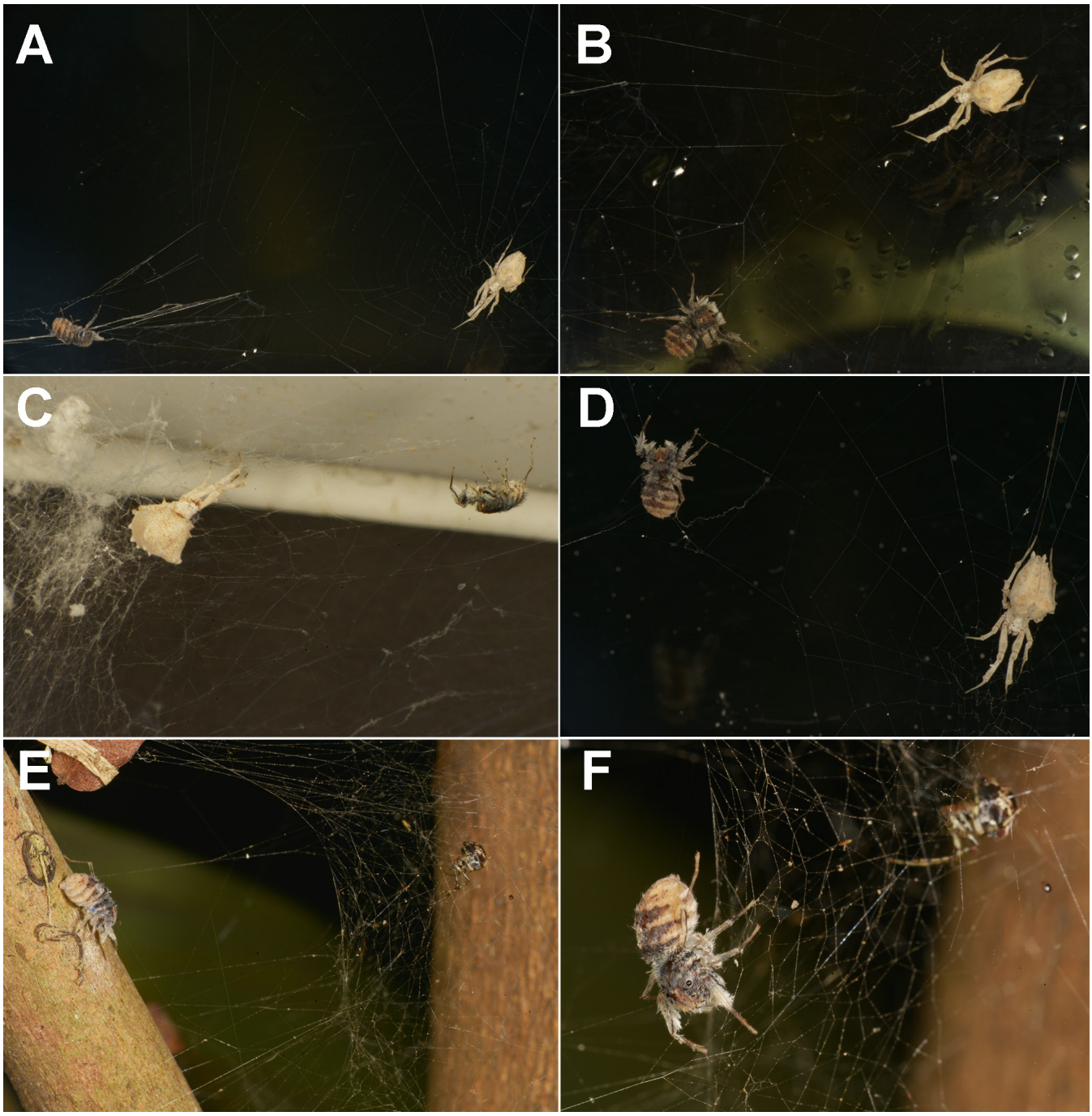

Fig. 6. Interactions with webs and web-building spiders in *Neobrettus tibialis*. A, adult female *N. tibialis* (facing left) inspecting and moving along the margins of the web of an adult female *Zosis geniculata* (at the hub, facing downward and to the left). B, adult female *N. tibialis* moving on the web closer to the resident spider at the hub, with both spiders facing each other. C, adult female *N. tibialis* (facing left) moving in the web closer to the resident *Z. geniculata* (hanging at the hub), with both spiders facing each other. During approaches, *N. tibialis* sometimes produced tapping (brief contacts with the web) and drumming (rapid repeated strikes generating vibratory pulses). D, adult female *N. tibialis* (facing upward, left) turning away and exiting the web after repeated plucking (involved pulling and releasing a silk thread with a leg I to generate web vibrations) of the silk, while the resident spider (facing downward, right) remained at the hub. E, adult female *Neobrettus tibialis* (facing downward, left) inspecting and moving along the margins of the web of a juvenile *Nihonhimea mundula* (at the hub, facing downward, right). F, adult female *Ne. tibialis* (facing downward, left) moving in the web and approaching the resident juvenile *Ni. mundula* (facing left) at the hub.

were unstable, we focus on the significance of the overall model rather than the estimated odds ratio. Together, these data analyses indicate that *N. tibialis* was most successful when attacking insects and least successful when attacking web-building spiders.

***Taraxella* sp.** *Taraxella* sp. exhibited prey-capture sequences more typical of derived salticids (Fig. 5). Individuals visually oriented toward prey, stalked slowly, and most frequently attacked by leaping from distances of approximately 2–4 body lengths. Although close-range lunges were occasionally observed, leaping was the predominant attack mode. When

tested with the cursorial salticid *Colyttus* sp., stalking and attacking behaviours were similar to those observed at insect prey; however, in most cases, *Colyttus* sp. detected the approaching predator and fled before an attack could be launched.

Pursuit time differed significantly among five types of prey tested in *Taraxella* sp. (Kaplan-Meier analysis; log rank test: $\chi^2 = 26.5$, df = 4, P < 0.0001; Fig. 4A; Appendix 1). *Taraxella* sp. spent significantly longer pursuing spider prey than insect prey. Cox proportional hazards analysis showed that pursuit termination occurred significantly slowly when attacking spider prey (median: ~28–33 min, range: 12–56 min) than insect prey (median: ~6–14 min, range: 1–45 min) (hazard ratio = 0.28, 95% CI = 0.15–0.52, Wald z = –4.00, P < 0.001; LRT: $\chi^2 = 19.01$, df = 1, P < 0.001). There was no significant difference in pursuit time between wolf spiders and non-spartaeine salticids (hazard ratio = 1.76, 95% CI = 0.52–5.93, Wald z = 0.92, P = 0.359; LRT: $\chi^2 = 0.89$, df = 1, P = 0.3).

Overall, *Taraxella* sp. appeared to capture insects more frequently than spiders (Fig. 4B). Binomial logistic regression revealed that capture success slightly varied among prey types, being highest for *D. melanogaster* (34.1%, n = 41), followed by *Acheta domesticus* nymphs (27.6%, n = 29), *Hippasa holmerae* (19%, n = 21), *Colyttus* sp. (12.5%, n = 16), and *Aedes albopictus* adults (11.1%, n = 27). However, after excluding trials in which *Taraxella* sp. showed no predatory response (n = 67), binary logistic regression revealed no significant effect of prey type on capture success (likelihood-ratio test: $\chi^2_4 = 3.47$, $P = 0.482$; Fig. 4B). Relative to the reference prey category, odd ratios for fruit flies (OR = 0.63, 95% CI = 0.15–2.35), mosquitoes (OR = 0.23, 95% CI = 0.04–1.24), salticids (OR = 0.31, 95% CI = 0.03–2.24), and wolf spiders (OR = 0.50, 95% CI = 0.08–2.78) did not differ significantly from unity.

Interactions with spiders in their webs. *Neobrettus tibialis* frequently responded to webs by visually inspecting and walking along web margins (Fig. 6). Individuals often plucked (pulled and released web threads to generate single or discreate pulses), taped (touched web threads with a leg to produced low-amplitude vibration), or drummed (repeated rhythmic tapping of web with one or more legs, producing series of signal trains) silk threads using legs I and palps, thereby generating vibratory disturbance. Such silk manipulation occurred more frequently on *Zosis geniculata* webs (68%, n = 37) than on *Nihonhimea mundula* webs (51%, n = 35). In most cases, resident spiders remained at the web hub and no capture occurred. However, in four instances (three involving *Z. geniculata*, one involving *N. mundula*), sustained activity at the web margin caused the resident spider to leave the hub, after which it was captured by *N. tibialis*. Despite these interactions and small sample size, repeated web invasion was not seen as in *Portia*. In five trials, *N. tibialis* entered alien webs to inspect debris but did not attack resident spiders. In contrast, *Taraxella* sp. did not invade alien webs. Individuals usually exited the web after brief inspection and did not pluck, tap, or drum silk threads, nor did they attempt to attack resident web-building spiders.

DISCUSSION

Spartaeinae as a behaviourally diverse lineage. Spartaeinae has long attracted attention because of its remarkable behavioural diversity, particularly in silk use, visually guided predation, and interactions with web-building spiders (Jackson & Blest, 1982; Wanless, 1984; Jackson & Hallas, 1986a, b; Jackson, 1990a, b, 1992, 2000; Jackson & Pollard, 1990, 1996). Subsequent studies have shown that different genera combine these behaviour traits in markedly different ways, ranging from specialised web-builders and web invaders to predominantly cursorial hunters (Su et al., 2007; Harland et al., 2012). By documenting the behaviour of *N. tibialis* and *Taraxella* sp., two previously little-known genera, our study broadens this comparative framework and further illustrates the diversity with which silk use and visually guided predation are integrated within Spartaeinae (Table 2).

Both species relied primarily on vision to locate, assess, and capture prey, yet they differed markedly in silk structures, locomotion, and prey-capture behaviour. These observations reinforce the view that predatory behaviour in Spartaeinae is not characterised by a single prototype, but instead comprises a diverse assemblage in which silk use, locomotion, web-associated behaviour, and visually guided prey-capture tactics occur in different combinations (Table 2). Such diversity is consistent with previous comparative studies suggesting that complex behavioural traits in salticids are not necessarily tightly integrated (Su et al., 2007; Harland et al., 2012; Maddison et al., 2015).

Comparisons with other early-diverging salticid lineages are also informative. Lyssomanines are primarily cursorial hunters that rely heavily on vision and do not build prey-capture webs. Likewise, the spider families most frequently recovered as closest relatives of Salticidae, including Selenopidae and Philodromidae, use silk mainly for retreats, moulting, or reproduction rather than prey capture (Fernández et al., 2018; Kulkarni et al., 2023; Li et al., 2025). Within this broad context, the diversity of silk-associated behaviours documented in Spartaeinae represent an exceptional expansion of behavioural repertoires among predominantly visually-guided hunting spiders.

Silk use and silk-associated behaviour. The two species examined here differed markedly in both silk architecture and the behavioural contexts in which silk was used. *Neobrettus tibialis* constructed layered silk platforms together with enclosed tubular retreats and oviposition nests, whereas *Taraxella* sp. deposited a loose network of silk threads associated with a distinct retreat spatially separated from the surrounding silk network. A comparable separation between a resting retreat and an extensive surrounding silk network has also been reported for *Simaetha* (Jackson, 1985), although

Table 2. Comparative summary of habitat, silk use, locomotion, and prey-capture behaviour in *N. tibialis* and *Taraxella sp*.

Behavioural trait	***N. tibialis***	***Taraxella* sp.**
Field microhabitat	Curled dead banana leaves in plantation and forest-edge habitats	Suspended leaf litter and low vegetation near the ground in lowland and montane rainforest
General silk architecture	Layered, non-sticky silk platforms and tubular retreat	Loose three-dimension silk network connected to a distinct retreat
Oviposition nest	Enclosed oviposition nest with suspended egg sac	Not observed
Typical resting site	Usually on the floor or wall of the enclosure; males occasionally on silk-covered areas	Usually within the retreat rather than on the surrounding silk network
Association between silk and prey encounters	Prey occasionally contacted silk before attack	Prey remains frequently suspended on or among silk threads
Normal locomotion	Slow stop-and-go walking with frequent pauses	Slow stop-and-go walking; regular leg and palp movements during pauses
Leg I and palp movements	Frequent leg I waving and palp quivering during pauses	Similar coordinated leg and palp movements during pauses
Jumping during routine locomotion	Rare	Very rare
Typical prey-capture tactic (away from silk)	Slow stalking followed by short-range lunge	Stalking followed by relatively long-distance leap
Typical attack distance	< 1 body length	2–4 body lengths
Long-distance leaps	Rare	Common
Prey successfully captured in laboratory	Primarily *Drosophila melanogaster* and small web-building spiders	Primarily insects (*D. melanogaster* most frequently)
Capture of cursorial spiders	Occasional success	Not observed
Ability to move on spider webs	Cribellate, sticky ecribellate, and non-sticky ecribellate webs	Cribellate, sticky ecribellate, and non-sticky ecribellate
Web invasion	Occasionally (5 cases) entered occupied webs; no prolonged web-invading behaviour observed	Not observed
Interactions with resident web-building spiders	Occasional vibratory signalling; four successful predation events observed	Not observed

whether these similarities reflect functional convergence or shared common ancestry remains unknown.

Comparisons with other spartaeine genera (Table 3) further illustrate that no single silk architecture characterizes the subfamily. Silk use ranges from prey-capture webs in *Portia*, to loose silk platforms in *Brettus*, sparse retreats in *Cyrba*, sheet-like web structures in *Gelotia*, flattened retreats in *Phaeacius*, and the layered platforms and loose retreat-associated silk networks documented here for *Neobrettus* and *Taraxella.* Together, these observations emphasise the remarkable diversity of silk-associated behaviours within Spartaeinae.

Our observations of *N. tibialis* are broadly consistent with field studies from India describing brood nests within curled dead banana leaves and prolonged maternal attendance of eggs and spiderlings (Ahmed et al., 2018; Banerjee et al., 2019). Although our laboratory observations were not designed to document silk use under natural conditions, the similarity between the tubular retreats observed here and brood nests reported previously suggests that silk use associated with reproduction may likely be a conserved component of behavioural repertoire of *N. tibialis*. Nevertheless, dedicated field observations are needed to determine how these silk structures are constructed and used in nature.

Compared with *N. tibialis, Taraxella* sp. deposited a more extensive network of silk threads associated with a distinct retreat. Although prey was frequently encountered on or among surrounding silk threads, prey capture was consistently initiated only after visual orientation followed by active attack. Our observations therefore suggest that silk network influence the spatial context in which prey

Table 3. Comparative summary of silk architecture, silk use, and silk-associated behaviours among spartaeine genera.

Genus	Silk structure	Main function	References
Brettus	Loose silk platforms and mats	Resting, oviposition, prey capture	Jackson & Hallas, 1986b
Cyrba	Sparse sheets and retreats	Resting, web invasion	Jackson, 1990a; Jackson & Pollard, 1996
Gelotia	Sheet-like web structures	Silk-associated foraging	Jackson, 1990b
Neobrettus	Layered platforms and tubular retreats	Resting, oviposition	This study
Phaeacius	Flattened retreats on tree trunks	Ambush predation	Jackson, 1990b, 2000
Portia	Prey-capture web and retreats	Prey capture, web invasion, moulting, oviposition	Jackson & Hallas, 1986a; Jackson & Pollard, 1996
Taraxella	Loose silk network with retreats	Resting, prey handling	This study

encounters occurred, but do not function directly as prey-capture webs. Likewise, oviposition nests comparable to those of *N. tibialis* were not observed in *Taraxella* sp. under laboratory conditions.

Taken together, our observations suggest that silk primarily provides a structural framework within which prey encounters, reproduction, and shelter construction occur, whereas successful prey capture remains predominantly visually-guided in both species. This interpretation is consistent with previous studies showing that, in many spartaeines, silk modifies the spatial context of predator-prey interactions rather than replacing visually guided hunting (Jackson & Pollard, 1996; Jackson & Cross, 2013). Silk therefore appears to contribute in diverse ways to prey encounters, shelter construction, reproduction, and spatial organisation, while vision remains the principal sensory modality guiding prey capture.

Locomotion and visually guided prey-capture. Both *N. tibialis* and *Taraxella* sp. relied primarily on vision during prey capture, but differed in locomotion and attack tactics. *Neobrettus tibialis* typically approached prey by slow stalking followed by a short-range lunge, with long-distance leaps observed only rarely. This predatory mode resembles that reported for *Cocalus* and *Spartaeus* (Jackson, 1990b; Jackson & Pollard, 1990) and may be well suited to visually cluttered microhabitats such as curled dead leaves, although this inference remains to be verified experimentally. The cryptic appearance and slow, deliberate movements of *N. tibialis* may also reduce the likelihood of detection by prey through visual or other sensory modalities, depending on sensory capabilities of the prey.

In contrast, *Taraxella* sp. typically detected prey from a distance and attacked by rapid leaps spanning several body lengths, with little or no stalking. This reliance on long-distance leaping distinguishes *Taraxella* sp. from most other spartaeines, and indicates that an extensive association with silk structures need not be accompanied by reduced dependence on visually guided attacks. The combination of a persistent silk network with frequent long-distance leaps represents a distinctive behavioural combination within Spartaeinae. More broadly, these differences suggest that visually guided predatory behaviour in the subfamily has diversified along a potentially complex trajectory involving multiple locomotion and attack tactics, rather than along a simple continuum from web-associated to cursorial hunting. The frequent foreleg waving and palp quivering observed during locomotion and prey capture in *N. tibialis* are also noteworthy. Similar movements have been described in *Cyrba* during prey capture (Jackson, 1990a) and *N. tibialis* during courtship (Banerjee et al., 2019; Hou et al., 2026). Whether these movements contribute to sensory assessment, tactile exploration, communication, or a combination of these roles remains unknown and will require experimental verification.

Web invasion and aggressive mimicry. Interactions with occupied webs further distinguished the two species. *Neobrettus tibialis* occasionally entered occupied webs and, in a small number of cases, captured resident web-building spiders. During some encounters, individuals generated vibrations that attracted resident spiders toward the source of the signal before attacking. These observations resemble behaviours associated with aggressive mimicry, which has been documented extensively in specialised spartaeine web invaders including *Brettus*, *Cyrba*, *Gelotia*, and *Portia* (Jackson & Hallas, 1986a, b; Jackson, 1990a, b, 1992, 2000; Jackson et al., 2003). However, the behavioural sequences observed here appeared considerably simpler and were based on relatively few observations.

Unlike *Portia* and *Cyrba*, which characteristically employ prolonged trial-and-error vibratory signalling together with other forms of behavioural flexibility when invading webs (Jackson & Hallas, 1986a, b; Jackson, 1990a; Guseinov et al., 2004), *N. tibialis* showed no evidence of extended signal adjustment or repeated modification of signalling patterns. Instead, signalling—if observed—was brief and followed by immediate attack if the resident spider approached. Our observations therefore suggest that while *N. tibialis* is capable of producing vibratory signals during some encounters with

web-building spiders, the former do not demonstrate the highly elaborate aggressive-mimicry repertoire characteristic of specialised web invaders.

In contrast, *Taraxella* sp. showed little tendency to invade occupied webs or attack resident spiders at least under experimental conditions. Individuals typically left webs after brief exploration, and we observed no behaviours suggesting aggressive mimicry. Together, these observations further illustrate behavioural diversity within Spartaeinae, with closely related genera differing substantially in their interactions with web-building spiders (Su et al., 2007).

More broadly, our findings provide evidence that the ability to move on spider webs, the tendency to invade occupied webs, and the use of aggressive mimicry represent distinct behavioural traits that need not occur together. Although these traits are integrated in specialised web invaders such as *Portia* (Jackson & Pollard, 1996; Harland et al., 2012), our observations suggest that other spartaeine lineages may express different subsets of this behavioural repertoire. Determining how these traits are distributed across Spartaeinae will require comparative behavioural studies across many genera with poorly documented natural histories.

Study limitations and future directions. Although the present study is primarily observational, such descriptive studies provide an important foundation for understanding behavioural diversity in poorly known spartaeine spiders. By documenting the behaviour of *N. tibialis* and *Taraxella* sp. under standardised laboratory conditions, we contribute crucial evidence supporting the coexistence of diverse combinations of silk use, locomotion, and prey-capture strategies within Spartaeinae (Harland et al., 2012).

Several limitations should be acknowledged. First, most observations in this study were made based on behaviours exhibited under laboratory conditions. Although *N. tibialis* constructed tubular retreats comparable to brood nests reported previously from the field (Ahmed et al., 2018; Banerjee et al., 2019), our field collections were intended to obtain specimens rather than document silk use in-situ. Consequently, the extent to which the silk structures observed in captivity accurately correspond to those constructed in nature remains uncertain. Second, our experiments focused on predator behaviour using a limited range of prey species and experimental situations. Behaviours that were rare or not observed, such as prolonged aggressive-mimicry signalling or frequent web invasion, should therefore be interpreted cautiously. Finally, we did not quantify prey defensive behaviour or distinguish among the causes of unsuccessful capture attempts. Future studies combining detailed field observations with broader experimental comparisons of both predators and prey will help clarify the ecological significance of these behaviours.

Despite these limitations, the present study expands behavioural knowledge of two previously little-known spartaeine genera. Because behavioural information remains unavailable for many members of Spartaeinae, further comparative studies of these neglected taxa are likely to reveal additional diversity in silk use, locomotion, prey capture, and interactions with other spiders.

Conclusions. This study adds to growing evidence that Spartaeinae exhibits remarkable diversity in silk-associated behaviour, locomotion, and prey-capture strategies. Although both *N. tibialis* and *Taraxella* sp. relied primarily on visually guided predation, they differed strikingly in how silk structures were incorporated into their behavioural repertoires. *Neobrettus tibialis* constructed layered silk platforms and enclosed tubular retreats, stalked prey at close range using slow and deliberate movements, occasionally interacting with occupied webs in ways that included the production of vibratory signals. In contrast, *Taraxella* sp. constructed a loose silk network associated with a distinct retreat, typically attacked prey from greater distances after shorter stalking sequences, and showed no evidence of web invasion or aggressive mimicry. Together with previous studies of other spartaeine genera, these observations attest to the extensive variation in silk use and predatory behaviour of the subfamily Spartaeinae. Rather than conforming to a single behaviour pattern, spartaeines can combine silk use, visually guided predation, and interactions with spider webs in diverse ways. By documenting the behaviour of two previously understudied genera, our study broadens the comparative framework for further investigations of behavioural diversity in jumping spiders.

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APPENDIX

Pursuit time (median, range, n) of *N. tibialis* and *Taraxella* sp. on insects and spiders (web-building spiders or/and cursorial spiders).

Prey category	**Prey type**	**Statistics**	***N. tibialis***	***Taraxella* sp.**
Insect	*Acheta domesticus*	Median	12.5 min	6 min
		Range	2–38 min	1–24 min
		n	6	13
	Aedes albopictus	Median	—	14 min
		Range	—	6–45 min
		n	—	11
	Drosophila melanogaster	Median	5 min	6 min
		Range	0.5–38 min	1 – 33 min
		n	53	29
Web spider	*Nihonhimea mundula*	Median	71.5 min	—
		Range	3–201 min	—
		n	18	—
	Zosis geniculata	Median	45 min	—
		Range	1–171 min	—
		n	25	—
Cursorial wolf spider	*Hippasa holmerae*	Median	25 min	28 min
		Range	3–65 min	12–45 min
		n	7	9
Cursorial non-spartaeine salticid	*Colyttus* sp.	Median	28.5 min	33 min
		Range	5–75 min	15–56 min
		n	11	6
Comparison (Likelihood ratio test, LRT)	Insects vs. spiders		χ^2_1 =79.1***	χ^2_1 =19.1***
	Web vs. cursorial spiders		χ^2_1 =23.75***	—
	Wolf spider vs. salticid		χ^2_1 =2.78, NS	χ^2_1 =0.89, NS

**: $P < 0.001$; NS: not significant.