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Checklist of Arachnids in Taman Rimba Ilmu Tanah BRIS (TRIBE), Besut: A New Record of *Damarchus* sp. (Bemmeridae) and *Lychas mucronatus* (Buthidae) in Terengganu

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ABSTRACT. This record provides the first, albeit preliminary, overview of the spiders in Taman Rimba Ilmu Tanah BRIS (TRIBE), UniSZA, highlighting the significance of beach ridges interspersed with swales (BRIS) soil ecosystems in supporting arachnid diversity. The arachnids were collected on 9-10th August 2025, through visual encounters where the samples were handpicked or collected using a sweep net. Samples were also collected through vegetation beating and litter sieving. Sampling was conducted both during the day and night. A total of 319 individuals, consisting of 66 species belonging to 47 genera, 18 families, and two orders (Araneae and Scorpiones) were recorded in TRIBE. The jumping spiders, Salticidae, and the orb-weavers, Araneidae were the most species-rich families, with 16 and 11 species, respectively. The finding of the tube trapdoor spider, *Damarchus* sp. (Bemmeridae), marks the first record of this genus in the state of Terengganu, underscoring the ecological importance of BRIS habitats in harbouring unique arachnid species. The presence of the scorpion *Lychas mucronatus* (Buthidae, another first record in this state further enriches the biodiversity of TRIBE. These findings provide crucial baseline data for future biodiversity assessment of arachnids and emphasize the need for conservation efforts in BRIS ecosystems in Malaysia.

Key words: BRIS soil, spider, scorpion, biodiversity conservation, Peninsular Malaysia

1. INTRODUCTION

Arachnids are one of the classes within the phylum Arthropoda, characterized by eight legs attached to the cephalothorax. This class of arthropods also has high species diversity and broad global distribution. The arachnid includes spiders (Araneae), whip spiders (Amblypygi), camel spiders (Solifugae), scorpions (Scorpiones), pseudoscorpions (Pseudoscorpiones), vinegaroons (Thelyphonida and Uropygi), short-tailed whipscorpions (Schizomida), microwhip scorpions (Palpigradi), mites (Acariformes), hooded tick-spiders (Ricinulei) and harvestmen (Opiliones). The largest order within the class Arachnida is Araneae, with more than 50,000 species recorded to date (World Spider Catalog, 2025). However, the phylogeny of arachnids remains incomplete, with millions of species are believed to remain undiscovered (Kuntner, 2022). This highlights the need for further

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exploration and documentation to uncover the hidden diversity of arachnids, particularly in understudied tropical regions.

Each species within the class plays a unique role in maintaining ecosystem stability. There are several venomous arachnid species, such as scorpions and spiders, that are important in the medical field (Hauke & Herzig, 2021). Parasitic mites can also act as vectors for dangerous pathogens such as tick-borne encephalitis virus (TBEV), *Anaplasma* spp., *Borrelia* spp., and *Babesia* spp. (de la Fuente et al., 2017; Cabezas-Cruz, 2023). Some species, such as *Acari* sp., have been identified as pests in the agricultural sector (Grbić et al., 2011; Basha et al., 2021). However, most species within this class are harmless to humans. Their general role as predators makes arachnids potentially useful as biological control agents to manage pest insects (Michalko et al., 2019; Bermúdez-Guzmán et al., 2024). Moreover, various arachnid species have also been utilized in the development of biomolecular products in the biomedical industry (Kumari et al., 2018; Leannec-Rialland et al., 2021; Fang et al., 2024). Such ecological and biomedical relevance emphasizes the need for continued research into arachnid diversity and functional potential.

Although arachnids are important in both ecology and industrial development, their species diversity remains underexplored. Taxonomic efforts to identify and catalogue arachnid species need to be intensified, especially as habitat disturbances are accelerating (Agnarsson & Kuntner, 2007; Kuntner, 2022). This is one of the necessary steps to ensure that this group is also conserved, just like other taxa. In Peninsular Malaysia, studies on the class Arachnid have mostly focused on forested areas (Dzulhelmi & Norma-Rashid, 2014; Razak et al., 2023; Razak et al., 2024), caves (Mohtar et al., 2024), and mangroves (Abdullah et al., 2019; Sundram & Joseph, 2020). However, arachnid diversity in other habitats remains largely unexplored, particularly in unique ecosystems such as BRIS soil.

BRIS soil is a unique type of coastal soil characterized by a high percentage of sand particles. The larger particle size results in low water retention capacity (Mohd Yusoff et al., 2017). Additionally, its generally low nutrient content makes BRIS soil a distinctive ecosystem with a specialized vegetation composition. Among the dominant plant species in this ecosystem are *Casuarina* (Rhu tree), *Melaleuca* (Gelam tree), and *Acacia* (Acacia tree), all of which exhibit strong resilience to harsh environmental conditions. Information on the class Arachnida from BRIS soil habitats is needed to evaluate their role in this unique ecosystem and to serve as baseline data for future environmental monitoring. Therefore, this survey was conducted to develop a checklist of arachnid species in the Taman Rimba Ilmu Tanah BRIS (TRIBE) at Universiti Sultan Zainal Abidin (UniSZA).

2. METHODOLOGY

2.1. Survey area

This survey was conducted at TRIBE (Taman Rimba Ilmu Tanah BRIS), Universiti Sultan Zainal Abidin (UniSZA), Besut Campus, Terengganu (Figure 1). Covering an area of 100 acres, TRIBE is part of UniSZA's coastal forest reserve and hosts a diverse range of plant species, including large trees, shrubs, lianas, and climbing plants (Ghazi et al., 2024). Among the unique tree species preserved in this area are *Melaleuca* (Gelam), *Melastoma* (Senduduk),

Shorea (Meranti), and *Pandanus* (Cucur Atap).

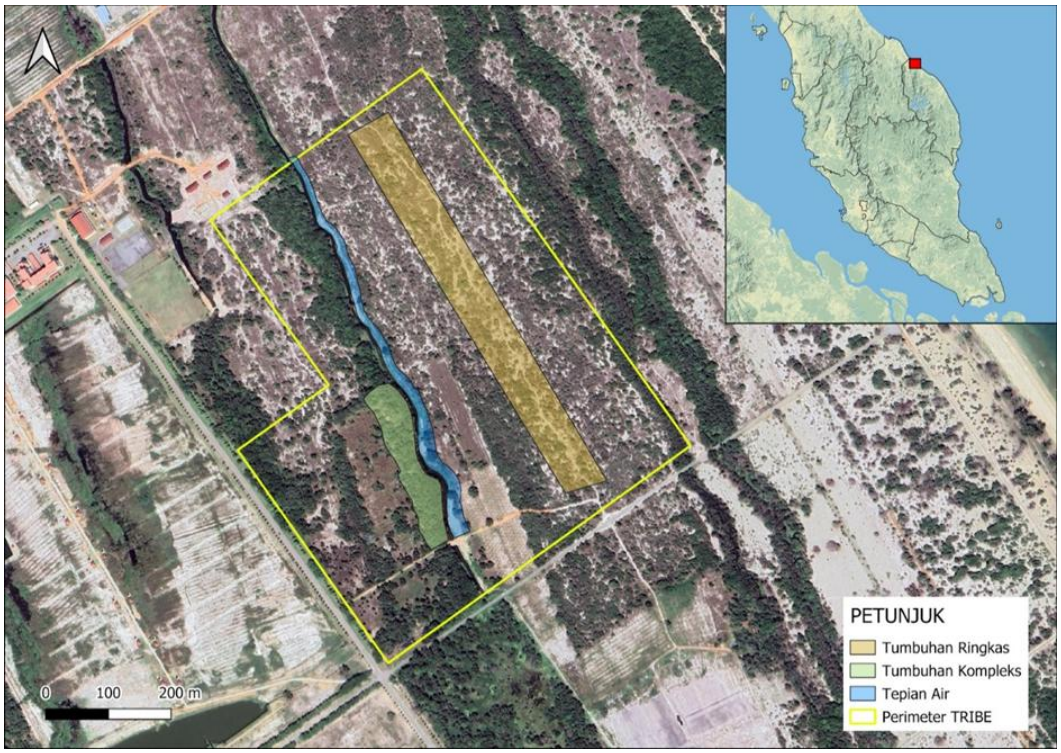

Figure 1. Survey area in the Taman Rimba Ilmu Tanah BRIS (TRIBE), Universiti Sultan Zainal Abidin (UniSZA), Besut Campus, Terengganu.

2.2. Materials and Methods

Arachnid sampling was conducted over two days, on the 9th and 10th August 2025. The study area included open areas with simple vegetation (eg. herbs and shrubs) and complex vegetation (eg. woody trees, and areas near water bodies) (Figure 1). Searches were focused on various microhabitats, including tree trunks, branches, and leaves, shrubs and herbs, grassy areas, open ground, sandy and soil surfaces, as well as the forest floor.

Rapid Assessment Protocol (Draney et al. 2025) was adapted for sampling in TRIBE. This protocol involves one person-hour (60 minutes) of aerial sampling and two person-hours (120 minutes) of ground sampling. The ground sampling includes the Visual Encounter Survey (VES) where spiders moving on the ground were directly captured by hand. Ground sampling also includes litter sieving where leaf litter and associated material were randomly scooped into wide, brightly coloured plastic containers. The leaves and branches were then moved aside and sieved to search for spiders hiding underneath. The aerial sampling includes the use of a sweep net and vegetation beating. Sweep nets were used to collect specimens living in grassy or shrubby vegetation by sweeping the net randomly through these areas. The umbrella method was applied by holding an inverted umbrella under branches and gently tapping the branches with a stick to dislodge specimens into the umbrella following the beating technique (Ribeiro et al. 2005). Sampling was conducted at both night and day. Flashlights were used during night sampling to aid in detecting specimens.

The images of arachnids were taken while the specimens were still alive to document colouration and patterns. All specimens were identified to species or genus level using identification keys from Nasir & Su (2015), Koh & Bay (2019), Nik Ahmad Irwan et. Al (2023) and the World Spider Catalog (2025).

3. RESULTS

A total of 319 arachnid individuals were sampled from TRIBE, UniSZA. From this total number captured, 66 species were identified, belonging to two distinct orders: Araneae and Scorpiones (Table 1 & Table 2). Most individuals recorded were spiders (Order Araneae), comprising 65 species, while only one scorpion species (Order Scorpiones) was found. The order Araneae was represented by 17 families, whereas the order Scorpiones included only one family, Buthidae. The highest species richness was recorded in the spider families Salticidae (16 species) and Araneidae (11 species). However, the greatest number of individual specimens came from the family Oxyopidae, specifically from the species *Oxyopes javanicus* and *Oxyopes lineatipes*, with a total of 50 individuals collected throughout the survey.

Table 1. Taxonomic composition, abundance, and IUCN status of recorded spider species (Part I)

Order	Family	Genus/Species	Common name	No of individuals	IUCN Status
Araneae	Araneidae	Araneidae sp. 1	Orb-weaver spider	3	-
		Argiope dang	Dang's Cross Spider	3	Not Evaluated
		Argiope versicolor	Multicoloured Silver-faced Spider	1	Not Evaluated
		Caerostris sumatrana	Broad-headed Bark Spider	2	Not Evaluated
		Cyclosa insulana	Humpback Cyclosa Spider	3	Not Evaluated
		Eriovixia laglaizei	Laglaise's Garden Spider	3	Not Evaluated
		Eriovixia sp.	Orb-weaver spider	3	-
		Larinia phthisica	Dried-grass Orb-weaver	1	Not Evaluated
		Larinia sp.	Dried-grass Orb-weaver	2	-
		Neoscona theisi	Serrated Spearhead Neoscona	7	Not Evaluated
		Neoscona vigilans	Two-spotted Orb-weaver	22	Not Evaluated
	Bemmeridae	*Damarchus* sp.	Tube Trapdoor Spider	8	-
	Clubionidae	Clubionidae sp. 1	Sac spider	3	-
		Pristidia sp.	Sac Spider	2	-
	Ctenidae	*Bowie* sp.	Wandering spiders	1	-
	Hersiliidae	*Hersilia* sp.	Two-tailed Spider	1	-
	Lycosidae	*Hippasa holmerae*	Lawn Wolf Spider	17	Not Evaluated
		Hippasa sp.	Funnel Web Wolf Spider	6	-
		Pardosa sp. 1	Wolf Spider	13	-
		Pardosa sp. 2	Wolf Spider	2	-
		Trochosa ruricoloides	Wolf Spider	1	-
	Nephilidae	*Nephila pilipes*	Giant Golden Orb-weaver	4	Least Concern
	Oecobiidae	*Oecobius navus*	Common Tiny House Dweller	2	Not Evaluated
	Oxyopidae	*Hamataliwa* sp.	Boxy-headed Lynx Spider	2	-

		Hamataliwa incompta	Common Boxy Lynx Spider	1	Not Evaluated
		Oxyopes javanus	Striped Lynx Spider	3	Not Evaluated
		Oxyopes lineatipes	Common Garden Lynx	54	Not Evaluated
	Philodromdae	*Philodromus* sp.	Grey Running Crab Spider	25	-
	Pisauridae	*Hygropoda* sp.	Nursery Web Spider	1	-
		Dolomedes sp.	Fishing Spider	3	Not Evaluated

Table 2. Taxonomic composition, abundance, and IUCN status of recorded spider species (Part II)

Order	Family	Genus/Species	Common name	No of individuals	IUCN Status
	Salticidae	*Bathippus* sp.	Jumping spider	2	-
		Carrhotus viduus	Double-striped Black-and-white Jumper	3	Not Evaluated
		Cocalus murinus	Bump-headed Arboreal Jumper	4	Not Evaluated
		Epeus sp.	Jumping spider	1	-
		Epocilla calcarata	Painted Face Orange Jumper	1	Not Evaluated
		Evarcha flavocincta	Horned Grass Jumper	2	Not Evaluated
		Hasarius adansoni	Adanson's House Jumper	1	Least Concern
		Hyllus diardi	Heavy Jumper	2	Not Evaluated
		Jerzego sp.	Hisponine Jumping Spider	5	-
		Myrmarachne cornuta	Long-waist Ant-mimic Jumper	2	Not Evaluated
		Phintelloides versicolor	Multi-colored Phintella	1	Not Evaluated
		Plexippus paykulli	Greater Housefly Catcher	1	Not Evaluated
		Burmattus pococki	Jumping spider	1	-
		Cyrba sp.	Jumping spider	1	-
		Salticidae sp. 1	Jumping spider	1	-
		Salticidae sp. 2	Jumping spider	1	-
	Sparassidae	*Heteropoda* sp. 1	Huntsman spider	1	-
		Heteropoda sp. 2	Huntsman spider	7	-
		Heteropoda venatoria	Domestic Huntsman Spider	3	Not Evaluated
		Olios sp.	Huntsman Spider	6	-
	Tetragnathidae	*Mesida* sp.	Long-jawed orb-weaver	1	-
		Tetragnatha hasselti	Green and Red Long-jawed Spider	1	Not Evaluated
		Tetragnatha sp. 1	Long-jawed Spider	2	-
		Tetragnatha sp. 2	Long-jawed Spider	1	-
		Tetragnithidae sp.	Long-jawed orb-weaver	2	-
	Theridiidae	*Nihonhimea mundula*	Comb-footed Spider	2	Not Evaluated
		Parasteatoda tepidariorum	Common house spider	1	Not Evaluated
		Theridion t-notatum	Cyrillic Comb-footed Spider	11	Not Evaluated
	Thomisidae	*Boliscus tuberculatus*	Asian crab spider	1	Not Evaluated
		Monaeses sp.	Tailed-grass Crab Spider	1	-
		Runcinia insecta	Crab spider	5	Not Evaluated
		Runcinia sp.	Long-tailed Runcinia	37	-

		Thomisidae sp. 1	Crab spider		1	-
		Xysticus sp.	Ground Crab Spider		4	-
	Zodaridae	*Mallinella* sp.	Ant-eating spider		1	-
Scorpiones	Buthidae	*Lychas mucronatus*	Chinese Striped Scorpion	Bark	3	Not Evaluated

The IUCN status for most arachnid species found in the TRIBE area remains unknown, with the majority listed as Not Evaluated (Table 1 & Table 2). However, two spider species, which are *Nephila pilipes* and *Hasarius adansoni*, have been classified as Least Concern.

One of the most interesting observations from this survey was the discovery of a trapdoor spider, *Damarchus* sp., in a sandy BRIS soil area near the coastline. Although BRIS soil is typically covered by simple vegetation with low diversity, the habitat was still able to support a wide variety of arachnid species. Figure 2 illustrates some of the arachnid species found around TRIBE, UniSZA.

Figure 2. Several arachnid species are found in TRIBE. (a) *Damarchus* sp., (b) *Hippasa holmarae* (c) *Heteropoda venatoria*, (d) *Lychas mucronatus*, (e) *Caerostris sumatrana*, (f) *Neoscona vigilans*, (g) *Hyllus diardi* and (h) *Nephila pilipes*.

Species Notes

1. *Araneidae* sp. 1

Orb-weaver spider

This spider was found webbing on the leaves of trees beside a small canal.

2. *Argiope dang* (Jäger & Praxaysombath, 2009)

Dang's Cross Spider

This spider was found making a web on the branches of a tree in an area with complex vegetation.

3. *Argiope versicolor* (Doleschall, 1859)

Multicolored silver-faced spider

This spider was found making a web on a tree branch.

4. *Caerostris sumatrana* (Strand, 1915)

Broad-headed Bark Spider

This spider was found on the branch of a shrub beside the road and is camouflaged with the tree bark.

5. *Cyclosa insulana* (Costa, 1834)

Humpback Cyclosa Spider

This spider was found making a web on a tree branch.

6. *Eriovixia laglaizei* (Simon, 1877)

Laglaise's Garden Spider

This spider was found building a web on a tree branch.

7. *Eriovixia* sp.

Orb-weaver spider

This spider was found in a grassy area in an open space.

8. *Larinia phthisica* (L. Koch, 1871)

Dried-grass orb-weaver

This spider was found among the gaps of herbaceous plants.

9. *Larinia* sp.

Dried-grass Orb-weaver

This spider was found among the grass in an open area.

10. *Neoscona theisi* (Walckenaer, 1841)

Serrated Spearhead Neoscona

This spider was found webbing among the grass in an open area.

11. *Neoscona vigilans* (Blackwall, 1865)

Two-spotted Orb-weaver

This spider was found active and building a web on a shrub near a small canal.

12. *Damarchus* sp.

Tube Trapdoor Spider

This spider was found making a nest in the ground beneath a gelam tree.

13. *Clubionidae* sp. 1

Sac Spider

This spider was found among the leaves of a shrub beside a small canal.

14. *Pristidia* sp.

Sac Spider

This spider was found in an area with complex vegetation near a canal.

15. *Bowie* sp.

Wandering spiders

The spider was found on the ground surface in a forested area at night.

16. *Hersilia* sp.

Two-tailed Spider

This spider was found on the ground surface in a wooded area.

17. *Hippasa holmerae* (Thorell, 1895)

Lawn Wolf Spider

This spider was found in a shrub area in an open space.

18. *Hippasa* sp.

Funnel Web Wolf Spider

This spider was found on the ground surface beside the road and next to a canal.

19. ***Pardosa* sp. 1**

Wolf Spider

This spider was found on the ground surface near a body of water. It was also found on the ground surface in an open area with shrubs.

20. ***Pardosa* sp. 2**

Wolf Spider

This spider was found on the ground surface in an open area with shrubs.

21. *Trochosa ruricoloides* (Schenkel, 1963)

Wolf spider

This spider was found in a grassy and shrubby area.

22. *Nephila pilipes* (Fabricius, 1793)

Giant Golden Orb-weaver

This spider was found building a web on a tree branch in an area with complex vegetation.

23. *Oecobius navus* (Blackwall, 1859)

Common Tiny House Dweller

This spider was found building a web on a woody substrate.

24. *Hamataliwa* sp.

Boxy-headed Lynx Spider

This spider was found among the grass beside a body of water.

25. *Hamataliwa incompta* (Thorell, 1895)

Common Boxy Lynx Spider

This spider was found building a web on a tree branch.

26. *Oxyopes javanus* (Thorell, 1877)

Striped Lynx Spider

This spider was found among the leaves of a shrub.

27. *Oxyopes lineatipes* (C. L. Koch, 1847)

Common Garden Lynx

This spider was found among the grass in an open area, beside a water body.

28. *Philodromus* sp.

Grey Running Crab Spider

This spider was found in a grassy area in an open space.

29. *Hygropoda* sp.

Nursery Web Spider

This spider was found wandering on the sandy surface of a road, which is an open area.

30. *Dolomedes* sp. (Latreille, 1804)

Fishing Spider

This spider was found on the ground surface beside a water body.

31. *Bathippus* sp.

Jumping spider

This spider was found in a grassy area with shrubs.

32. *Carrhotus viduus* (C. L. Koch, 1846)

Double-striped Black-and-white Jumper

This spider was found on the dense foliage of a shrub.

33. *Cocalus murinus* (Simon, 1899)

Bump-headed Arboreal Jumper

This spider was found on the branch of a shrub and is camouflaged with the tree bark.

34. *Epeus* sp.

Jumping spider

This spider was found on the leaves of a tree in an area with complex vegetation near a water body.

35. *Epocilla calcarata* (Karsch, 1880)

Painted Face Orange Jumper

This spider was found on the branch of a shrub in an area with complex vegetation.

36. *Evarcha flavocincta* (C. L. Koch, 1846)

Horned grass jumper

This spider was found in a grassy area.

37. *Hasarius adansoni* (Audouin, 1826)

Adanson's House Jumper

This spider was found on the tree trunk and among the leaves.

38. *Hyllus diardi* (Walckenaer, 1837)

Heavy Jumper

This spider was found on the branch of a shrub beside a water body.

39. *Jerzego* sp.

Hisponine Jumping Spider

This spider was found on the surface of a gelam tree's bark.

40. *Myrmarachne cornuta* (Badcock, 1918)

Long-waist Ant-mimic Jumper

This spider was found on the leaves of a shrub in an area with simple vegetation.

41. *Phintelloides versicolor* (C. L. Koch, 1846)

Multi-colored Phintella

This spider was found on the tree trunk, among the leaves, and on shrubs.

42. *Plexippus paykulli* (Audouin, 1826)

Greater Housefly Catcher

This spider was found on the surface of the bark of a gelam tree.

43. *Burmattus pococki* (Thorell, 1895)

This spider was found on a gelam tree.

44. *Cyrba* sp.

This spider was found wandering on the ground surface..

45. Salticidae sp. 1

This spider was found on the surface of a gelam tree's bark.

46. Salticidae sp. 2

This spider was found on an acacia tree in an area with complex vegetation. It used the acacia leaves as its nest.

47. *Heteropoda* sp. 1

This spider was found among the leaves of a shrub beside a body of water.

48. *Heteropoda* sp. 2

This spider was found among the leaves of a shrub beside a body of water.

49. *Heteropoda venatoria* (Linnaeus, 1767)

Domestic Huntsman Spider

This spider was found on a gelam tree.

50. *Olios* sp.

Huntsman Spider

This spider was found on the surface of a gelam tree trunk in a water body.

51. *Mesida* sp.

Long-jawed orb-weaver

This spider was found on a shrub near a water body.

52. *Tetragnatha hasselti* (Thorell, 1890)

Green-and-red Long-jawed Spider

Labah-labah ini ditemui pada celahan daun pokok gelam bersebelahan dengan badan air.

53. *Tetragnatha* sp. 1

Long-jawed Spider

This spider was found on the branch of a shrub beside the road.

54. *Tetragnatha* sp. 2

Long-jawed Spider

This spider was found on the branch of a shrub beside the road.

55. Tetragnithidae sp.

This spider was found building a web on the branch of a fig tree in an area with complex vegetation.

56. *Nihonhimea mundula* (L. Koch, 1872)

Comb-footed Platform Spider

This spider was observed building a web on a fig tree branch in an area with complex vegetation.

57. *Parasteatoda tepidariorum* (C. L. Koch, 1841)

Common house spider

This spider was found building a web among the tree bark crevices and dead leaves.

58. *Theridion t-notatum* (Thorell, 1895)

This spider was found building a web on a fig tree branch in an area with complex vegetation.

59. *Boliscus tuberculatus* (Simon, 1886)

Asian crab spider

This spider was found among the shrubs.

60. *Monaeses* sp.

Tailed-grass Crab Spider

This spider was found in a grassy area in an open space.

61. *Runcinia insecta* (L. Koch, 1875)

Crab spider

This spider was found on the leaves and stems of a shrub.

62. *Runcinia* sp.

Long-tailed Runcinia

This spider was found in a grassy area in an open space.

63. Thomisidae sp. 1

This spider was found in the crevices of a gelam tree's bark.

64. *Xysticus* sp.

Crab Spider

This spider was found among the grass in a body of water area.

65. *Mallinella* sp.

This spider was found under dry leaves on the sandy surface along the roadside, which is an open area.

66. *Lychas mucronatus* (Fabricius, 1798)

Chinese Striped Bark Scorpion

This scorpion was found in the crevices of a gelam tree's bark.

4. DISCUSSION

The majority of arachnid individuals recorded around TRIBE belonged to the order Araneae (spiders). Spiders can inhabit a wide range of microhabitats, which contributes to their broader distribution. The high species richness recorded in the families Salticidae and Araneidae suggests these groups are well adapted to the coastal BRIS soil environment. These two families have also been documented as highly diverse in other habitats such as forest reserves (Muhammad Nasir et al., 2020) and have shown high individual abundance in riparian zones (Abdullah et al., 2019). As predators of various small invertebrates, both families occupy distinct ecological niches with different prey-capturing strategies.

The Araneidae family consists of orb-weaving spiders that rely on web structures and need physical anchors to build their webs (Nentwig et al., 2024; Olive, 1980). Araneidae are commonly found constructing their webs on trees within their habitat. The sparsely treed open areas in TRIBE offer ideal web-building sites for these spiders. They typically capture flying insects that become trapped in their webs for food. Meanwhile, spiders from the Salticidae family (jumping spiders) actively hunt using visual cues (Nelson, 2023). The presence of complex

structures such as rocks, tree trunks, and shrubs in TRIBE creates suitable and active foraging zones for this family.

Several other spider families were also recorded, although in lower numbers, including Hersilidae, Ctenidae, Zodariidae, and Oecobidae. Each of these families has its distinct ecological niche. For example, *Bowie* (Ctenidae) is a nocturnal hunter that often hides beneath leaf litter, within soil crevices, or tree holes (Chu et al. 2022). *Mallinella* (Zodariidae) lives on the forest floor including within the leaf litter and is a specialized ant predator (Dankittipakul et al., 2012). The short sampling duration and reliance on a single sampling method may have limited the ability to detect these families, which have specific microhabitats and activity patterns.

Nevertheless, the discovery of the trapdoor spider *Damarchus* sp. in TRIBE is a noteworthy record, marking its first documentation in Terengganu, specifically in BRIS soil habitat. Previously, this spider had only been reported in Pahang (Razak et al. 2023), Selangor (Zonstein & Marusik, 2014), and Johor (Razak et al. 2024). It is characterized by a unique tube-like burrow often covered by dead leaves and small twigs. The tube-like structure differentiates it from the burrow of a tarantula. The ecological information on this genus, however, is very limited though like other mygalomorph spiders (trapdoor spiders and their kin), it may feed on a variety of prey ranging from beetle larvae, termites, ants and other ground-dwelling arthropods during daytime (Pompozzi & Copperi 2018; Garcia et al., 2021; Nyffeler & Symondson 2001). *Damarchus* Thorell, 1891 are known only from Asia which can be distinguished from other genera by having short procurved fovea, rastellum bearing weak spines and pairs of posterior sternal sigilla not centrally confluent (Kunsete et al., 2025). The mygalomorphs have a limited dispersal mechanism and low vagility (Pérez-Miles & Perafán, 2017). *Damarchus* occur sympatrically with other Theraphosidae across lowland, highland and island forests. The type locality of the genera only includes India, Indonesia, Malaysia, Myanmar and Thailand (World Spider Catalog 2025). Given its rarity, the presence of *Damarchus* sp. in TRIBE underscores the ecological importance of conserving BRIS soil habitats.

This study only recorded one species from the order Scorpiones (scorpions). Compared to spiders, scorpions require more specific microhabitats such as spaces beneath rocks, logs, and burrows in the soil. In addition, scorpions are more active at night and possess excellent camouflage abilities, with colouration that blends into their surroundings. These factors make scorpions more difficult to detect and record.

Research on the order Scorpiones in Malaysia is still limited (Izzat-Husna et al., 2014), with existing study primarily focused on taxonomy and systematics (Kovařík et al., 2018; 2019) rather than ecology. As predators, scorpions play an important role in ecosystems by regulating prey populations. In this study, we have recorded *Lychas mucronatus* in the BRIS soil habitat. Our observation indicates that this scorpion species exhibits both arboreal and terrestrial behaviors. One individual was sighted wandering in the grassland at night, while two others found shelter beneath tree bark during both day and night. The bark likely provides refuge from predators and environmental stressors. It may also serve as a site for ambush hunting. This group is similarly threatened by the rapid increase in anthropogenic activities. Therefore, comprehensive data on scorpion distribution and population patterns are essential to conduct more thorough status assessments. Such information is not only necessary for

understanding their ecological importance but also contributes to the development of more effective conservation strategies.

Only two of the arachnid species recorded in TRIBE have been assessed for IUCN conservation status. This lack of data makes it difficult to determine the conservation status of most species observed, highlighting a broader gap in arachnid research both in Malaysia and globally. Further studies should be conducted in TRIBE over a longer duration, considering variables such as weather, habitat type, activity periods, and microhabitat preferences of different arachnid species. In order to understand their ecological roles, further research is also needed to explore the potential of arachnids in applications such as pest control and biomedical use.

5. CONCLUSION

The study of arachnid diversity in TRIBE provides a foundational record of spider species in the BRIS soil ecosystem. A total of 66 species from 47 genera, 18 families, and two orders were documented, with the families Salticidae and Araneidae being the most dominant. The discovery of *Damarchus* sp., and *Lychas mucronatus* recorded for the first time in Terengganu, highlights the potential of BRIS soil ecosystems as important sites for biodiversity research. Additionally, the presence of *Lychas mucronatus* contributes to the understanding of scorpion diversity in the area. The level of arachnid diversity in TRIBE may be influenced by habitat variation and the availability of microhabitats. Understanding the ecological roles of arachnids in the local ecosystem provides clearer insights into the importance of BRIS soil as a habitat for this group, thereby emphasizing the need for conservation efforts in BRIS ecosystems in Malaysia.

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AUTHOR CONTRIBUTIONS

Muhammad Irham Abdul Razak (MIAR), **Muhammad Ramzie Aliff Aiman Rosli** (MRAAR), **Bee Jir Hak** (BJH), **Muhammad Farhan Abd Wahab** (MFAW), **Muhammad Afif Yusof** (MAY), **Farah Ayuni Farinordin** (FAF) and **Nabilah Zainol** (NZ) contributed to data collection. **MIAR**, **Nur Athirah Abdullah** (NAA) and **Puteri Raihanah Megat Sahrir** (PRMS) work with identification of specimens. **NAA** interpreted the data and wrote the

first draft of manuscript with **MIAR**, **MFAW**, **MAY**, **FAF** and **NZ**. **Syriswin Wesdy Sindance** (SWS) along with **MIAR**, **MRAAR**, **BJH**, **MFAW**, **MAY**, **FAF** and **NZ** provided resources for the research. All authors work together in reviewing the manuscript.

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The authors declare that an AI-based language checker was used solely for grammar, spelling, and clarity improvements. All content has been reviewed and verified by the authors, who take full responsibility for the final manuscript.

DATA AVAILABILITY

All data supporting the findings of this study are included in the article.

COMPETING INTEREST

The authors declare that there are no competing interests.

COMPLIANCE OF ETHICAL STANDARDS

The authors declare that this research did not involve human or animal subjects and this research does not include any ethical issue. All experimental procedures were conducted in accordance with the institutional Safety, Health, and Environmental (HSE) protocols of Universiti Teknologi MARA (UiTM).

SUPPLEMENTARY MATERIAL

No supplementary material is associated with this article.

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