



## Spiders (Arachnids) of District Kohat, Khyber Pakhtunkhwa, Pakistan

Hamza Yousaf<sup>1</sup>, Abdul Majid<sup>1\*</sup>, Muhammad Shehzad<sup>1</sup>, Muhammad Abdullah<sup>1</sup>, Syed Mohsin Shah<sup>1</sup> and Siraj ud Din<sup>1</sup>

1. Department of Zoology, Kohat University of Science and Technology, Kohat, Khyber Pakhtunkhwa, Pakistan

\*Corresponding author e-mail: [abdulmajid@kust.edu.pk](mailto:abdulmajid@kust.edu.pk)

### SUMMARY

Spiders (Arachnids) play a vital role in ecological research and ecosystems as prominent predators of insects and other arthropods, contributing to regulating insect populations and maintaining ecological balance. The present research work was carried out in district Kohat for the first time and provided valuable information regarding spider diversity. The study area has different habitat types: gardens, Savanah, Sandy areas, wetlands, grasslands, and caves. We gathered data from March 2022 to June 2023 in all habitat types using hand picking, jarring, and net picking. We recorded 20 species of spiders (belonging to eight families and 15 genera) across the study area. Our findings will develop existing knowledge of the Arachnids of the country and could be used to prepare a species atlas of the country in the future.

**Keywords:** Arachnids, Spider, Diversity, Kohat, Khyber Pakhtunkhwa

**Citation:** Shehzad, M., H. Yousaf, A. Majid, M. Abdullah, S. M. Shah, and S. u. Din. 2025. Spiders (Arachnids) of District Kohat, Khyber Pakhtunkhwa, Pakistan. *Journal of Wildlife and Ecology*. 9: 43-51.

Received 10 January, 2025

Revised 22 February, 2025

Accepted 25 February, 2025

Published 10 March, 2025

### INTRODUCTION

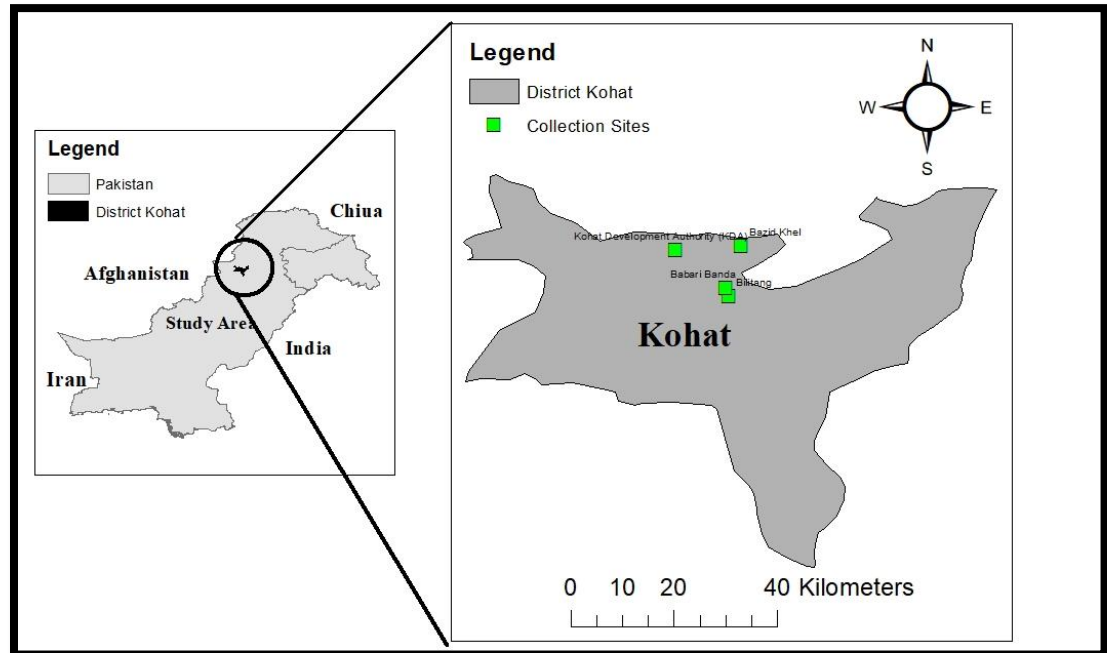
Spiders (Order Arachnida) are a highly diverse group of animals, with over 51,000 known species, and their actual diversity may be as great as 150,000-200,000 species, making them one of the most diverse groups of animals on the planet (Agnarsson, 2023; Måsviken et al., 2023; Kuntner and Agnarsson, 2018). They are distributed worldwide, inhabiting a wide range of Earth's environments, from cold tundra to tropical rainforests, deserts, ocean shores, ponds, and streams (Hu et al., 2020; Cardoso et al., 2019). Most of this diversity is found in the tropics, where it is believed that there may be over 100,000 spider species, most of which have not yet been discovered (Kuntner and Agnarsson, 2018). Spiders play a crucial role in ecosystems as prominent predators of insects and other arthropods, contributing to regulating insect populations and maintaining ecological balance (Agnarsson, 2023). However, they face threats such as habitat destruction, which leads to species extinctions, and the decline in their populations due to changes in environmental conditions, such as temperature and habitat structure (Butz et al., 2023). The decline in spider populations can have cascading effects on ecosystems, impacting the natural pest control they provide and the overall biodiversity of their habitats (Samu et al.,

2023; Butz et al., 2023). Therefore, understanding and conserving spider diversity is essential for maintaining the health and balance of ecosystems.

Species checklist and fauna inventories of various areas of Pakistan are available (Platnick 2006; Mukhtar 2013; Khan et al., 2015; Hasan et al., 2006; Bukhari et al., 2012; Logunov et al., 2011; Marusik et al., 2014; Ahmad et al., 2015; Ghafoor et al., 2011; Perveen and Khan 2015; Ghazanfar et al., 2016; Sajid et al., 2021); however, there are still some unexplored geographical regions. Therefore, we conducted the study to document the spider fauna in the Kohat, Southern Khyber Pakhtunkhwa district. By investigating this unexplored region, our research aims to contribute valuable insights into the broader understanding of spider fauna distribution and diversity within Pakistan.

### MATERIAL AND METHODS

The Kohat district is situated in the southern region of Khyber Pakhtunkhwa, Pakistan (Figure 1). It has a total area of 2,545 square kilometres (Ullah et al., 2013). The district is practically advanced, with well-developed hydrocarbon extraction and mining (Qadri et al., 2022). The district is located in a mountainous area, surrounded by a chain of mountains, and holds an important forest cover (Khatoon et al., 2012). It is home to Tanda Dam Wildlife Park, the largest wildlife park in the southern region of Khyber Pakhtunkhwa (Abdul et al., 2015). The region experiences a hot summer and cool winter, with the cultivation of crops such as vegetables, wheat, and maize. The study area is known for its agricultural products, including guava, wheat, barley, onions, persimmons, and pomegranate (Farooq et al., 2007).



**Figure 1: Map showing Collection sites randomly selected in the areas of district Kohat, Southern Khyber Pakhtunkhwa**

We selected four different sites for data collection representing six habitats: Garden, Savannah, Sandy areas, Wetlands, Grasslands, and Caves. We carried out six field surveys from March 2022 to June 2023. We followed the active searching method. We observed and collected specimens using hand picking, jarring, net picking, and plastic bags. We handled the specimens' using gloves. We recorded the geographical coordinates and habitat of the collection sites using GPS (offline maps, travel guides, and navigation). The specimens were collected and euthanized using ethanol. We then fixed and preserved the specimens in a 10% formalin solution (Ziegler and Technology Associations 2007) and brought them to the Laboratory at the Systematic Lab, Department of Zoology, KUST, Kohat. The specimens were identified using keys given by Levi and Randolph (1975), Biswas and Biswas (1992), Patil et al. (2013), and Namkung et al. (2002).

## RESULTS AND DISCUSSION

The studied Kohat district showed a varied arachnid assemblage. We recorded 20 species of spiders (belonging to eight families and 15 genera) across the study area (Table 1). Arachnid inventories and species checklists of various areas of Pakistan are available, but there are still some unexplored areas. Therefore, we conducted the present research work in the district of Kohat, Khyber Pakhtunkhwa. We recorded 20 species of spiders (belonging to eight families and 15 genera) across the study area.

In the genus *Pholcus*, two species were observed: *Pholcus phalangioides* and *Pholcus alticeps*. They were collected indoors in buildings and human settlement areas. These spiders construct messy cobwebs in corners, near windows, and on ceilings. They are commonly found in dark and uninterrupted areas (Chaudhary and Rizvi 2017). In natural habitats, *Pholcus phalangioides* was observed in crevices, caves, or rock formations in the study area. Previous records of *Pholcus phalangioides* include its presence in Pir Baba and its margins in district Buner (Khan et al., 2015) and in Lahore, Punjab (Riaz et al., 2023).

Within the genus *Araneus*, four species were recorded, namely *Araneus gemmoides*, *Araneus diadematus*, *Araneus cavaticus*, and *Araneus Ventricocus*. These were found in parks and gardens, particularly in areas with flowers, shrubs, and tall grasses. They naturally build their webs between plants to catch flying insects (Jimenez-Valverde and Lobo 2007). The *Araneus gemmoides* were documented in Buner Valley (Luqman et al., 2021) and observed in gardens in Punjab (Mukhtar 2012). The genus *Walckenaeria* was represented by the *Walckenaeria acuminata*, collected and observed in rocky habitats. These spiders are found in rocky areas with small spaces and crevices where they take shelter and build their webs (Miliczky and Horton 2005). It was also recorded near bodies of water, such as streams, ponds, and wetlands. This species is endemic to the study area and found in Pakistan (Siliwal and Molur 2007).

In the genus *Olios*, one species, *Olios argelasius*, was collected and observed in sandy areas in the district of Kohat. It has been previously documented along the Makran coast and in Balochistan, Pakistan (Moradmand and Jäger 2012). The genus *Cyrtophora* included the species *Cyrtophora citricola*, recorded in dense vegetation, such as gardens and parks. While no records of this species were found in Pakistan, it

has been documented in South African regions (Franzini, 2013) and Nigerian gardens (Musa, 2023).

**Table 1 Species of Spiders recorded from District Kohat, Khyber Pakhtunkhwa.**

Sr.	Scientific Name	Common Name	Encounter Rate
<b>Family Pholcidae</b>			
1	<i>Pholcus phalangioides</i>	Daddy long legs spider (Figure 2A)	Common
2	<i>Pholcus alticep</i>	Long-legged cellar spider	Common
<b>Family Araneidae</b>			
3	<i>Araneus gemmoides</i>	Cat faced spider	Common
4	<i>Araneus diadematus</i>	Garden spider (Figure 3A)	Common
5	<i>Cryptiphora citricola</i>	Tropical tent-web spider (Figure 2E)	Common
6	<i>Araneus cavaticus</i>	Barn spider	Common
7	<i>Araneus ventricocus</i>	(Figure 3D)	Un-common
8	<i>Neoscona adianta</i>	Orb-weavers spider	Common
<b>Family Linyphiidae</b>			
9	<i>Walckenaeria acuminata</i>	Sharp-bodied orb-weaver (Figure 2D)	Un- common
<b>Family Sparassidae</b>			
10	<i>Olios argelasius</i>	Huntsman spider	Un- common
<b>Family Theridiidae</b>			
11	<i>Robertus fuscus</i>	Dwarf spider (Figure 2B)	Un-common
<b>Family Salticidae</b>			
12	<i>Corythalia latipes</i>	(Figure 2F)	Un-common
13	<i>Plexippus paykulli</i>	Tropical jumping spider (Figure 2C)	Un-common
14	<i>Hyllus giganteus</i>	Giant jumping spider	Common
15	<i>Euophrys omnisuperstes</i>	Alpine jumping spider (Figure 3C)	Common
16	<i>Phidippus otiosus</i>	Canopy Jumping Spider (Figure 3E)	Common
17	<i>Hylus diardia</i>	(Figure 3F)	Un-common
18	<i>Leptofreya ambigua</i>	Jumping spider	Common
<b>Family Oxyopidae</b>			
19	<i>Oxyopes salticus</i>	Striped lynx spider (Figure 3B)	Un-common
<b>Family Theraphosidae</b>			
20	<i>Kochiana brunnipes</i>	Brown-footed spider	Un-common

The genus *Robertus* was represented by the species *Robertus fuscus*, observed in open areas such as meadows, pastures, grasslands, and gardens in the study area. They prefer to inhabit the ground and create their webs among vegetation or leaf litter

(Simo et al., 2013). In Pakistan, it was documented in Swat grasslands (Swat). *Corythalia* one species was recorded from the genus *Corythalia latipes*, collected and observed in vibrant ecosystems with dense vegetation and abundant rainfall in the district Kohat. It is rarely found in Pakistan. Within the genus *Plexippus*, the species *Plexippus paykulli* was collected and observed in warm and humid climates with abundant vegetation and insects (Simó et al., 2013). It was found on tree trunks, leaves, and undergrowth in the study area. In Pakistan, it was previously documented in Khyber Pakhtunkhwa, specifically in Malakand (Manzari Baba) and Karak (Karak city) (Ali et al., 2018). Two species were recorded in the genus *Hyllus giganteus* and *Hyllus diardia*. They were collected in dense and wild tropical forests with abundant vegetation and various types of plants and animals in the study area. Kohat. In Pakistan, they were documented in cotton fields in the district of Faisalabad (Veeramani et al., 2023). The genus *Euophrys* had one species, *Euophrys omnisuperstes*, recorded from mountain ranges and areas with rocky outcrops in the district Kohat. In Pakistan, it was documented in the mountain areas of Punjab (Singh and Singh 2021). In the genus *Oxyopes*, the species *Oxyopes salticus* was collected in lawns, fields, and open grassy areas. It was observed on the ground, on low vegetation. Documentation of this species includes the rice ecosystem under the Terai region of West Bengal (Musa, 2023).

The genus *Kochiana* was represented by the species *Kochiana brunnipes*, which were collected and observed in urban green spaces like gardens, parks, and botanical areas. It is likely to be more active during the day in sunny and warm weather. Previous documentation of this species is in the northeastern Brazilian Atlantic rainforest (Fukushima et al., 2008). Within the genus *Phidippus*, the species *Phidippus otiosus* was collected and observed in wooded areas with a mix of vegetation and open space. It was most active during daylight hours in the district of Kohat. Previous documentation includes their presence in the Charsadda district, Khyber Pakhtunkhwa, in stream banks and crop fields (Nooreen et al., 2022). The genus *Neoscona* included *Neoscona adianta*, recorded in wooded areas with abundant lichen growth. It was also found in Buner Valley in arid regions, agricultural land, and building areas (Luqman et al., 2021). Lastly, the genus *Leptofreya* had one species, *Leptofreya ambigua*, collected in marshy or wetland areas. It is most active during the evening or nocturnal. Previous documentation includes their presence in Colombo in the Caribbean region, including Tropical Dry Forests (Suarez-Martinez and Bedoya-Roque, 2021).

#### ACKNOWLEDGEMENT

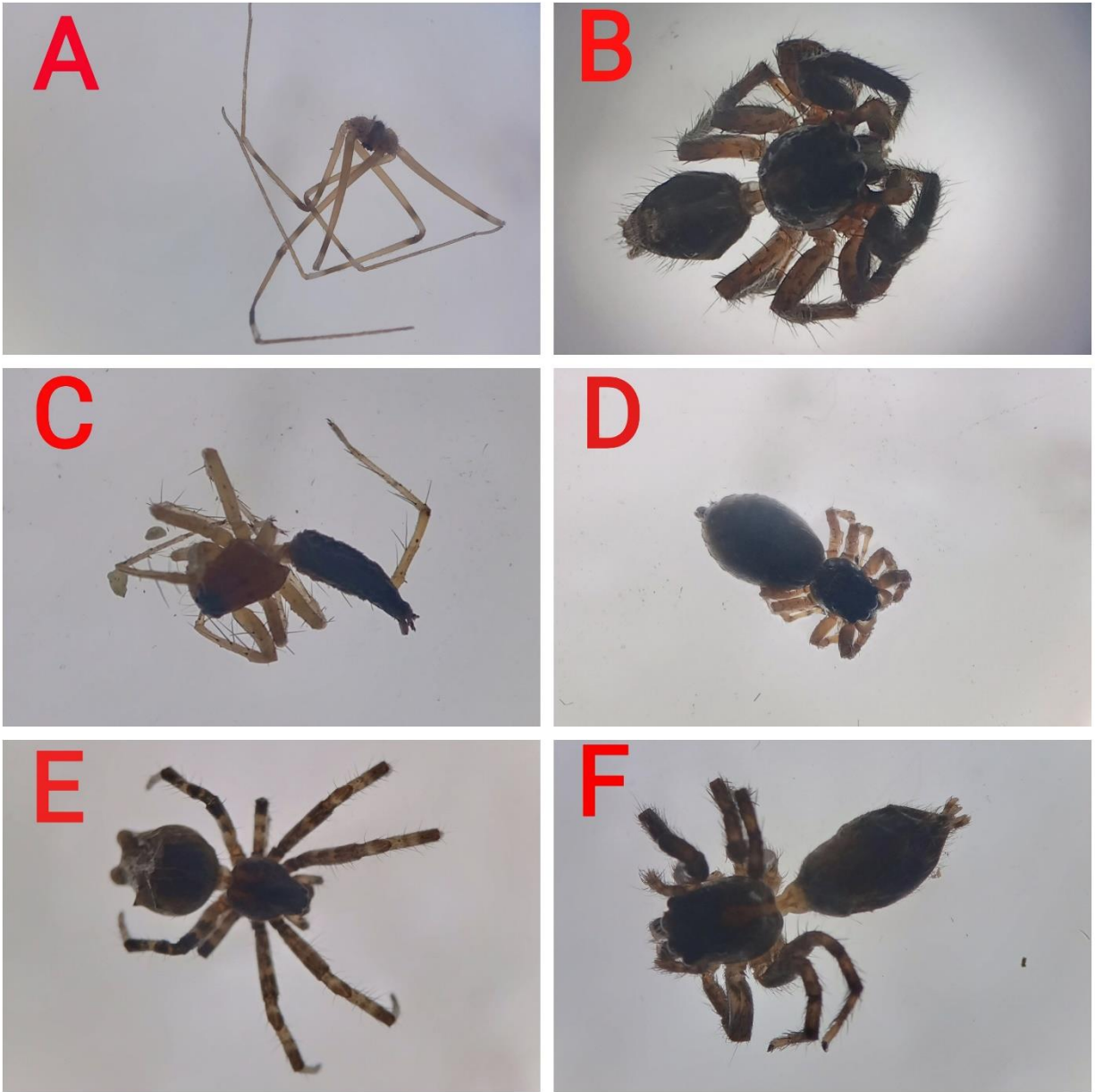
We sincerely thank the Wildlife Department district Kohat and Kohat University of Science and Technology for providing equipment and supplies.

#### REFERENCES

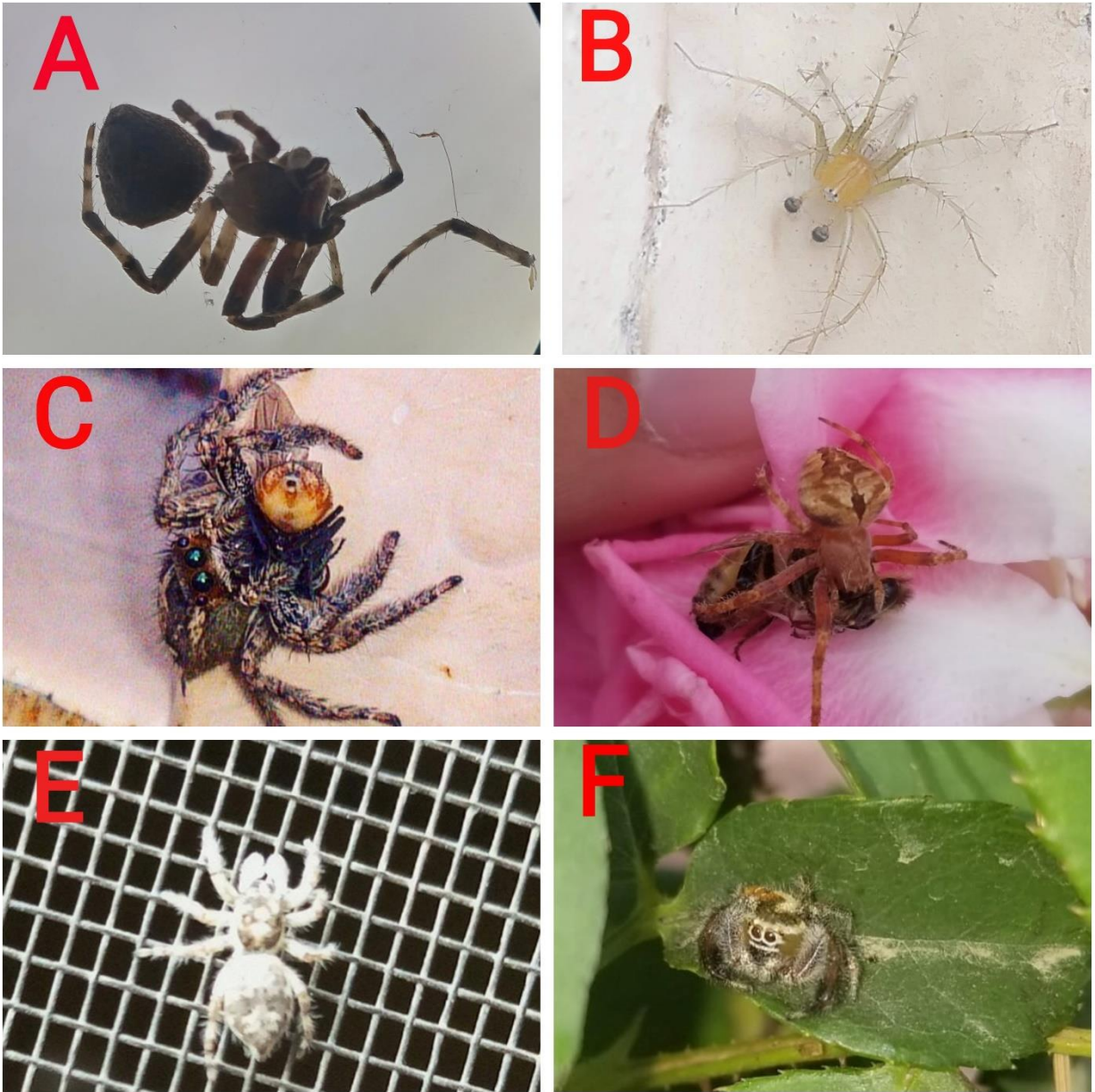
- Agnarsson, I. 2023. Grand challenges in research on arachnid diversity, conservation, and biogeography. *Frontiers Media* 2: 2813-5083
- Ahmad, S., N. Akhtar, and K. Saeed. 2015. Some observations on spider fauna of district Buner, Khyber Pakhtunkhwa Pakistan. *J Entomol Zool Studies*. 3: 47-52.
- Ali, P. A., W. P. Maddison, M. Zahid, and A. Butt. 2018. New chrysilline and aelurilline jumping spiders from Pakistan (Araneae, Salticidae). *ZooKeys* 783, 1–15.
- Biswas, B, and K. Biswas. 1992. Araneae: spiders. *State Fauna Series*, 3, pp.357-500.

- Bukhari, M., M. M. Naeem, K. Rehman, and S. Andleeb. 2012. Occurrence and distribution of araneid fauna trapped from cotton fields of district Faisalabad, Pakistan. *World Applied Sciences Journal*, 19:714-718.
- Butz, E. M., L. M. Schmitt, J. D. Parker, and K. T. Burghardt. 2023. Positive tree diversity effects on arboreal spider abundance are tied to canopy cover in a forest experiment. *Ecology*, 2023 Aug;104(8): e4116..
- Cardoso, P., V. Shirey, S. Seppälä, S. Henriques, M. L. Draney, S. Foord, A. T. Gibbons, L. A. Gomez, S. Kariko, and J. Malumbres-Olarte. 2019. Globally distributed occurrences utilised in 200 spider species conservation profiles (Arachnida, Araneae). *Biodiversity Data Journal*, 7: e33264.
- Chaudhary, A., and S. I. Rizvi. 2017. Protein content in silken webs of cellar spiders (Family-Pholcidae): Effect of habitat and senescence. *National Academy Science Letters*, 40: 315-318.
- Farooq, A., M. Ishaq, S. Yaqoob, and K. N. Sadozai. 2007. Varietal adoption effect on wheat crop production in irrigated areas of NWFP. *Sarhad Journal of Agriculture*, 23(3), p.807.
- Franzini, P. Z. N. 2013. The use of molecular data to determine species identification: a study of the *Cyrtophora* spp. (Araneae: Araneidae) in South Africa with notes on their behaviour. [University of Johannesburg].
- Fukushima, C. S., R. H. Nagahama, and R. Bertani. 2008. The identity of *Mygale brunripes* C. L. Koch 1842 (Araneae, Theraphosidae), with a redescription of the species and the description of a new genus. *The Journal of Arachnology* 36(2): 402-410.
- Ghafoor, A., and A. Mahmood. 2011. Population dynamics of the araneid fauna from district Gujranwala, Pakistan. *The Journal of Animal and Plant Sciences*, 21(4): 812-816.
- Ghazanfar, M., M. Hussain, M. Hashim, and A. M. Fahid. 2016. Checklist of spider (Araneae) fauna of Pakistan: A review. *Journal of Entomology and Zoology Studies*, 4: 245-256.
- Hasan, M., W. Wakil, and F. Bashir. 2006. False spider mites (Acari: Tenuipalpidae) from northern Punjab, Pakistan. *International Journal of Acarology*, 32(4): 383-386.
- Haseeb, A., T. Azeem, Z. Masood, F. Mengal, U. Rehman, and A. Fayyaz. 2015. An investigation on freshwater fish fauna of Tanda dam in Kohat district, Khyber Pakhtunkhwa province of Pakistan. *Global Veterinaria*. 14: 576-581.
- Hu, W. H., M. C. Duan, S. H. Na, F. Zhang, and Z. R. Yu. 2020. Spider diversity and community characteristics in cropland and two kinds of recovery habitats in Bashang area, China. *Ying Yong Sheng Tai Xue Bao*, 31(2): 643-650. doi: 10.13287/j.1001-9332.202002.020.
- Jiménez-Valverde, A., and J. M. Lobo. 2007. Determinants of local spider (Araneidae and Thomisidae) species richness on a regional scale: climate and altitude vs. habitat structure. *Ecological Entomology*, 32(1): 113-122.
- Khan, J., and A. Zaman. 2015. Biodiversity of spider fauna in Pir Baba, district Buner, Khyber Pakhtunkhwa, Pakistan. *Journal of Entomology and Zoology Studies*, 3(1): 69-74.
- Khatoon, L., I. U. Khan, S. A. Shah, M. I. Jan, F. Ullah, and S. A. Malik. 2012. Genetic diversity of *Plasmodium vivax* and *Plasmodium falciparum* in Kohat District, Pakistan. *Brazilian Journal of Infectious Diseases*, 16: 184-187.
- Kuntner, M., and I. Agnarsson. 2018. Diversity of tropical spiders. *Frontiers for Young Minds* 64.
- Levi, H. W., and D. E. Randolph. 1975. A key and checklist of American spiders of the family Theridiidae north of Mexico (Araneae). *Journal of Arachnology* 31-51.
- Logunov, D. V., F. Ballarin, and Y. M. Marusik. 2011. New faunistic records of the jumping and crab spiders of Karakoram, Pakistan (Aranei: Philodromidae, Salticidae, and Thomisidae).
- Luqman, L., K. Saeed, K. Muhammad, M. S. Ahmad, F. Akbar, A. Rasool, M. Israr, H. Jabeen, S. A. Mehmood, and S. Ahmed. 2021. Biodiversity of orb-web spiders (Family: Araneidae) of Buner Valley, Pakistan. *Brazilian Journal of Biology* 82: e238339.
- Marusik, Y. M., F. Ballarin, M. M. Omelko, and S. Koponen. 2014. On new and interesting records of spiders from northern Pakistan and India (Aranei). *Arthropoda Selecta* 23(4): 415-424.
- Måsviken, J., L. Dalén, K. Norén, and F. Dalerum. 2023. The relative importance of abiotic and biotic environmental conditions for taxonomic, phylogenetic, and functional diversity of spiders across spatial scales. *Oecologia* 202(2): 261-273. doi: 10.1007/s00442-023-05383-0.
- Miliczky, E. R., and D. R. Horton. 2005. Densities of beneficial arthropods within pear and apple orchards affected by distance from adjacent native habitat and association of natural enemies with extra-orchard host plants. *Biological Control* 33(3): 249-259.
- Moradmand, M., and P. Jäger. 2012. Taxonomic revision of the huntsman spider genus *Eusparassus* Simon, 1903 (Araneae: Sparassidae) in Eurasia. *Journal of Natural History* 46(39-40): 2439-2496.
- Mukhtar, M. K. 2012. Spiders of the genus *Neoscona* (Araneae: Araneidae) from Punjab, Pakistan. *Pakistan Journal of Zoology* 44(6).
- Mukhtar, M. K. 2013. Two new species of the genus *Oxyopes* Latreille (Arachnida: Araneae: Oxyopidae) from Punjab, Pakistan. *Pakistan Journal of Zoology* 45(2).

- Musa, A. 2023. Diversity and distribution of spiders in selected communities in Moro Local Government Area, Kwara State, Nigeria. Thesis, Kwara State University, Nigeria.
- Namkung, J., M. S. Im, S. T. Kim, and J. H. Lee. 2002. Spider fauna of Jeju Island in Korea. *Journal of Asia-Pacific Entomology* 5(1): 55-74.
- Nooreen, N., M. Zahid, M. Jawad, S. A. Ullah, M. I. Khan, K. Khan, M. Shah, A. Wahab, R. Ahmad, and M. Sajid. 2022. Studying biodiversity of spider species in seven different localities of Charsadda District, Khyber Pakhtunkhwa, Pakistan. *Brazilian Journal of Biology* 84: e260515.
- Patil, S. R., S. Sambath, and R. Bhandari. 2013. Preliminary investigation on spiders (Arachnida: Araneae) in Rani Veerangana Durgawati Wildlife Sanctuary, Damoh, Madhya Pradesh, India. *Indian Forester* 139(10): 943-946.
- Perveen, F., and N. Khan. 2015. Checklist of the first recorded spider fauna in Sheringal, Khyber Pakhtunkhwa, Pakistan. *Advances in Entomology* 3(3): 94.
- Platnick, N. I. 2006. *The World Spider Catalog, version 7.0*. American Museum of Natural History. Available at: <http://research.org/entomology/spiders/catalog/index.html>
- Qadri, H. A., A. Wahid, N. A. Siddiqui, S. H. Ali, A. A. El Aal, A. Q. B. A. Rashid, and M. N. B. Temizi. 2022. Prospect analysis of Paleocene coalbed methane: A case study of Hangu Formation, Trans-Indus Ranges, Pakistan. *Geofluids* 2022.
- Riaz, S., N. Virk, F. Manzoor, and Z. Ali. 2023. Insects and arachnids as bioindicators of heavy metal toxicity in Lahore. *Environmental Science Archives* 2: 23-33.
- Sajid, M., M. Zahid, M. Shah, M. Rasool, I. Ullah, R. Ahmad, P. Habibullah, and N. Majeed. 2021. Identification of the orb-weaving spider (Araneae: Araneidae) fauna of Dir Lower (Pakistan) through DNA barcoding. *Journal of Animal and Plant Sciences (JAPS)* 31(4).
- Samu, F., É. Szita, E. Botos, J. Simon, N. Gallé-Szpisjak, and R. Gallé. 2023. Agricultural spider decline: long-term trends under constant management conditions. *Scientific Reports* 13(1): 2305.
- Siliwal, M., and S. Molur. 2007. Checklist of spiders (Arachnida: Araneae) of South Asia including the 2006 update of Indian spider checklist. *Zoos' Print Journal* 22(2): 2551-2597.
- Simó, M., M. de Fátima da Rocha Dias, C. Jorge, M. Castro, M. A. Dias, and Á. Laborda. 2013. Habitat, redescription, and distribution of *Latrodectus geometricus* in Uruguay (Araneae: Theridiidae). *Biota Neotropica* 13: 371-375.
- Singh, R., and G. Singh. 2021. Updated checklist of spider diversity (Arachnida: Araneae) in Haryana, Himachal Pradesh, Punjab, Chandigarh, and Delhi (India). *Serket* 18(2): 199-228.
- Suarez-Martinez, L. A., and E. Bedoya-Roque. 2021. First report of *Eustiromastix spinipes* (Taczanowski 1872) (Araneae: Salticidae: Saltafresia) from Colombia, with new salticid records for the Department of Córdoba. *Peckhamia*: 240.1: 1-13
- Ullah, R., S. Ayaz, and N. M. AbdElIslam. 2013. Prevalence of *Plasmodium vivax* using PCR method in Afghan refugee Ghamkol Camp, District Kohat, Pakistan. *Life Science Journal*, 10(1): 2948-2953.
- Veeramani, A., D. Abinaya, V. Ennavan, N. Bhuvaneshwaran, S. Ravichandran, and S. Pazhanisamy. 2023. Assemblage of spider diversity—an agent of biological control of agricultural pests. *Journal of Applied Entomologist*, 3(1): 01-06.
- Ziegler, T. 2007. Field surveys and collection management as a basis for herpetodiversity research and nature conservation in Vietnam. *Ho Chi Minh City People's Committee, Vietnam Union of Science, and Colivam Technology Associations, PTC: Development of Hochiminh City Museum of Natural History*, 12-15.



**Figure 2: Photographs of spiders recorded from study area i.e. A) *Pholcus phalangioides*, B) *Robertus fuscus*, C) *Plexippus paykulli*, D) *Walckenaeria acuminata*, E) *Cryptiphora citricola*, F) *Corythalia latipes***



**Figure 3:** Photographs of spiders recorded from study area i.e. A) *Araneus diadematus*, B) *Oxyopes salticus*, C) *Euophrys omnisuperstes*, D) *Araneus Ventricocus*, E) *Phidippus otiosus*, F) *Hylus diardia*.

**Competing interests:** The authors have declared no conflict of interest.

**Funding:** The study received no external funding.

**Authors' contributions:** HY, SD, and MS conducted the field survey and collected, identified, and analyzed data. MS and MA drafted and finalized the manuscript. AM and MS supervised the research work and provided all the facilitations. SMS assisted in field visits and technical support.

