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Original Research Article

New records of spiders: Araneae, Eresidae, Cheiracanthiidae, Scytodidae from Pakistan

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Abstract:
In this study, we confirm the presence of the spider species *Cheiracanthium approximatum* O. Pickard-Cambridge, 1885, which has been observed after a 139-year absence. The species is validated based on an established population and an extended distribution, as reported. We also report the rediscovery of a new species, *Stegodyphus* pacificus Pocock, 1900, after 90 years, recorded, and *Dictis striatipes* L. Koch, 1872, a species is recorded as new, including the genus *Dictis* L. Koch, 1872, in the subtropical North-West Hindu Kush sub-mountainous foothills of Peshawar valley, with uneven population. These results reveal that both Sub-continent Eurytopic *C. approximatum* O. Pickard-Cambridge, 1885 and Eurasian Eurytopic and *D. striatipes* L. Koch, 1872 gradually acclimated to habitats. Our findings show that both *Cheiracanthium approximatum* and *Dictis striatipes* have adapted well to their environments. The populations we observed are not evenly distributed, highlighting the complex ecology of the area. To help with identification, we have included detailed photographs of these spiders and their reproductive organs. This research enhances our understanding of spider diversity in South Asia and emphasises the need for ongoing studies in less-explored regions.

Keywords: Araneae, Cheiracanthiidae, Eresidae, Scytodidae, Spider species, Spider habitats, Spider diversity, Complex ecology.

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1. Introduction

Despite the country having diverse ecosystems and an extensive landscape divided into valleys, terrain, plateaus, ecotones, and hyper-diverse mountain ranges of the Himalayas, Hindukush, and Karakoram, partial studies have shown that Eurasian and African eurytopic species have an extension in Pakistan (Ali, 2021; Ali *et al.*, 2016, 2018; Dyal, 1935; Logunov *et al.*, 2011). Extensive taxonomic and validation works are required to overcome species distribution gaps in Pakistan (Logunov et al., 2011; Li, 2020).

The aims and objectives of the current paper are to validate and record *Cheiracanthium approximatum* O. Pickard-Cambridge, 188. 2) First record of genus Dictis L. Koch, 1872 and Dictis striatipes L. Koch, 1872 species from Pakistan, and 3) to report and taxonomic validation of Stegodyphus pacificus Pocock, 1900 from the North-West Hindu Kush district, Swabi in Peshawar valley.

All the preserved specimens were examined using a stereomicroscope or a light microscope attached to the Department of Zoology, Swabi, Pakistan. The specimens were preserved in 70% ethanol and deposited. Photographs of the bodies and genitalia were taken with an OMAX 3MP camera attached to an OMAX stereomicroscope and light microscope.

2. Results and discussion

2.1. Taxonomy

2.1.1. Family Cheiracanthiidae (Wagner, 1887)

Cheiracanthium approximatum O. Pickard-Cambridge, 1885 (Figure 1)

Cheiracanthium approximatum O. Pickard-Cambridge, 1885b: 26, pl. 2, 18 (♀).

Cheiracanthium adjacens O. Pickard-Cambridge, 1885b: 24, pl. 2. 17 (♀)

Cheiracanthium approximatum Marusik *et al.* (2020): 341. 1, 2a-c, e, 4-7, 9-12, 25-31(♂♀).

For the complete list of taxonomic references, see World Spider Catalogue (2024).

Material examined: 1♂, 1♀, Swabi, River Indus banks, 34.00 N, 72.24E, 340 m. 25.07. 2021. P.A. Ali. 1 ♂, Swabi (Ambar), 34.05 N, 72.41 E, 310 m. 27.07. 2021. P.A. Ali. 1 ♂ (1imm), Swabi (Ambar), 34.07 N, 72.62 E, 365 m. 29.07. 2021. P.A. Ali.

Cheiracanthium approximatum O. Pickard-Cambridge, 1885 is described from the Second Yark Mission 1874 somewhere between Murree and Sind Valley on a road trip (Marusik *et al.*, 2020; Simmons & Marusik, 2022). The species is reconfirmed after 136 years with an extended eastern Palearctic-Oriental distribution. Like other eurythermal species, they have an extended distribution in the Himalayas, the Hindu Kush Mountains, the Himalaya-Hindu Kush Mountain ecotones, and the subtropical plains. There is variation in palpal structure, conductor and retrolateral tibial apophysis. The species *Cheiracanthium adjacens* O. Pickard-Cambridge, 1885 and *Cheiracanthium approximatum* O. Pickard-Cambridge, 1885 also have taxonomic placement issues (Esyunin & Zamani, 2020; Li & Zhang, 2024).

Figure 1: *Cheiracanthium approximatum* O. Pickard-Cambridge, 1885 male habitus; 2 female habitus; 3 palp ventral view; 4 palp retro lateral view. Scale bars: (1-2) 1 mm, (3-4) 0.35 mm.

2.1.2. Family Eresidae (C. L. Koch, 1845)

Stegodyphus pacificus Pocock, 1900 (Figure 2)

Stegodyphus pacificus Pocock, 1900: 209 (♂♀).

Stegodyphus pacificus Dyal, 1935: 131. 11, 2(♀)

Stegodyphus pacificus Lehtinen, 1967: 4611455 (♂♀).

Stegodyphus pacificus Kraus and Kraus (1989): 202, 102, 109, 116, 119, 121-124, 132-138 (♂♀).

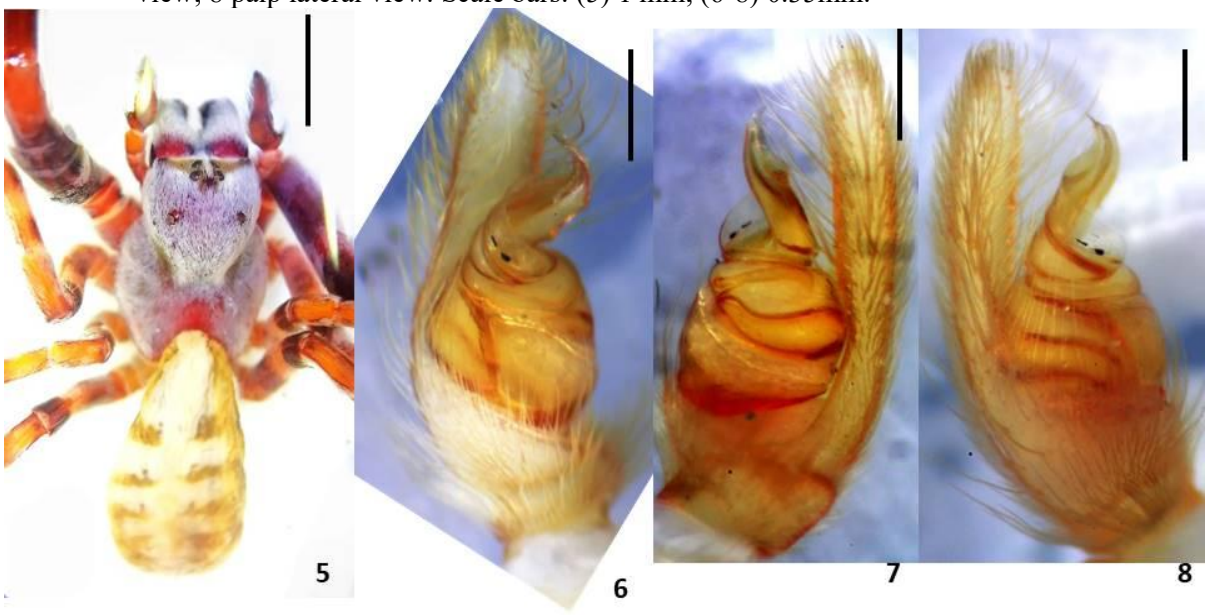
For the complete list of taxonomic references, see World Spider Catalog (2024).

Material examined: 3♂ 1♀(imm), Swabi, River Indus banks, 34.00 N, 72.24E, 340 m a.s.l. 25.07. 2022. Pir Asmat Ali.

The genus Stegodyphus Simon, 1873 with 18, out of which world species mostly The *Stegodyphus pacificus* Pocock**,** 1900 was described from Khandesh, Eastern District of

Poona India (Pocock, 1900) and reported from South-East reported from Lahore British India (now part of Pakistan) and the material collected mostly lost after partition (Dyal, 1935). The present study confirms its new locality in the North-Western subtropical ecotone of the Hindukush, adjacent to the river Indus basin of Pakistan. This eurytopic species has an extended distribution, ranging from Jordan, Iran, Pakistan, and India, and can be eurythermal in its distribution.

Figure 2: *Stegodyphus pacificus* Pocock, 1900 male habitus; 6 palp ventral view; 7 palp retro lateral view; 8 palp lateral view. Scale bars: (5) 1 mm, (6-8) 0.35mm.



2.2.3. Family Scytodidae (Blackwall, 1864)

Dictis striatipes L. Koch, 1872 (Figure 3)

Dictis striatipes L. Koch, 1872a: 294, pl. 24, f. 5 (♀).

Dictis nigrolineata Simon, 1880b: 123 (♀).

Dictis lugubris Thorell, 1887: 86 (♀).

For a complete list of taxonomic references, see World Spider Catalog (2024).

Material examined: Khyber Pakhtunkhwa, District Swabi, 2 ♂, Swabi town, 34°10'47"N 72°45'68"E, 640 m, decaying litter 29.7.2022. District Swabi (Gadoon), 3♀ or juvenile, 34°10'28"N 72°68'01"E, 640 m, bushes, 5.7.2022. District Swabi (Kundal dam), 1 ♂, 3♀ or juvenile, 34°19’46"N 72°59'26"E, 740 m, bushes, subtropical hills and bank, 08.vii.2021. District Swabi (Dewal villages), 2 ♂, 2♀ or juvenile, 34°19’60"N 72°70'86"E, 840 m, ecotone subtropical mountains bushes, 11.5.2020. District Swabi (Utla mountain complex ecotone mid), 2 ♂, 2♀ or juvenile, 34°22’79"N 72°70'86"E, 1040 m, ecotone subtropical/ dry sub mountains transition zones bushes/litter, 11.5.2020. District Swabi (Utla mountain complex ecotone upper region), 3 ♂, 3♀ or juvenile, 34°27’28"N 72°69'30"E, 1240 m, ecotone subtropical/ dry sub mountains transition zones bushes/litter, 11. 09.2021. District Swabi (Beer

Gali mountains ecotone upper region), 3 ♂, 3♀ or juvenile, 34°27’28"N 72°69'30"E, 1750 m, dry sub mountains of Hindkush, bushes/litter, 11. 08.2021.

Comments: This new record represents the third species of the family Scytodidae to be found in Pakistan. The two *Scytodes propinqua* Stoliczka, 1869 and Scytodes sordida Dyal, 1935, which were earlier reported but require taxonomic validation (Dyal, 1935; Stoliczka, 1869). The eurytopic species *Dictis striatipes* L. Koch, 1872 is a widely distributed species found in Yemen, the United Arab Emirates, Iran, tropical Asia, Korea, Japan, China, Australia, and the Pacific Islands, while also being introduced to the USA and Mexico.

Figure 3: Male and female of *Dictis striatipes* L. Koch, 1872: (9) male habitus; (10) Female; (11) palp, Prolateral view; (12) palp, Retrolateral view. Scale bar 9-10 (1mm); 11-12 (0.3 mm).

3. Conclusion

The discovery of the Stegodyphus pacificus spider in the North-Western subtropical region of the Hindukush Mountains is significant because it demonstrates that this species can adapt and survive in diverse environments. This recent discovery expands our understanding of spider

species in Pakistan and highlights the need for more research on these often-neglected creatures in wildlife studies. It also serves as a reminder of the significant loss of spider specimens that occurred after the partition of India, emphasising how important it is to preserve biological samples for future research. Without these samples, we lose valuable insights that could improve our understanding of different spider species. Furthermore, the potential existence of species like Scytodes propinqua and Scytodes sordida indicates that there is still much to learn about spider diversity in the area. This underscores the importance of ongoing research to accurately identify and classify these spiders, as well as to discover any previously unknown species.

To enhance our understanding of spider diversity in Pakistan and its surrounding regions, researchers should investigate areas that have not been thoroughly studied. Using modern DNA techniques can significantly aid in accurately identifying various spider species, especially those that have not been well-documented. Building partnerships between local and international scientists can foster knowledge exchange and enhance expertise in spider studies. Protecting natural habitats that host diverse spider populations is also crucial. Additionally, educating the public about the vital roles spiders play in our ecosystems can help involve local communities in conservation efforts. By following these steps, we can deepen our understanding of spider diversity and work toward preserving these important species and their habitats.

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