

Distributional Notes on Three Wolf Spider Species (Araneae: Lycosidae) Recorded for the First Time in Diyala Province, Iraq

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Abstract

This study presents new distributional data for three wolf spider species (*Araneae: Lycosidae*) from Diyala Province in eastern Iraq. Specimens were gathered from different districts and habitats between July 2025 and June 2026. The species *Arctosa tbilisiensis* Mcheidze, 1946, *Lycosa piochardi* Simon, 1876, and *Wadicosa fidelis* (O. Pickard-Cambridge, 1872) are recorded for the first time in Diyala, extending their known ranges within Iraq. The paper describes key diagnostic morphological features and includes information about the examined specimens and their local distributions. These findings improve knowledge of the distribution of Iraqi *Lycosidae* and reveal that Diyala Province, despite its habitat variety, remains insufficiently studied. The records serve as a valuable baseline for future taxonomic, faunistic, and ecological research on spiders in Iraq.

Keywords: Araneae, distribution, new provincial records, Lycosidae, Diyala.

ملاحظات حول توزيع ثلاثة أنواع من عناكب الذئب (*Araneae: Lycosidae*) المسجلة لأول مرة في محافظة ديالى، العراق

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الخلاصة

تقدم هذه الدراسة بيانات توزيعية جديدة لثلاثة أنواع من عناكب الذئب (*Araneae: Lycosidae*) في محافظة ديالى شرق العراق. جُمعت العينات من مناطق وموائل مختلفة بين يوليو 2025 ويونيو 2026. سُجلت الأنواع *Arctosa tbilisiensis* Mcheidze, 1946 و *Lycosa piochardi* Simon, 1876 و *Wadicosa fidelis* (O. Pickard-Cambridge, 1872) لأول مرة في ديالى، مما يوسع نطاق انتشارها المعروف في العراق. تصف الورقة البحثية السمات المورفولوجية التشخيصية الرئيسية، وتتضمن معلومات عن العينات المدروسة وتوزيعها المحلي. تحسّن هذه النتائج معرفتنا بتوزيع عناكب الذئب في العراق، وتُظهر أن محافظة ديالى، على الرغم من تنوع موائلها، لا تزال غير مدروسة بشكل كافٍ. تُشكل هذه السجلات قاعدة بيانات قيمة للبحوث التصنيفية والحيوانية والبيئية المستقبلية المتعلقة بالعناكب في العراق.

1. Introduction

Wolf spiders (Lycosidae) form one of the largest and most widespread spider families globally, with 2,463 known species across 132 genera [1]. Despite this extensive diversity, documentation in Iraq remains limited. So far, *Arctosa tbilisiensis* Mcheidze, 1946 has been reported from Basrah, Duhok, and Dhi Qar [2]; [3]; [4]. *Wadicosa fidelis* (O. Pickard-Cambridge, 1872) from Baghdad, Basrah, Karbala, and Salah Al-Din [5]; [6]; [7]; [3]; [4]; [8] and *Lycosa piochardi* Simon, 1876 from Basrah, Baghdad, Dhi Qar, and Duhok [8]. Molecular studies further show that several traditionally delimited lycosid genera require continued systematic evaluation [9]; [10].

Diyala Province, situated in northeastern Iraq near Iran, features extensive orchards, especially citrus groves, along with diverse agricultural areas and natural vegetation that offer suitable habitats for spiders [11]. Despite this environmental variety, the spider fauna of the region is still poorly documented. Before this study, only three spider species had been recorded there: the jumping spider *Plexippus paykulli* (Audouin, 1826) [8], and the titanoecid spiders *Pandava Lehtinen*, 1967, and *Nurscia albomaculata* (Lucas, 1846) [12]. These limited records highlight that the spider diversity in Diyala remains underexplored, and more faunistic surveys are necessary.

Although Iraq has seen a significant rise in documented spider species over the past decade, many provinces, especially at the family level, remain underexplored. Diyala Province is one of the least studied regions, and current knowledge of its spider fauna relies on only a few published records. As a result, the full diversity and distribution of spiders in the area are still not well understood, underscoring the need for further taxonomic and faunistic research. In a faunistic survey of Diyala Province, eastern Iraq, three wolf spider species *Arctosa tbilisiensis* Mcheidze, 1946; *Wadicosa fidelis* (O. Pickard-Cambridge, 1872); and *Lycosa piochardi* Simon, 1876, were collected. Since none of these species had been previously recorded in Diyala, this study reports their first provincial records and advances our knowledge of Lycosidae distribution in Iraq.

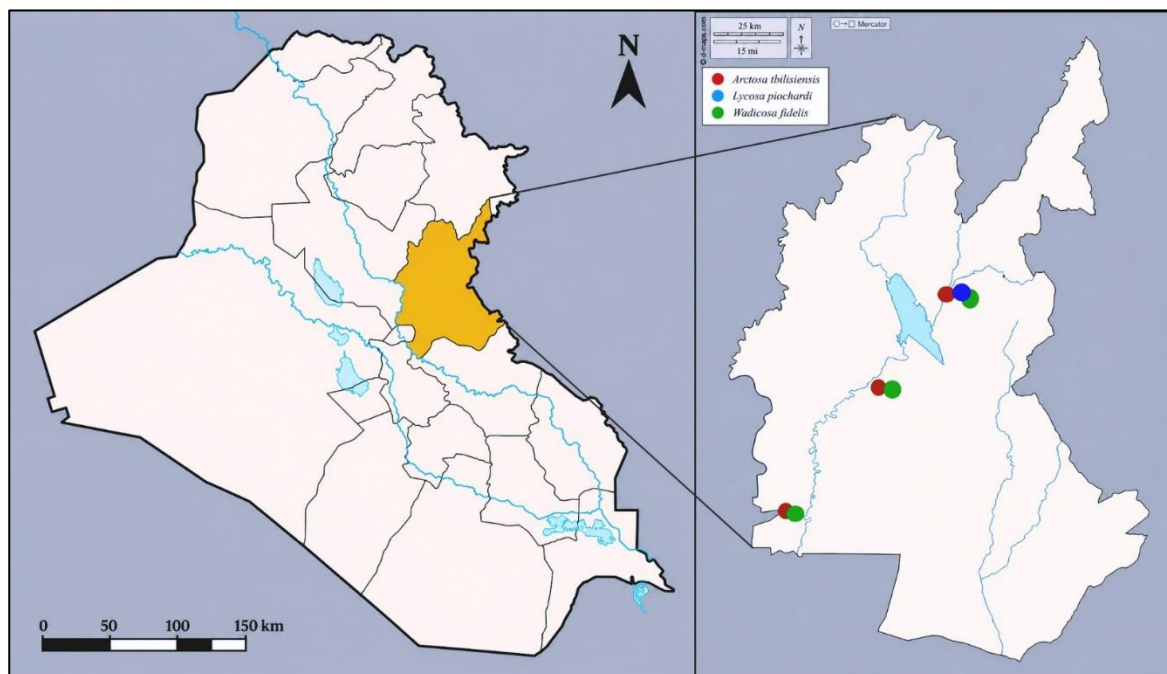
1. Materials and Methods

The research took place in Diyala Province, northeastern Iraq, neighboring Iran. This province features diverse habitats such as citrus orchards, farmland, natural vegetation, riverbanks, and foothill regions, all supporting a rich diversity of spiders. Diyala has a continental climate characterized by hot, dry summers and mild to cold winters [13].

Adult spider specimens were manually collected from various locations in Diyala Province, northeastern Iraq, between July 2025 and June 2026. They were preserved in 75% ethanol and stored in the Zoology Laboratory, Department of Science, College of Basic Education, University of Sumer, Iraq (CBEUS). Female genitalia (epigynes) were dissected and cleared using 10% potassium hydroxide (KOH) for detailed examination. Morphological features and measurements were analyzed under a stereomicroscope, with all measurements expressed in millimeters (mm). Map of Diyala Province, Iraq. Base map obtained from D-maps.com and modified by the authors to show the collection

localities and species records. The preservation, genital dissection, stereomicroscopic examination, and mapping procedures follow standard arachnological practice [14]; [15].

Figure 1. Map of Iraq showing Diyala Province (highlighted), and the distribution of *A.*



tbilisiensis (red circles), *L. piochardi* (blue circles), and *W. fidelis* (green circles) within Diyala Province, Iraq.

3. Results

3.1 Family Lycosidae Sundevall, 1833

Genus *Arctosa* C. L. Koch, 1847

Arctosa tbilisiensis Mcheidze, 1946

3.1.1 Material examined

IRAQ: Diyala Province: Baquba District, 33.7540°N, 44.6052°E, 12. 9. 2025, 4 ♀♀; Al-Muqdadiya District, Al-Abara Region, 33.966523°N, 44.997665°E, 17.8. 2025, 8 ♀♀; Baladruz District, Baladruz, 33.6968°N, 44.8386°E, 2025, 2 ♀♀. All specimens deposited in CBEUS; leg. M.A. Al-Khailani.

3.1.2 Description

The general morphology and body measurements of the female are shown in Figure 2 and Table 1. The carapace is light brown to reddish brown, broader posteriorly and gradually narrowing anteriorly, with a distinct longitudinal median fovea extending along the middle of the carapace. The ocular region is darkly pigmented. The chelicerae are dark brown to black, whereas the sternum is oval and light brown to yellowish brown.

The legs are pale yellow to yellowish brown and are covered with fine setae and scattered spines. The opisthosoma is elongate-oval and larger than the prosoma, creamy to light brown in colour, with irregular dark markings on the dorsal surface. The ventral surface is paler, with the genital opening situated on the anterior part of the abdomen. The epigyne is relatively small and located on the anterior ventral surface of the abdomen. It consists of a sclerotized epigynal plate bearing a distinct median septum separating two symmetrical copulatory openings. The copulatory openings are oval to subcircular and surrounded by well-defined sclerotized margins. The shape of the median septum and the width of the copulatory openings are the principal diagnostic characters distinguishing this species from other members of the genus *Arctosa* [16].

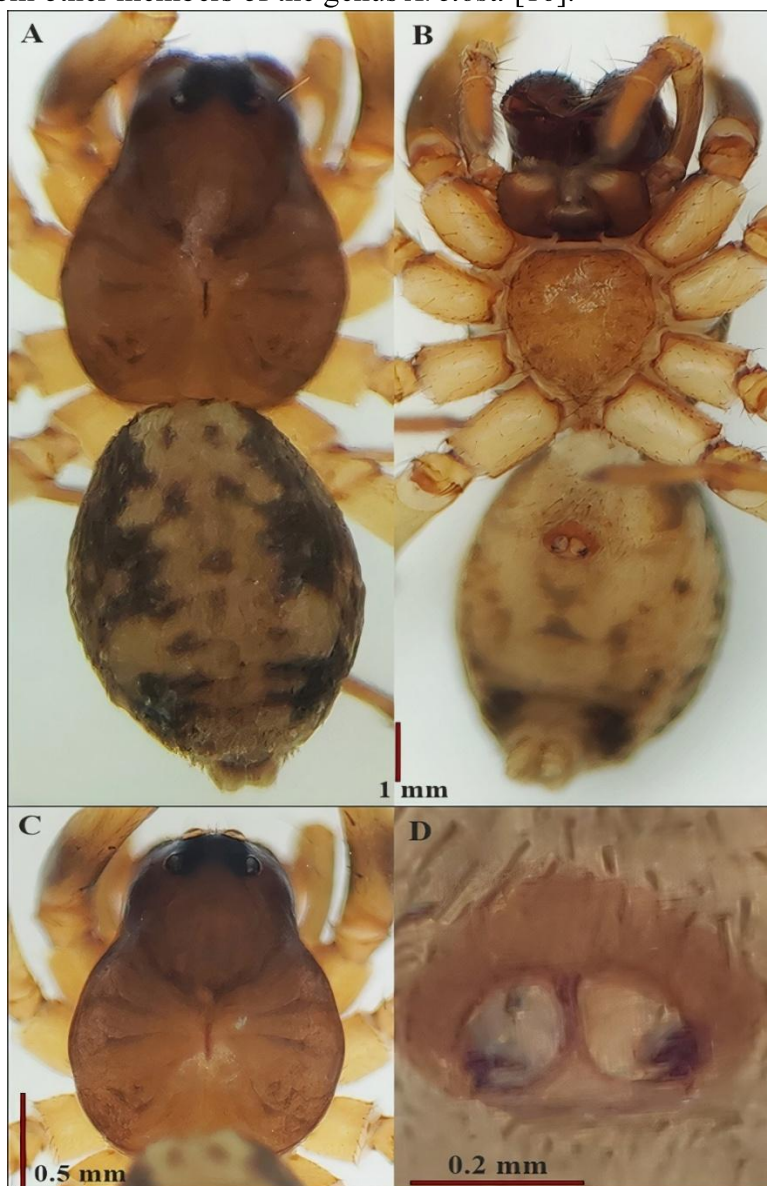


Figure -2 Female of *Arctosa tbilisiensis*. A, dorsal view; B, ventral view; C, carapace; D, epigyne

3.1.3 Measurements

The principal morphometric measurements of the examined female are shown in Table 1.

Table 1- Main measurements of *Arctosa tbilisiensis*

No.	Parameters	Measurements (mm)
1	Total body Length	7.17
2	Prosoma	L: (3.11) , W: (2,48)
3	Opisthosoma	L: (4.06) , W: (2,44)
4	Leg Total I	14.12
5	Leg Total II	13.17
6	Leg Total III	11.82
7	Leg Total IV	14.55

3.1.4 Habitat

This species inhabits sandy and gravelly areas near rivers, streams, pond edges, and semi-moist agricultural soils. They are often seen beneath stones or within shallow burrows in sandy ground [16].

3.2 Genus *Lycosa* Latreille, 1804

Lycosa piochardi Simon, 1876

3.2.1 Material examined

IRAQ: Diyala Province: Al-Muqdadiya District, Al-Abara Region, 33.966523°N, 44.997665°E, 25. 2; 14. 3. 2026, 12♂♂(CBEUS), leg. M.A. Al-Khailani.

3.2.2 Description

The general morphology and body measurements of the male are shown in Figure 3 and Table 2. The carapace is slightly longer than wide and varies from greyish brown to light brown, densely covered with setae. A distinct pale median longitudinal stripe extends from the ocular region to the posterior margin of the carapace. The ocular region is slightly elevated. The chelicerae are robust and dark brown to black in colour. The sternum and maxillae are also dark, ranging from dark brown to black. The pedipalps are well developed and terminate in a heavily sclerotized male copulatory organ bearing the diagnostic structures of the species. The legs are long and robust, yellowish to light brown, with distinct dark annulations at the joints and on several segments. They are densely covered with spines and sensory setae, particularly on the anterior legs. The opisthosoma is elongate-oval, yellowish sandy to light brown, and covered with short, fine setae. The dorsal surface bears an indistinct pattern of irregular markings, whereas the ventral surface is darker, especially in the anterior and median regions. The male palp is elongate and densely setose, with a well-developed bulb and distinct sclerotized

structures. The embolus is short and hook-shaped, representing one of the principal diagnostic characters distinguishing this species from closely related taxa [12]; [13].



Figure -3 Male of *Lycosa piochardi*. A, dorsal habitus; B, ventral view; C, palp in ventral view; D, palp in lateral view

3.2.3 Measurements

The principal morphometric measurements of the examined male are presented in Table 2.

Table 2- Main measurements of *Lycosa piochardi*

No.	Parameters	Measurements (mm)
1	Total body Length	26.84
2	Prosoma	L: 12.19 , W: 8.74
3	Opisthosoma	L:14.65, W: 9.42
4	Leg Total I	34.72
5	Leg Total II	31.46
6	Leg Total III	28.35
7	Leg Total IV	38.24

3.2.4 Habitat

This species was found in semi-dry agricultural areas with exposed soil near irrigation canals and sparse vegetation. During field surveys, specimens were located beneath stones, amidst plant debris, and along orchard margins [12].

3.3 Genus *Wadicosa* Zyuzin, 1985

***Wadicosa fidelis* (O. Pickard-Cambridge, 1872)**

3.3.1 Material examined

IRAQ: Diyala Province: Baquba District, Baquba, 33.7540°N, 44.6052°E, 22.3. 2026, 9♀♀, (CBEUS), leg. M.A. Al-Khailani; Al-Muqdadiya District, Al-Abara Region, 33.966523°N, 44.997665°E, 25.10. 2025, 3♀♀, 3 juveniles (CBEUS), leg. M.A. Al-Khailani; Baladruz District, Baladruz, 33.6968°N, 44.8386°E, 8.5. 2026, 2♀♀, 6 juveniles (CBEUS), leg. M.A. Al-Khailani.

3.3.2 Description

The general morphology and body measurements of the female are shown in Figure 4 and Table 3. The carapace is oval, dark brown in colour, and densely covered with fine setae. A relatively distinct pale cardiac mark is present on the dorsal surface. The chelicerae are robust and dark coloured, whereas the sternum ranges from light brown to yellowish brown. The legs are relatively long, densely covered with conspicuous setae, and bear alternating dark and pale annulations on the femora, patellae, tibiae, and metatarsi. The opisthosoma is oval and bears a characteristic pattern of irregular pale markings on a greyish-brown to dark background. The ventral surface is lighter, with dark markings near the spinnerets. The epigyne is broad and relatively well sclerotized, consisting of a distinct epigynal plate with a median depression separating two lateral sclerotized areas. The copulatory openings are situated on both sides of the median region. The vulva possesses two large anterior spermathecae connected to relatively short copulatory ducts and fertilization ducts [11]; [17], [18].

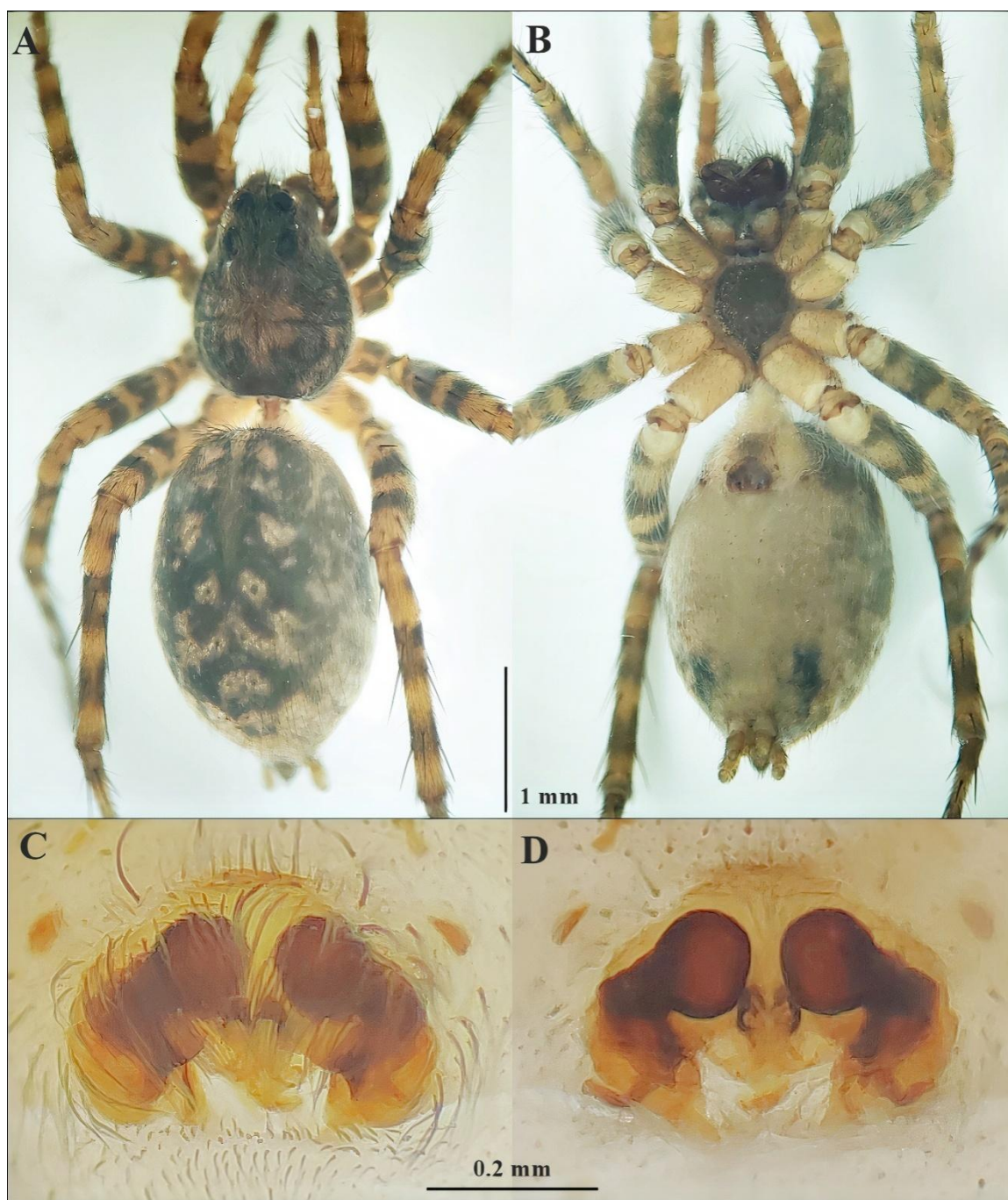


Figure -4 Adult female of *Wadicosa fidelis*. A, dorsal view; B, ventral view; C, epigyne; D, vulva

3.3.3 Measurements

The principal morphometric measurements of the examined female are shown in Table 3.

Table 3- Main measurements of the female of *Wadicosa fidelis*

No.	Parameters	Measurements (mm)
1	Total body Length	8.92
2	Prosoma	L: 3.86, W: 2.96
3	Opisthosoma	L: 5.06, W: 3.52
4	Leg Total I	11.48
5	Leg Total II	10.74
6	Leg Total III	10.22
7	Leg Total IV	13.64

3.3.4 Habitat

This species was observed at all sampling stations and was frequently found in open and semi-open terrestrial areas. It mainly inhabits the soil surface and is often seen among short grasses and plant litter in orchards, as well as at the edges of agricultural fields [11]; [17]; [18].

4. Discussion

Research on Iraqi spiders has grown significantly over the past decade, with numerous taxonomic and faunistic studies discovering new species and updating distribution data for known taxa. These efforts have greatly increased the number of identified spider species across various families [2]; [8]; [16]; [15]. However, knowledge of spider distribution throughout Iraq remains uneven, as most research has focused on a few provinces, leaving others, such as Diyala, poorly surveyed. As a result, our understanding of the spider fauna in Diyala is still incomplete. Recent phylogenetic work also cautions that morphology-based generic assignments should be interpreted within an evolving systematic framework [9]; [10].

Existing literature indicates that *A. tbilisiensis* was previously recorded in Basra, Dhi Qar, and Dohuk governorates [2]; [3]; [8]. *W. fidelis* was known from Baghdad, Basra, Karbala, and Salah ad-Din [5]; [6], [7]; [3]; [8]. Similarly, *L. piochardi* had been reported only from Basra, Baghdad, Dhi Qar, and Dohuk since its initial identification in Iraq [4]. This study broadens the known range of these three species within Iraq by documenting their first occurrence in Diyala Province, thus increasing the number of lycosid species recorded in that area and enhancing understanding of their distribution across provinces [16]; [11]; [12]; [19].

The current results suggest that the scarcity of lycosid records from Diyala in the past likely reflects limited collecting efforts rather than truly low species diversity. Similar trends have been seen in recent research on other spider groups, where ongoing faunistic surveys have uncovered many new provincial, national, and regional records [4]; [15]. These results emphasize the need for more taxonomic and faunistic surveys in underexplored areas of Iraq, especially in governorates with minimal arachnological study. Therefore, the three new provincial records reported here significantly enhance our understanding of Lycosidae distribution in Iraq and establish a valuable baseline for [19]

future taxonomic, ecological, and biogeographical research.

5. Conclusion

This study provides the first provincial records of *Arctosa tbilisiensis* Mcheidze, 1946, *Lycosa piochari* Simon, 1876, and *Wadicosa fidelis* (O. Pickard-Cambridge, 1872) from Diyala Province, thereby expanding the known distribution of these lycosid spiders within Iraq. The findings demonstrate that the spider fauna of Diyala remains insufficiently explored despite the province's wide range of natural and agricultural habitats. The examined specimens were identified using diagnostic morphological characters, and detailed information on their distribution, habitat, and morphometric features is provided. These new records contribute to improving the current knowledge of Iraqi Lycosidae and emphasize the importance of continued faunistic surveys in poorly investigated regions. Additional taxonomic and ecological studies, supported by broader geographic sampling and molecular approaches, are recommended to achieve a more comprehensive understanding of the diversity and distribution of spiders in Iraq. The recommendation for molecular corroboration is consistent with current phylogenetic practice in Lycosidae [13]; [9]; [10].

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