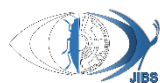


Original Article 

# Addition to the solifuge fauna (Arachnida) of Iraq: first record of *Galeodes turcmenicus* Birula, 1937 and an annotated checklist and identification key to the species of the genus *Galeodes* Olivier, 1791

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**ABSTRACT.** *Galeodes turcmenicus* Birula, 1937 is recorded from Iraq for the first time, based on seven male specimens collected from four districts in the eastern part of Thi Qar Province, southern Iraq. This represents the twelfth species of Galeodidae recorded from the country. The diagnostic morphological characters of the species are described and illustrated, and phenotypic and morphometric variation among the examined specimens is documented. A map showing the known distribution of *G. turcmenicus* across its range is also provided. We also provide an annotated checklist and an identification key to the species of the genus *Galeodes* Olivier, 1791 recorded from Iraq.

**KEYWORDS:** Distributional data, Galeodidae, New record, Sun spiders, Western Asia

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## INTRODUCTION

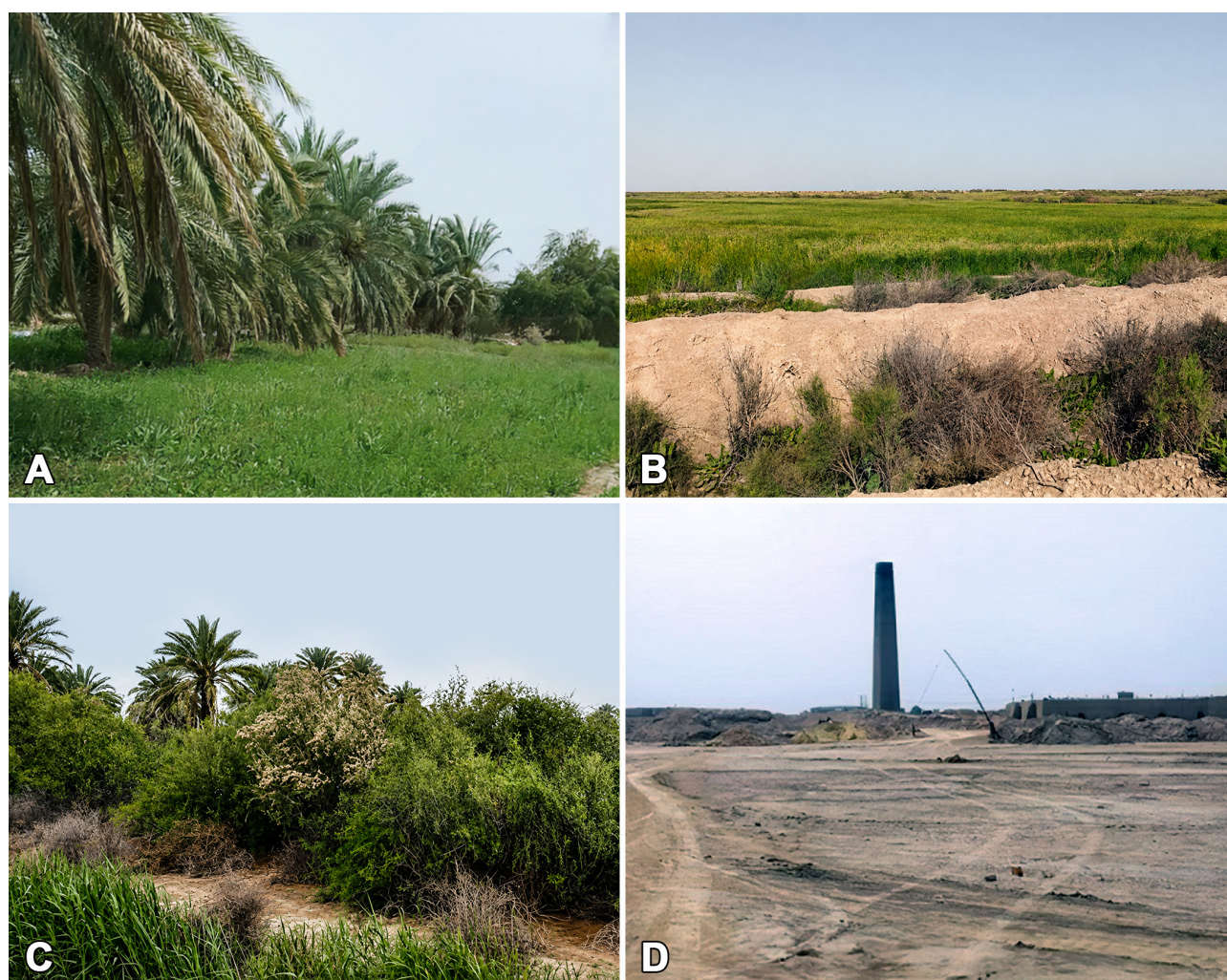
Solifugae Sundevall, 1833 is a small order of arachnids that remains relatively understudied in Iraq. According to the most recent annotated checklist, the Iraqi solifuge fauna comprised 21 species and three subspecies in 11 genera and four families (Koç 2023). This number subsequently increased to 22 species and three subspecies following the first Iraqi record of the genus *Rhagodes* Pocock, 1897 (Rhagodidae), represented by *R. caucasicus* from Thi Qar Province (Al-Taher et al. 2025). Knowledge of Iraqi Solifugae remains limited, with most records historically provided by foreign researchers and only a few local studies contributing to our understanding of the group (Hussen & Ahmed 2017; Al-Khazali 2021; Al-Taher et al. 2025).

Galeodidae is one of the most species-rich families of Solifugae, with 209 described species, ranking third after Solpugidae (218 species) and Daesiidae (215 species). The family is distributed throughout the Old World, with its members occurring mainly in dry environments (WSC 2022). *Galeodes* Olivier, 1791 is the most diverse genus in Galeodidae, comprising approximately 182 species, whereas the other genera contain considerably fewer species (WSC 2022). The family is particularly diverse in several countries neighbouring Iraq. In Iran, 35 species have been documented, 29 of which belong to *Galeodes* (Zamani 2025). Turkey has 18 species, all belonging to *Galeodes*, whereas Syria has six species, five of which belong to *Galeodes*. Saudi Arabia has six species and one subspecies, including three species of *Galeodes*, while Jordan is represented by a single species of *Galeodes* (WSC 2022). In Iraq, Galeodidae currently comprises 15 species belonging to three genera, with *Galeodes* including 12 species. The limited number of records, particularly from southern Iraq, indicates that the diversity and distribution of Iraqi Solifugae remain insufficiently explored.

During the examination of specimens recently collected by the first author from eastern Thi Qar Province, several specimens were found to belong to *Galeodes*. Comparison with the original descriptions of morphologically similar species led to their identification as *G. turcomenicus* Birula, 1937, which is herein recorded from Iraq for the first time.

## MATERIALS AND METHODS

Specimens were collected in four districts in Thi Qar Province (Fig. 1), located in southern Iraq: Karma Bani Saeed, Al-Tar sub-district, Al-Islah, and Al-Fahoud. Climatically, the region is characterized by an arid to semi-arid climate, flat to gently rolling terrain, and predominantly alluvial soils. Annual precipitation is generally below 200 mm, while summer temperatures often exceed 45°C. Vegetation is somewhat limited, consisting mainly of scattered drought- and salinity-tolerant plants. Specimens were identified using available taxonomic keys and compared with original descriptions of morphologically related species (Birula 1937, 1938; Roewer 1941). The specimens were photographed fully immersed in alcohol. Their identification was then confirmed by Dr. Hassan Maddahi (Department of Biology, Faculty of Science, Arak University, Iran). Seven adult male specimens were hand-collected at night using a flashlight and the headlights of the vehicle. Specimens were preserved in 75% ethanol.



**Figure 1.** Collection localities of *Galeodes turcomenicus* in Thi Qar Province, southern Iraq. A. Karma Bani Saeed. B. Al-Tar subdistrict. C. Al-Fuhud; D. Al-Islah District.

Morphological examination was conducted with a stereo microscope (ED4) equipped with a Nikon digital camera. Measurements were recorded in millimeters; leg segment lengths are presented as follows: total length (femur, tibia, metatarsus, tarsus, claw). The arrangement of spines on the right side of the body was recorded. The map was created using SimpleMappr 0.8 (Shorthouse 2010). Ratios were calculated following Muma (1951) and Brookhart & Muma (1981), and Bird et al. (2015) was used for the terminology of cheliceral morphology. Leg spinulation was described following the terminology and notation of Roewer (1934). Specimens are deposited at the Arachnid Collection of Dr. Azhar Mohammed Al-Khazali (AMAC), Department of Science, College of Basic Education, University of Sumer, Iraq.

**Abbreviations.** FD = distal teeth of fixed finger; FM = medial teeth of fixed finger; FPM = postmedial teeth of fixed finger; FP = proximal teeth of fixed finger; FMA = mesal accessory teeth; MM = medial tooth of movable finger; MSM = submedial teeth of movable finger; MP = proximal tooth of movable finger; CL = chelicera length; CW = chelicera width; PL = propeltidium length; PW = propeltidium width; A/CP = the sum of the lengths of the pedipalp, leg I, and leg IV (A) divided by the sum of the lengths of the propeltidium and chelicera (CP).

## RESULTS

### Class Arachnida Lamarck, 1801

### Order Solifugae Sundevall, 1833

### Family Galeodidae Sundevall, 1833

### Genus *Galeodes* Olivier, 1791

**Type species:** *Phalangium araneoides* Pallas, 1772.

#### *Galeodes adamsi* (Turk, 1947)

*Galeodora adamsi* Turk, 1947:77–80. – Type locality: Habbāniya, Al-Anbar, Iraq.

**Distribution in Iraq.** Al-Anbar Province (Turk 1947).

**Distribution.** Iraq (WSC 2022).

#### *Galeodes arabs arabs* C.L. Koch, 1842

*Galeodes arabs* C.L. Koch, 1842:353. – Type locality: “Arabia.”

**Distribution in Iraq.** Baghdad, Nineveh, and Maysan provinces (Pocock 1895; Roewer 1934; Koç 2023).

**Global distribution.** North and East Africa, the Arabian Peninsula, and southwestern Asia (WSC 2022).

#### *Galeodes araneoides* (Pallas, 1772)

*Phalangium araneoides* Pallas, 1772:37. – Type locality: unknown.

**Distribution in Iraq.** Baghdad and Nineveh provinces (Butler 1873; Harvey 2003).

**Global distribution.** Ukraine and Türkiye to Kazakhstan and Afghanistan, Russia to Egypt (WSC 2022).

#### *Galeodes babylonicus* Roewer, 1934

*Galeodes babylonicus* Roewer, 1934:532. – Type locality: Babylon [ancient site], Babil Province, Iraq.

**Distribution in Iraq.** Babil Province (Roewer 1934; Zilch 1946).

**Global distribution.** Iraq and [historical] Palestine (Levy & Shulov 1964).

#### *Galeodes bacillifer* Pocock, 1900

*Galeodes bacillifer* Pocock, 1900:144. – Type locality: northern Balochistan, Pakistan.

**Distribution in Iraq.** Baghdad Province (Lawrence 1953).

**Global distribution.** Afghanistan, Iran, Pakistan and Iraq (Lawrence 1953; WSC 2022).

***Galeodes bogojavlenskii* Birula, 1906**

*Galeodes bogojavlenskii* Birula, 1906:25. Type locality: Kabadian and Kuljab [= Kulob], Tajikistan.

**Distribution in Iraq.** Al-Najaf Province (Lawrence 1953).

**Global distribution.** Iraq and Tajikistan (WSC 2022).

***Galeodes caspius subfuscus* Birula, 1937**

*Galeodes (Galeodellus) fuscus subfuscus* Birula, 1937:574. – Type locality: Kirghiz Range (Kazakhstan/Kyrgyzstan).

**Distribution in Iraq.** Erbil Province (Hussen & Ahmed 2017).

**Global distribution.** Kazakhstan, Kyrgyzstan, and Iraq (Hussen & Ahmed 2017; WSC 2022).

***Galeodes darius* Pocock, 1895**

*Galeodes darius* Pocock, 1895:81. – Type locality: Al-Faw, Basra Province, Iraq.

**Distribution in Iraq.** Basra Province (Pocock 1895).

**Global distribution.** Iraq and [historical] Palestine (WSC 2022).

***Galeodes gromovi* Harvey, 2002**

*Galeodes birulai* Roewer, 1941:162–163. – Type locality: Mesopotamia (Wilajet Baghdad and Mosul), Iraq.

*Galeodes gromovi* Harvey, 2002:452 [replacement name for *Galeodes birulae* Roewer, 1941]

**Distribution in Iraq.** Baghdad and Nineveh provinces (Roewer 1941; Harvey 2002).

**Global distribution.** Azerbaijan, Iraq, and Türkiye (WSC 2022).

***Galeodes lacertosus* Roewer, 1934**

*Galeodes lacertosus* Roewer, 1934:532. – Type locality: Wadi al Masilah, Hadramawt, Yemen.

**Distribution in Iraq.** Al-Najaf Province (Lawrence 1953).

**Global distribution.** Iraq, Saudi Arabia, and Yemen (WSC 2022).

***Galeodes laniator* Roewer, 1934**

*Galeodes laniator* Roewer, 1934:532. – Type locality: Karbala Province, Iraq.

**Distribution in Iraq.** Karbala Province (Roewer 1934; Zilch 1946).

**Global distribution.** Iraq and [historical] Palestine (WSC 2022).

***Galeodes lawrencei* Harvey, 2002**

*Galeodellus bicolor* Lawrence, 1954:120. – Type locality: Al-Basrah Province, Iraq.

*Galeodes lawrencei* Harvey, 2002:452 [replacement name for *Galeodellus bicolor* Lawrence, 1954]

**Distribution in Iraq.** Basra Province (Harvey 2002, 2003).

**Global distribution.** Iraq (WSC 2022).

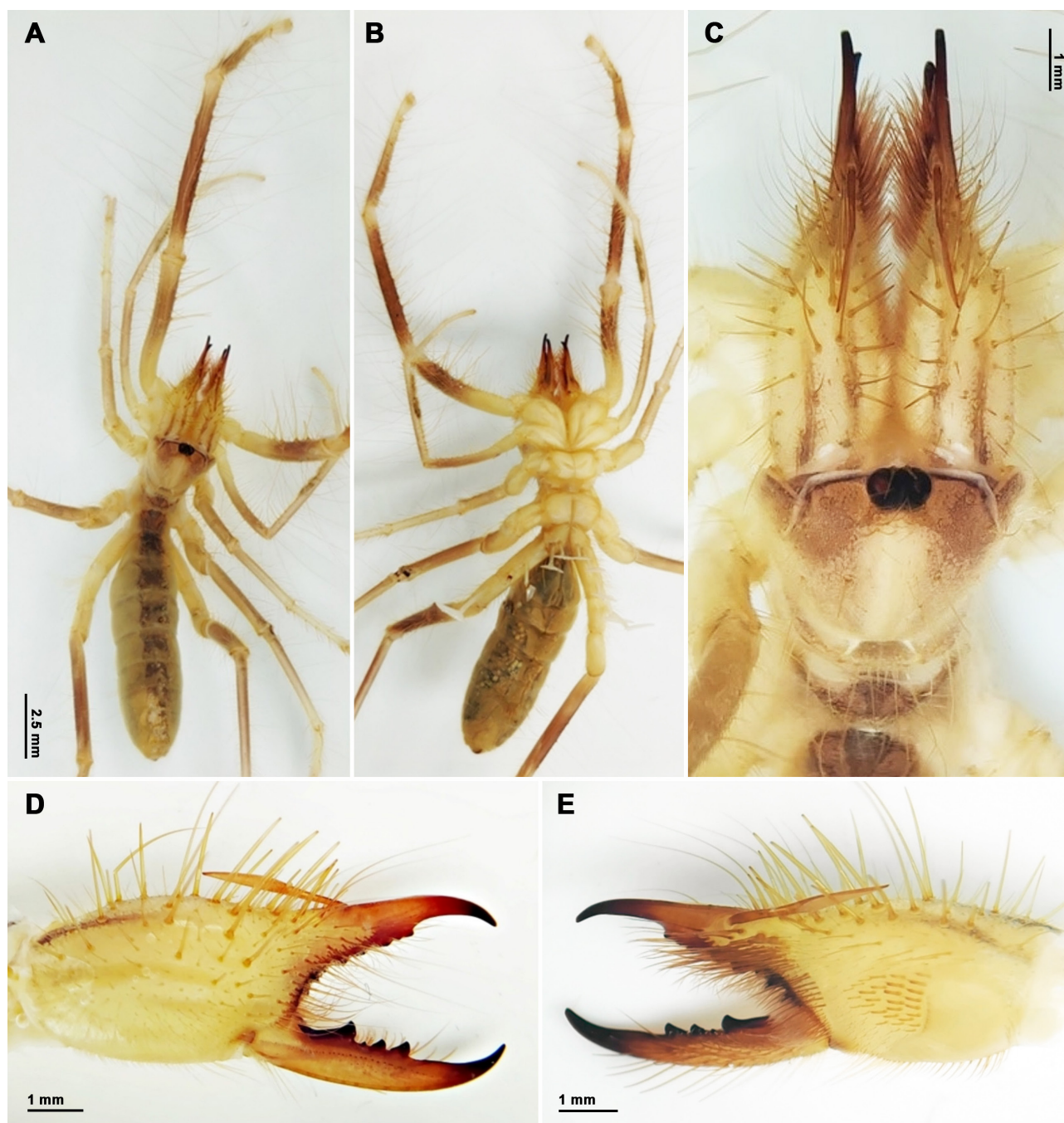
***Galeodes turcmenicus* Birula, 1937**

*Galeodes (Galeodes) turcmenicus* Birula, 1937:585. – Type locality: Turkmenistan (Aj-Dere).

*Galeodes turcmenicus*: Roewer, 1941:192.

**Figs 2–5**

**Material examined.** IRAQ: Thi Qar Province: 3 ♂♂ (AMAC-KBS-1), Karma Bani Saeed, 30°58'48"N, 46°39'00"E, elev. 35 m, 12.viii.2025, agricultural land, leg. A. K. Jaber; 1 ♂ (AMAC-ATS-1), Al-Tar sub-district, 30°54'36"N, 46°38'24"E, elev. 26 m, 16.viii.2025, grassland, leg. A. K. Jaber; 2 ♂♂ (1 juvenil) (AMAC-AF-1), Al-Fuhud, 31°00'00"N, 46°31'12"E, elev. 19 m, 20.viii.2025, grasslands outside the city center, A. K. Jaber; 2 ♂♂ (AMAC-AI-1), Al-Islah District, 31°10'12"N, 46°36'00"E, elev. 20 m, 29.viii.2025, semi-desert environment, leg. A. K. Jaber.



**Figure 2.** *Galeodes turcmenicus* from Iraq, male. **A.** Habitus, dorsal view; **B.** Habitus, ventral view; **C.** Propeltidium, dorsal view; **D.** Dextral chelicera, retrolateral view; **E.** Same, prolateral view.

**Diagnosis.** The specimens were identified as *G. turcmenicus* Birula, 1937 based on well-developed ctenidia on the posterior margin of sternite V, arranged in a simple transverse row of 13 filamentous elements (type I sensu Roewer 1934), with additional solitary ctenidia scattered on sternites VI–VII. A similar species, *G. araneoides* (Pallas, 1772), lacks ctenidia entirely (Birula 1929). Compared to *G. krausi* Harvey, 2002, another similar species, *G. turcmenicus*, differs in the pedipalpal metatarsus, which has six pairs of ventral spines separated by long setae arranged lengthwise (Birula 1937). Other diagnostic characters, namely the dense scaly setae on the ventral side of the tarsi of the posterior legs and the leg spination pattern (i.e., 1+2 and 2+2+2/2), match the original description.

**Description.** Male. General appearance as shown in [Figure 2A–B](#).

**Coloration.** Propeltidium pale straw-yellow; central area around ocular tubercle and external lobe rounded, slightly rust-brown; ocular tubercle darkened, eyes brown; chelicerae with 2 dorsal rust-brown stripes; anterior margin of propeltidium black, posterodorsal surface of each chelicera with small transverse whitish spot ([Fig. 2C](#)). Propeltidium and chelicerae clothed with yellow setae; cheliceral setae dark yellow. Mesopeltidium and metapeltidium creamy-yellow; median stripe darker; posterior margin of propeltidium with small oblique whitish transverse spot extending onto mesopeltidium. Flagellar complex spiniform setae yellowish-red. Cheliceral fingers reddish-brown, darker apically; teeth dark brown. Anterolateral surfaces bear scattered pale reddish-brown spiniform setae. Flagellum pale reddish-brown. Stridulatory area (including setal field and plate) pale yellow ([Fig. 2D, E](#)). Pedipalpal tarsus and femur pale yellow; tibia and metatarsus rust-brown ([Fig. 3A–C](#)). Legs pale yellow, with tibiae and femora rust-brown ([Fig. 3D–F](#)). Opisthosoma dorsally yellow, with dark median stripe of irregular subrectangular (rhomboid) blotches. Pleurites and dorsolateral tergites yellow ([Fig. 2A](#)); opisthosomal sternites yellowish. Entire opisthosoma with numerous thin yellow setae. Malleoli pale white ([Fig. 2B](#)).

**Ctenidia.** Present on the posterior margin of sternite V, arranged in a simple transverse row, 13 in number, filiform and slender (type I). Additional solitary ctenidia are irregularly scattered on sternites VI and VII.

**Cheliceral dentition.** Fixed finger with primary teeth FD, FM, and FP, along with one subdistal tooth (FSD) and submedial teeth (FSM). These teeth are diminished and partly merged into a low crenulate dental margin, creating a clear longitudinal crest, which makes some individual teeth hard to distinguish. The movable finger features one medial tooth (MM), two submedial teeth (MSM), and one proximal tooth (MP) ([Fig. 2D, E](#)).

**Leg spination and measurements.** Legs: I: without claws and spines; armed only with scattered, elongate setae. II: tibia with one dorsal apical spine and two ventral spines; metatarsus dorsally with 1.1.1.1.1 spines, ventrally 1.2; tarsus ventrally with 1.2.2.2 spines ([Fig. 3D](#)). III: tibia with one dorsal apical spine and two ventral spines; metatarsus dorsally with 1.1.1 spines, ventrally 1.2.2; tarsus ventrally with 1.2.2.2 spines ([Fig. 3E](#)). IV: tibia with one dorsal apical spine and two ventral spines; metatarsus ventrally with 1.2.2 spines; arsus ventrally with 2.2.2.2 spines ([Fig. 3F](#)). Measurements and morphometric ratios of the examined male, including those of its appendages, are presented in [Table 1](#) and [Table 2](#).

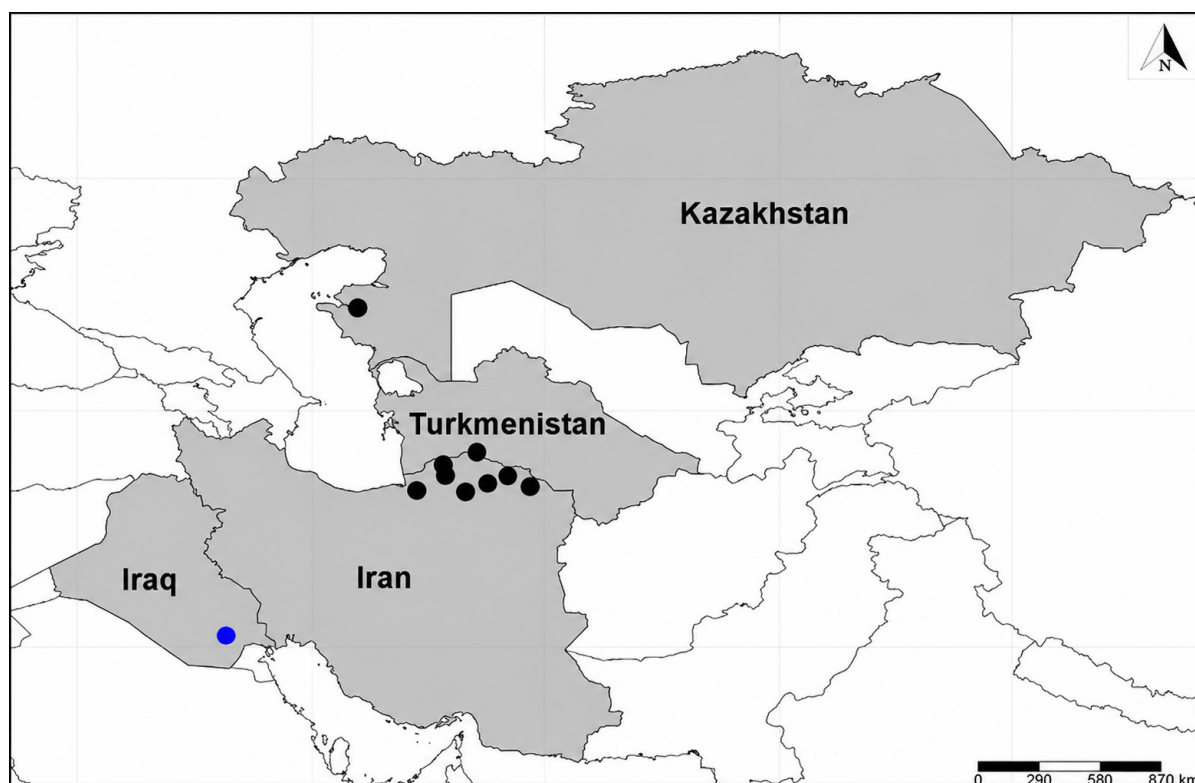
**Variation.** The male specimens exhibit intraspecific variation in several morphometric and qualitative traits (see [Table 3](#)). This variation included differences in overall body length, propeltidium dimensions, opisthosoma size, cheliceral length and width, and the lengths of the pedipalps and legs, particularly legs I and IV. Additionally, variation in the number of ctenidia was observed among the specimens. Small differences in overall body color, ranging from light to dark brown, were also noted, along with variations in the color of the propeltidium and abdomen. Furthermore, variation in the number and arrangement of spines on the tibiae, metatarsi, and tarsi of pedipalps and legs I and IV was observed. Despite these variations, the overall spinulation pattern remained largely consistent among all males, with the key diagnostic characteristics of the species, particularly those related to cheliceral morphology, ctenidial structures, and the overall spination, being invariant.

**Distribution in Iraq.** Thi Qar Province.

**Global distribution.** The species was previously known from Kazakhstan, Turkmenistan, and Iran (Birula 1937, 1938; Roewer 1941; Gromov 1999; Harvey 2003; Maddahi et al. 2017), with the Iranian record representing its southernmost known distribution. The record from Azerbaijan reported by Aliev and Gadzhiev (1983) was considered questionable, and Maddahi et al. (2022) suggested that it may have been based on a misidentification. The new record from Iraq represents a southwestern extension of the known distribution range of the species ([Fig. 4](#)).



**Figure 3.** Pedipalp (A–C) and legs IIIV (D–F) of male *Galeodes turcmenicus*. A. Tibia, metatarsus, and tarsus, ventral view; B. Metatarsus and tarsus, ventral view, showing spiniform setae and sensory structures; C. Metatarsus and tarsus, lateral view, showing terminal setation; D. Leg II; E. Leg III; F. Leg IV.



**Figure 4.** Known distribution of *Galeodes turcmenicus*. Black circles indicate previous records; blue circle indicates the present record from Iraq.

**Table 1.** Measurements and morphometric ratios (mm) of a single male of *Galeodes turcmenicus* from Iraq.

| Measurements |            |       |              |       | Ratios |       |      |
|--------------|------------|-------|--------------|-------|--------|-------|------|
| Body length  | Chelicerae |       | Propeltidium |       | CL/CW  | PL/PW | A/CP |
| 41.61        | Length     | Width | Length       | Width | 1.67   | 1.64  | 1.64 |
|              | 7.83       | 12.86 | 7.14         | 11.91 |        |       |      |

**Table 2.** Measurements (mm) of the appendages of a single male of *Galeodes turcmenicus* from Iraq.

| Appendages | Total<br>(without coxa) | Femur | Tibia | Metatarsus | Tarsus | Claw |
|------------|-------------------------|-------|-------|------------|--------|------|
| Palp       | 52.70                   | 18.92 | 18.05 | 9.22       | 6.51   | -    |
| Leg I      | 42.12                   | 15.79 | 12.33 | 9.25       | 4.53   | 0.22 |
| Leg II     | 32.27                   | 9.98  | 9.53  | 8.24       | 3.79   | 0.73 |
| Leg III    | 37.47                   | 12.67 | 11.59 | 6.69       | 2.50   | 4.02 |
| Leg IV     | 51.67                   | 16.99 | 13.41 | 15.14      | 4.41   | 1.72 |

**Table 3.** Intraspecific variation among male specimens of *Galeodes turcmenicus* from Iraq. Measurements in mm.

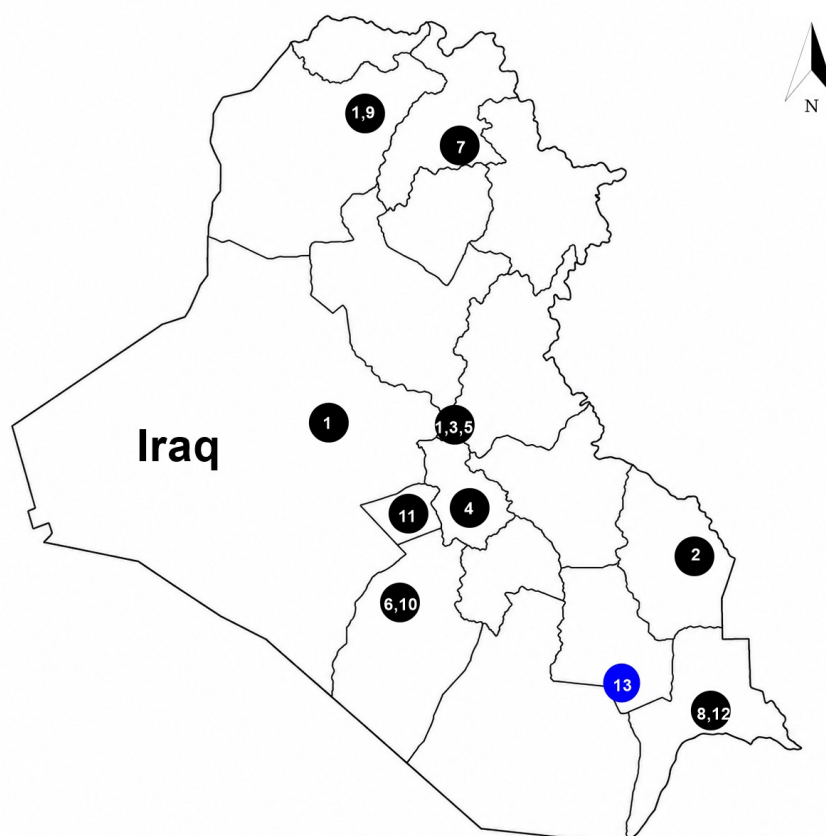
| Specimens               |               |             |                 |               |               |                 |                 |
|-------------------------|---------------|-------------|-----------------|---------------|---------------|-----------------|-----------------|
| Characters              | 1             | 2           | 3               | 4             | 5             | 6               | 7               |
| Body length             | 25.50         | 6.33        | 47              | 5.43          | 2.41          | 5.39            | 3.36            |
| Cheliceral length       | 13.9          | 9.5         | 13.4            | 12            | 12.8          | 11.6            | 10.6            |
| Pedipalp length         | 61.2          | 43          | 60.8            | 56.1          | 56.4          | 52              | 44.3            |
| Length of leg IV        | 74            | 57.3        | 75.7            | 69.5          | 66.6          | 57              | 55.5            |
| Number of Ctenidia      | 14            | 14          | 15              | 18            | 8             | 14              | 7               |
| Propeltidium coloration | Pale brown    | Light brown | Yellowish brown | Light brown   | Light brown   | Yellowish brown | Pale yellow     |
| Opisthosoma coloration  | Light brown   | Brown       | Yellowish brown | Pale brown    | Brown         | Light brown     | Yellowish brown |
| SPINATION               |               |             |                 |               |               |                 |                 |
| Pedipalp metatarsus     | 1.2.2.2.2.2.2 | 1.2.2.2.2.2 | 1.2.2.2.2.2     | 2.1.2.2.2.2.1 | 2.2.2.2.2.2.2 | 1.2.2.2.2.2.2   | 1.2.2.2.2.2.2   |
| Pedipalp tibia          | 3.3.3.3.3     | 3.2.2.1.1.1 | 3.3.2.3.2.1.2.3 | 3.3.3.2.1.2.1 | 3.2.2.1.2.2.3 | 3.3.3.2.2.2     | 3.3.3.3.3       |
| Leg IV metatarsus       | 2.2.2.2       | 1.2.2.2     | 2.2.2.2         | 2.2.2.2       | 2.2.2.2       | 2.2.2.2         | 2.2.2.2         |
| Leg IV tibia            | 2.2.1         | 1.2.2       | 1.2.2           | 1.2.2         | 2.2           | 1.2.2           | 1.2.2           |

### Key to the Iraqi species and subspecies of *Galeodes* (Males)

[Diagnostic features sourced from original descriptions, redescrptions, and related taxonomic studies]

- 1 Pedipalpal metatarsus with cylindrical bristles; ventral setae of tarsus IV spindle-shaped (type II); ctenidia spindle-shaped (type II), forming a conspicuous transverse row. .... *G. laniator*
- Combination of pedipalpal, tarsal, and ctenidial characters different. ....2
- 2 Abdominal ctenidia absent. .... 3
- Abdominal ctenidia present. ....6
- 3 Ventral setae of tarsus IV obtusely clavate (type IV); cylindrical bristles present on pedipalpal metatarsus. .... *G. bogojavlenskii*
- Ventral setae of tarsus IV not obtusely clavate. ....4
- 4 Ventral setae of tarsus IV spindle-shaped (type II); cylindrical bristles present on pedipalpal metatarsus. .... *G. araneoides*
- Ventral setae of tarsus IV narrow lanceolate. ....5
- 5 Male fixed cheliceral finger dorsally bearing numerous bifurcated spines; pedipalpal and leg characters as in the original description. .... *G. caspius subfuscus*
- Pedipalpal metatarsus densely furnished with cylindrical bristles and bearing six pairs of ventral spines, with a long seta inserted between successive spine pairs. .... *G. turcmenicus*

- 6    entral setae of tarsus IV needle-shaped (type I); cylindrical bristles present on pedipalpal metatarsus; ctenidia needle-shaped (Type I). ..... *G. arabs arabs*  
 —    Ventral setae of tarsus IV not needle-shaped. ....7  
 7    Ventral setae of tarsus IV spindle-shaped (type II); ctenidia needle-shaped (type I). ..... *G. lacertosus*  
 —    Combination of characters different. ....8  
 8    Cylindrical bristles absent from pedipalpal metatarsus. .... 9  
 —    Cylindrical bristles present on pedipalpal metatarsus. ....11  
 9    Pedipalpal metatarsus bearing five pairs of robust ventral spines; ventral setae of tarsus IV Type I. ....  
       ..... *G. lawrencei*  
 —    Pedipalpal armature different. ....10  
 10    Pedipalpal metatarsus bearing seven pairs of short ventral spines; ventral setae of tarsus IV Type I. ....  
       ..... *G. adamsi*  
 —    Tarsi II and III with 2+2+2+2 ventral spines; tarsus IV with 2+2+2 ventral spines. ....*G. darius*  
 11    Ventral setae of tarsus IV acutely clavate (Type III); ctenidia type III. .... *G. gromovi*  
 —    Ventral setae of tarsus IV not acutely clavate. ....12  
 12    Metatarsi II–III ventrally armed with 1.2.2 spines and metatarsus IV with 1.1.2.2 spines. ..*G. babylonicus*  
 —    Metatarsal spination different; ventral setae of tarsus IV spindle-shaped (type II); ctenidia needle-shaped (Type I). ....*G. bacillifer*



**Figure 5.** Distribution of the Iraqi species of *Galeodes* based on published records and the present study. Numbers correspond to the following taxa: (1) *G. adamsi* [Al-Anbar; Baghdad; Nineveh], (2) *G. arabs* [Misan], (3) *G. araneoides* [Baghdad], (4) *G. babylonicus* [Babil], (5) *G. bacillifer* [Baghdad], (6) *G. bogojavlenskii* [Najaf], (7) *G. caspius subfuscus* [Erbil], (8) *G. darius* [Basrah], (9) *G. gromovi* [Baghdad; Nineveh], (10) *G. lacertosus* [Najaf], (11) *G. laniator* [Karbala], (12) *G. lawrencei* [Basrah], and (13) *G. turcmenicus* [Thi Qar].

## DISCUSSION

This study is the first to document *G. turcmenicus* in Iraq, expanding its known range southwestward from earlier records. Specimens were found in various habitats within a semi-desert environment, such as agricultural areas, open grasslands, and sparsely vegetated zones outside urban centers. Gromov (1999) suggested that *G. turcmenicus* can mostly be found in areas with clay desert soils. However, Maddahi et al. (2022) reported its presence in northeastern Iran from diverse terrains, including highlands and mountain slopes. The Iraqi specimens further confirm that this species occupies a variety of habitats with different environmental features.

Not all Iraqi specimens exhibited identical external features; variations were seen in certain body measurements and minor differences in the number and placement of spines on appendages, especially the chelicerae and legs. Similar intraspecific variability has been observed in other *Galeodes* species. For example, Erdek (2021) demonstrated that hair distribution on the tarsus and metatarsus can differ among individuals and even between the right and left appendages of the same specimen in *G. hakkariensis* Erdek, 2021. Likewise, Baran and Erdek (2022) reported differences in sensory hairs and surface characteristics in *G. araneoides*. Regarding *G. turcmenicus*, Maddahi et al. (2022) reported individuals from northeastern Iran inhabiting a broad range of habitats and elevations, from clay deserts to mountainous areas up to 2232 meters. Living under diverse environmental conditions might contribute to phenotypic diversity across geographic populations. Despite these recorded variations, the morphological features used to identify *G. turcmenicus* showed no significant differences among the examined specimens. The Iraqi fauna of *Galeodes* includes 13 identified species (including 2 subspecies) with varied biogeographical connections. Most species are found in the arid and semi-arid region of Western Asia and are shared with neighboring countries such as Iran, Türkiye, the Arabian Peninsula, and Central Asia. Of these, *G. arabs* has the widest distribution, spanning North Africa, the Horn of Africa, and much of the Middle East. In contrast, several species have much more limited ranges (Harvey 2003; WSC 2022).

Several taxa are currently known only from Iraq, such as *G. adamsi* and *G. lawrencei*. *Galeodes babylonicus*, *G. darius*, and *G. laniator* have only been documented from Iraq and Israel (Harvey 2003; WSC 2022). These distribution patterns could indicate wider regional connections across the Middle East. However, their apparent limited distribution could also be due to insufficient sampling efforts and the lack of recent surveys across much of their potential range. Other species, such as *G. bacillifer*, *G. gromovi*, *G. lacertosus*, and *G. turcmenicus*, display wider Western Asian distribution patterns. The geographic distribution patterns of these species reflect clear links between Iraqi populations and those in several neighboring countries (Harvey 2002, 2003; WSC 2022). A similar geographic range is also observed for *G. bogojavlenskii* and *G. caspius subfuscus*, which are distributed across Iraq and parts of Central Asia. Our understanding of the diversity and distribution of this genus in Iraq remains limited. Some species are known from only a single governorate, and many are known only from very old records. This lack of information is due to limited survey and collection efforts across large parts of the country. Comparative molecular studies of populations from different geographic areas can provide an additional basis for evaluating currently accepted taxonomic boundaries, particularly for widely distributed species. Such comparisons may reveal whether these populations truly belong to a single species or represent genetically distinct lineages that are difficult to distinguish based solely on traditional morphological characteristics. In light of this, a separate molecular study is planned to assess the boundaries and geographic variation of some Iraqi species, comparing them with representative samples from other regions.

## AUTHOR CONTRIBUTIONS

The authors confirm their contribution to the paper as follows: A.K. Jaber: fieldwork and specimen collection, visualization, and mapping. A.M. Al-Khazali: conceptualization, morphological analysis, data interpretation, supervision, review, and editing. A.M. Al-Khazali and A.K. Jaber: preparation of the original draft. Both authors read and approved the final version of the manuscript.

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## AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited at the Arachnid Collection of Dr. Azhar Mohammed Al-Khazali (AMAC), Department of Science, College of Basic Education, University of Sumer, Iraq, and are available upon request.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

## CONSENT FOR PUBLICATION

Not applicable.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

## GENERATIVE AI STATEMENT

The authors declare that ChatGPT was used to improve the English language for some parts of the manuscript. The AI tool was not used for data generation, analysis, interpretation of results, taxonomic decisions, or drawing scientific conclusions.

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## یافته جدید از فون رتیل‌ها (Arachnida) در عراق: نخستین گزارش گونه *Galeodes turcmenicus* Birula, 1937، فهرست مشروح و کلید شناسایی گونه‌های جنس *Galeodes* Olivier, 1791

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**چکیده:** بر اساس هفت نمونه نر جمع‌آوری شده از چهار منطقه در بخش شرقی استان ذی‌قار، جنوب عراق، یک گونه رتیل به نام *Galeodes turcmenicus* Birula, 1937 برای اولین بار ثبت شد. این مورد، دوازدهمین گونه از خانواده Galeodidae است که در آن کشور ثبت می‌شود. ویژگی‌های ریخت‌شناسی افتراقی این گونه توصیف و تصاویر مربوطه ارائه شد. تنوع فنوتیپی و مورفومتريک بین نمونه‌های بررسی‌شده مستندسازی شد. نقشه پراکنش شناخته‌شده *G. turcmenicus* نیز ارائه شد. علاوه بر این، یک فهرست با شرح اجمالی و کلید شناسایی گونه‌های جنس *Galeodes* Olivier, 1791 ثبت‌شده از عراق ارائه شد.

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**واژگان کلیدی:** داده‌های پراکنش، Galeodidae، گزارش جدید، شترزَنک، آسیای غربی