

Checklist of the Solifugae (Arachnida) of Iraq

Контрольный список сольпуг (Arachnida: Solifugae) Ирака

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KEY WORDS: solifuge, camel spider, checklist, literature review, fauna, Iraq.

КЛЮЧЕВЫЕ СЛОВА: сольпуга, контрольный список, обзор литературы, фауна, Ирак.

ABSTRACT. A checklist of all taxa of the order Solifugae from Iraq is presented. The checklist is based on the compilation of data gathered from published records up to now. This list comprises 21 species and 3 subspecies belonging to 11 genera distributed in 4 families, Daesiidae, Galeodidae, Karschiidae and Rhagodidae. It composes of one endemic genus; *Rhagodospus*, and four endemic species; *Galeodes adamsi* (Turk, 1947), *G. lawrencei* Harvey, 2002 (Galeodidae), *Rhagodixa kurdistanica* (Birula, 1936) and *Rhagodospus babylonicus* (Birula, 1935) (Rhagodidae). Two previously overlooked species, *Gluiopsilla discolor* (Kraepelin, 1899) (Daesiidae) and *Galeodes bacillifer* Pocock, 1900 (Galeodidae) are included in the list. Altogether, five species erroneously reported from the country are omitted from the checklist; *Galeodes bacilliferoides* Roewer, 1934, *G. starmuehlneri* Roewer, 1952, *G. sulfuripes* Roewer, 1934, *G. taurus* (Roewer, 1934) and *Gylippus* (*Gylippus*) *syriacus* (Simon, 1872). This study provides more detailed and comprehensive documentation of solifuges in Iraq.

How to cite this paper: Koç H. 2023. Checklist of the Solifugae (Arachnida) of Iraq // Arthropoda Selecta. Vol.32. No.1. P.56–64. doi: 10.15298/arthsel.32.1.04

РЕЗЮМЕ. На основе полного анализа литературных данных составлен контрольный список всех таксонов отряда Solifugae Ирака. Список включает 21 вид и 3 подвида, принадлежащие к 11 родам из 4 семейств: Daesiidae, Galeodidae, Karschiidae и Rhagodidae. Он включает один эндемичный род *Rhagodospus* и 4 эндемичных вида, *Galeodes adamsi* (Turk, 1947), *G. lawrencei* Harvey, 2002 (Galeodidae), *Rhagodixa kurdistanica* (Birula, 1936) и *Rhagodospus babylonicus* (Birula, 1935) (Rhagodidae). В список включены два ранее пропущенных вида, *Gluiopsilla discolor* (Kraepelin, 1899) (Daesiidae) и *Galeodes bacillifer* Pocock, 1900 (Galeodidae). Из списка исключены 5 видов, ранее ошибочно отмеченные в регионе: *Galeodes bacilliferoides* Roewer, 1934, *G. starmuehlneri* Roewer, 1952, *G. sulfuripes* Roewer, 1934, *G. taurus* (Roewer, 1934) и *Gylippus* (*Gylippus*) *syriacus* (Simon, 1872). В этой работе приведены

наиболее полные литературные материалы по фауне сольпуг Ирака.

Introduction

About 1,100 species of solifuges are found throughout the world [Harvey, 2003]. Studies of solifuges in Iraq date back over a century. The first solifuges specimens from Iraq were examined by Butler in 1873. Pocock [1895] described two species from Fao in Iraq. Substantial contributions were made by Kraepelin [1901], Birula [1905a, b] and Hirst [1908]. Later, the publication on Iraqi Solifugae fauna continued with the study of Penther [1913]. He described two species and recorded four species from Iraq. Three years later, one of the diurnal solifuges (*Paragaleodes nesterovi* Birula, 1916) was described from Wesne, Iraq, by Birula [1916]. The most important contribution to the fauna of Iraq was made by Roewer, who not only added 11 species to the list but also described four new species from Iraq [Roewer, 1933, 1934, 1941, 1952]. Three additional species were described by Birula [1935a, b, 1936]. Solifugae records from Iraq have been scarce after the works of Birula. In the comprehensive catalogue of the Solifugae of the Senckenberg Museum, Zilch [1946] listed four species for Iraq. Next year, Turk [1947] described a galeodid from Habbaniyah. A few years later, Lawrence [1953] recorded four species from several localities in Iraq.

Solifugae of Iraq have not been rather thoroughly collected and studied with new specimens in the last decades [El-Hennawy, 1998; Gromov, 2003]. However, checklists and catalogues help to understand the current distribution patterns of the Solifugae in Iraq. El-Hennawy [1999] provided a synopsis of Solifugae, including a key to family and genera and a checklist of species of all Arabian countries. He listed a total of 13 species of solifuges from Iraq in his checklist. Later, Harvey [2002] detected two homonyms and provided replacement names that were described from Iraq (*Galeodes gromovi* Harvey, 2002 and *G. lawrencei* Harvey, 2002). In 2003, Harvey presented a useful catalogue that has compiled all available data about Solifugae, including 20 species and two subspecies from Iraq.

In recent years, there have been no relevant papers on camel spider fauna of Iraq except the works of Hussien, Ahmed [2017] and Al-Khazali [2021]. These are the first scientific papers published on Solifugae by Iraqi researchers.

The aim of the updated checklist is to provide more information to Harvey's catalogue on Solifugae by adding all published data and bringing together all the scattered literature. Furthermore, this work summarizes the current knowledge about the diversity of Solifugae of Iraq and can serve as a database for future studies.

Methods

The annotated species checklist is based on a thorough review of the literature on the solifuges of Iraq. Families,

genera and species are listed alphabetically. Taxonomic arrangement, nomenclature and general distribution are mainly based on Harvey [2003]. The references cited for each species are ordered chronologically, and the literature records are given within brackets. The records are derived from a variety of published sources, excluding all dubious and erroneous data. The endemic species of Iraq are also mentioned in the list. Additional comments are provided for species for which annotations are necessary for the remarks section. A distributional map is given based on the reviewed and revised relevant published data sources (Fig. 1). The originally cited exact localities are shown in Table 1, while some species cited as "Iraq, Mesopotamien, Mesopotamien Iraq and südlichen Kurdistan, etc." are not listed in the table. Finally, to avoid confusion with given species in the following list, omitted species are listed under "Omissions from the list".

Table 1. Main distributional data on the species and subspecies of Solifugae present in Iraq.
Таблица 1. Данные о распространении видов и подвидов сольпуг в Ираке.

Recorded species	Locality (as indicated in literature)	Locality (in actual)	Locality (abbreviation in map, Fig. 1)
1	2	3	4
<i>Gluviopsilla discolor</i> (Kraepelin, 1899)	Assur	Ashur, Ash Sharqat, Salah al-Din Province	A
<i>Gluviopsis rufescens</i> (Pocock, 1897)	Assur	Ashur, Ash Sharqat, Salah al-Din Province	A
<i>Galeodes adamsi</i> (Turk, 1947)	Habbaniya	Al Habbaniyah, Al-Anbar Province	B
<i>Galeodes arabs</i> C.L. Koch, 1842	Baghdad	Baghdad Province	C
	Mosul	Mosul, Nineveh Province	D
	Amara	Amarah, Misan Province	E
<i>Galeodes araneoides</i> (Pallas, 1772)	Baghdad	Baghdad Province	C
<i>Galeodes babylonicus</i> Roewer, 1934	Ruinen von Babylon	Babylon ancient site, Babil Province	F
<i>Galeodes bacillifer</i> Pocock, 1900	Baghdad	Baghdad Province	C
<i>Galeodes bogojavlenskii</i> Birula, 1906	Necif	Najaf, Al-Nacaf Province	G
<i>Galeodes caspius subfuscus</i> Birula, 1937	Erbil, Arbil Province	Erbil, Arbil Province	H
<i>Galeodes darius</i> Pocock, 1895	Fao	Al-Faw, Al-Basrah Province	I
<i>Galeodes gromovi</i> Harvey, 2002	Baghdad	Baghdad Province	C
	Mosul	Mosul, Nineveh Province	D
<i>Galeodes lacertosus</i> Roewer, 1934G	Necif	Najaf, Al-Nacaf Province	G
<i>Galeodes laniator</i> Roewer, 1934	Kerbela	Karbala Province	J
<i>Galeodes lawrencei</i> Harvey, 2002	Basrah	Al-Basrah Province	K
<i>Galeodopsis cyrus</i> (Pocock, 1895)	Fao	Al-Faw, Al-Basrah Province	I

Table 1 (continued).
Таблица 1 (продолжение).

1	2	3	4
<i>Paragaleodes nesterovi</i> Birula, 1916	Wesne	Vasneh Pass is border between Al-Sulaymaniyah Province, Iraq and Azarbayjan-e Gharbi Province, Iran (just north of Kani Rash Pass and the main pass to Alvatan Village, Iran)	V
<i>Karschia (Karschia) kurdistanica</i> Birula, 1935	Kaniresch	Kani Rash Pass is border between Al-Sulaymaniyah Province, Iraq, and Azarbayjan-e Gharbi Province, Iran	L
<i>Rhagodia obscurior</i> Penther, 1913	Assur	Ashur, Ash Sharqat, Salah al-Din Province	A
	Bara	Bara is an old village 4.5 km northwest of Samouka, Sinjar, Nineveh Province	M
	El' Abid	Al Abid, Nasiriyah, Dhi Qar Province	N
	Gajara	Al Qayyarah, Mosul District, Nineveh Province	O
	Charmina	Hawi al Kharninah is located on the right bank of the Tigris River, 25 km north of Tikrit, Salah al-Din Province	T
	Samoidja	Samouka is a village 30 km northwest of Sinjar, Nineveh Province	U
<i>Rhagodinus caenaicus</i> Penther, 1913	Assur	Ashur, Ash Sharqat, Salah al-Din Province	A
	Gajara	Al Qayyarah, Mosul District, Nineveh Province	O
	Wadi Sefa	Wadi Safa, 14 km southeast of Hatra, Nineveh Province	P
	Tikrit	Tikrit, Salah al-Din Province	Q
<i>Rhagodixa kurdistanica</i> (Birula, 1936)	Erbil, Arbil Province	Erbil, Arbil Province	H

Table 1 (continued).
Таблица 1 (продолжение).

1	2	3	4
<i>Rhagodorta zorab</i> (Birula, 1905)	Tal Afar	Tal Afar, Nineveh Province	R
<i>Rhagodospus babylonicus</i> (Birula, 1935)	Ruinen Baksai	Ash Shahabi, Wasit Province	S



Fig. 1. Distributional map of solifuges species in Iraq. A — Ashur, B — Al Habbaniyah, C — Baghdad, D — Mosul, E — Amarah, F — Babylon ancient site, G — Najaf, H — Erbil, I — Al-Faw, J — Karbala, K — Al-Basrah, L — Kani Rash Pass, M — Bara, N — Al Abid, O — Al Qayyarah, P — Wadi Safa, Q — Tikrit, R — Tal Afar, S — Ash Shahabi (Baksai ruins), T — Hawi al Kharninah, U — Samouka, V — Vasneh Pass (see Table 1).

Рис. 1. Карта местонахождений сольпуг в Ираке. А — Ашшур (Ассур), В — Эль-Хаббания, С — Багдад, D — Мосул, E — Эль-Амара, F — древний Вавилон, G — Ан-Наджаф, H — Эрбиль, I — Эль-Фао, J — Кербела, K — Басра, L — перевал Kani Rash, M — Бара, N — Ал Абид, O — Кайяра, P — вадии Сафа, Q — Тикрит, R — Талль-Афар, S — Ash Shahabi (руины Baksai), T — Hawi al Kharninah, U — Samouka, V — перевал Vasneh (см. табл. 1).

Results

The Solifugae fauna of Iraq is composed of 21 species and three subspecies included in 11 genera and four families. Among the different families of Iraqi solifuges, Galeodidae with 13 species and two subspecies in three genera is the most speciose family, fol-

lowed by Rhagodidae (five species in five genera) and Daesiidae (two species and one subspecies in two genera). On the other hand, the family Karschiidae is represented by a single species, *Karschia (Karschia) kurdistanica*, *Galeodes adamsi*, *G. lawrencei* (Galeodidae), *Rhagodixa kurdistanica* and *Rhagodospus babylonicus* (Rhagodidae) are endemic species of the Solifugae

fauna of Iraq. Two species reported from Iraq were found to be missing from all previous solifuges catalogues or checklists, including Harvey's [2003]: *Gluviopsilla discolor* (Daesiidae) and *Galeodes bacillifer* (Galeodidae). However, the record of *Galeodes bacilliferoides*, *G. starmuehlneri*, *G. sulfuripes* and *G. taurus* (Galeodidae) and *Gylippus (Gylippus) syriacus* (Gylippidae) are removed from the Iraqi solifuges fauna. These species were excluded from the main species list and listed as omitted. They are presented below with remarks about their exclusion.

List of species

Family Daesiidae

Gluviopsilla discolor (Kraepelin, 1899)

LITERATURE RECORDS: Zilch [1946]: 128 (Assur).

REMARKS: The presence in Iraq was not reported by Harvey [2003], but Zilch [1946] recorded from Assur. Thus, the species was added to the list.

GENERAL DISTRIBUTION: Somalia, Algeria, Greece (Rhodes), Syria, Türkiye, and Iran [Harvey, 2003; Hosseinpour *et al.*, 2020].

Gluviopsis rufescens (Pocock, 1897)

LITERATURE RECORDS: Penther [1913]: 107 (Assur-Kal'at Schergat); Harvey [2003]: 230 (Iraq).

GENERAL DISTRIBUTION: Djibouti, Greece, Iraq, Somalia, and Yemen [Harvey, 2003].

Gluviopsis rufescens rufescens (Pocock, 1897)

LITERATURE RECORDS: Harvey [2003]: 230 (Iraq).

GENERAL DISTRIBUTION: Djibouti, Greece, Iraq, Somalia, and Yemen [Harvey, 2003].

Family Galeodidae

Galeodes adamsi (Turk, 1947)

LITERATURE RECORDS: Turk [1947]: 77–80 (Habbaniya, near Baghdad); El-Hennawy [1999]: 90 (Iraq); Harvey [2003]: 256 (Habbaniya, near Baghdad, Al Anbar, Iraq).

REMARKS: Known only from the type locality and endemic to Iraq.

Galeodes arabs C.L. Koch, 1842

LITERATURE RECORDS: Pocock [1895]: 77 (Baghdad, Euphrates, Iraq); Penther [1913]: 107 (nordlichen und südlichen Mesopotamien); Roewer [1934]: 532 (Mesopotamien: Mosul, Amara); El-Hennawy [1998]: 18 (Iraq); El-Hennawy [1999]: 84 (Iraq); Harvey [2003]: 257 (Iraq).

GENERAL DISTRIBUTION: Algeria, Djibouti, Egypt, Ethiopia, Iran, Iraq, Israel, Kenya, Morocco, Niger, Oman, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, Türkiye, and Yemen [Harvey, 2003].

Galeodes arabs arabs C.L. Koch, 1842

LITERATURE RECORDS: Harvey [2003]: 257 (Iraq).

Galeodes araneoides (Pallas, 1772)

LITERATURE RECORDS: Butler [1873]: 418 (Baghdad); Penther [1913]: 107 (nordlichen und südlichen Me-

sopotamien); Roewer [1959]: 35 (Mesopotamien); El-Hennawy [1998]: 19 (Iraq); El-Hennawy [1999]: 84 (Iraq); Harvey [2003]: 258 (Iraq).

GENERAL DISTRIBUTION: Afghanistan, Armenia, Azerbaijan, Egypt, Iran, Iraq, Israel, Kazakhstan, Russia, Syria, Türkiye, Turkmenistan, and Ukraine [Harvey, 2003].

Galeodes babylonicus Roewer, 1934

LITERATURE RECORDS: Roewer [1934]: 524 (Mesopotamien), 532 (Mesopotamien: Ruinen von Babylon); Zilch [1946]: 143 (Mesopotamien: Ruinen v. Babylon); El-Hennawy [1999]: 84 (Iraq); Harvey [2003]: 259 (Babylon (ancient site), Babil, Iraq).

REMARKS: It was first described from Babil in Iraq by Roewer [1934]. Later, the species was recorded from Israel by Levy & Shulov [1964].

Galeodes bacillifer Pocock, 1900

LITERATURE RECORDS: Lawrence [1953]: 120 (Bagdad).

REMARKS: *G. bacillifer* is known from Afghanistan, Iran, Pakistan [Harvey, 2003]. The occurrence of this species was reported from Bagdad, Iraq by Lawrence [1953]. So, *G. bacillifer* was included in the list.

Galeodes bogojavlenskii Birula, 1906

LITERATURE RECORDS: Lawrence [1953]: 120 (Nejjif, Iraq); Harvey [2003]: 260 (Iraq).

Galeodes caspius subfuscus Birula, 1937

LITERATURE RECORDS: Hussen, Ahmed [2017]: 90–97 (Erbil, Iraq).

GENERAL DISTRIBUTION: Kazakhstan, Kyrgyzstan [Harvey, 2003], and Iraq [Hussen, Ahmed, 2017].

Galeodes darius Pocock, 1895

LITERATURE RECORDS: Pocock [1895]: 81 (Fao, on the Persian Gulf); Kraepelin [1901]: 17 (Persien (Fao)); Birula [1905a]: 260 (Südost-Persien, Fao, on the Persian Gulf); Hirst [1908]: 241 (Fao, Persia); Roewer [1934]: 547 (Fao); Harvey [2003]: 262 (Al Faw (as Fao), Al Basrah, Iraq).

GENERAL DISTRIBUTION: Iraq, and Israel [Harvey, 2003].

Galeodes gromovi Harvey, 2002

LITERATURE RECORDS: Roewer [1941]: 162–163 (Mesopotamien (Wilajet Bagdad u. Mossul)); El-Hennawy [1999]: 84 (Iraq); Harvey [2002]: 452 (Iraq); Harvey [2003]: 264 (several localities in Iraq).

GENERAL DISTRIBUTION: Azerbaijan, Iraq, and Türkiye [Harvey, 2003].

Galeodes lacertosus Roewer, 1934

LITERATURE RECORDS: Lawrence [1953]: 120 (Nejjif, Iraq); Harvey [2003]: 265 (Iraq).

GENERAL DISTRIBUTION: Iraq, Saudi Arabia, and Yemen [Harvey, 2003].

Galeodes laniator Roewer, 1934

LITERATURE RECORDS: Roewer [1934]: 532 (Mesopotamien: Kerbela); Zilch [1946]: 145 (Mesopotamien, Kerbela); El-Hennawy [1999]: 86 (Iraq); Harvey [2003]: 265 (Karbala' (as Kerbela), Karbala', Iraq).

GENERAL DISTRIBUTION: Iraq, and Israel [Harvey, 2003].

Galeodes lawrencei Harvey, 2002

LITERATURE RECORDS: Harvey [2002]: 452 (Basrah, Iraq); Harvey [2003]: 266 (Al Basrah (as Basrah), Al Basrah, Iraq).

REMARKS: Endemic for Iraqi fauna.

Galeodopsis cyrus (Pocock, 1895)

LITERATURE RECORDS: Pocock [1895]: 80 (Fao, on the Persian Gulf); Kraepelin [1901]: 16 (Persien (Fao)); Roewer [1934]: 549 (Fao am pers. Golf); Harvey [2003]: 274 (Al Faw (as Fao), Al Basrah, Iraq).

GENERAL DISTRIBUTION: Iran, Iraq, Pakistan, and Saudi Arabia [Harvey, 2003].

Paragaleodes nesterovi Birula, 1916

LITERATURE RECORDS: Birula [1916]: 74 (Mosul at Wesne); Roewer [1934]: 532 (Mesopotamien: Prov. Mosul: Wesné, Pendshwin, Shené); El-Hennawy [1999]: 87 (Iraq); Harvey [2003]: 275 (Wesné, Mosul, Ninawa, Iraq).

GENERAL DISTRIBUTION: Azerbaijan, Iraq, and Türkiye [Birula, 1916; Roewer, 1934; Bird *et al.*, 2015] and Iran [Hosseinpour *et al.*, 2020].

Family Karschiidae

Karschia (Karschia) kurdistanica Birula, 1935

LITERATURE RECORDS: Birula [1935a]: 304 (Gebirgsland Kurdistan (Vorderasien), Umgebung von Kaniresch); Roewer [1941]: 111 (Kurdistan (bei Kaniresch)); El-Hennawy [1999]: 93 (Iraq?); Gromov [2003]: 83 (NE Iraq); Harvey [2003]: 286 (Sulaymaniyah, Iraq).

REMARKS: The species were described from Kani Rash [=Kaniresch] Pass, the border between Sulaymaniyah Prov., Iraq, and Azarbayjan-e Gharbi Prov., Iran, thus, its locality is indicated from both Iraq and Iran.

GENERAL DISTRIBUTION: Iran and Iraq [Harvey, 2003].

Family Rhagodidae

Rhagodia obscurior Penther, 1913

LITERATURE RECORDS: Penther [1913]: 108 (Assur-Kal'at Schergat, Bara, El'Abid, Gajara, Zwischen Samoidja und Charnina); Roewer [1933]: 281 (Mesopotamien (Assur, Charnina)); El-Hennawy [1999]: 96 (Iraq); Harvey [2003]: 297 (Ash Sharqat (as Assur (Kal'at Schergat)), Ninawa, Iraq; Bara, Iraq; El'Abid, Dhi Qar, Iraq; Gajara, Iraq; between Samoidja and Charnina, Iraq).

REMARKS: Penther [1913] recorded this species from Khatunyah, Syria (as Chatunije), and other authors followed this record as Chatunije (is called variously Chatunia, Katynnija, Khatunieh, Khatuniyeh, Khatuniya, Khatounie), Iraq [El-Hennawy, 1999; Harvey, 2003], since the village is located in Syria, near the border between Syria and Iraq.

GENERAL DISTRIBUTION: Iraq and Türkiye [Harvey, 2003].

Rhagodinus caenaecus Penther, 1913

LITERATURE RECORDS: Penther [1913]: 107 (Assur-Kal'at Schergat, Wadi Sefa, Gajara); Roewer [1933]: 279 (Mesopotamien (Assur, Wadi Sefa, Gajara); Zilch [1946]:

121 (Mesopotamien: Assur); El-Hennawy [1999]: 97 (Iraq); Harvey [2003]: 298 (Ash Sharqat (as Assur (Kal'at Schergat)), Ninawa, Iraq; Wadi Sefa, Iraq; Gajara, Iraq); Al-Khazali [2021]: 475, 476 (Salah al-Din Province, Tikrit District).

GENERAL DISTRIBUTION: Iraq and Israel [Harvey, 2003].

Rhagodixa kurdistanica (Birula, 1936)

LITERATURE RECORDS: Birula [1936]: 50 (südlichen Kurdistans, Oertlichkeit Kani-Palanka, Nomadenlager Dar-Dedaban); Roewer [1941]: 106 (Mesopotamien, (im südl. Kurdistan-Gebirgsland bei Kani-Palanka)); El-Hennawy [1999]: 97–98 (Iraq); Harvey [2003]: 299 (Kani-Palanka, Nomadenlager DarDedaban, Southern Kurdistan, Iraq); Hussien, Ahmed [2017]: 90–97 (Erbil, Iraq).

REMARKS: *R. kurdistanica*, which is known only from the type locality Kani-Palanka, Nomadenlager Dar-Dedaban, Iraq [Birula, 1936] and the locality is not seen in the current map and old maps. Regarding “Nomadenlager Dar-Dedaban” (*nomad camp door sentry*); *Nomadenlager* is a German word meaning *nomad camp* and *Dar-Dedaban* is a Persian word meaning *door sentry*. So, it is understood from the label that the specimen collector was a nomad camp door sentry. On the other hand, this species is recently reported from northern Iraq [Hussen, Ahmed, 2017], *R. kurdistanica* is endemic to the fauna of Iraq.

Rhagodorta zorab (Birula, 1905)

LITERATURE RECORDS: Lawrence [1953]: 111 (Tal Afar area, west of Mosul, Iraq); Harvey [2003]: 302 (Iraq).

GENERAL DISTRIBUTION: Iran, Iraq, and Saudi Arabia [Harvey, 2003].

Rhagodospus babylonicus (Birula, 1935)

LITERATURE RECORDS: Birula [1935b]: 318 (Mesopotamien, Ruinen Baksai, ein wenig nach Osten von der St. Mendeli); Roewer [1941]: 105 (Mesopotamien (Ruinen von Baksai, wenig östl. on St. Mendeli)); El-Hennawy [1999]: 98 (Iraq); Harvey [2003]: 302 (Ash Shahabi (as Ruinen Baksai), Wasit, Iraq).

REMARKS: The genus *Rhagodospus* and the species *R. babylonicus* are known only from the type locality and endemic to Iraq.

Omissions from the list

Family Galeodidae

Galeodes bacilliferoides Roewer, 1934

LITERATURE RECORDS: Roewer [1934]: 529 (Iraq, Adshemi); El-Hennawy [1999]: 85 (Iraq); Harvey [2003]: 259 (Iraq).

REMARKS: Roewer [1934] discovered that the specimens collected from Iraq-Adshemi, Dorf Risa-abad, had misidentified as *G. bacillifer* by Birula [1905b]. And, he described a new species as *G. bacilliferoides*. This species is known from Iran, Iraq, Pakistan [El-Hennawy, 1999; Harvey, 2003]. Birula [1905b] recorded it from Central-Iran. The type and paratype materials of *G. bacilliferoides* were collected by Nikolai A. Zarudny in 1904. Sissom and Fet [1998] analyzed Zarudny's excursions route and were able to trace localities of Birula's collections. These localities are found between Ahvaz and Esfahan in Iran. During the Ottoman Empire period, this area is also located in the region

called “Irak Acemi” [S, emseddin, 1889]. In this area, the localities are cited as “Iraq-Adjemi” or “Iraq-Adshemi” by Birula. This species is therefore excluded from the present list.

Galeodes starmuehlneri Roewer, 1952

LITERATURE RECORDS: Roewer [1952]: 511 (100 km east of Routbah (Iraq)).

REMARKS: Specimens listed by Roewer [1952] also include samples collected from Iraq. This specimen was an immature and he was not able to identify. Therefore, *G. starmuehlneri* is excluded from the list of solifuges in Iraq.

Galeodes sulfuripes Roewer, 1934

LITERATURE RECORDS: Roewer [1934]: 532 (Mesopotamien: west of Mosul); Zilch [1946]: 147 (Kleinasien: Diarbekr (w. Mossul)); El-Hennawy [1999]: 88 (Iraq); Harvey [2003]: 271 (W. Mosul, Ninawa, Iraq).

REMARKS: Zilch [1946] restricted the locality as Kleinasien: Diarbekr (w. Mossul) (now Diyarbakır, Türkiye) when Harvey [2003] restricted the locality as W. Mosul, Ninawa, Iraq and include *G. sulfuripes* in the species list for Iraq. And also, SMF (Forschungsinstitut und Natur-Museum Senckenberg) corrected the locality as Türkiye, Diarbekr (westl. Mossul). Thus, I accept and follow the restriction of Zilch [1946] and SMF database. Thus, I exclude this species from the checklist, until reliable evidence of its occurrence in Iraq is provided.

Galeodes taurus (Roewer, 1934)

LITERATURE RECORDS: El-Hennawy [1999]: 89 (Iraq).

REMARKS: El-Hennawy [1999] erroneously added *G. taurus* to the list. This species was described from the specimens collected in Mesopotamien (Taurus, nördl. Diarbekr) [Roewer, 1934]. Zilch [1946] restricted the locality as “Taurus Gebirge: n. Diarbekr. Until further evidence is available, I regard *G. taurus* record as dubious.

Family Gylippidae

Gylippus (Gylippus) syriacus (Simon, 1872)

LITERATURE RECORDS: Penther [1913]: 107 (Tez Charab); El-Hennawy [1999]: 91 (Iraq); Harvey [2003]: 278 (Iraq).

REMARKS: This species was recorded in “Tez Charab” by Penther [1913] and other authors followed this record [El-Hennawy, 1999; Harvey, 2003]. In old maps, Tez Charab was also cited as Tel Kharab and Tez Kharab. However, Tez Charab (=□kiztepe Köyü) is a village of Mardin Province in Türkiye. The village’s old name is also known as “Têzzerab” in the Kurdish language. □kiztepe Köyü is located on the border between Türkiye and Iraq, 31 km east of Nusaybin, Mardin and lies between 37°6’3.9”E and 41°34’18.8”N longitude and latitude. Therefore, *G. syriacus* is omitted from the list of solifuges in Iraq.

Discussion

The data from the present study show that there are 21 species and three subspecies of solifuges, which represent approximately 2.22% of all Solifugae species known from the world. It is, therefore, reasonable to

assume that the Solifugae fauna in Iraq is underestimated and poorly studied. This lower number of Iraq species could possibly be due to the fact that the majority of the investigations have been restricted to historical places, leaving other areas unexplored and in previous studies “direct hand collecting” was the principal method. On the other hand, most of the previous studies on Solifugae of Iraq have been conducted in the eastern part of the country. Further investigations must be performed in order to collect a more complete knowledge of the solifuges fauna of this country.

Of the 21 species and three subspecies of solifuges species recorded from Iraq, two species in this checklist constitute an addition to the Harvey’s [2003] list: *Gluviopsilla discolour* (Daesiidae) and *Galeodes bacillifer* (Galeodidae). Among these species, only *Galeodes adamsi*, *G. lawrencei* (Galeodidae), *Rhagodixa kurdistanica* and *Rhagodospus babylonicus* (Rhagodidae) can be considered endemic. However, *Rhagodospus* genus is known to be endemic to Iraq. Overall, 13 species have a type locality from Iraqi specimens: *Galeodes adamsi*, *G. babylonicus*, *G. darius*, *G. gromovi*, *G. laniator*, *G. lawrencei*, *Galeodopsis cyrus*, *Paragaleodes nesterovi*, *Karschia (Karschia) kurdistanica*, *Rhagodia obscurior*, *Rhagodinus caenaicus*, *Rhagodixa kurdistanica*, and *Rhagodospus babylonicus*. Many species are only known from a single locality (e.g. endemic species), while others show extremely wide distribution range (e.g. *Galeodopsis cyrus* is distributed in Iraq, Iran, Pakistan, and Arabia and, *Paragaleodes nesterovi* occurs in Iraq, Azerbaijan, Türkiye, and Iran (Hosseinpour *et al.*, [2020])). Although these species are widespread, they have only been found from one locality in Iraq. Additional investigation is required for the species from Iraq that have been recorded from a single locality.

The following four solifuges species previously reported for Iraq are doubtful and are probably inaccurate. While they occur in neighboring regions, their existences have not yet been confirmed in Iraq by the subsequent studies. The species *Galeodes taurus* was mistakenly reported from Iraq by El-Hennawy [1999]. Checking the original reference [Roewer, 1934] the specimen was from Türkiye not from Iraq. Similarly, the presence of *G. bacilliferoides* in Iraq by Roewer [1934] seems to be erroneous and the actual presence of this species in Iraq remains dubious. These localities may have been within the historical borders of Iraq at the time of species collection. The locality of *G. sulfuripes* is restricted to Türkiye by Zilch [1946] while Harvey [2003] restricted to the north of Iraq. For this reason, the record of this species from Iraq is also questionable. Roewer [1952] listed an immature specimen under the name of *G. starmuehlneri*, but he could not determine. The identification of this species thus remains uncertain. *Gylippus (Gylippus) syriacus* occurs in Cyprus, Israel, Syria and Türkiye [Harvey, 2003].

Galeodids and rhagodids are also taxonomically very diverse and very difficult to identify, especially

for species that are only known by a few specimens and those that are described or identified from a single specimen or sex. Furthermore, most problems regarding their identification are related to the rarity of specimens of rhagodids, gylippids and karschiids. By far, the vast majority of Iraqi solifuges species, according to their activity pattern (diurnal or nocturnal), are nocturnal; only *Paragaleodes nesterovi* is diurnal. The sampling method and sampling different habitats are important for the collection of rare species. Rhagodids and gylippids are short-legged, karschiids are small-sized solifuges, thus, the pitfall trap method and using portable ultraviolet light [Hrušková-Martišová *et al.*, 2008; Gromov, 2000; Koç, 2011] are effective for collecting a great number of solifuges species. Light attraction and pitfall trap sampling are most often used inventory methods for solifuges sampling [Cushing, González-Santillán, 2018]. Additional field trips with these methods will probably lead to new discoveries.

The results of this checklist cover a complete bibliography on Iraqi Solifugae, as well as all the literature that is related to Solifugae studies in Iraq. Despite being a comprehensive bibliographical review, the checklist remains incomplete because previous studies have limited sampling efforts and insufficient taxonomic knowledge of Iraqi solifuges. Only some old references recorded most of the species from Iraq, and some of which have not yet been re-collected in the country. The scarce collections and limited literature using only one sampling method (active sampling or hand collecting) present difficulties in identifying and assessing the distribution patterns of solifuges in Iraq. Therefore, many areas of Iraq should be sampled in order for future research to reveal additional species. This was confirmed by Hussen & Ahmed [2017]. The results in the present study contribute to increase the knowledge on the diversity and distribution of solifuges in Iraq and can serve as a reference for future studies.

Acknowledgements

I would like to thank Dr. Süleyman Tekir (Department of History, Sinop University, Türkiye) for his valuable opinions and explanations of the historical maps of Iraq.

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Responsible editor K.G. Mikhailov