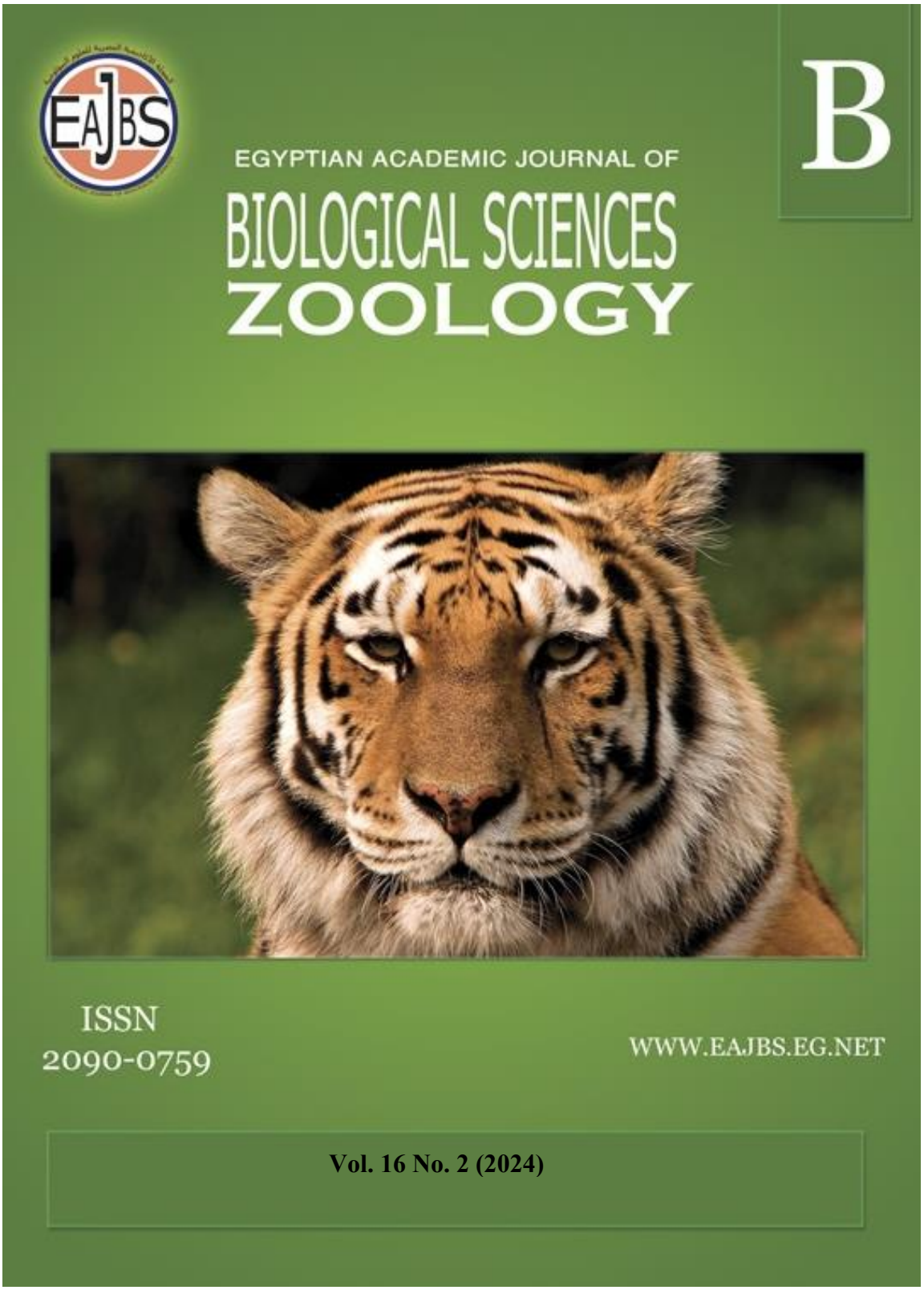


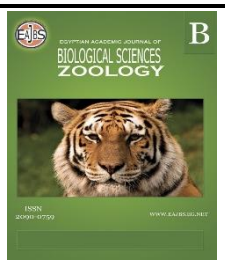
.

www.eajbs.eg.net

Citation: *Egypt. Acad. J. Biolog. Sci. (B. Zoology) Vol. 16(2) pp:97-103 (2024)*
DOI: 10.21608/EAJBSZ.2024.379061

Egypt. Acad. J. Biolog. Sci., 16(2):97-103(2024)

Egyptian Academic Journal of Biological Sciences
B. Zoology
ISSN: 2090 – 0759
http://eajbsz.journals.ekb.eg/



Survey of Spiders (Araneae) Associated with the Bean Plant Crop (*Phaseolus vulgaris*) in Dakahlia Governorate, Egypt

Ibrahim A. I. Zaher
Department of Agricultural Zoology and Nematology, Faculty of Agriculture, Al-Azhar University, Cairo, Egypt
*** E-mail** : zaahiribrahim80@outlook.com

ARTICLE INFO
Article History
Received:7/8/2024
Accepted:10/9/2024
Available:14/9/2024

Keywords:
Spiders, Survey, Field Crops.

ABSTRACT

Spiders play a crucial role in reducing the infestation ratio of field crop pests. These arachnids act as natural predators, effectively controlling pest populations that would otherwise damage crops. Their presence in agricultural fields helps maintain a balanced ecosystem, reducing the need for chemical pesticides and promoting sustainable farming practices. By preying on various pests, spiders contribute significantly to the health and productivity of field crops, ensuring better yields and healthier plants. The sucking pests are favorable prey for it, as are the first and second instars of cotton leafworm. This study was carried out during two successive years 2022-2023 to survey the spider species associated with some field crops in Dakahlia Governorate in Egypt. A survey study was conducted to determine the presence of 19 families, 43 genera, and 49 spider species associated with the bean plant crop (*Phaseolus vulgaris*). The relationship between temperature and the number of spiders in El Dakahlia Governorate was studied.

INTRODUCTION

Spiders are considered among the most important biological control agents for managing pests in various field crops. Many spider species consume large numbers of immature stages of these pests, significantly reducing their population infestations. Spiders are one of the most widespread groups of predatory organisms in the animal kingdom, with over 52,200 species (World Spider Catalog, 2024)

Young *et al.* (1990) analyzed 29 faunal surveys of spiders in nine field crops across the United States, identifying 614 species in 192 genera and 26 families. These species represent 19% of the 3,311 species found in North America. The most frequently occurring species in these field crops were *Oxyopes salticus* (Family Oxyopidae), *Rhidippus audax* (Family Salticidae), and *Tetragnatha laboriosa* (Family Araneidae).

In Egypt, Sallam (1996) collected 25 species of spiders from 18 families on various fruit crops, field crops, and ornamental plants. This current study aims to reveal some ecological aspects of spiders in El Dakahlia Governorate of Egypt.

MATERIALS AND METHODS

Collecting Spiders:

Spider individuals were collected randomly from the vegetable field using the methods of Picking up by hand (Sampling using hand sorting)**.**

Spiders were picked up from plants, and then individually placed in plastic vials. Small spiders were picked up using a 5X magnifying lens. Larger individuals were placed in plastic tubes measuring 3 cm in diameter by 6 cm in height, while smaller ones were kept in plastic tubes measuring 1.5 cm in diameter by 4 cm in height.

These vials were then transferred to the laboratory for counting and identification. Spider individuals were preserved in 70% alcohol in glass vials for identification.

Identification of Spiders:

All specimens transferred to the laboratory were examined in petri dishes. The samples were studied under a stereomicroscope. Each specimen was individually kept in a glass vial (3 x 5 cm) containing 70% ethyl alcohol, with locality, host, and date of collection labelled on each vial. After identification, the specimens were placed into tubes with final labels giving their scientific names. These specimens were then kept in the collection at the Department of Agricultural Zoology and Nematology, Faculty of Agriculture, Al-Azhar University.

The identification of spider families depended on the key of El-Hennawy (2017). Generic and specific identifications were conducted by specialists when this was possible. In some cases, identification was possible only at the genus level.

Statistical Analysis:

Population density and frequency of occurrence of spider families and species were determined using the following equations; all obtained data were statistically analyzed according to **Duncan** (1955):

$$\textbf{Population density} = \frac{\text{No. Individuals of a species}}{\text{Weight of fresh cocoon (g.)}}$$

$$\textbf{Frequency of occurrence} = \frac{\text{No. of samples containing a species}}{\text{Total no. of collected samples}} x100$$

RESULTS AND DISCUSSION

Distribution and Occurrence of Spiders Associated with The Bean Plant Crop (*Phaseolus vulgaris*) of Aga City at El Dakahlia Governorate.

Samples of spiders were collected from the field crop Bean plant (*Phaseolus vulgaris*) , in Dakahlia Governorate and identified. Data presented in (Table 1 and Figs. 1 & 2) showed that 1720 spider individuals were collected belonging to (49) spider species, (39) genera (19) families. These families are Agelenidae, Araneidae, Cheiracanthiidae, Corinnidae, Dictynidae, Gnaphosidae, Linyphiidae, Liocranidae, Lycosidae, Oecobiidae, Philodromidae, Salticidae, Scytodidae, Tetragnathidae, Theridiidae, Thomisidae, Titanoecidae, Trachelidae, and Uloboridae. These spiders greatly varied in their population densities and frequencies of occurrence according to the type of locality. However, the families Lycosidae, Titanoecidae, and Salticidae, were found with relatively high population densities (P.D.) and frequencies of occurrence (F.O. %) during the two years (2022/2023 and 2023/2024).

Data in Table 1 and Figures. 1 & 2, indicated that the members of families Lycosidae, Titanoecidae, and Salticidae, were represented in most surveyed spiders in

Bader city with high total individuals reaching 786, 453, and 380 individuals whereas population density and frequency of occurrence (8, 45 & 96.88 %), (4.87 & 96.88 %), and (4.22 & 93.75 %) respectively in the two years (2022/2023 and 2023/2024). Whereas, the other families of spiders were recorded in the lowest population densities and frequencies of occurrence. The families of Liocranidae, Agelenidae, and Uloboridae were found in localities with lower total individuals reached 8, 5, and 5 with averaged lower values of their P.D. and F.O. % they averaged, (1.6 & 5.21 %), (1.25 & 4.17%) and (1.25 & 4.17 %) respectively.

On the other hand, individuals of the family Tetragnathidae were recorded only in season 2 with population density and frequency of occurrence averaging (1.00 & 1.04%). Also, individuals of families. It is worth mentioning that the low percentages of frequencies of these families are because of the absence of them in some surveyed localities. The variation in population densities and frequency of occurrence of spider families and species in all collected samples could be related to different environmental conditions, i.e. temperature and humidity in the locality. This is in accordance with the previous data obtained by several investigators; Baert *et al.* (1997) and in Egypt, Sallam (1996), El-Erksousy (2000), Mohafez (2000), Sallam (2002), and Mohafez (2004).

Table 1: Population density and frequency of occurrence of spider families and species associated with the bean plant crop (*Phaseolus vulgaris*) in Aga city at El Dakahlia Governorate.

Spider families and species		Total individuals of families or species 2022/2024	Total no. of samples containing families or species	(P.D.)	(F.O. %)
Agelenidae		5	4	1.25	4.17
.	*Tegenaria domestica*	1	1	1.00	1.04
	Tegenaria sp.	2	2	1.00	2.08
	Tegenaria parietina	1	-	0.00	0.00
	Spiderling	1	1	1.00	1.04
Araneidae		63	29	2.17	30.21
	Argiope sp.	5	5	1.00	5.21
	Argiope trifasciata	8	6	1.33	6.25
	Spiderling	46	25	1.84	26.04
Cheiracanthiidae		94	48	1.96	50.00
	Cheiracanthium sp.	8	7	1.14	7.29
	Cheiracanthium isiacum	5	5	1.00	5.21
	Spiderling	72	37	1.95	38.54
Corinnidae		31	22	1.41	22.92
	Spiderling	18	15	1.20	15.63
	Spiderling	18	15	1.20	15.63
Dictynidae		64	28	2.29	29.17
	Spiderling	51	27	1.89	28.13
Gnaphosidae		334	70	4.77	72.92
.	*Zelotes* sp.	53	29	1.83	30.21
	Zelotes laetus	5	5	1.00	5.21
	Heser nilicola	4	4	1.00	4.17
.	*Drassodes* sp.	2	2	1.00	2.08
	Marinarozelotes sp.	3	3	1.00	3.13
	Marinarozelotes jaxartensis	2	2	1.00	2.08
	Setaphis subtilis	2	2	1.00	2.08
	Poecilochroa pugnax	1	1	1.00	1.04

	Spiderling	246	67	3.67	69.79
Linyphiidae		364	80	4.55	83.33
	Gnathonarium dentatum	4	4	1.00	4.17
	Mermessus sp.	13	6	2.17	6.25
	Mermessus denticulatus	6	6	1.00	6.25
	Erigone dentipalpis	7	5	1.40	5.21
	Sengletus sp.	3	3	1.00	3.13
	Sengletus extricatus	18	11	1.64	11.46
	Prinerigone vagans	4	4	1.00	4.17
	Spiderling	174	58	3.00	60.42
Liocranidae		8	5	1.60	5.21
	Mesiotelus tenuissimus	7	4	1.75	4.17
	Spiderling	1	1	1.00	1.04
Lycosidae		786	93	8.45	96.88
	Hogna sp.	4	4	1.00	4.17
.	*Hogna ferox*	2	2	1.00	2.08
	Wadicosa sp.	15	13	1.15	13.54
	Wadicosa fidelis	24	21	1.14	21.88
	Trochosa sp.	4	3	1.33	3.13
	Trochosa urbana	85	36	2.36	37.50
	Pardosa injucunda	1	1	1.00	1.04
	Lycosa sp.	4	4	1.00	4.17
	Spiderling	607	91	6.67	94.79
Oecobiidae		41	23	1.78	23.96
	Oecobius putus	1	1	1.00	1.04
.	*Oecobius* sp.	2	2	1.00	2.08
	Oecobius navus	4	3	1.33	3.13
	Spiderling	32	22	1.45	22.92
Philodromidae		201	76	2.64	79.17
	Pulchellodromus sp.	13	10	1.30	10.42
	Pulchellodromus glaucinus	16	11	1.45	11.46
	Spiderling	153	62	2.47	64.58
Salticidae		380	90	4.22	93.75
	Plexippus sp.	13	12	1.08	12.50
	Plexippus paykulli	31	24	1.29	25.00
	Plexippus clemens	4	4	1.00	4.17
	Afraflacilla spiniger	3	3	1.00	3.13
	Synageles dalmaticus	1	1	1.00	1.04
	Thyene imperials	15	10	1.50	10.42
	Spiderling	308	81	3.80	84.38
Scytodidae		46	32	1.44	33.33
	Scytodes sp.	6	4	1.50	4.17
	Scytodes velutina	4	4	1.00	4.17
	Spiderling	36	26	1.38	27.08
Tetragnathidae		1	1	1.00	1.04
	Tetragnatha sp.	1	1	1.00	1.04
	Spiderling	-	-	0.00	0.00
Theridiidae		356	85	4.19	88.54
.	*Euryopis* sp.	5	5	1.00	5.21
	Kochiura sp.	5	5	1.00	5.21
	Kochiura aulica	13	11	1.18	11.46
	Steatoda sp.	4	4	1.00	4.17
	Steatoda erigoniformis	7	6	1.17	6.25

	Theridion sp.	56	32	1.75	33.33
	Theridion melanostictum	22	14	1.57	14.58
	Theridion varians	1	1	1.00	1.04
	Spiderling	229	69	3.32	71.88
Thomisidae		91	33	2.76	34.38
.	*Thomisus* sp.	5	4	1.25	4.17
	Thomisus spinifer	28	15	1.87	15.63
	Runcinia grammica	1	1	1.00	1.04
	Spiderling	57	27	2.11	28.13
Titanoecidae		453	93	4.87	96.88
	Nurscia albomaculata	99	49	2.02	51.04
	Nurscia sp.	11	10	1.10	10.42
	Spiderling	333	83	4.01	86.46
Trachelidae		14	7	2.00	7.29
	Trachelas minor	4	4	1.00	4.17
	Spiderling	7	5	1.40	5.21
Uloboridae		5	4	1.25	4.17
	Uloborus sp.	1	1	1.00	1.04
	Uloborus walckenaerius	4	3	1.33	3.13
	Spiderling	-	-	0.00	0.00

Population density (P.D.) Frequency of occurrence (F.O. %)

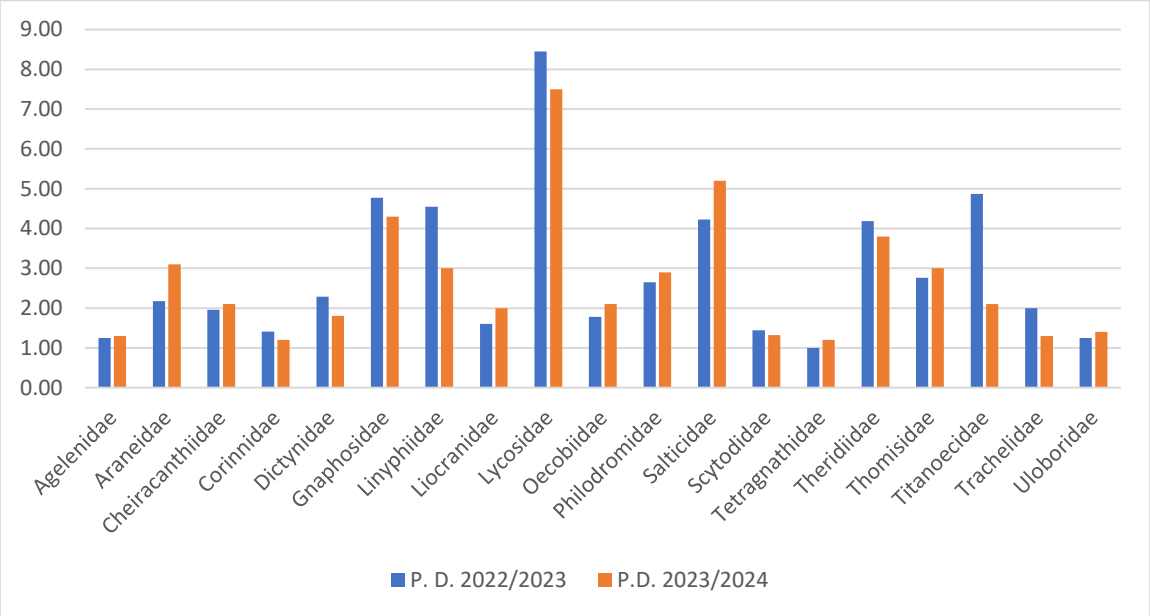


Fig. 1: Average population density of the spider families collected from the bean plant crop (*Phaseolus vulgaris*) during two successive years in Aga city at El Dakahlia Governorate.

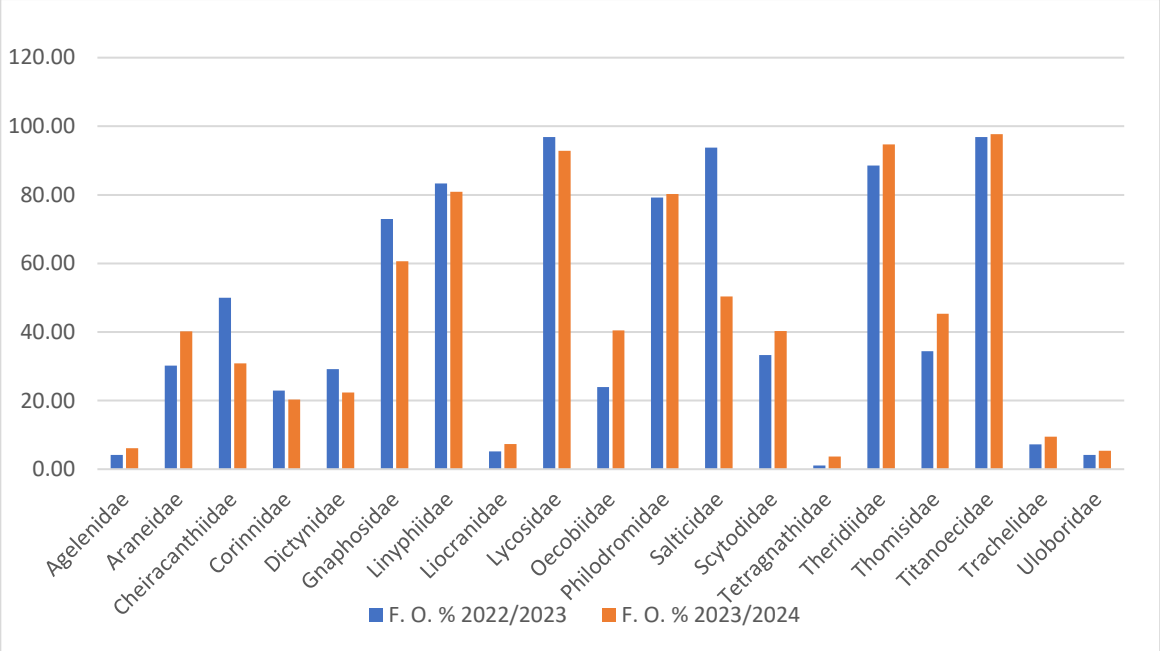


Fig.2: Average frequency of occurrence of the spider families collected from the bean plant crop (*Phaseolus vulgaris*) during two successive years in Aga city at El Dakahlia Governorate.

Declarations:

Ethical Approval: Not applicable.

Competing interests: The authors declare that they have no duality of interest associated with this manuscript.

Availability of Data and Materials: All datasets analysed and described during the present study are available from the corresponding author upon reasonable request.

Funding: No specific funding was received for this work.

Acknowledgements: Not applicable.

REFERENCES

Baert, L., Ransy, M. & Fassotte, C. (1997). The spiders (Araneae) of apple and pear orchards. *Bulletin et Annales de la Société Royale Belge de'Entomologie,* 133: 445-556.

Duncan, D.B. (1955) Multiple Range and Multiple F-Test. *Biometrics,* 11, 1-5.

El-Erksousy, M. H. M. (2000). Studies on some true spiders in Egypt. Ph. D. Thesis, Fac. Agric. Al-Azhar Uinv., 132 pp.

El-Hennawy, H.K. (2017). Illustrated key to spider families of Egypt (Arachnida: Araneae). *Serket*, 15(4): 184-208.

Mohafez, M. A. M. (2000). Studies on true spiders in Sohag Governorate. M. Sc. Thesis, Fac. Agric. Al-Azhar Univ., 155 pp.

Mohafez, M. A. M. (2004). Ecological and biological studies on spiders in Egypt. Ph. D. Thesis, Fac. Agric. Al-Azhar Univ., 178 pp.

Sallam, G.M. (1996): Studies on true spiders in Giza Governorate, Egypt. M.Sc. Thesis, Fac. Agric., Cairo Univ., Egypt, 139 pp.

Sallam, G. M. E. (2002). Survey and ecological studies on spiders in four Governorates of Egypt. Ph. D. Thesis, Fac. Agric. Cairo Univ., 144 pp.

World Spider Catalog 2024. *World Spider Catalog. Version 25.5*. Natural History Museum Bern, online at http://wsc.nmbe.ch.

Young, O.P. & G.B. Edwards (1990): Spiders in United States field crops and their potential effect on crop pests. J. Arachnol., 18: 1-27.