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SURVEY OF THE SPIDERS (ARANEAE) AT ASSIUT GOVERNORATE, UPPER EGYPT

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ABSTRACT

On reviewing literature that focused on the Egyptian spider fauna, it could be concluded that it still incompletely known due to scarcity of studies on this group especially in Upper Egypt. So, the present study was aimed to make a survey of spiders in six different sites covering Assiut governorate, the central part of Egypt, (27º14'N and 31º11'E) and to study its abundance of this group as well as the effects of monthly and seasonally fluctuations on the abundance of the collected taxa. Hand picking method was conducted during day light hours during a period of one year (from December, 2015 till November 2016). Survey results revealed the occurrence of 3457 specimens belonging to 22 families that included 42 genera and 47 species. Family Lycosidae was the most abundant family which represented the highest number during the whole period of study, while family Dictynidae and family Uloboridae were represented by the lowest number in the same period of study. The eudominant species in this survey was *Pulchellodromus glaucinus*.

Key words: Survey, spiders, Assiut governorate, Upper Egypt.

INTRODUCTION

Spiders belong to Phylum Arthropoda, the largest phylum in the animal kingdom and consist of approximately 80% of all known animal species. Spiders belong to class Arachnida, which also includes mites, ticks, and scorpions. Spiders, Order Araneae, are among one of the most rich groups of terrestrial animals, with more than 46,700 spider species belonging to 112 families described so far and many thousands still awaiting discovery and description (World Spider Catalog, 2017). In Egypt, there are 40 families belonging to 193 genera and 385 species (El-Hennawy, 2006). Spiders are an excellent example of such a group because they are widespread intermediate-level predators and are among the most diverse groups on earth (Coddington & Levi, 1991). Moreover, spiders appear to be good subjects for studying biodiversity patterns (Platnick, 1999) as their distribution and occurrence are strongly influenced by habitat structure and vegetation parameters (Greenstone, 1984; Buddle *et al*., 2000; de Souza & Martins, 2004), also, they are an important component of the naturally occurring complex of predatory arthropods in field crops. They are often highly abundant and may play an essential role in the reduction of pest populations (Reichert and Lockley, 1984). As a taxonomic group, spiders are good candidates for bio-indication, because they form a species rich group, inhabiting all kinds of terrestrial ecosystems (Maelfait and Baert, 1988a, b; Maelfait, 1996; Marc *et al*., 1999). The worldwide spider fauna is still incompletely known. Furthermore, the scientific literature is very scattered, and new species can be found even with the most cursory surveys. Despite these problems, there is fair taxonomic literature (Sewlal and Cutler, 2003). Knowledge of species composition and distribution in eastern Mediterranean ecosystems is very limited, making ecological studies in this region very difficult (Chatzaki *et al*., 1997). Although spiders were well known to people in Egypt since ancient times, we cannot find any scientific publication

on Egyptian spiders before 1758 (El-Hennawy, 2004), but since then it passed through a long dormant stage. Only during the last five decades, there were a few revivals related to spiders. On reviewing literature that focused on the Egyptian spider fauna, it could be concluded that it still incompletely known due to scarcity of studies on this group especially in Upper Egypt. So, the present study was focused on Assiut Governorate (27º14'N, 31º11'E) to make a survey of spiders in different habitats of this region and to study the abundance of this group.

MATERIAL AND METHODS

In the present investigation, samples were collected for one year of studying (starting with December, 2015 till November 2016) from six different sites covering Assiut governorate (Figure 1). These sites were numerated as follows (I-VI): (1st site was at Dirot city, 2nd site was at Manfalout city, 3rd site was at Sidfa city, 4th site was at the Ornamental farm of Assiut University, 5th site was at El-Wadi El-Assiuty and the 6th site was at the El-Wasta village). For seasonal fluctuations, samples were collected seasonally from 3 different locations (Dirot, Manfalout and Sidfa cities). For monthly fluctuations, three sites were chosen (The Ornamental farm of Assiut University, El-Wadi El-Assiuty and El-Wasta village). Hand picking method was used and the collected specimens were preserved in 70% ethyl alcohol (Quasin & Uniyal, 2010). The identification of specimens was carried out on the light of the available taxonomical knowledge. Many keys, papers and catalogues were used for identification of the recorded species. The collected specimens were identified to the species level whenever possible and others on genus or family level. Identification of the specimens was done by the help of the following literature: Levi and Levi (1968); Kaston (1978); Tikader (1987); Coddington and Levi (1991); Roth (1993); Barrion and Litsinger (1995); Dippenaar-Schoeman and Joccqué (1997); Sewlal and Cutler (2003); Ubick *et al*. (2005); Jocqué and Dippenaar-Schoeman (2006) and El Hennawy (2006 and 2010) and. Finally, species identification were confirmed by Mr. H. K. El-Hennawy, the expert in spider identification in Egypt. The dominance structure of the collected spiders was calculated according to Engelmann (1978): subrecedent (below 1.3%), recedent (1.3-3.9%), subdominant (4-12.4%), dominant (12.5-39.9%), eudominant (40-100%).

RESULTS

A total number of 3457 specimens of different taxa of spiders were collected from six different sites located in Assiut governorate. Taxa collected were assigned in 42 genera and 47 species that fall in 22 families (Table 1). Among these collected specimens, only 40 of 42 genera and 31 of 47 species were identified. The two unidentified genera (Pisauridae juvenile and Dictynidae juvenile) and the 16 unidentified species were sent to Mr. H. K. El-Hennawy, the expert in spider identification in the Middle East and North Africa to be kindly identified. These unknown genera and species might be considered as new records in Egypt.

These families were: Agelenidae, Araneidae, Dictynidae, Dysderidae, Eresidae, Eutichuridae, Filistatidae, Gnaphosidae, Linyphiidae, Liocranidae, Lycosidae, Oecobiidae, Philodromidae, Pholcidae, Pisauridae, Salticidae, Sicariidae, Sparassidae, Theridiidae, Thomisidae, Titanoecidae, and Uloboridae, these families varied in their numbers and frequencies of occurrence according to the site, type of plants and the date of collections. Family Lycosidae was the most abundant family which represented the highest number during the whole period of study (1080 specimens, constituting 31.24 % from total number of collected taxa), but family Dictynidae and family Uloboridae represented the lowest numbers in the same period of study (1 specimen for each one, constituting 0.03 % from the total number).

However, family Gnaphosidae embraced most of the spider genera and species collected

during the entire period of study (764 specimens, 7 species and constituting 22.10 % from the total number) followed by Philodromidae (444 specimens, only one species and constituting 12.84 % from the total number), Salticidae (242 specimens, 5 species and constituting 7 % from the total number), Linyphiidae (218 specimens, 3 species and constituting 6.31 % from the total number), Theridiidae (198 specimens, 5 species and constituting 6.31 % from the total number).

Considering the number of each taxa of spiders collected from all sites, it was observed that the maximum number was collected from *Pardosa* sp. (541 specimens, constituting 15.65% of the total number), while Dictynidae juvenile and *Uloborus walckenaerius* were the least species number since 1 specimen for each one, consisting 0.03 % from the total number.

Regarding monthly fluctuations abundance of spiders, it was found that the maximal number was collected during May (437 specimens, consisting 15.65 % from the total number for each of them), while, the lowest number of the population was collected during October, December and September (81 specimens, consisting 2.90 % from the total number).

However, the seasonally fluctuations for all six sites showed that the maximal number was collected during spring (1201 specimens, constituting 34.74 % from the total number), and the minimal number was collected during summer (700 specimens, constituting 20.25% from the total number) (Table 1).

The most favorable locality was site (V) since the maximum number of specimens was collected (1006 specimens, constituting 29.10% of the overall total number), whereas site (I) was the least favorable one, since 168 specimens were collected and constituting 4.86% of the overall total number (Table 2).

There were variation in number of collected species and families (14 to 37 species and 8 to 19 families) from different sites, the richest sites; site (IV) since 37 species belong to 19 families were recorded. It was cultivated by different orchard fruit trees whereas throughout the four seasons, where, the poorest one; site II (14 species belonged to 8 families) was dominated by only one orchard tree *Punica granatum* all over the time of collection. Whereas, there were no or little variations among sites (III, V and VI) in number of species and families of spiders specimens recovered as long as they were found to be cultivated by orchard trees and some Germaine plants. Although (site I) was dominated by only weeds in addition to *Bauhinia alba* contained considerable number of species and families (20 species belong to 10 families) but they had the lowest number of specimens collected all over the seasons (168 specimens) (Table 2).

In monthly fluctuations, the dominance structure of the collected species showed that there were 7 eudominant species (with frequency): *Pulchellodromus glaucinus* (88.9%), *Nurscia albomaculata* (72.2%), *Pardosa* sp. (61.1%), *Cheiracanthium siwi* (58.3%), *Plexippus clemens* (52.8%), *Phlegra* sp. (50%), and *Wadicosa fidelis* (41.7%).

The dominant species were 21 species: *Paidiscura dromedaria* and *Setaphis subtilis* (38.9 %), *Steatoda erigoniformis* (36.1%), *Berlandina venatrix*, *Dysdera crocota* and *Hogna ferox* (33.3%), *Theridion melanostictum* (27.8%), *Zelotes laetus*, *Zelotes* sp. and *Mermessus denticulatus* (25%), *Heliophanillus* sp. and *Plexippus paykulli* (22.2%), *Filistata insidiatrix*, *Prinerigone vagans*, *Theridion* sp., *Thomisus spinifer* and *Trachyzelotes* sp. (19.4%), *Synaphosus* sp. and *Thyene imperialis* (16.7%), *Lycosoides coarctata* and *Argiope* sp. (13.9%).

The subdominant species were 12 species: *Artema atlanta, Sengletus extricatus*, *Xysticus* sp. (11.1%), *Mesiotelus tenuissimus*, *Oecobius* sp., *Poecilochroa pugnax* and *Xysticus tristrami* (8.3%), *Argiope* sp., *Euryopis* sp., *Larinia* sp., *Stegodyphus dufouri* and *Uroctea* sp. (4.2%).

There were 5 recedent species: Dictynidae juvenile, *Eusparassus walckenaeri*, *Eusparassus* sp., *Nita elsaff and Uloborus walckenaerius* (2.8%) (Table 4).

Seasonal fluctuations revealed that there were eight eudominant species (with frequency): *Pulchellodromus glaucinus* (75%), *Berlandina venatrix*, *Hogna ferox* (66.67%), *Cheiracanthium siwi*, *Plexippus clemens*, *Setaphis subtilis*, *Zelotes* sp. (58.33%) and *Wadicosa fidelis* (41.67%). Whereas, 17 species showed dominant frequency of collection; *Loxosceles rufescens*, *Paidiscura dromedaria*, *Steatoda erigoniformis*, *Uroctea* sp. (33.3%), *Dysdera crocota*, *Filistata insidiatrix*, *Heliophanillus* sp., *Pardosa* sp., Pisauridae juveniles, *Oecobius* sp., *Synaphosus* sp., *Zelotes laetus* (25%), *Mermessus denticulatus*, *Mesiotelus tenuissimus*, *Phlegra* sp., *Theridion melanostictum* and *Thomisus spinifer* (16.67%).

In three studied sites, 5 other spider species exhibited subdominance there were: *Euryopis* sp., *Sengletus extricatus*, *Theridion* sp. *Thyene imperialis* and *Nurscia albomaculata* with a frequency level (8.33%), whereas none of the species recorded as recedent or subrecedent (Table 3).

DISCUSSION

To the best of the present authors' knowledge and as far as can be ascertained, the present study is the first of its kind carried out at Assiut governorate and is one of the few studies on spider communities in Egypt indicating diversity of spider fauna inhabiting plants. Results of the present study showed the total number of 3457 specimens collected was assigned in 42 genera and 47 species that fall in 22 families.

In Egypt, there are 40 families belonging to 193 genera and 385 species (El-Hennawy, 2006). This study indicated that Assiut governorate minimally contains 55% of the families (22 vs 40), 24% of the genera (42 vs 193), and 12% of spider species (47 vs 385) found in Egypt.

In present study, the 22 families recorded are: Agelenidae, Araneidae, Dictynidae, Dysderidae, Eresidae, Eutichuridae, Filistatidae, Gnaphosidae, Linyphiidae, Liocranidae, Lycosidae, Oecobiidae, Philodromidae, Pholcidae, Pisauridae, Salticidae, Sicariidae, Sparassidae, Theridiidae, Thomisidae, Titanoecidae, and Uloboridae.

Recently, Obuid-Allah *et al*. (2015) revealed the occurrence of 14 families that included 23 genera and 23 species of spiders at Qena Governorate, Egypt which is relatively close to the area of this study. All of the recorded families in this research were recoverd in the present study except family Oxyopidae. Whereas, 8 families: Dysderidae, Dictynidae, Eresidae, Filistatidae, Liocranidae, Pisauridae, Sicariidae, Titanoecidae and Uloboridae were recorded in the present study did not show in Obuid-Allah *et al*. (2015) survey.

Many investigations have revealed relationships between plant communities and their associated spider fauna (Turnbull, 1960; Duffey 1962; Bultman *et al.*, 1982; Fraser and Frankie, 1986). Some studies like Duffey (1962), Almquist (1973), Hatley and MacMahon (1980), Robinson (1981), Greenstone (1984), Fraser and Frankie (1986) and Rypstra (1983) have shown that architectural features of vegetation, prey availability, and microclimatic conditions all are important in determining the abundance and distribution of spiders. The degree to which each of these factors, which are not independent, affects the spider community composition depends on the particular features of the habitat. Diversity generally increases when a greater variety of habitat types are present (Reid and Miller, 1989). The larger shrubs and more complex structures generally lead to an increase in diverse spider community of resource available (Lawton, 1983, 1986). It is also known that the phytophagous fauna increases with a plant's structural complexity (Strong *et al.,* 1984). The present study agrees with all of the above results where the most favorable locality was site V (1006 specimens), which is probably due to the abundance and diversity of plants (as shown in site description, Table 2). This site was a fertile environment to attract insects and thus the diversity of spider's food. The less favorable locality

was site I (168 specimens), which is probably due to the drought and small number of plants. The anthropogenic effect during study caused rapid change in this site by cutting vegetation (as it happened during the period of collection in this site i.e. cutting down trees and plants to create buildings) may have an adverse effect on the abundance and diversity of spiders. Different levels of grass, thinning of vegetation, also the time and the way of vegetation cut may affect the abundance, diversity, distribution, and life cycles of spider species (Henderson, 2007).

Faragalla and Al-Ghamdi (2002) studied the seasonal occurrence of the major true spiders (Araneida) in some crop systems in western Saudi Arabia, the seasonal of spider community belonging to 10 families was determined in three different habitats: vegetable, date-palm and mixed weed habitats. Different densities were observed in all habitats; however the vegetable habitat showed high number of spiders. This may be due to variability of food sources. They reported that the wolf spider family (Lycosidae) was predominant in all habitats. Previous study agree with the present study which indicated that Family Lycosidae was the most abundant family which represented the highest number during the whole period of study (1080 specimens, constituting 31.24 % from total number of collected taxa), also, the maximum number was collected from *Pardosa* sp. (541 specimens, constituting 15.65% of the total number).

Haddad and Dippenaar-Schoeman (2002) studied the true spiders in abandoned *Trinervitermes trinervoides* (Sjostedt), with five mounds excavated on a bimonthly basis. A total of 771 true spiders represented by 21 families and 82 species were collected from the 30 mounds during the course of the study. The most abundant were the Gnaphosidae, which represented 37.87% of all true spiders collected, followed by the Salticidae (12.97%), Pholcidae (10.51%) and Oonopidae (9.60%). The previous studies agree with the present study that family Gnaphosidae embraced most of the spider genera and species collected during the whole period of study (764 specimens, 7 species and constituting 22.10 % from the total number) followed by Philodromidae (444 specimens, only one species and constituting 12.84 % from the total number), Salticidae (242 specimens, 5 species and constituting 7 % from the total number), Linyphiidae (218 specimens, 3 species and constituting 6.31 % from the total number) and Theridiidae (198 specimens, 5 species and constituting 6.31 % from the total number).

Regarding monthly fluctuations abundance of spiders, it was found that the maximal number was collected during May (437 specimens, consisting 15.65 % from the total number), while, the lowest number of the population was collected during September, October and December (81 specimens, consisting 2.90 % from the total number). This result agrees with Negm *et al.* (1976), who mentioned that although population size of spiders varied greatly throughout the growing seasons of clover, there was gradual increase until late May when a peak activity was reached, also Mukherjee *et al.* (2010) indicated that April showed a distinct peak in fluctuation numbers of spiders.

In our study, the seasonally fluctuations for all six sites showed that the maximal number was collected during spring (1201 specimens, constituting 34.74 % from the total number), and the minimal number was collected during summer (700 specimens, constituting 20.25% from the total number). This result agrees with Zaher *et al.* (2005), who recorded 33 species of 33 genera and 16 families throughout the four seasons of the year. They reported that, spring showed the greatest number of spider taxa (29) followed by 22 in summer, while autumn recorded the lowest number (15) species. *Steatoda erigoniformis* was recorded for the first time from Qalyubiya Governorate.

Concerning methods of collection of spiders, most studies which use several methods, such as hand collecting, sweep nets or vacuum samples, are usually conducted during daylight hours (Young and Lockley, 1990; Mason, 1992; and Breene *et al*., 1993a, b). In the present

investigation, Hand picking method was conducted during day light hours during the period of investigation. This result agrees with Haddad and Dippenaar-Schoeman (2002), who studied the true spiders in abandoned *Trinervitermes trinervoides* (Sjostedt), with five mounds excavated on a bimonthly basis. All true spiders present in the mound were collected by hand and preserved in 70% ethanol. A total of 771 true spiders represented by 21 families and 82 species were collected from the 30 mounds during the course of the study.

By the end of this investigation, we had the opportunity to collected and identified 42 genera and 47 species belonging to 22 family of spider species at Assiut governorate locality which is considered the first study to cover the central part of Egypt. Further studies must be needed for identifying the unknown genera and species.

Table 1 The identified species at all sites during the period of investigation.

S.No.	Family	Species	S.No.	Family	Species
1	**Agelenidae** C.L. Koch, 1837	*Lycosoides coarctata*	24 25	**Oecobiidae** Blackwall, 1862	*Oecobius* sp. *Uroctea* sp.
2 3 4	**Araneidae** Clerck, 1757	*Argiope* sp. *Cyrtophora citricola* *Larinia* sp.	26	**Philodromidae** Thorell, 1870	*Pulchellodromus glaucinus*
5	**Dictynidae** O.P.-Cambridge, 1871	Unidentified species	27 28	**Pholcidae** C.L. Koch, 1850	*Artema atlanta* *Nita elsaff*
6	**Dysderidae** C.L. Koch, 1837	*Dysdera crocota*	29	**Pisauridae** Simon, 1890	Unidentified species
7	**Eresidae** C.L. Koch, 1845	*Stegodyphus dufouri*	30 31 32 33 34	**Salticidae** Blackwall, 1841	*Heliophanillus* sp. *Phlegra* sp. *Plexippus clemens* *Plexippus paykulli* *Thyene imperialis*
8	**Eutichuridae** Lehtinen, 1967	*Cheiracanthium siwi*	35	**Sicariidae** Keyserling, 1880	*Loxosceles rufescens*
9	**Filistatidae** Ausserer, 1867	*Filistata insidiatrix*	36 37	**Sparassidae** Bertkau, 1872	*Eusparassus walckenaeri* *Eusparassus* sp.
10 11 12 13 14 15 16	**Gnaphosidae** Pocock, 1898	*Berlandina venatrix* *Setaphis subtilis* *Synaphosus* sp. *Poecilochroa pugnax* *Trachyzelotes* sp. *Zelotes laetus* *Zelotes* sp.	38 39 40 41 42	**Theridiidae** Sundevall, 1833	*Euryopis sp.* *Paidiscura dromedaria* *Steatoda erigoniformis* *Theridion melanostictum* *Theridion* sp.
17 18 19	**Linyphiidae** Blackwall, 1859	*Mermessus denticulatus* *Prinerigone vagans* *Sengletus extricatus*	43 44 45	**Thomisidae** Sundevall, 1833	*Thomisus spinifer* *Xysticus tristrami* *Xysticus* sp.
20	**Liocranidae** Simon, 1897	*Mesiotelus tenuissimus*	46	**Titanoecidae** Lehtinen, 1967	*Nurscia albomaculata*
21 22 23	**Lycosidae** Sundevall, 1833	*Hogna ferox* *Pardosa* sp. *Wadicosa fidelis*	47	**Uloboridae** Thorell, 1869	*Uloborus walckenaerius*

Total: 22 Families, 42 genera, 47 species

Table 2 Seasonal fluctuation richness of collected specimens, families, and species and the type of vegetation from the six sites studied.

Site No.	No. of specimens per season				Total No.	No. of families	No. of Species	Habitats (vegetation)
	Winter	Spring	Summer	Autumn				
Site I	38	52	40	38	168	10	20	Weeds, *Bauhinia alba*, *Punica granatum*
Site II	65	83	52	79	279	8	14	*Punica granatum*
site III	49	85	43	40	217	10	17	*Glycine max*+*Punica granatum*+ *Triticum* sp.+*Morus* sp.
Site IV	182	320	162	134	798	19	37	*Punica granatum* +*Vitis* sp.+ *Mangifera indica*+*Morus* sp. +*Rhamnus* sp.+grasses
Site V	163	288	236	319	1006	15	34	*Vitis* sp.+*Convolvolus* sp.+*Medicago sativa*+ *Triticum vulgaris*+*Citrus limon*+*Rhamnus* sp.
Site VI	289	373	167	160	989	14	27	*Phragmites australis* +*Malus* sp.+*Citrus reticulata*+*Punica granatum*+*Medicago sativa*
Total	786	1201	700	770	3457	22	47	

Table 3 Seasonal fluctuations and percentages of frequency of spiders collected from three different sites (1: Dirot 2: Manfalout 3: Sidfa).

Sr. No	Family	Species	Distribution sites	F %	Dominance
1	Dysderidae	*Dysdera crocota*	3	25.00	dominant
2	Eutichuridae	*Cheiracanthium siwi*	1,2,3	58.33	eudominant
3	Filistatidae	*Filistata insidiatrix*	1,3	25.00	dominant
4	Gnaphosidae	*Berlandina venatrix*	1,3	66.67	eudominant
		Setaphis subtilis	1,2,3	58.33	eudominant
		Synaphosus sp.	1,3	25.00	dominant
		Zelotes laetus	1	25.00	dominant
		Zelotes sp.	1,3	58.33	eudominant
5	Linyphiidae	*Mermessus denticulatus*	2	16.67	dominant
		Sengletus extricatus	2	8.33	subdominant
6	Liocranidae	*Mesiotelus tenuissimus*	3	16.67	dominant
7	Lycosidae	*Hogna ferox*	1,2,3	66.67	eudominant
		Pardosa sp.	1,2	25.00	dominant
		Wadicosa fidelis	1,2	41.67	eudominant

8	Oecobiidae	*Oecobius* sp.	1,3	25.00	dominant
		Uroctea sp.	1,3	33.33	dominant
9	Philodromidae	*Pulchellodromus glaucinus*	1,2,3	75.00	eudominant
10	Pisauridae	Unidentified species	3	25.00	dominant
11	Salticidae	*Heliophanillus* sp.	1,2,3	25.00	dominant
		Phlegra sp.	1,3	16.67	dominant
		Plexippus clemens	1,3	58.33	eudominant
		Thyene imperialis	3	8.33	subdominant
12	Sicariidae	*Loxosceles rufescens*	1,3	33.33	dominant
13	Theridiidae	*Euryopis* sp.	1	8.33	subdominant
		Paidiscura dromedaria	1,2	33.33	dominant
		Steatoda erigoniformis	2	33.33	dominant
		Theridion melanostictum	2	16.67	dominant
		Theridion sp.	2	8.33	subdominant
14	Thomisidae	*Thomisus spinifer*	2	16.67	dominant
15	Titanoecidae	*Nurscia albomaculata*	1	8.33	subdominant

(Subrecedent: below 1.3%, recedent: 1.3-3.9%, subdominant: 4-12.4%, dominant: 12.5-39.9%, eudominant (40-100%).

Table 4 Monthly fluctuations and percentages of frequency of spiders collected from three different sites (4: The Ornamental farm of Assiut University, 5: El-Wadi El-Assiuty and 6: El-Wasta).

Sr. No.	Family	Species	Distribution sites	F%	Dominance
1	Agelenidae	*Lycosoides coarctata*	4	13.9	dominant
2	Araneidae	*Argiope* sp.	6	5.6	subdominant
		Cyrtophora citricola	4,5	13.9	dominant
		Larinia sp.	4,5	5.6	subdominant
3	Dictynidae	Unidentified species	**4**	2.8	recedent
4	Dysderidae	*Dysdera crocota*	4,5,6	33.3	dominant
5	Eresidae	*Stegodyphus dufouri*	5	5.6	subdominant
6	Eutichuridae	*Cheiracanthium siwi*	4,5,6	58.3	eudominant
7	Filistatidae	*Filistata insidiatrix*	4,6	19.4	dominant
8	Gnaphosidae	*Berlandina venatrix*	5	33.3	dominant
		Poecilochroa pugnax	5,6	8.3	subdominant
		Setaphis subtilis	4,5,6	38.9	dominant
		Synaphosus sp.	4,5	16.7	dominant
		Trachyzelotes sp.	4,5	19.4	dominant
		Zelotes laetus	4,5	25.0	dominant
		Zelotes sp.	4,5,6	25.0	dominant
9	Linyphiidae	*Mermessus denticulatus*	4,5,6	25.0	dominant
		Prinerigone vagans	4,6	19.4	dominant
		Sengletus extricatus	4,6	11.1	subdominant
10	Liocranidae	*Mesiotelus tenuissimus*	4,5,6	8.3	subdominant

11	Lycosidae	*Hogna ferox*	4,5,6	33.3	dominant
		Pardosa sp.	4,5,6	61.1	eudominant
		Wadicosa fidelis	4,5,6	41.7	eudominant
12	Oecobiidae	*Oecobius* sp.	5	8.3	subdominant
		Uroctea sp.	4,5	5.6	subdominant
13	Philodromidae	*Pulchellodromus glaucinus*	4,5,6	88.9	eudominant
14	Pholcidae	*Artema atlanta*	4,6	11.1	subdominant
		Nita elsaff	6	2.8	subdominant
15	Salticidae	*Heliophanillus* sp.	4,5,6	22.2	dominant
		Phlegra sp.	4,5,6	50.0	eudominant
		Plexippus clemens	4,5,6	52.8	eudominant
		Plexippus paykulli	4,6	22.2	dominant
		Thyene imperialis	4,5,6	16.7	dominant
16	Sparassidae	*Eusparassus walckenaeri*	4	2.8	recedent
		Eusparassus sp.	4	2.8	recedent
17	Theridiidae	*Euryopis* sp.	4,5	5.6	subdominant
		Paidiscura dromedaria	4,5,6	38.9	dominant
		Steatoda erigoniformis	4,5,6	36.1	dominant
		Theridion melanostictum	4,5,6	27.8	dominant
		Theridion sp.	4,5,6	19.4	dominant
18	Thomisidae	*Thomisus spinifer*	4,5,6	19.4	dominant
		Xysticus tristrami	4,5	8.3	subdominant
		Xysticus sp.	4,5	11.1	subdominant
19	Titanoecidae	*Nurscia albomaculata*	4,5,6	72.2	eudominant
20	Uloboridae	*Uloborus walckenaerius*	5	2.8	recedent

(Subrecedent: below 1.3%, recedent: 1.3-3.9%, subdominant: 4-12.4%, dominant: 12.5-39.9%, eudominant (40-100%).

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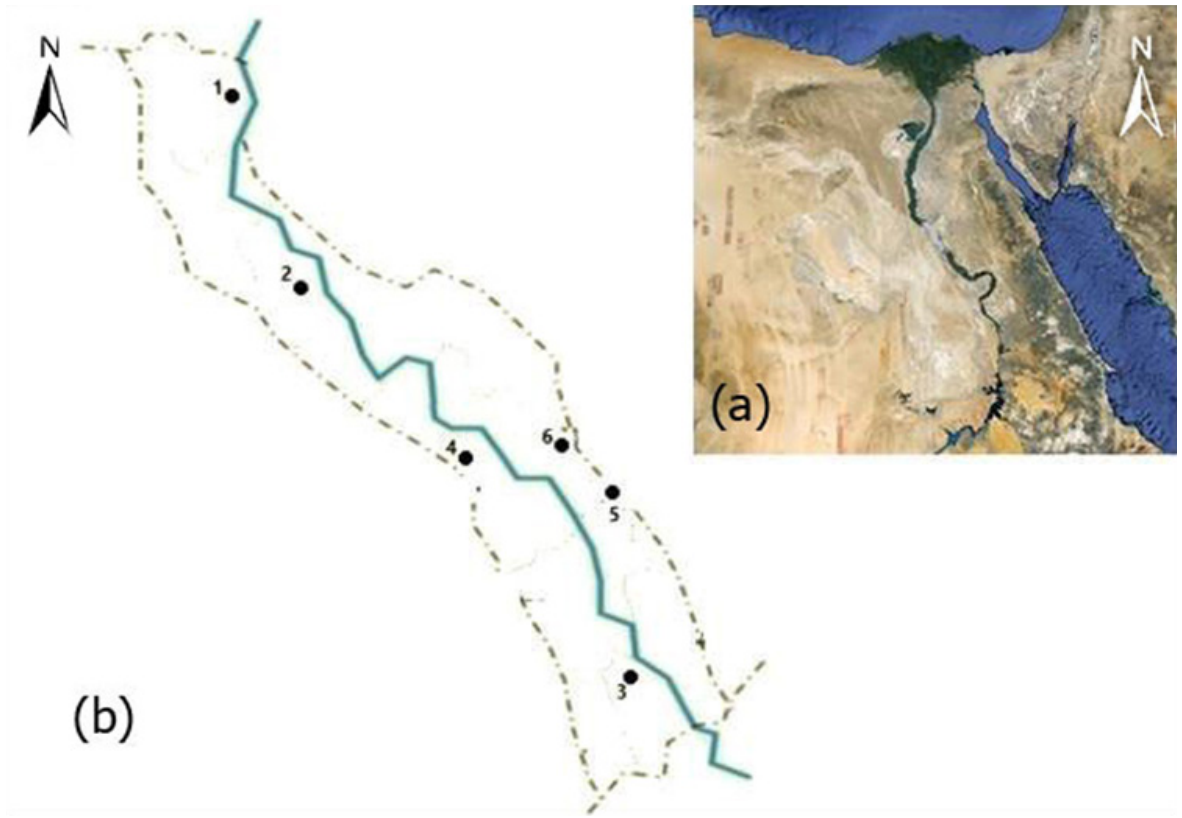

Figure 1 (a) Egypt map showing the location of Assiut governorate (the arrow).
(b) Assiut governorate map showing sites of collection 1: Dirot city **2:** Manfalout city **3:** Sidfa city **4:** the Ornamental farm of Assiut University **5:** El-Wadi El-Assiuty **6:** El-Wasta village.