

## **RELATIVE ABUNDANCE AND DISTRIBUTION OF THE TRUE SPIDER FAMILIES IN ASSUIT GOVERNORATE**

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### **ABSTRACT**

Survey and distribution of true spiders were studied on different fruit trees (citrus, guava, grapes and apple orchards), in Al-Azhar University and Banymore localities, Assuit Governorate during two successive years (2007/2008-2008/2009). Population of spiders were estimated monthly during the period of study to know their distribution all over the year. Data showed that twenty-two families, belonging to sub-order labidognatha distributed in Al-Azhar University and Banymore localities, Assuit Governorate during two successive years. Data indicated that the members of families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found during the two years (2007/2008 and 2008/2009) in the two localities with highly total individuals, population density and frequency of occurrence. While, the members of families Dictynidae, Hersiliidae, Pholicidae and Scytodidae were found in moderate numbers, population density and frequency of occurrence. Whereas, the other families of spiders were recorded in lowest numbers, population densities and frequencies of occurrence.

### **INTRODUCTION**

Spiders are worldwide distributed and occupy many ecological environments through Agroecosystem. Spiders are one of the most abundance predatory groups in terrestrial ecosystems. They fed on insects and small arthropods, and they can play an important role in pest control. All spiders are considered as biocontrol agents, they attack most of pests infesting crops, vegetables, ornamental and orchard fruit trees (Luczak, 1979 and Ghavani, 2006). Prey preference, foraging methods and timing of predation vary between spider species, but seem to be complementary and successful cases for pest suppression have been reported where spiders act as multi-species assemblages. Spiders can also control prey populations because they often capture and kill more preys than they consume. In some agroecosystems, spiders may be able to capture important pest species and can reduce insect densities, as well as stabilize population. Pesticides (education) has lead to increase interest in spiders as potential biological control agents. Spiders may be capable of fulfilling both of pest reduction and pest stabilization requirements (Greenstone, 1999). Some types of spiders may be adapted towards catching a particular type of prey. Although, spiders are diverse arachnid order, they are obligate predators and many feed upon herbivorous pests. They can feed and consume usefully lepidopteran insect larvae. On the other hand, spiders feed and consume phytophagous mites.

The aim of this work is to study the relative abundance and distribution of the most common families of spiders associated with four fruit orchards

(guava, grape, apple and citrus) in two localities; Al-Azhar University and Banymore localities in Assuit Governorate during two successive years (2007/2008 and 2008/2009).

## **MATERIALS AND METHODS**

### **Survey and distribution studies:**

Survey and distribution studies of spider individuals of the most common families were conducted in two localities; Al-Azhar University and Banymore localities in Assuit Governorate during two successive years (2007/2008 and 2008/2009).

Population of spiders were estimated monthly intervals all over the period of the study to know their distribution during the year. Spiders collected randomly from orchard crops (guava, grape, apple and citrus) in the fields by three methods as follow:

#### **Pitfall traps:**

The pitfall traps consist of plastic bowls (6 cm diameter and 8 cm depth). Into which 6 ml of foamy soap solution was added. Traps were set at different sampling sites on 5 meters distance of each other (Southwood, 1987).

#### **Branch shaking:**

For guava, grape, apple and citrus trees, 6-8 branches were chosen randomly and shaken for each sample. For grapes large amount of leaves were shaken over the shaking cloth. Apple branches were 50-100 cm; citrus, guava and grape branches were 100-125 cm.

After shaking specimens were individually picked up in a plastic vial (2x5cm); while larger ones kept in vial (2x5 cm); and transferred to the laboratory for counting and identification. Individual adult males and females were isolated for ecological studies. The collected spiders were preserved in 70% alcohol and transferred to laboratory for classification. Locality, habitat, date of collected samples and other information were recorded attached to each specimen in the side of tube.

#### **Hand sorting:**

Spiders were picked handly, the big individuals kept in tubes and small ones collected by gamel's hair brush and kept into the plastic tubes (1x4cm). Samples were collected monthly for one hour from 11-12 a.m in the winter and 10-11 a.m in the summer.

Population density and frequency of occurrence of spider families and species were determined according to their localities and sort of fruit trees using to the following equations according to El-Sebaay (2003):

$$\text{Population density (P.D.)} = \frac{\text{Total number of family or species individuals}}{\text{Number of samples containing this family or species}}$$

$$\% \text{Frequency of occurrence (F.O.)} = \frac{\text{Number of samples containing family or species}}{\text{Number of collected samples}} \times 100$$

**Classification studies:**

All specimens after transfer to laboratory, examined and kept in petri dish of 10 cm diameter, the individual examined using a stereoscopic binocular microscope. Each specimen was individually kept in a large tube containing 70% alcohol; date of collection, locality, host plant and other information were recorded in the side of each tube. Samples of spiders were identified according to nomenclatures of (Petrunkevitch, 1939 and Kaston 1978).

## **RESULTS AND DISCUSSION**

**Distribution and occurrence of true spider families associated with certain fruit orchards in Assuit Governorate:**

Samples of true spiders were collected from (citrus, guava, grapes and apple orchards), located in two locations; Al-Azhar University and Banymore, Assuit Governorate, and processed for spiders isolation and identification well detected. All collected spiders belonging to sub-order labidognatha and this group includes what are usually referred to as true spiders. Data presented in (Tables 1-3) showed the presence of sixty three spider species belonging to thirty-five genera and twenty-two families, belonging to sub-order labidognatha. These families were Araneidae, Clubionidae, Dictynidae, Dysderidae, Filistatidae, Gnaphosidae, Hersiliidae, Linyphiidae, Liocranidae, Lycosidae, Miturgidae, Oecobiidae, Oonopidae, Philodromidae, Pholcidae, Salticidae, Scytodidae, Theridiidae, Thomisidae, Titanoecidae and Uloboridae. They varied greatly in their population densities and frequencies of occurrence according to the type of locality. However, the families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found in most surveyed with relatively highly population densities and frequencies of occurrence (Tables 1-3).

**The two years (2007/2008 and 2008/2009):**

Data in Table (1) indicated that the members of families Clubionidae, Dysderidae, Dictynidae, Hersiliidae, Linyphiidae, Liocranidae and Scytodidae were represented in two localities (Al-Azhar University and Banymore) with moderate total number which reached 82, 86, 78, 92, 78, 84 and 80 individuals, whereas population density and frequency of occurrence were (13.67-3.1%), (15.60-2.6%), (12.29-3.6%) (18.40-2.6%), (13.00-1.1%), (12.00-3.6%) and (16.00-2.6%), respectively. The families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found in two most localities with highly total individuals reached 340, 386, 512, 372, 384, 382 and 380 individuals with population density and frequency of occurrence (28.33-6.3%), (25.73-7.8%), (32.00-8.3%), (33.82-5.7%), (38.40-5.2%), (27.29-7.3%) and (31.67-6.3%), respectively. Whereas, the other families were recorded in lowest population densities and frequencies of occurrence.



Data in Table (1) showed that the population of spider families associated with some fruit trees in Al-Azhar locality. The members of families Dictynidae, Hersiliidae, Pholicidae and Scytodidae were surveyed in Al-Azhar University locality with moderate total numbers were reached 48, 66, 42 and 42 individuals, also the population density and frequency of occurrence were (16.00-3.1%), (22.00-3.1%), (14.00-3.1%) and (14.00-3.1%), respectively. While, the families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found with highly total individuals reached 152, 208, 240, 198, 188, 184 and 210 individuals, also the population density and frequency of occurrence were (28.33-6.3%), (25.73-7.8%), (32.00-8.3%), (33.82-5.7%), (38.40-5.2%), (27.29-7.3%) and (31.67-6.3%), respectively. Whereas, the other families of spiders were recorded in lowest population densities and frequencies of occurrence. Data in Table (1) showed that the population of spider families associated with some fruit trees in Banymore locality. The members of families Clubionidae, Dysderidae and Linyphiidae were surveyed in Banymore locality with moderate total were reached 44, 54 and 56 individuals, also the population density and frequency of occurrence were (13.67-3.1%), (12.29-3.6%) and (13.00-3.1%), respectively. While, the families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found with highly total individuals reached 188, 178, 272, 174, 196, 198 and 170 individuals, also the population density and frequency of occurrence were (28.33-6.3%), (25.73-7.8%), (32.0-8.3%), (33.82-5.7%), (38.40-5.2%), (27.29-7.3%) and (31.67-6.3%), respectively. Whereas, the other families of spiders were recorded in lowest population densities and frequencies of occurrence.

The obtained results agree with those obtained by Thaler and Zapparoli (1993) they recorded 70 species belonging to 18 families with the predominant families being Linyphiidae, Lycosidae, Dysderidae, Gnaphosidae and Theridiidae.

**The first year (2007/2008):**

Data in Table (2) indicated that the members of families Dysderidae, Hersiliidae, and Linyphiidae were represented in two localities (Al-Azhar University and Banymore) with moderate total numbers reached 47, 44 and 44 individuals whereas population density and frequency of occurrence were (11.75-4.2%), (11.00-4.2%) and (11.00-4.2%), respectively. The families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found in two localities with highly total individuals reached 168, 207, 231, 188, 206, 189 and 191, whereas, population density and frequency of occurrence (21.00-8.3%), (29.57-7.3%), (33.00-7.3%), (31.33-6.3%), (34.33-6.3%), (31.50-6.3%) and (38.20-5.2%), respectively. While the members of families Filistatidae, Liocranidae, Oecobiidae and Tetanosiidae not recorded during this year. Whereas, the other families of spiders were recorded in lowest population densities and frequencies of occurrence.

**Table (2): Population density and frequency of occurrence of families and spider species on different fruit trees during 2007/2008 year in Assuit Governorate.**

Families and spider species	Spider population density		Total individuals of families	Total No. of samples containing families	Population density (P.D.)	Frequency occurrence% (F.O.)
	Al-Azhar	Banymore				
Araneidae	21	17	38	2	19.00	2.1
Clubionidae	12	20	32	2	16.00	2.1
Dictynidae	22	13	35	2	17.50	2.1
Dysderidae	18	29	47	4	11.75	4.2
Filistatidae	0	0	0	0	0.00	0.0
Gnaphosidae	71	97	168	8	21.00	8.3
Hersiliidae	30	14	44	4	11.00	4.2
Linyphiidae	13	31	44	4	11.00	4.2
Liocranidae	0	0	0	0	0.00	0.0
Lycosidae	108	99	207	7	29.57	7.3
Miturgidae	107	124	231	7	33.00	7.3
Oecobiidae	0	0	0	0	0.00	0.0
Oonopidae	5	14	19	1	19.00	1.0
Philodromidae	89	99	188	6	31.33	6.3
Pholcidae	19	5	24	2	12.00	2.1
Salticidae	107	99	206	6	34.33	6.3
Scytodidae	18	21	39	2	19.50	2.1
Tetanosidae	0	0	0	0	0.00	0.0
Theridiidae	88	101	189	6	31.50	6.3
Thomisidae	112	79	191	5	38.20	5.2
Titanoecidae	1	2	3	1	3.00	1.0
Uloboridae	15	20	35	2	17.50	2.1

Data in Table (2) showed that the population of spider families associated with some fruit trees in Al-Azhar locality i.e. the members of families Araneidae, Dictynidae and Hersiliidae were represented in Al-Azhar University locality with moderate total reached 21, 22 and 30 individuals, also the population density and frequency of occurrence were (19.00- 2.1%), (17.50- 2.14%) and (11.00 – 4.2%), respectively. While, the families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found with highly total individuals reached 71, 108, 107, 89, 107, 88 and 112 individuals, also the population density and frequency of occurrence were (21.00- 8.3%), (29.57- 7.3%), (33.0-7.3%), (31.33- 6.3%), (34.33-6.3%), (31.5-6.3%) and (38.20-5.2%), respectively. Whereas, the other families of spiders were recorded in lowest population densities and frequencies of occurrence.

Data in Table (2) showed that the population of spider families associated with some fruit trees in Banymore locality i.e. the members of families Clubionidae, Dysderidae and Linyphiidae were represented in Banymore locality with moderate total reached 20, 29, and 31 individuals, also the population density and frequency of occurrence were (16.00-2.1%), (11.75-4.2%) and (11.00- 4.2%), respectively. While, the families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found with highly total individuals reached 97, 99, 124, 99, 99, 101 and 79 individuals, also the population density and frequency of

occurrence were (21.0-8.3%), (29.57-7.3%), (33.00- 7.3%), (31.33-6.3%), (34.33-6.3%), (31.50-6.3%) and (38.20-5.2%), respectively. Whereas, the other families of spiders were recorded in lowest population densities and frequencies of occurrence.

The obtained results are agree with those obtained by Mohafez (2000) who recorded the true spider species *Thyene imperialis* (Salticidae), *Eusparassus* sp., (Sparassidae), *Euryopis acuminata*, *Theridion* sp., (Theridiidae), *Runcinia* sp., *Thomisus spinfer* (Thomisidae), *Uloborius walcknerius* (Uloboridae), from fruit trees of citrus, fig, grape, guava, and mango, in some counties of Sohag Governorate.

**The second year 2008/2009:**

Data in Table (3) indicated that the members of families Clubionidae, Filistatidae, Hersiliidae, Liocranidae, and Oecobidae were represented in two localities (Al-Azhar University and Banymore) with moderate total numbers reached 50, 66, 48, 84, and 48 individuals whereas population density and frequency of occurrence were (12.50-4.2%), (13.20-5.2%), (16.00-3.1%), (12.00-7.3%) and (12.00-4.2%), respectively.

The families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found in two most localities with highly total individuals reached 172, 179, 281, 184, 178, 193 and 189 individuals with population density and frequency of occurrence (24.57-7.3%), (22.38-8.3%), (31.22-9.4%), (36.80-5.2%), (35.60-5.2%), (24.13-8.3%) and (27.00-7.3%), respectively. Whereas, the other families of spiders were recorded in lowest population densities and frequencies of occurrence.

Data in Table (3) showed that the population of spider families associated with some fruit trees in Al-Azhar locality. The members of families Filistidae, Hersiliidae, Liocranidae and Oecobiidae were represented in Al-Azhar University locality with moderate total numbers reached 32, 36, 34 and 32 individuals, also the population density and frequency of occurrence were (6.40-10.4%), (12.00-6.3%), (4.86-14.6%) and (8.00-8.3%), respectively. While, the families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found with highly total individuals reached 81, 100, 133, 109, 81, 96 and 98 individuals, also the population density and frequency of occurrence were (24.57-7.3%), (22.38-8.3%), (31.22-9.4%), (36.80-5.2%), (35.60-5.2%), (24.13-8.3%) and (27.00-7.3%), respectively. Whereas, the other families of spiders were recorded in lowest population densities and frequencies of occurrence.

Data in Table (3) showed that the population of spider families associated with some fruit trees in Banymore locality. The members of families Filistatidae and Liocranidae were surveyed in Banymore locality with moderate total numbers reached 34 and 50 individuals, also the population density and frequency of occurrence were (11.33-6.3%) and (8.33-12.5%), respectively. While, the families Gnaphosidae, Lycosidae, Miturgidae, Philodromidae, Salticidae, Theridiidae and Thomisidae were found with highly total individuals reached 91, 79, 148, 75, 97, 97 and 91 individuals, also the population density and frequency of occurrence were (11.38-16.7%), (11.29-14.6%), (21.14-14.6%), (12.50-12.5%), (16.17-12.5%), (16.17-12.5%) and

(18.20-10.4%), respectively. Whereas, the other families of spiders were recorded in lowest population densities and frequencies of occurrence.

**Table (3): Population density and frequency of occurrence of families and spider species on different fruit trees during 2008/2009 year in Assuit Governorate.**

Families and spider species	Spider population density		Total individuals of families	Total No. of samples containing families	Population density (P.D.)	Frequency occurrence% (F.O.)
	Al-Azhar	Banymore				
Araneidae	17	15	32	2	16.00	2.1
Clubionidae	26	24	50	4	12.50	4.2
Dictynidae	26	17	43	3	14.33	3.1
Dysderidae	14	25	39	3	13.00	3.1
Filistatidae	32	34	66	5	13.00	5.2
Gnaphosidae	81	91	172	7	24.57	7.3
Hersiliidae	36	12	48	3	16.00	3.1
Linyphiidae	9	25	34	4	8.50	4.2
Liocranidae	34	50	84	7	12.00	7.3
Lycosidae	100	79	179	8	22.38	8.3
Miturgidae	133	148	281	9	31.22	9.4
Oecobiidae	32	16	48	4	12.00	4.2
Oonopidae	3	22	25	2	12.50	2.1
Philodromidae	109	75	184	5	36.80	5.2
Pholcidae	23	7	30	3	10.00	3.1
Salticidae	81	97	178	5	35.60	5.2
Scytodidae	24	17	41	3	13.67	3.1
Tetanosidae	24	24	48	4	12.00	4.2
Theridiidae	96	97	193	8	24.13	8.3
Thomisidae	98	91	189	7	27.00	7.3
Titanoecidae	3	2	5	1	5.00	1.0
Uloboridae	11	18	29	3	9.67	3.1

The obtained results are agree with those obtained by Deltashev (1997) reported that the most important families were Lycosidae (25.8%), Salticidae (12.9%) and Linyphiidae, Theridiidae and Gnaphosidae (all 9.7%) collected from 10 sites along the Shabla-Exerets Lake in Bulgaria.

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### حصر وتوزيع عائلات العناكب الحقيقية في محافظة أسيوط

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تمت دراسة حصر وتوزيع عائلات العناكب الحقيقية علي أشجار الجوافة والعنب والموالح والتفاح في منطقتي جامعة الأزهر وبني مر بمحافظة أسيوط خلال سنتي ٢٠٠٧/٢٠٠٨ و ٢٠٠٨/٢٠٠٩.

وقد أسفرت الدراسة عن أن تعداد العناكب الحقيقية التي تم أخذها شهريا خلال مدة الدراسة عن تسجيل ٢٢ عائلة تتبع sub-order labidognatha موزعة علي أشجار الجوافة والعنب والموالح والتفاح في منطقتي جامعة الأزهر وبني مر بمحافظة أسيوط خلال سنتي ٢٠٠٧/٢٠٠٨ و ٢٠٠٨/٢٠٠٩. كما أظهرت النتائج أن عائلات Lycosidae ، Gnaphosidae ، Thomisidae ، Theridiidae ، Salticidae ، Philodromidae ، Miturgidae تواجدت خلال سنتي الدراسة منطقتي جامعة الأزهر وبني مر بمحافظة أسيوط بمتوسط تعداد كلي مرتفع ونسب حدوث تكرارية عالية علي أشجار الجوافة والعنب والموالح والتفاح في منطقتي جامعة الأزهر وبني مر بمحافظة أسيوط. كما أظهرت النتائج أن عائلات Dictynidae ، Scytodidae ، Pholicidae ، Hersiliidae تواجدت خلال سنتي الدراسة منطقتي جامعة الأزهر وبني مر بمحافظة أسيوط بمتوسط تعداد كلي متوسط ونسب حدوث تكرارية متوسطة علي أشجار الجوافة والعنب والموالح والتفاح في منطقتي جامعة الأزهر وبني مر بمحافظة أسيوط بينما بقية العائلات ظهرت بمتوسط تعداد كلي قليل ونسب حدوث تكرارية قليلة.

### قام بتحكيم البحث

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**Table (1): Population density and frequency of occurrence of families and spider species on different fruit trees during two successive years, 2007/2008 and 2008/2009 in Assuit Governorate.**

Families and spider species	Spider population density		Total individuals of families	Total No. of samples containing families	Population density (P.D.)	Frequency occurrence% (F.O.)
	Al-Azhar	Banymore				
Araneidae	38	32	70	4	17.50	2.1
Clubionidae	38	44	82	6	13.67	3.1
Dictynidae	48	30	78	5	15.60	2.6
Dysderidae	32	54	86	7	12.29	3.6
Filistatidae	32	34	66	5	13.20	2.6
Gnaphosidae	152	188	340	12	28.33	6.3
Hersiliidae	66	26	92	5	18.40	2.6
Linyphiidae	22	56	78	6	13.00	3.1
Liocranidae	34	50	84	7	12.00	3.6
Lycosidae	208	178	386	15	25.73	7.8
Miturgidae	240	272	512	16	32.00	8.3
Oecobiidae	32	16	48	4	12.00	2.1
Oonopidae	8	36	44	3	14.67	1.6
Philodromidae	198	174	372	11	33.82	5.7
Pholcidae	42	12	54	5	10.80	2.6
Salticidae	188	196	384	10	38.40	5.2
Scytodidae	42	38	80	5	16.00	2.6
Tetanosidae	24	24	48	4	12.00	2.1
Theridiidae	184	198	382	14	27.29	7.3
Thomisidae	210	170	380	12	31.67	6.3
Titanoecidae	4	4	8	1	8.00	0.5
Uloboridae	26	38	64	5	12.80	2.6