Menoufia J. Plant Prot., Vol. 4 August (2019): 139 - 144

OCCURRENCE OF TRUE SPIDERS ASSOCIATED WITH WHEAT PLANTS IN QALUOBIA AND BENI-SUIEF GOVERNORATES, EGYPT

Hosnea A. A. Elwan

Plant Protection research Institute, Agricultural Research center, Dokki, Giza, Egypt

Received: Mar. 28 , 2019 **Accepted: May. 22, 2019**

ABSTRACT: ***Wheat, (Triticum aestivum L.), is a major cereal crop in Egypt. True spiders represent one of the most important natural predators against different arthropod pests in Egyptian fields. In this study , the common true spiders were surveyed in wheat fields, and counted weekly using two different methods (Plant-shaking method and Pit-fall trap) during the cultivated seasons 2016/2017 and 2017/2018. The obtained results indicated that the collected spiders associated with wheat plants in the two tested localities (Qaluobia and Beni-Suief governorates) were 13 spider species belongs to 12 genera in 12 families. The number of collected spider species associated with foliage in this study were 10 species, as the soil spiders were 4 (one of them inhabiting foliage and soil (Erigone sp : Linyphidae). The abundance of the collected species were higher during April month along the two cultivated seasons. The results indicated that the commonest spiders inhabiting the soil of wheat plants in Qaluobia Governorate were belonging to 3 families, Gnaphosidae, Lycosidae and Oecobiidae. The highest number of collected spider species were observed during April 2017 and 2018 but the period of December did not recorded any spiders. Family Gnaphosidae recorded the highest population followed by Lycosidae and Oecobiidae along the two examined seasons.***

Key words: ***Wheat, true spiders, wheat, population, identification.***

INTRODUCTION

Wheat, (*Triticum aestivum* L.) is a major cereal crop not only in Egypt but also worldwide. It gained a particular importance as the most available winter cereal crop. Most of previous investigations of the wheat insect pests have been largely directed towards the common insects infesting this crop such as aphids, wheat stem sawfly, the lesser grain borer and the rice weevil. True spiders (Araneae) represent by far the largest order of the arachnids, with about 35,000 species known worldwide. All are carnivorous predators with powerful fangs, called chelicerae, which are used to bite and crush the prey and to inject venom. However, Wise (1993) stated that spiders are generalist feeders that attack insects and other arthropods. They are even more strictly carnivorous that have many other tasks of primarily predacious invertebrates such as carbide beetles. Many of the spiders commonly found in Egyptian fields, particularly members of the families of Lycosidae, Philodromidae, Salticidae and Scytodidae are considered beneficial natural enemies. Many authors who are related to biological control field of insect pests mentioned true spiders as important predators within their works of survey. They are capable of reducing populations of herbivores that may not be limited by competition and food availability in some agroecosystems (Sunderland 1999). Another review of an abundant spider in agroecosystems, *Oxyopes salticus* Hentz, indicated the

considerable potential of this species for suppressing insect pest populations in agroecosystems (Young and Lockley 1985). These reviews and others increasingly point to the importance of spiders as part of a strategy of Integrated Pest Management. Many field experiments, performed over the last 35 years, have demonstrated that spiders can reduce insect populations and the crop damage they cause (Mansour *et al.*, 1980; Mansour and Whitcomb 1986; Oraze and Grigarick 1989; Carter and Rypstra 1995; Riechert and Lawrence 1997).The Effect of organic fertilizers and flowering plants on sheet-web and wolf spider populations (Araneae: Lycosidae and Linyphiidae) and its importance for pest control was studied by El-Nabawy *et al*. (2016).The authors noticed that the numbers of Collembola, thirps, and lycosid and linyphiid spiders were higher on flowering plants recieved organic fertilizer compared with that received chemical fertilizers. An analysis of 29 faunal surveys of spiders found in nine field crops in the United States indicates the presence of 614 species in 192 genera and 26 families. These species represent 19% of the total of 3311 species occurring in North America. Five families included 61% of the species reported in field crops: Salticidae (89 spp.), Linyphiidae (78 spp), Araneidae (77spp), Theridiidae (64spp), and Lycosidae (62spp) Young and Edwards (1990).

The present study was conducted to study the occurrence of true spiders in wheat fields in Qaluobia and Beni Suief Governorates during the period of December to April months for two seasons.

MATERIALS AND METHODS

Survey of true spiders:

Survey of the common true spiders found in wheat fields was done in Qaluobia (Qaha region) and Beni–Suief (Seds region) Governorates during 2016/2017 and 2017/208 cultivated seasons, where the wheat plants were weekly investigated for true spiders and counted (early in the morning).

Picking of the collected true spiders:

Spiders were trapped by two methods:

1- Plant-shaking method:

The spiders on wheat foliage were collected by shaking the plants on a cloth or a shake sheet. This method is referred as the drop cloth method. Ten wheat plants were shacked over the shaking white cloth (1m x 1m) twice monthly during the surveying period.

2-Pit-fall trap method:

Samples of the soil spiders fauna were collected from the study area by pit-fall method described by Slingsby and Cook (1986) and Southwood and Henderson (2000). In this study, the number of spiders trapped in primarily depend on their location activity (Greenslade and Greenslade, 1983, and Mickhail, 1993). The traps were used in each sampling date in different plots according to Rizk *et al.* (2005). The number of spiders collected is the total number of individuals/10 traps to avoid decimal fraction. Plastic containers (10 cm diameter) were filled with detergent and water (1:40). In this way specimens that fall into the trap are died and preserved. The traps were embedded in the soil at the soil surface. Ten traps were distributed at the experimental wheat area (1/2 feddan). Trap catches were collected every two weeks and the old traps were replaced by new ones at the same place. Specimens are transported back to the laboratory alive or dead.

Identification of true spiders:

In most cases the families are easy to distinguish in the field by position and number of eyes, overall shape, length of legs, and form of spinners (Wise, 1993, and sallam , 2002). In the laboratory it is easy to separate the kinds of true spiders which are morphologically similar and given a code number for each. Then, spiders were kept in a mixture of 70% alcohol and 5% glycerol until their identification.

RESULTS AND DISCUSSION

The study indicated that the collected spiders associated with wheat plants in the two tested localities (Qaluobia and Beni-Suief governorates) were 13 spider species belongs to 12 genera in 12 families (Table 1). The families are : Gnaphosidae, Araneidae, Miturgidae, Theridiidae, Lycosidae, Philodromidae, Oecobiidae, Salticidae, Thomisidae, Linyphidae, Tetragnathidae and Dictynidae. The number of collected spider species associated with foliage in this study were 10 species, as the soil spiders were 4 (one of them collected inhabiting foliage and soil i.e, *Erigone* sp. (Linyphidae). In this study, the abundance of the collected families was higher during April of both seasons.

Table (1): True spider species associated with wheat plants at Qaluobia and Beni-Suief Governorates, during 2016/2017 and 2017/208 seasons

Family	Species	Habitat	Locality	Occurrence
Gnaphosidae Pocock	*Zelotes* sp.	Soil	Q.	April
Araneidae Simon	*Argiope trifasciata* Forskal	Foliage	Q. & B.	April-May
Miturgidae Simon	*Cheiracanthium isiacum* Cambridge	Foliage	Q. & B.	March- April
	C. pelasgicum (Koch)	Foliage	Q. & B.	March- April
Theridiidae Sundeval	*Crustufina conspicus*	Foliage	Q.	February-March
Lycosidae Sundeval	*Hogna ferox* (Lucas)	Soil	Q. & B.	December-February
Philodromidae Thorell	*Thanatus albini* (Audouin)	Foliage	Q. & B.	March- April
Oecobiidae Blackwall	*Oecobius* sp.	Soil	Q.	January-April
Salticidae Blackwall	*Plexippus paykulli* (Audouin)	Foliage	Q. & B.	February-April
Thomisidae Sundeval	*Thomisus spinifer* Cambridge	Foliage	Q. & B.	March- April
Linyphidae Blackwall	*Erigone* sp.	Foliage	Q.	April
		Soil	B.	March- April
Tetragnathidae Menge	*Tetragnatha nilens* (Audouin)	Foliage	Q. & B.	March- April
Dictynidae Blackwall	*Dictyna sp.*	Foliage	Q. & B.	March -April

Q. = Qaluobia B.= Beni-Suief Sample was consists of 10 wheat plants

The current study showed that Qaluobia governorate was harbored more spiders than Beni-Suief governorate. The collected spiders in two tested regions collectively were *Argiope trifasciata* (Araneidae), *Cheiracanthium isiacum* and *C. pelasgicum* (Miturgidae), *Hogna ferox* (Lycosidae), *Thanatus albini* (Philodromidae), *Plexippus paykulli* (Salticidae) and *Thomisus spinifer* (Thomisidae), *Tetragnatha nilens* (Tetragnathidae) and *Dictyna sp.* (Dictynidae) Table (1). The same data showed that the collected spiders in Qaluobia Governorate and disappeared in Beni-Suief Governorate were *Zelotes* sp. (Gnaphosidae), *Crustufina conspicus* (Theridiidae), and *Oecobius* sp, (Oecobiidae).

The obtained data in Tables (2 and 3) show that the commonest spiders inhabiting soil of wheat plants in Qaluobia Governorate were belonging to 3 families, Gnaphosidae, Lycosidae and Oecobiidae. The highest number of collected spider families was observed during April 2017 and 2018 (52 and 60 individuals, respectively). However, the period of December 2016 did not recorded any population of the collected spiders. Also, the same tables indicated that the highest population of the collected families was determined for the family Gnaphosidae followed by Lycosidae and Oecobiidae during the two cultivated seasons.

In conclusion, the spiders species may play a buffer to regulate population of many mites and insect pests such as stem borer, maggots and leaf and plant hoppers. Thee beneficial role of spiders might be interpreted by the low populations of the pests when existed. Accordingly, conservation of these beneficial species are necessary to keep the natural balance in wheat fields as well in other ecosystem (Hendawy and Abul-Fadl, 2004). This could be mainly done by minimizing the application of any chemicals, Sallam (2002). Barrion and Litsinger (1980) and Nentwig (1987) reported that small pests, such as thirps, midge and aphids, may die by being eaten of caught in the webs of large spiders.

Table (2): Seasonal abundance of spiders/10 pit-fall traps in wheat fields at Qaluobia Governorate during 2016/2017 cultivated season.

Month	Gnaphosidae	Lycosidae	Oecobiidae	Total
December 2016	0	0	0	0
January 2017	6	5	4	15
February 2017	8	5	3	16
March 2017	11	7	6	24
April 2017	22	17	13	52

Table (3): Seasonal abundance of spiders/10 pit-fall traps in wheat fields at Qaluobia Governorate during 2017/2018 cultivated seasons.

Month	Gnaphosidae	Lycosidae	Oecobiidae	Total
December 2017	1	0	0	1
January 2018	9	3	5	17
February 2018	12	4	7	23
March 2018	16	9	4	29
April 2018	27	15	18	60

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تواجد العناكب الحقيقية المرتبطة بنباتات القمح فى محافظتي القليوبية وبني سويف

حسنية عبد الفتاح عفيفي علوان

معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقى – جيزة – مصر

الملخص العربى

يعتبر محصول القمح من المحاصيل الاستراتيجية فى مصر وتعتبر العناكب الحقيقية واحدة من أهم الأعداء الطبيعية التى تستخدم فى مجال المكافحة لآفات القمح المختلفة ولقد تم هذا العمل لحصر العناكب الحقيقية فى حقول القمح فى محافظتي القليوبية وبني سويف موسمي الدراسة ٢٠١٦/٢٠١٧ و ٢٠١٧/٢٠١٨ على الجزء الخضري أو فى التربة المجحيطة بالنباتات.

أثبتت الدراسة وجود ١٣ نوع من العناكب و ١٢ جنس داخل ١٢ عائلة مختلفة. ولقد لوحظ من الدراسة وجود ١٠ أنواع مختلفة مصاحبة للجزء الخضري وظهر ايضا ٤ أنواع فى التربة (منها نوع واحد مشترك مع الجزء الخضري وهو النوع .sp *Erigone* المنتمى لعائلة (Linyphidae). ايضا لوحظ أن تواجد العناكب كان اكثر تعدادا فى شهر ابريل فى كل من الجزء الخضري والتربة . ولقد اتضح ايضا أثناء الدراسة أن عائلات Gnaphosidae و Lycosidae و Oecobiidae كانت هي الموجودة والسائدة فى تربة القمح بمحافظة القليوبية ، واتضح أن أكبر تعداد للعناكب فى التربة كان أثناء شهر ابريل عامى ٢٠١٧ و ٢٠١٨ ، كما لم يشاهد أى تواجد للعناكب على الجزء الخضرى لنباتات القمح فى شهر ديسمبر على مدار موسمى الدراسة ، كما لم يتم تسجيل اى تواجد للعناكب فى التربة اثناء شهر ديسمبر ٢٠١٦ ، ووجد ايضا أن أعلي تعداد للعناكب كان لعائلة Gnaphosidae يليها عائلة Lycosidae ثم عائلة Oecobiidae اثناء موسمي الدراسة.

السادة المحكمين

أ.د/ عصام محمد عبدالسلام مركز البحوث الزراعية – الجيزة

أ.د/ محمد الأمين سويلـــم كلية الزراعة – جامعة المنوفية