



First Inventory of Spiders in Fetzara Lake (Wetland) In North Eastern Algeria and Studying of Monthly Dynamics of Abundances and Species Richness

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ABSTRACT

In Algeria, little work has focused on the study of spiders. Fetzara Lake which is a wetland located in north eastern of Algeria, covers an area of 20680 hectares. This has encouraged the development of several plant species in the lake and the borders of the lake. This particular ecosystem allowed the installation of arthropods in the edges of the lake, including spiders.

The objective of this work was to make an initial inventory of spiders occupying the edges of Fetzara Lake, and draw up the first list of species that characterize the region. An inventory was conducted in Fetzara Lake (Annaba Algeria) during a period running from December 2013 to November 2014. The inventory revealed the presence of 38 species belonging to 15 families Araneidae, Dysderidae, Clubionidae, Gnaphosidae, Liocranidae, Lycosidae, Oxyopidae, Palpimanidae, Pisauridae, Salticidae, Scytodidae, Tetragnathidae, Theridiidae, Philodromida and Zodariidae. Very high species richness was observed in the Araneidae family with 07 species, while the family Gnaphosidae recorded 06 species. Lycosidae and Philodromidae families were represented by four species each. Three species were recorded for each family in Dysderidae and Salticidae. Pisauridae and Theridiidae revealed two species each. And the rest of the families marked their presence by a single species each. The number of the identified individuals was 432 adult specimens. The most encountered species were *Pardosa sp* and *Araneus diadimatus*.

Keywords: spiders, arachnids, families, species, *Araneus*, *Pardosa*, Fetzara Lake, Algeria

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Taxonomic studies of Bosman & Arous (1992), Bosman & Chergui (1993) were also recorded. In a study of spiders in the

Mellah Lake region in northeastern Algeria, (Bourbia et al, 2018) recorded the presence of 10 families, 15 genera and 17 species of spiders.

This work is a biological inventory that allowed us to draw a partial list of wildlife Spiders northeastern Algeria, and specifically that of the northern edges of Fetzara Lake, and studying of monthly dynamics of abundances and species richness. Our inventory revealed the presence of 38 species belonging to 15 families.

MATERIALS AND METHODS

Study area

Fetzara lake (Latitude 36 ° 43 ' and 36 ° 50' N Longitude 7 ° 24 ' and 7 ° 39' E), covers the southern foothills of the massif of Edough over an area of about 20,680 hectares, 14 Km from the Mediterranean Sea. The lake lies on 17 km from east to west of the city of Annaba in the far east of Algeria, and 13 kilometers at its widest part. The open water, including fresh water is relatively depending on the intensity of the rainy seasons, is usually one of more than 5,800 hectares, but also covering 4,000 hectares of floodplain in winter thus providing extensive wet meadows. In 2003, it was officially classified as an area of "Ramsar", a wetland (Fig 1).

INTRODUCTION

Scarce or abundant, day or night, wandering or sedentary, the often subtle and hidden spiders are present everywhere in the various habitat types. They are abundant in nature (Wise 1993). There are 47505 spider species that have been described worldwide belonging to 116 families (WSC 2018). Spiders play a role in regulation of insects and other invertebrate populations (Riechert 1974), (Nyffeler & Benz 1987), (Wise 1993). They are known for their role of bioindication (Pearce & Venier 2006). Webs of spiders have been used as indicators of environmental chemistry (Hose et al. 2002).

The main prey of spiders is terrestrial insects in general, and sometimes for aquatic spiders that can hunt in water. But being cannibals for the majority of species, their food also consists of spiders or other arachnids (scorpions).

For studies of the spiders in Algeria include the work of Lucas in (1846), who made a scientific exploration of Algeria during 1840, 1841, and 1842. Simon studies (1899, 1910a) that published an Arachnid catalog reasoned in northern of Africa.

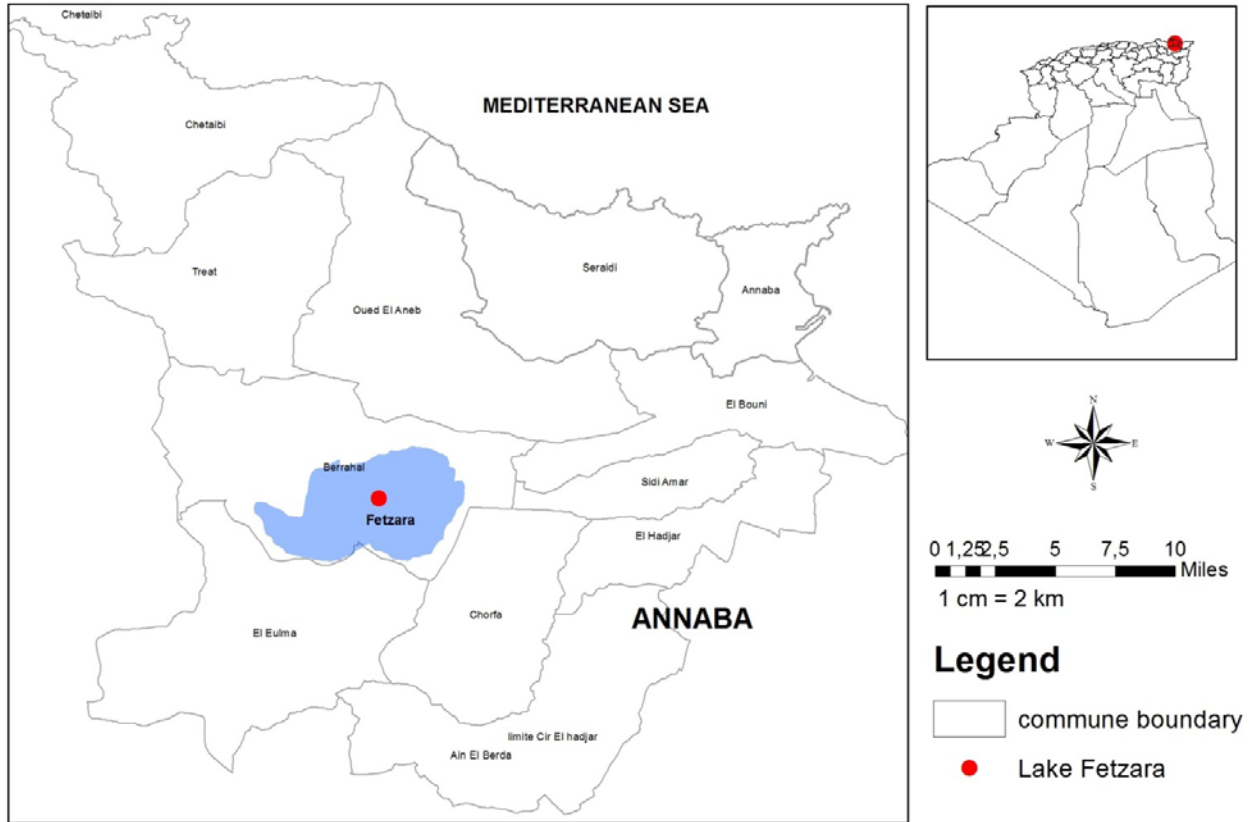


Figure 1. Location of the wetland Fetzara Lake (North East Algeria)

Study period and sampling

This study was conducted during the period of one year from the month of December 2013 to November 2014, with the average of two per month outputs to sampling site. The sampling was done between (9 am to 2 pm). In order to obtain representative samples of the site, some techniques were used for catching the numbers of samples that include:

Tracking and capturing on a random and exhaustively all the wandering or sedentary spiders, on the ground or in the various strata of vegetation and under stones; The installation of the Barber traps, which are containers sunk into the ground, filled with 1/3 of a liquid (vinegar) to slay the quicker individuals before escaping, and keep them up at next lift of the trap, was used to capture ground spiders.

Conservation and identification

Individuals caught are immediately placed in glass tubes containing ethanol 70 °.

The identification was performed through an individual examination under binocular according to the identification keys of (Michael 2009) and (Nentwig et al. 2017).

Several other specimens yet to be identified and that can be a new species in this field of science.

RESULTS

The final list includes 38 species belonging to 15 families in the northern basin of the Lake Fetzara (Tab 1).

Table 1. Spider species identified in the edges of Fetzara Lake North East Algeria

family	Genera & species	Author
Araneidae	Araneus diadematus	Clerck
	Gibbaranea sp	
	Cyclosa sp1	
	Cyclosa sp2	
	Mangora acalypha	Walckenaer
	Araneilla sp	
	Agalenates sp	
Dysderidae	Dysdera crocata	L. Koch
	Dysdera sp1	
	Harpactea sp	

Clubionidae	Clubiona sp	
Gnaphosidae	Gnaphosa sp	
	Haplodrassus sp	
	Drassodes sp1	
	Drassodes sp2	
	Aphantaulax sp	
	Zelotes sp	
Liocranidae	Agraecina sp	
Lycosidae	Pardosa sp	
	Pardosa prativaga	L. Koch
	Arctosa sp	
	Pirata piraticus	Clerck
Oxyopidae	Oxyopes sp	
Palpimanidae	Palpimanus sp	
Pisauridae	Pisaura mirabilis	Clerck
	Pisaura sp	
Salticidae	Euophrys sp	
	Phlegra sp	
	Neon sp	
Scytodidae	Scytodes thoracica	Latreille
Tetragnathidae	Tetragnatha sp	
Theridiidae	Dipoena sp	
	Euryopis sp	
Philodromidae	Philodromus sp	
	Thanatus arenarius	L. Koch
	Thanatus atratus	Simon
	Thanatus vulgaris	Simon
Zodariidae	Zodarion sp	

This study has shown that the population of spiders in the region of Fetzara Lake consists of fifteen families Araneidae,

Dysderidae, Clubionidae, Liocranid, Lycosidae, Oxyopidae, Palpimanidae, Pisauridae, Salticidae, Scytodidae, Tetragnathidae, Theridiidae, Philodromidae and Zodariidae. The richest families in species were Araneidae and Gnaphosidae, against the least represented families which were Clubionidae, Liocranidae, Oxyopidae, Palpimanidae, Scytodidae, Tetragnathidae and Zodariidae with one species for each (Fig 2).

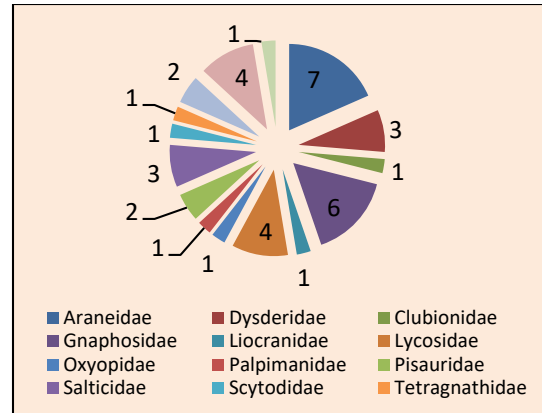


Figure 2. The number of species per family in the overall population of spiders in the edges of the Fetzara Lake (North East Algeria)

The distribution of abundances

The population of spiders was dominated by a species *Pardosa sp* comprising 102 individuals, *Araneus diadematus* was also well represented with an abundance of 43 individuals. The remaining species are less represented (fig 3).

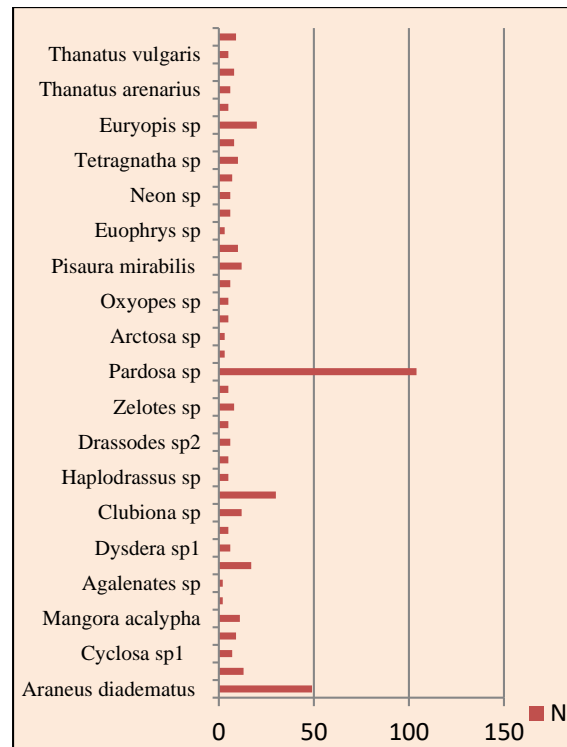


Figure 3. The distribution of abundances of the overall population of spiders in Fetzara Lake (North East Algeria)

Monthly dynamic of abundance (N) in the population of spiders in the area of Fetzara Lake (North East Algeria)

The monthly changes in the abundances showed they reach the peak in December with 87 individuals, and become weak from

January to March. It was denoted that against an increase in April, the abundances declined in June and July, and they reached the minimum in the month of August with 10 individuals. Elevated numbers were recorded in September, October, and November (Fig 4).

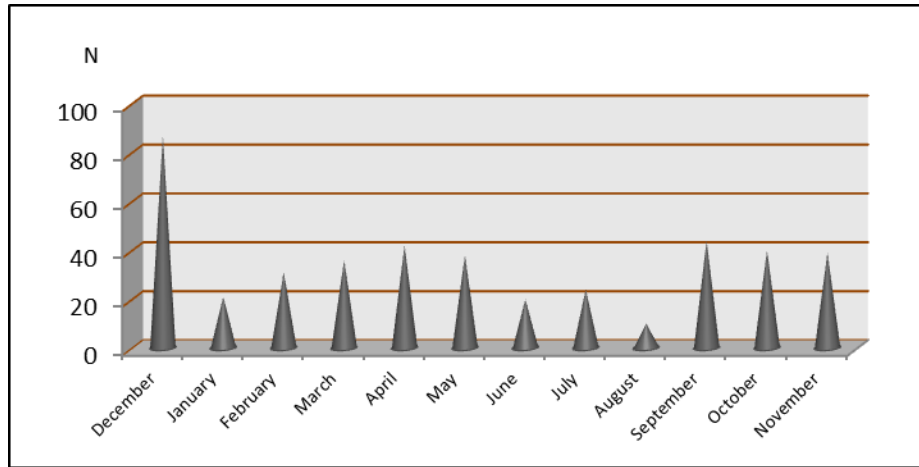


Figure 4. Monthly change in abundances (N) of spiders at Fetzara Lake (North East Algeria)

Monthly dynamic of species richness (S) in Fetzara Lake area (North East Algeria)

The change in the monthly wealth said it has reached its maximum value in September, October and November. It was low in June, July and August (Fig 5).

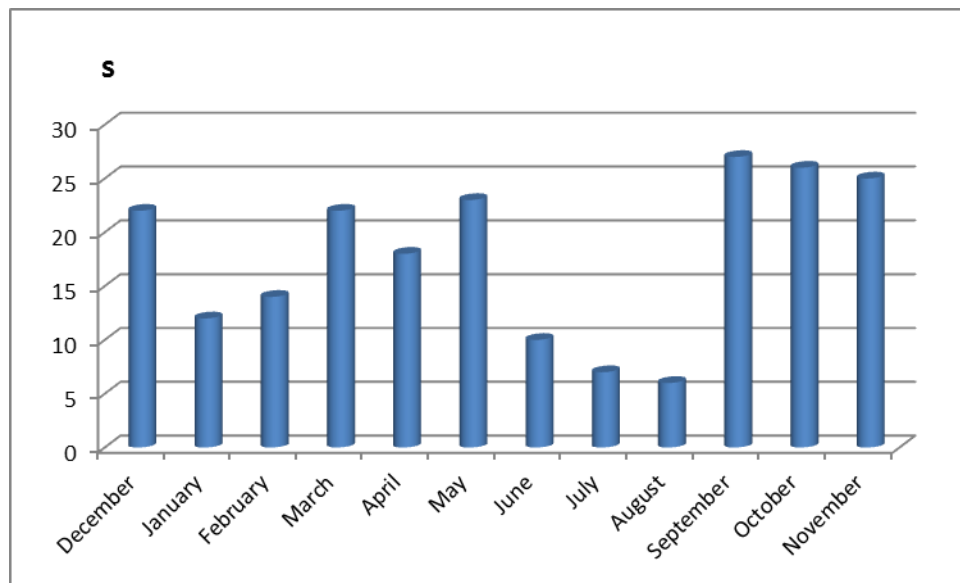


Figure 5. The monthly change in species richness (S) at Fetzara Lake (North East Algeria)

DISCUSSION AND CONCLUSION

The Fetzara Lake revealed very important species richness from the ecological and biological points of view, there were 38 species of spiders belonging to 15 families, many other species yet to be identified, there was a high abundance of *Pardosa* sp as a wandering species living at the ground level, and also *Araneus diadimatus* that builds webs everywhere. This significant wealth reflected the diversity of habitats at the lake Fetzara in its peripheries of large lawn and herbaceous fallow

land and open areas with low vegetation and bare soil favoring the installation of certain spider species. These predators of many arthropods are an important component of the natural

ecosystem (Horvath et al. 2009). On the ground floors, bare ground, and open spaces, there were the *Lycosidae*, *Salticidae*, *Araneidae*, *Theridiidae* and *Zodariidae* families. While *Tetragnatidae*, *Oxyopidae* and *Philodromidae* prefer low-growing plants. *Pisauridae* frequented in wet meadows of the lake. *Scytodes thoracica* often lived under stones. While

Dysderidae, Clubionidae, Liocranidae were hiding under stones, in the tufts of grass and low-growing plants near water. The Gnaphosidae were captured on low-growing plants in open areas and under stones, too.

The present work showed that Fetzara Lake revealed very important species richness from ecological and biological points of view, there were 38 species of spiders belonging to 15 families. A study that was conducted by (Alioua 2012) in four gardens of date palms in two groves located in Ouargla basin (North-East of Algeria) revealed 61 species of spiders belonging to 18 families. At Estepona (Anda-Lousie, Malaga Province, Spain), Lecigne (2012) identified 71 species of spiders belonging to 21 families during the period of 13th to 20th of April in 2011. Alioua *et al.* (2016) identified 13 species belonging to 13 genera and 9 families in the Sebkhet El Melah region of Northern Sahara, Algeria. In one sampling year, Bourbia *et al.* (2018) recorded 164 individuals from 10 families, 15 genera and 17 species in the region of Mellah Lake (Northeast of Algeria).

Compared to these places, it was found that Fetzara Lake's wildlife is diverse because the edges of the lake are generally open areas with a less dense canopy which provides less favorable conditions for the installation of spiders that are often discreet and hidden. Also, Fetzara Lake is known as an intensive area for agricultural activities in addition to overgrazing, which has had a negative impact on the natural presence of the spiders. On the other hand, this humid environment of the lake favors the installation and the proliferation of the insects all the year, and especially in winters and springs when the ambient temperature is within the limits of 25 °C favoring the reproduction of several species of mosquitos and flies and other insects that serve as trophic resources encouraging the installation of several species of spiders.

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