

ARTÍCULO:

**Arachnids of Elba protected area in the southern part of the eastern desert of Egypt**

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ARTÍCULO:

**Arachnids of Elba protected area in the southern part of the eastern desert of Egypt**

Hisham K. El-Hennawy

**Abstract:**

Elba protected area is a unique area with a variety of habitats. Its fauna is rich with numerous vertebrate and invertebrate species. The arachnids of this area are here studied for the first time. Specimens of five arachnid orders were collected during nine trips to different places in the area (June 1994 - November 2000). The collection contains 28 species of 16 families of Order Araneae, 1 species of family Phalangidae of Order Opiliones, 2 species of family Olpiidae of Order Pseudoscorpiones, 4 species of 3 families of Order Solifugae, and 7 species of family Buthidae of Order Scorpiones. A map of the studied area and keys to the solifugid and scorpion species and spider families of the area are included.

**Keywords:** Arachnida, spiders, scorpions, sun-spiders, pseudoscorpions, harvestmen, Egypt, Elba protected area.

**Arácnidos del área protegida de Elba en la parte del sur del desierto oriental de Egipto**

**Resumen:**

El Elba es un área protegida con una gran variedad de hábitats. Su fauna es rica con numerosas especies de vertebrados e invertebrados. En este trabajo se estudian por primera vez los arácnidos existentes en esta zona. Representantes de cinco órdenes de arácnidos fueron recolectados durante nueve campañas a diversos lugares de la zona de estudio (junio de 1994 - noviembre de 2000). La colección contiene 28 especies de 16 familias del Orden Araneae, 1 especie de Phalangidae (Opiliones), 2 especies de Olpiidae (Pseudoscorpiones), 4 especies de Solifugae de 3 familias diferentes y 7 especies de Buthidae (Scorpiones). Se incluye un mapa de la zona y claves de las especies de solífugos y escorpiones y de las familias de arañas del área estudiada.

**Palabras clave:** Arachnida, arañas, escorpiones, solífugos, pseudoscorpiones, opiliones, Egipto, área protegida de Elba.

## Introduction

In spite of the great number of invertebrate species and individuals and their great influence on the surrounding habitats, most studies on world protected areas are devoted to vertebrate animals. This study of arachnids of Elba protected area in the southern part of the eastern desert of Egypt is a preliminary work. The recorded species may be the most common arachnid species of the area. The arachnological studies are still few and sporadic in Egypt. The first landmark in the Egyptian arachnology was that achieved by Savigny and Audouin in the 19<sup>th</sup> century (El-Hennawy, 2000). They recorded 81 spider species, 3 scorpion species, 3 pseudoscorpion species, 4 solifugid species, 3 opilionid species, and 10 acarid species. The works of Pickard-Cambridge, Simon, Denis and other scientists added more records, descriptions, and data during the 19<sup>th</sup> and 20<sup>th</sup> centuries (El-Hennawy, 2002). The number of spider species recorded from Egypt now is 385 (El-Hennawy, 2006). The number of recorded species of other arachnid orders from Egypt is increased too, i.e. 24 scorpion species, 18 pseudoscorpion species, 26 solifugid species, and 6 opilionid species (El-Hennawy, 2002). This study is the fourth study on arachnids of protected areas of Egypt (El-Hennawy, 1991, 2003, 2005).

## Study site

Elba was declared as protected area by the Prime Ministerial Decree No. 450 for 1986 adjusted by P.M.D. No. 1186 for 1986 and P.M.D. No. 642 for 1995. Its area is about 35600 km<sup>2</sup>. Its location is: 22°00'-23°50'N 35°00'-37°00'E.

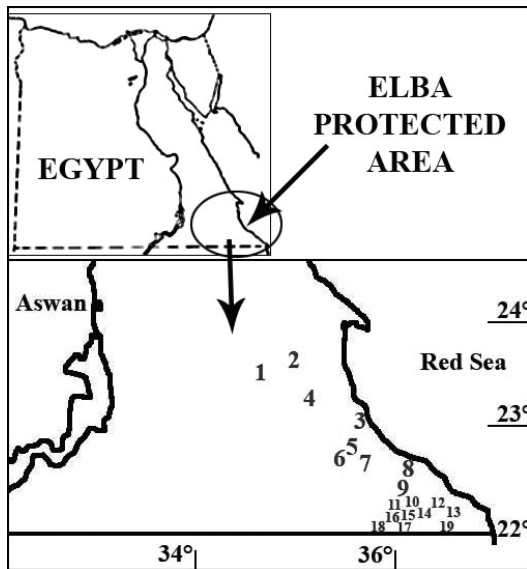
The Elba Protected Area encompasses an enormous variety of habitats and landscape features. A cluster of coastal mountains is overlooking the Red Sea and enjoys high precipitation than other mountains in the region. The summit of Gabal Elba is a "mist oasis" where a considerable part of precipitation is contributed in the form of dew or mist and clouds, creating a unique and rare ecosystem, not found anywhere else in Egypt. The abundance of moisture allows an exceptionally diverse flora to exist; 458 species are known. Ferns, mosses and succulents are fairly common in the mist zone at higher altitudes, where *Acacia etbaica*, *Moringa peregrina* and *Dracaena ombet* are dominant. At lower altitudes, in mountain wadis and foothills, there is a dense parkland, dominated by *Acacia tortilis*, *Delonix elata*, *Aerva persica* and *Euphorbia consobrinaa*. The density of this parkland is particularly high in the northern and north-eastern portions of Gabal Elba. The undulating coastal plain, separating the mountains from the coast, is interspersed with shallow wadis and covered with scattered bushes and trees dominated by *Acacia*

*tortilis*, *A. nubica* and *Balanites aegyptiaca*. Saltmarsh vegetation and mangrove swamps fringe long stretches of the coast. *Biscutella elbensis* and other plant species are endemic to Gabal Elba. Gabal Elba also supports a rich biological diversity unparalleled in any other desert environment in Egypt. Many Afrotropical elements have their northern limits at Gabal Elba. Some 40 bird species are known to breed in the vicinity of Gabal Elba. Species, such as. Ostrich *Struthio camelus* and Lappet-faced Vulture *Torgos tracheliotus*, which have disappeared from most of their former North African / Middle Eastern range, can still be found in the area of Gabal Elba. At least, 30 reptile species and one toad species have been recorded to date, of which four species do not extend further north. At least, 23 mammal species are known. Ruppel's Sand Fox *Vulpes rueppelli* is fairly common. Leopard *Panthera pardus* possibly still exists. Dorcas Gazelle *Gazella dorcas* and the Nubian Ibex *Capra nubiana* constitute a prominent part of the local fauna and are still fairly common; while the threatened Barbary Sheep *Ammotragus lervia* has apparently been locally extirpated. A small population of the Nubian Wild Ass *Equus asinus africanus* might still be present. The coast and islands included within the protected area support a diverse terrestrial flora and fauna, as well as, a rich marine ecosystem. Sea grass beds off shore are of importance to the endangered Dugong *Dugong dugon*. The protected area has several archaeological sites, outstanding structural formations and numerous water sources. The local Bischari and Ababda inhabitants have a rich and colourful traditional culture, which forms an important and integral part of the local landscape (MSEA, 2001). Insects of this area are recently studied by Fadl & Hassan (1997) and Hassan & Fadl (2000). They recorded 330 species to increase the insect fauna of the area to 815 species which belong to 17 orders.

## Material and methods

A preliminary survey of spiders, scorpions, sunspiders, pseudoscorpions and harvestmen had been achieved in Elba protected area during nine trips to different places in the area in June 1994, October and November 1995, March and December 1996, January, May and August 1997, and November 2000. Nineteen scattered sites were visited and specimens of five arachnid orders were collected with insects and some vertebrates in these sites (Fig. 1). The aim was to get an idea about the arachnids which are living in different habitats of this region.

The collecting methods were: 1. Collecting with the hands, 2. Beating net, and 3. Sweeping net. The identification of specimens was executed in the light of the available taxonomical knowledge, taking in consideration that the group of Arachnida is poorly studied in this geographical area. Indeed, it is the first study of arachnids in this Egyptian protected area.



**Figure 1.** Map of Elba protected area in the southern part of the eastern desert of Egypt. 1-19. Collecting sites of this study. 1. Bir Abraç 2. Bir Gahliya 3. Bir Shalateen 4. Wadi Hodein 5. Wadi Sifeira 6. Wadi She'b 7. Gabal Hamra Dom 8. Bir Abu Ramad 9. Wadi Yahameib 10. Bir Kanseroab 11. Aguametra 12. Wadi Serimtai 13. Gabal Shellal 14. Drawina 15. Wadi Akau 16. Wadi Dahreeb 17. Wadi Deheet 18. Wadi El-De'ieb 19. Bir Frokit

**Results and Discussion**

**I. ORDER ARANEAE**

Spiders of sixteen families were collected from the studied sites (Table I). Among the 136 specimens, only 22 genera (of 28) and 11 species (of 28) could be identified.

The most abundant species was *Eusparassus walckenaeri* (Audouin, 1825), family Sparassidae, followed by filistatids and gnaphosids (Table II). *Argiope lobata* (Pallas, 1772), family Araneidae, is characteristic to this area. Most of the identified species were previously recorded only from the northern part of Egypt (El-Hennawy, 2006).

The spider families of Elba protected area can be identified by the following key (adopted from Jocqué & Dippenaar-Schoeman, 2006):

**Key to spider families recorded from Elba protected area during this study**

- 1. Cribellum and calamistrum present ..... 2
- Cribellum and calamistrum absent..... 3
- 2. Labium fused to sternum; eyes in a compact group on a slight hump; spinnerets advanced, located ventrally instead of terminally; carapace narrowed anteriorly; haplogyne ..... Filistatidae
- Labium not fused to sternum; Carapace rectangular; ocular area long, anterior lateral eyes and posterior lateral eyes more than 4 times their diameter apart; spinnerets not as above; entelegyne ..... Eresidae
- 3. Tarsus with two claws..... 4
- Tarsus with three claws.....10
- 4. Six eyes, in three diads ..... Sicariidae

- Eight eyes..... 5
- 5. Eyes in three rows (4.2.2); anterior median eyes very large; jumping spiders ..... Salticidae
- Eyes arranged differently ..... 6
- 6. Legs laterigrade, directed towards side .....7
- Legs prograde, directed forwards and backwards ... 9
- 7. Tarsi and metatarsi without scopulae; legs I and II usually much longer than legs III and IV ..... Thomisidae
- Tarsi and sometimes metatarsi with scopulae; legs different ..... 8
- 8. Small to medium-size spiders (3-16 mm); chelicerae without teeth or at most one on retromargin; tarsus-metatarsus allowing movement in one plane only ..... Philodromidae
- Medium-size to large spiders (6-35 mm); chelicerae with at least two teeth (rarely one) on retromargin; membranous connection to metatarsus permits free movement of tarsus ..... Sparassidae
- 9. Posterior median eyes flat, without dome-shaped lens; endites obliquely depressed; Anterior lateral spinnerets one segment with enlarged piriform gland spigots; endites without median groove; abdomen without invaginated sclerites behind epigastric furrow ..... Gnaphosidae
- Posterior median eyes with dome-shaped lens; endites usually not obliquely depressed; Median spinnerets of females not flattened, without rows of large spigots ..... Clubionidae
- 10. Tarsi with trichobothria, often in a row .....11
- Tarsi without trichobothria ..... 12
- 11. Clypeus very high; posterior eyes and anterior lateral eyes forming a hexagonal group in front of small anterior median eyes; numerous long spines on legs ..... Oxyopidae
- Clypeus not as high; eyes sessile, not on tubercles; abdomen oval, smoothly rounded posteriorly; male palpal tibiae without retrolateral apophysis; egg cocoon carried attached to spinnerets; anal tubercle with one segment ..... Lycosidae
- 12. Posterior spinnerets long to very long, last segment at least three times longer than wide ..... 13
- Posterior spinnerets not unusually long ..... 14
- 13. Anal tubercle very large, with fringe of long hairs; posterior spinnerets curved around it; carapace almost circular .....Oecobiidae (Urocteinae)
- Anal tubercle normal; carapace differently shaped; posterior spinnerets with a median row of spigots ..... Hersiliidae
- 14. Eyes in three groups, anterior median eyes apart, remainder in two triads; legs thin and long, tarsi pseudosegmented ..... Pholcidae
- Eye pattern and legs different .....15
- 15. Tarsi IV with ventral comb of serrated hairs; brownish rings around eyes; femora without spines ..... Theridiidae
- Tarsi without ventral comb of serrated hairs; eyes without brownish rings..... Araneidae

## II. ORDER OPILIONES

Four females of unidentified species of family Phalangidae were collected from two sites (4. Wadi Hodein and 11. Aguametra) in January. This record is important to a poorly studied arachnid group in Egypt (Cokendolpher, 1990).

## III. ORDER PSEUDOSCORPIONES

Two specimens of two species of family Olpiidae were collected from Elba protected area. *Minniza vermis* Simon, 1881 was collected from site 10, Bir Kanseroab, in October, and *Calocheirus* cf. *atopos* Chamberlin, 1930 (Mahnert, pers.comm.) was collected from site 2, Bir Gahliya, in March. The two species were described in detail by Heurtault (1980) and Mahnert (1980, 1986). *M. vermis* was recorded from lower Egypt but not from the southern part of Egypt. *C. atopos* was mentioned before in a key to Egyptian pseudoscorpions (El-Hennawy, 1988) as a possible record from Egypt. Its type locality is Port Sudan (Mahnert, 1986). Now, it is recorded from Egypt, more than 400 km north of Port Sudan.

## IV. ORDER SOLIFUGAE

Four species of four genera were recorded from six sites (Table III). *Biton ehrenbergi* Karsch, 1880 is the most widespread species, followed by *Blossia spinosa* Simon, 1880, both of family Daesiidae. Family Galeodidae and family Rhagodidae are represented by one species each. This is the first record of both *B. ehrenbergi* and *B. spinosa* from the southern limit of Egypt (El-Hennawy, 1998).

The sun-spiders of Elba protected area can be easily identified by the following key (adopted from El-Hennawy, 1998):

### Key to sun-spiders recorded from Elba protected area during this study

1. Anus : ventrally located. Tarsal segmentation : 1-1-1-1. Heavy-bodied; short-legged ..... Rhagodidae, *Rhagodes* ? sp
- Anus : terminally located. Tarsal segmentation: 1-1-1-1 to 1-2-2-4 ..... 2
2. Tarsal claws of legs 2 to 4: setaceous. Tarsal segmentation: 1-2-2-3 ..... Galeodidae, *Galeodes* sp.
- Tarsal claws of legs 2 to 4: smooth. Tarsal segmentation: 1-1-1-1 to 1-2-2-4 Daesiidae ..... 3
3. Tarsi of leg 4: 4-segmented; tarsi of legs 2 and 3: 2-segmented ..... *Biton ehrenbergi*
- Tarsi of leg 4: 2-segmented; tarsi of legs 2 and 3: 1-segmented ..... *Blossia spinosa*

## V. ORDER SCORPIONES

Seven scorpion species of seven genera of family Buthidae were recorded during this preliminary study (Table IV). *Leiurus quinquestriatus* is the most widespread species with 13 specimens (32.5%) from 7 sites. *Buthus occitanus* is the second widespread species in the area with 8 specimens

(20%) from 3 sites. *Parabuthus leiosoma* is the third widespread species with 7 specimens (17.5%) from 3 sites too. Each of the sites 2, 3, 8, 12, and 19 (Bir Gahliya, Bir Shalateen, Bir Abu Ramad, Wadi Serimtai, and Bir Frokit) has three different species recorded from it.

These seven species are recorded for the first time from Elba area (El-Hennawy, 1992). The previous records of *Buthus occitanus* were too far to the north from Elba. *Parabuthus leiosoma* was previously recorded from Egypt without definite locality. Now, this is the first exact record of it from Egypt.

The scorpion species of Elba can be easily identified by the following key (adopted from El-Hennawy, 1987):

### Key to scorpion species recorded from Elba protected area during this study

1. Mesosoma: tergal crests distinct ..... 2
- Mesosoma tergal crests: indistinct or absent ..... 6
2. Mesosoma: 1<sup>st</sup> and 2<sup>nd</sup> tergites with five crests ..... *Leiurus quinquestriatus*
- Mesosoma: 1<sup>st</sup> and 2<sup>nd</sup> tergites with three crests or without crests ..... 3
3. Mesosoma: tergal crests : posteriorly attenuated
- Prosoma median crests: united forming a straight line ..... *Compsobuthus werneri*
- Mesosoma: tergal crests : not projecting posteriorly
- Prosoma : median crests : separated, do not form a straight line ..... 4
4. Prosoma: with a lyra-shaped united crests ..... *Buthus occitanus*
- Prosoma: without a lyra-shaped united crests ..... 5
5. Metasoma: 4<sup>th</sup> and 5<sup>th</sup> segments + telson black ..... *Parabuthus leiosoma*
- Metasoma: 4<sup>th</sup> and 5<sup>th</sup> segments + telson yellow alike other body segments ..... *Androctonus amoreuxi*
6. Metasoma: posterior segments with small depressions; Prosoma: without crests but with deep depressions; Colour: black..... *Orthochirus innesi*
- Metasoma: posterior segments without small depressions; Prosoma: smooth; Colour: yellow ..... *Buthacus leptochelys*

Elba protected area needs more studies. It is necessary to make continuous seasonal survey of all arachnid species to know how many species are living there and to elucidate their ecological role and their importance in this area.

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**Table I**  
Spiders collected from Elba protected area.

Family	Species	Specimens	Sites	Months
Araneidae	<i>Argiope lobata</i> (Pallas, 1772)	8♀	3, 5, 18	May, Oct, Dec
	<i>Cyrtophora</i> sp.	1j	6	May
	? sp.	1♂, 1s♂, 1j	7, 12, 17	May, Aug, Nov
Clubionidae	<i>Cheiracanthium pelasgicum</i> (C.L.Koch, 1837)	1♂	5	Oct
Eresidae	<i>Stegodyphus lineatus</i> (Latreille, 1817)	1♂, 2♀, 2j	2, 3	May, Aug, Oct
Filistatidae	? sp.	8s♀, 9j	3, 4, 10, 12, 13, 17, 19	Jan, Mar, Aug
Gnaphosidae	<i>Poecilochroa</i> sp.	1♂	5	Oct
	<i>Pterotricha conspersa</i> (O.P.-Cambridge, 1872)?	2♂, 3♀, 6j	2, 3, 4, 5, 10, 12, 19	Jan, Mar, Oct
	? sp.	2♀, 1j	11, 13, 14	Jan, Nov
	? sp.	2♀	3, 11	Jan
Hersiliidae	<i>Hersiliola</i> sp.	1♀	13	Jun
Lycosidae	? sp.	3♂, 3♀, 1s♂, 7j	4, 10, 12, 18	Jan, May, Oct
Oecobiidae	<i>Uroctea limbata</i> (C.L.Koch, 1843)	1♀, 1j	2, 19	Mar, Oct
Oxyopidae	<i>Oxyopes</i> sp.	1♂, 1♀, 1s♂, 1j	3, 5, 6, 15	Aug, Oct
	<i>Peucetia Arabica</i> Simon, 1882	1♀, 1j	2	Oct
Philodromidae	<i>Philodromus</i> sp.	2♀, 1s♂, 2j	5, 6	Oct
	<i>Thanatus</i> sp.	3♀, 1j	3, 6, 13	May, Jun, Oct
Pholcidae	<i>Artema atlanta</i> Walckenaer, 1837	1♀, 3s♀, 2j	3, 14	May, Oct, Nov
Salticidae	<i>Mogrus</i> sp.	1♀, 1s♂, 3j	3, 4, 6	May, Oct
	<i>Plexippus paykulli</i> (Audouin, 1825)	1♂, 1♀, 1j	3	May, Aug, Oct
	? sp.	1♂, 1♀, 2j	2, 6, 15	May, Aug, Oct
Sicariidae	<i>Loxosceles</i> sp.	1j	19	Mar
Sparassidae	<i>Eusparassus walckenaeri</i> (Audouin, 1825)	1♂, 2♀, 1s♀, 15j	2, 3, 4, 11, 12, 13, 14, 16	Jan, Mar, May, Aug, Oct, Nov
Theridiidae	<i>Paidiscura dromedaria</i> (Simon, 1880)	1♂	5	Oct
	<i>Theridion</i> sp.	1s♂, 2s♀	4, 12	Jan, May
Thomisidae	<i>Ozyptila</i> sp.	1s♀, 3j	2, 3, 6, 15	May, Aug, Oct
	<i>Synema</i> sp.	1s♀	15	Aug
	<i>Thomisus onustus</i> Walckenaer, 1805	2♂, 2♀, 1j	3, 5, 6, 10	May, Oct

**Table II**  
Percentage of collected specimens of every spider family from Elba protected area.

Family	Specimen	%	Family	Specime	%
Sparassidae	19	13.97	Oxyopidae	6	4.41
Filistatidae	17	12.50	Pholcidae	6	4.41
Gnaphosidae	17	12.50	Eresidae	5	3.68
Lycosidae	14	10.29	Theridiidae	4	2.94
Araneidae	12	8.82	Oecobiidae	2	1.47
Salticidae	12	8.82	Clubionidae	1	0.73
Thomisidae	10	7.35	Hersiliidae	1	0.73
Philodromidae	9	6.62	Sicariidae	1	0.73

**Table III**  
Sun-spiders collected from Elba protected area.

Family	Species	Specimens	Sites	Months
Daesiidae	<i>Biton ehrenbergi</i> Karsch, 1880	1♂, 5j	3, 6, 7, 12	Mar, May, Nov
	<i>Blossia spinosa</i> Simon, 1880	1♂, 1j	2, 3	Oct
Galeodidae	<i>Galeodes</i> sp.	1j	19	Aug
Rhagodidae	<i>Rhagodes</i> ? sp.	1♂	3	Mar

**Table IV**  
Scorpions collected from Elba protected area.

Species	Specimens	Sites	Months
<i>Androctonus amoreuxi</i> (Audouin, 1825)	2	1, 18	Jan, Dec
<i>Buthacus leptochelys</i> (Ehrenberg, 1829)	3	8, 10	Mar, Aug
<i>Buthus occitanus</i> (Amoreux, 1789)	8	3, 8, 19	Mar, May, Aug, Oct
<i>Compsobuthus wernerii</i> (Birula, 1908)	5	2, 12, 15, 19	Jan, Mar, Aug, Oct
<i>Leiurus quinquestriatus</i> (Ehrenberg, 1828)	13	2, 3, 9, 12, 15, 16, 19	Jan, Mar, May, Aug, Oct, Dec
<i>Orthochirus innesi</i> Simon, 1910	2	2, 12	Jan, Oct
<i>Parabuthus leiosoma</i> (Ehrenberg, 1829)	7	3, 8, 14	Mar, May, Aug, Oct, Nov

