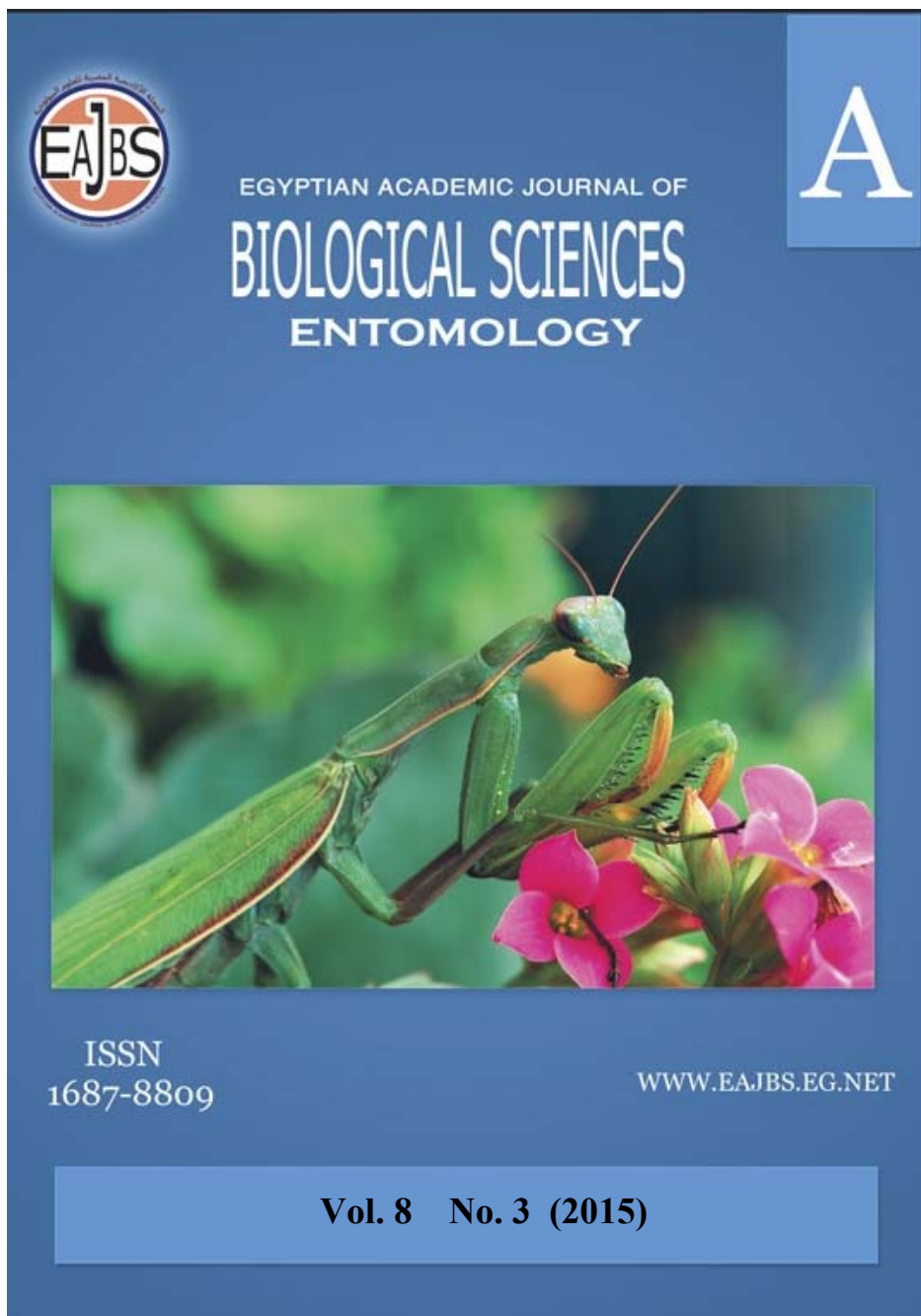


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**An Annotated Checklist of The Endemic And Sub-endemic Grasshoppers
(Orthoptera: Caelifera) of Egypt**

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ABSTRACT

Species endemism is used by conservationists to set priorities for establishing protected areas. Furthermore, species checklists of endemic species have potential to highlight focal regions for further investigation and for conservation prioritization. Most of Egypt's biodiversity is clustered around the Nile River and its Delta, while Egypt generally is a part of the Great Desert Belt. A total of 5 endemic grasshopper species and 2 subspecies belonging to 6 genera, 4 subfamilies and two families are listed from the Egyptian fauna: *Crinita nigripes*, *Duroniella cooperi*, *Hyalorrhypis hyalinus*, *Pamphagulus bodenheimeri bodenheimeri*, *Sphingonotus balteatus latifasciatus*, *Sphingonotus niloticus* and *Sphodromerus atakanus*. Another 10 sub-endemic species and subspecies in 3 families are listed. These were described from and are found only in Egypt and its neighboring countries. The endemic species and subspecies represent 6.5% while the sub-endemic species and subspecies are 9% of Egypt's total grasshopper fauna (N = 108 species). Most of Egypt's endemic and sub-endemic grasshoppers (90%) occur in the Sinai Peninsula and the Eastern Desert near the Gulf of Suez, while none occur in the Upper Nile Valley. Therefore, Sinai Peninsula is indicated as an important zone within Egypt where conservation efforts should be focused. Distribution, activity periods, type specimen data and available photos of each species are also provided. This is the first grasshopper checklist of conservation relevance for Egypt, and can be used to assist in conservation planning and decision-making in Egypt.

INTRODUCTION

Grasshoppers (Orthoptera: Caelifera) currently consist of 12023 valid species (Eades *et al.* 2015). Of these, Egypt contains 108 species, 93 (86%) of which belong to the family Acrididae (Abdel-Dayem *et al.* 2005, Haggag *et al.* 2008, Haggag 2011).

Endemic taxa are those found only in a particular region and nowhere else in the world and they are of great conservation concern (Abdel-Dayem 2012). Of secondary importance are those species which are endemic to a slightly larger geographic region such as Egypt and its immediate neighbours, and are referred to here as sub-endemic species.

North African biodiversity is threatened by the continuous increase of human and livestock populations. Habitat loss as a result of human encroachment threatens the survival of species, and in order to curb the rate of species extinctions, there is an urgent need to identify potential areas for conservation prioritization (Médail & Quézel 1999).

Egypt is a transcontinental country spanning the northeast corner of Africa and the southwest corner of Asia (Sinai Peninsula). Egyptian fauna and flora are unique, combining characteristics of both Palaearctic and Afrotropical regions (Steyskal & El-Bialy 1967, Semida *et al.* 2001). Sinai Peninsula is a triangular peninsula of roughly 60000 km² on the Asian continent. It is bordered by the Mediterranean Sea to the north, and the Gulf of Suez and the Gulf of Aqaba on the west and southeast, respectively.

Egypt as a whole forms a part of the Great Desert Belt, and is characterized by a warm and almost rainless climate. Ecologists divide Egypt into 8 geomorphological zones: Coastal Strip, Lower Delta Nile Valley, Upper Nile Valley, Fayoum Basin, Eastern Desert, Gabal Elba, Sinai Peninsula and Western Desert (Fig. 1; Larsen 1990). Only the Coastal Strip, Eastern Desert, Gabal Elba, and higher parts of southern Sinai mountains receive comparatively higher rainfall of 60 - 200 mm per year (El-Hawagry 2002, Soliman 1954).

The first orthopterist who contributed to the knowledge of Egyptian grasshoppers and locusts was Krauss (1890) who published a list of orthopteran species figured by Savigny in "Description de l'Égypte". Several taxonomic studies followed in the early twentieth century (Kneucker 1903, Werner 1905, Rehn 1912, Storey 1918). Uvarov (1924) provided the first somewhat comprehensive list of the Egyptian Orthoptera, by listing those deposited in the Egyptian Ministry of Agriculture collection. During the twentieth century, additional species were described and Egyptian locality records added to existing species on a sporadic basis (Ramme 1928; 1951, Uvarov 1929; 1943b, Innes Bey 1929, Ebner 1957), often as a result of regional studies of insect faunal composition within each of Egypt's bioregions. Ebner (1957) was the last to add to the list of grasshoppers of Egypt's Western Desert, Mediterranean Coast, Gabal Elba and Northern Sinai bioregions (Hassan & Fadl 2000, El-Moursy *et al.* 2001).

Recent taxonomic revisions of Egyptian Acrididae contributed seven new records to the Egyptian fauna (Abdel-Dayem *et al.* 2005, Haggag *et al.* 2008, Haggag 2011). However, the overall compilation of endemic Egyptian grasshoppers is still lacking. Checklists are an essential tool for studying biodiversity and systematics (El-Hawagry 2002). This study, following on the checklist of endemic Egyptian Carabidae (Coleoptera) by Abdel-Dayem (2012), aims to compile all available data in a simple checklist designed for non-specialists. In addition, it aims to complete the missing data about Egyptian endemic and sub-endemic species and subspecies in Eades *et al.* (2015), the currently most important database on Orthoptera.

In addition to an updated checklist, I also provide information on distribution, activity periods, deposited specimens and simple photos of Egypt's endemic and sub-endemic grasshoppers.

MATERIALS

Data Sources

Data for this checklist were compiled from published locality records, from specimens collected in long-term field surveys carried out by the author, or from specimens found in the Insect Reference Collection of Egypt (IRCs). Specimens were collected across Egypt's bioregions and ecological habitats between 2000 and 2010. Adults encountered on an *ad hoc* basis were collected using a sweep net. Localities and dates of collection were compiled to describe the distribution and activity periods of grasshoppers across Egypt's bioregions (Fig. 1, Larsen 1990). Photos of species were taken using a Nikon D5300 digital camera (Af-S zoom, Nikkor 18-55 mm 1:3.5-5.6 GII).

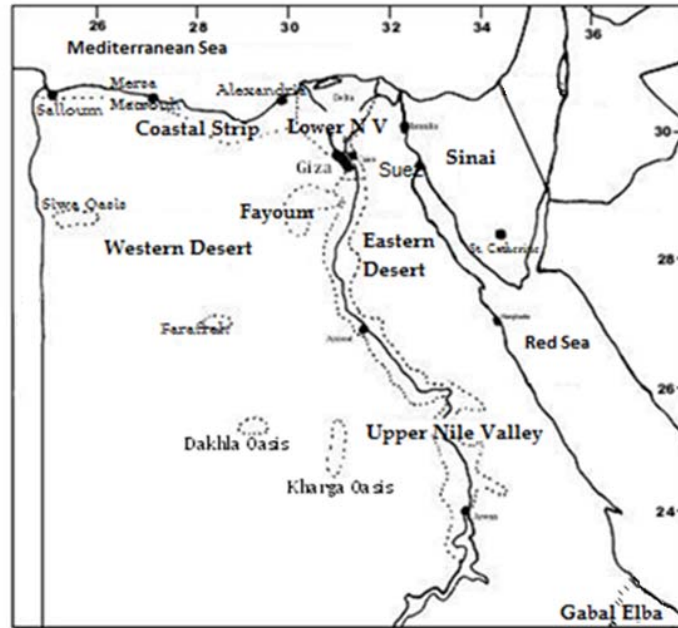


Fig. 1: Map of Egypt showing the geomorphological zones (Larsen, 1990)

Endemic species checklist

The checklist is arranged systematically to subfamily level and alphabetically thereafter. The genus, species, author, year, original citations and synonyms are listed. The locality of the type specimen and specimen depository are provided. In a few cases, specific type localities are unknown and thus 'Egypt' is given. The species distribution for each species is listed with relevant bioregions of Egypt followed by localities, and arranged alphabetically. Activity period and ecological notes are provided whenever available. Finally, discussions of the faunal status and distribution of each species are provided.

Acronymy of depositories:

NHM: Natural History Museum, London, United Kingdom [formerly British Museum (Natural History)].

MSNG: Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy.

MfN: Museum für Naturkunde der Humboldt-Universität, Berlin, Germany.

MNHN: Muséum National d'Histoire Naturelle, Paris, France.

Abbreviations and list of the Egyptian geomorphological regions:

(Localities are included in parentheses)

CS: Coastal Strip (Alexandria, Balteem, Borg El Arab, Hammam, Mariout, Mersa Matrouh, Port Said, Ramleh, Salloum).

DLN: Delta and Lower Nile Valley (Abu Rawash, Almazah, Cairo, Helwan, Gabal Asfar, Giza, Heliopolis, Kerdasa, Khanka Desert, Maadi, Maasara, Mansouryia, Mataryia, Mazghuna, Wardan).

ED: Eastern Desert (Abu Slima, Etbai Desert, Fayed, Gabal Ataka, Hurgada, Kosseir, Moqattam, Ougret El Sheikh, Qassasin, Suez, Suez Road, Wadi Digla, Wadi Ganadili, Wadi Hof, Wadi North Galala, Wadi Rashid, Wadi Um Ossad).

F: Fayoum Basin (Kom Osheim).

GE: Gabal Elba (Abu Ramad, Wadi Rabdet, Wadi Sermeti, Wadi Shalal, Wadi Um Elek).

SP: Sinai Peninsula (Arish, Farsh El Arab, Gabal Mousa, Gabal Samra, Gabal Serbal, Gabal St. Catherine, Kaiser, Mazar, Mohammedia, Qaa, Rafah, Romani, St.

Catherine, Wadi Ab Orte, Wadi Barraah, Wadi El Arbaeine, Wadi El Rabba, Wadi Fieran, Wadi Gebi, Wadi Genneh, Wadi Hebran, Wadi Isla, Wadi Karam, Wadi Khashabi, Wadi Mageirat, Wadi Mazara, Wadi Morrah, Wadi Tarfa, Zaranik).

UN: Upper Nile Valley.

WD: Western Desert (Baharyia Oasis, Siwa Oasis).

Geotags for Egyptian Localities:

Abu Ramad (22°23'49"N 36°24'22"E)
 Abu Rawash (30°03'13.9"N 31°04'36.1"E)
 Abu Slima (29°57'27.8"N 32°34'00.7"E)
 Alexandria (31°10'40.6"N 29°52'56.5"E)
 Almazah (30°05'21.7"N 31°20'29.9"E)
 Arish (31°08'11.1"N 33°47'36.9"E)
 Baharyia Oasis (29°01'13.1"N 29°32'09.1"E)
 Balteem (31°33'29.2"N 31°05'08.4"E)
 Borg El Arab (30°54'42.9"N 29°32'00.2"E)
 Cairo (30°03'01.5"N 31°15'13.7"E)
 Etbai Desert (22°34'40.3"N 35°37'13.8"E)
 Farsh El Arab (28°46'54.8"N 34°33'42.7"E)
 Fayed (30°19'02.9"N 32°18'57"E)
 Gabal Asfar (30°08'00"N 31°23'00"E)
 Gabal Ataqa (29°58'02.1"N 32°21'27.4"E)
 Gabal Mousa (28°32'07.2"N 33°57'16.5"E)
 Gabal Samra (28°14'34"N 34°15'14"E)
 Gabal Serbal (28°39'28.5"N 33°38'08.4"E)
 Gabal St. Catherine (28°30'46.4"N 33°57'15.7"E)
 Giza (30°00'04.9"N 31°11'50.6"E)
 Hammam (30°50'29.8"N 29°23'43.4"E)
 Heliopolis (30°05'45.7"N 31°20'01.6"E)
 Helwan (29°51'38.8"N 31°22'33.5"E)
 Hurgada (27°15'28.1"N 33°48'42.1"E)
 Kaiser (28°38'42.8"N 34°33'48.2"E)
 Kerdasa (30°01'56.1"N 31°06'32.7"E)
 Khanka Desert (30°13'08.4"N 31°22'06"E)
 Kom Osheim (29°31'45.9"N 30°55'34.4"E)
 Kosseir (26°07'35.3"N 34°15'49.9"E)
 Maadi (29°57'59"N 31°15'00"E)
 Maasara (29°54'33.6"N 31°17'43.8"E)
 Mansouryia (30°08'14.1"N 31°03'46.7"E)
 Mariout (31°00'29.8"N 29°45'40.1"E)
 Mataryia (30°07'39.5"N 31°18'07.2"E)
 Mazar (31°02'24.7"N 33°22'54.3"E)
 Mazghuna (29°45'58.5"N 31°13'11.8"E)
 Mersa Matrouh (31°21'20.8"N 27°14'13.2"E)
 Mohammedia (31°02'43"N 32°39'37"E)
 Moqattam (30°00'36.3"N 31°18'44.9"E)
 Ougret El Sheikh (26°20'59.6"N 33°52'00.1"E)
 Port Said (31°16'00"N 32°18'00"E)
 Qaa (28°14'20.7"N 33°42'13.2"E)
 Qassasin (30°33'39.8"N 31°55'10.7"E)
 Rafah (31°18'17.7"N 34°12'55.2"E)

Ramleh (31°14'35.1"N 29°57'36.8"E)
 Romani (31°01'31.1"N 32°37'58.3"E)
 Salloum (31°32'41.3"N 25°08'50.2"E)
 Siwa Oasis (29°11'42.5"N 25°33'16"E)
 Suez (29°58'48"N 32°32'24"E)
 Suez Road (30°06'50.5"N 31°37'32.1"E)
 St. Catherine (28°33'27.8"N 33°56'39.2"E)
 Wadi Ab Orte (30°28'30.9"N 34°14'32"E)
 Wadi Barrah (28°50'39.5"N 34°06'51.5"E)
 Wadi Digla (29°57'34.5"N 31°19'54.4"E)
 Wadi El Arbaeine (28°14'33.7"N 33°56'27.5"E)
 Wadi El Rabba (28°33'07.7"N 33°56'35.6"E)
 Wadi Fieran (28°42'22.6"N 33°38'54.2"E)
 Wadi Ganadili (29°50'55"N 31°41'05"E)
 Wadi Gebi (28°48.888' N 34° 26.242' E)
 Wadi Genneh (28°51'56.8"N 34°14'56.8"E)
 Wadi Hebran (28°25'35.9"N 33°35'20.9"E)
 Wadi Hof (29°53'16.2"N 31°21'54.7"E)
 Wadi Isla (28°08'00"N 33°43'00"E)
 Wadi Karam (30°40'49.7"N 33°30'00.1"E)
 Wadi Khashabi (27°50'59.2"N 34°11'25.4"E)
 Wadi Mageirat (28°17'00"N 34°09'00"E)
 Wadi Mazara (31°02'01.7"N 33°23'17.7"E)
 Wadi Morrah (28°48'24.8"N 34°14'21.3"E)
 Wadi North Galala (29°26'32.1"N 32°13'11"E)
 Wadi Rabdet (22°11'00"N 36°24'00"E)
 Wadi Rashid (24°58'55.7"N 34°06'59.2"E)
 Wadi Sermeti (22°21'14"N 36°26'29.9"E)
 Wadi Shalal (22°11'13.2"N 36°38'44.6"E)
 Wadi Tarfa (28°44'00"N 33°43'00"E)
 Wadi Um Elek (23°37'47.4"N 35°03'56.3"E)
 Wadi Um Ossad (29°54'06.4"N 31°33'54.8"E)
 Wardan (30°18'58.8"N 30°54'19.4"E)

RESULTS

A total of 17 endemic and sub-endemic grasshopper species and subspecies in ten genera, seven subfamilies and four families are listed from the Egyptian fauna (Table 1 and Fig 2).

I. Checklist of endemic and sub-endemic grasshopper species and subspecies of Egypt

The endemic grasshopper species and subspecies list:

Family Acrididae

Subfamily Acridinae

Crinita nigripes (Uvarov, 1929) (Pl. I: Figs. 1, 2)

Thalpomena hirtipes nigripes Uvarov, 1929: 94.

Type Locality. – Egypt (Sinai, St. Katherine)

Type depository. – NHM

Distribution. – Palaearctic: **Egypt:** SP: Arish, Wadi El Arbaeine.

Activity period. – from May to September.

Ecological notes. – This species is found on dry mountains, on stony gravel and bare rocks in localized populations (Dirsh 1949).

Faunal Status. – Endemic Egyptian species restricted to the south of Sinai Peninsula at St. Katherine (Dirsh 1949, Ebner 1957) and also recorded from Arish in the north (Bodenheimer 1932, Haggag 2011).

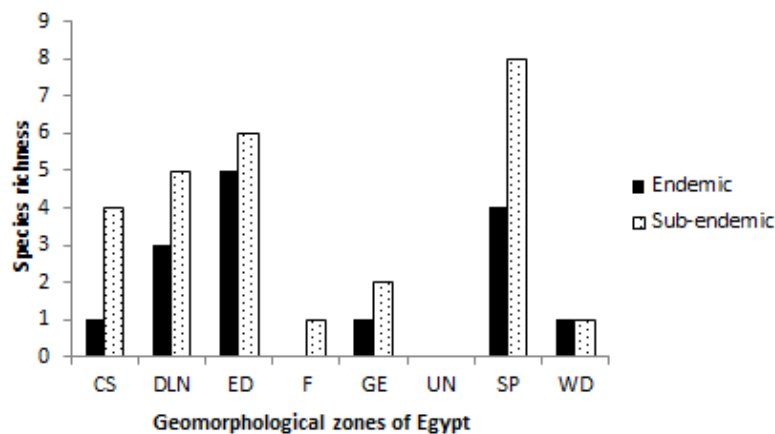


Fig. 2: Relationship of number of species, Egyptian geomorphological zones and faunal status. Legend: CS: Coastal strip; DLN: Delta and Lower Nile Valley; ED: Eastern Desert; F: Fayoum Basin; GE: Gabal Elba; UN: Upper Nile Valley; SP: Sinai Peninsula; WD: Western Desert.

Table 1: Species checklist of Egyptian endemic and sub-endemic species and subspecies. Legend: CS: Coastal strip; DLN: Delta and Lower Nile Valley; E: Endemic species or subspecies; ED: Eastern Desert; F: Fayoum Basin; GE: Gabal Elba; UN: Upper Nile Valley; SE: Sub-endemic species or subspecies; SP: Sinai Peninsula; WD: Western Desert; + indicates presence of the species; ↓ indicates country of original description, if not Egypt.

List of species	Egyptian geomorphological zones							Neighboring countries						Faunal status	
	CS	DLN	ED	F	GE	UN	SP	WD	Libya	Jordan	Palestine	Syria	Sudan		Saudi Arabia
<i>Crinita nigripes</i> (Uvarov)															E
<i>Duroniella cooperi</i> Uvarov	+	+													E
<i>Heteracris ethaica</i> (Ramme)			+										+		SE
<i>Heteracris moribosa moribosa</i> (Serville)														+	SE
<i>Hyalorrhapis hyalinus</i> Uvarov				+											E
<i>Hyalorrhapis rhamses</i> (Saussure)		+	+												SE
<i>Pamphagulus bodenheimeri bodenheimeri</i> Uvarov				+											E
<i>Paracnipe zebrata</i> (Brunner)	+	+	+	+							+			+↓	SE
<i>Poekilocerus bufonius bufonius</i> (Klug)	+	+	+		+					+	+				SE
<i>Sphingonotus angulatus</i> Uvarov	+	+	+							+	+↓		+		SE
<i>Sphingonotus balteatus latifasciatus</i> (Walker)															E
<i>Sphingonotus niloticus</i> Saussure		+	+												E
<i>Sphingonotus obscuratus obscuratus</i> (Walker)		+	+		+			+	+	+					SE
<i>Sphodromerus atakanus</i> Ramme				+											E
<i>Sphodromerus marmaricus</i> Capra	+							+		+↓					SE
<i>Sphodromerus pūipes</i> (Janson)								+		+	+↓				SE
<i>Sphodromerus serapis</i> (Serville)								+						+	SE
Total	5	8	11	1	3	0	12	2	3	3	4	2	1	3	7 E 10 SE

Duroniella cooperi Uvarov, 1943 (Pl. I: Figs. 3, 4)

Duroniella cooperi Uvarov, 1943b: 23.

Type Locality. – Egypt (Siwa Oasis, Koreishid)

Type depository. – NHM

Distribution. – Palearctic: **Egypt:** CS: Borg El Arab; DLN: Gabal Asfar; WD: Baharyia Oasis, Siwa Oasis.

Activity period. – Almost all year round.

Faunal Status. – Endemic Egyptian species (Uvarov 1943b, Dirsh 1965, Eades *et al.* 2015), common in the Western Desert from Siwa Oasis in the north (Uvarov 1943b) and Bahariya Oasis (Haggag 2011). It has also been recorded from the Coastal Strip in Borg El Arab, the Nile River Delta at Gabal Asfar and Sinai Peninsula at Arish (Haggag 2011).

Subfamily Calliptaminae

Sphodromerus atakanus Ramme, 1951 (Pl. I: Fig. 5)

Sphodromerus atakanus Ramme, 1951: 277.

Type Locality. – Egypt (Gabal Ataka)

Type depository. – MfN

Distribution. – Palaearctic: **Egypt:** ED: Gabal Ataka, Wadi North Galala.

Activity period. – November.

Faunal Status. – Endemic Egyptian species (Ramme 1951, Dirsh 1965, Eades *et al.* 2015), confined to the Eastern Desert at the northern part of the Gulf of Suez in Gabal Ataka (Ramme 1951) and Wadi North Galala (Haggag 2011).

Subfamily Oedipodinae

Hyalorrhypis hyalinus Uvarov, 1929

Hyalorrhypis hyalinus Uvarov, 1929: 96.

Type Locality. – Egypt (Sinai)

Type depository. – unknown

Distribution. – Palaearctic: **Egypt:** ED: Abu Slima; SP: Wadi Feiran.

Activity period. – July (Bodenheimer 1932).

Faunal Status. – Endemic Egyptian species (Uvarov 1929, Bodenheimer 1932, Eades *et al.* 2015), confined to Sinai Peninsula, extending west to the Eastern Desert at Abu Slima (near Suez) (Uvarov 1929, Bodenheimer 1932).

Sphingonotus balteatus latifasciatus (Walker, 1870) (Pl. I: Fig. 6)

Oedipoda latifasciata Walker, 1870: 2999.

Oedipoda terminalis Walker, 1870: 2300.

Sphingonotus bifasciatus Innes Bey, 1918: 48.

Type Locality. – Egypt: Rafia (probably Rafah)

Type depository. – unknown

Distribution. – Palaearctic: **Egypt:** DLN: Cairo, Hewan, Gabal Asfar, Maadi, Maasara, ED: Moqattam, Ougret El Sheikh, Wadi Digla, Wadi Hof, Wadi Rashid, GE: Wadi Rabdet, Wadi Um Elek, SP: Rafah, Wadi Morrah.

Activity period. – Almost all year round.

Faunal Status. – Endemic Egyptian subspecies (Bodenheimer 1932, Mistshenko 1936, Eades *et al.* 2015), widely distributed in the eastern part of Egypt in the vicinity of the Nile River Delta, the Eastern Desert and Gabal Elba (Uvarov 1924, Mistshenko 1936, Abdel-Dayem *et al.* 2005). Also, the distribution range reaches Sinai Peninsula (Bodenheimer 1932, Mistshenko 1936, Eades *et al.* 2015).

Sphingonotus niloticus Saussure, 1888

Sphingonotus niloticus Saussure, 1888: 80.

Type Locality. – Egypt

Type depository. – unknown

Distribution. – Palaearctic: **Egypt:** DLN: Maasara; ED: Suez Road, Wadi Digla; SP: Qaa, Wadi Khashabi, Gabal Samra.

Activity period. – From August to October.

Faunal Status. – Endemic Egyptian species (Eades *et al.* 2015), widely distributed in the northeastern part of Egypt in the vicinity of the Nile River Delta in Maasara, the Eastern

Desert near Wadi Digla and Suez Road (Abdel-Dayem *et al.* 2005) and the south Sinai Peninsula near Sharm El Shiekh (Bodenheimer 1932).

Family Dericorythidae

Subfamily Dericorythinae

Pamphagulus bodenheimeri bodenheimeri Uvarov, 1929

Pamphagulus bodenheimeri Uvarov, 1929: 99.

Type Locality. – Egypt (Suez)

Type depository. – NHM

Distribution. – Palaearctic: **Egypt:** ED: Abu Slima, Suez.

Activity period. – July (Bodenheimer 1932).

Ecological notes. – Found on sand dunes (Bodenheimer 1932).

Faunal Status. – Endemic Egyptian subspecies (Uvarov 1929, Bodenheimer 1932, Dirsh 1965, Eades *et al.* 2015) confined to the Eastern Desert from Suez and Abu Slima (near Suez) (Uvarov 1929, Bodenheimer 1932).

The sub-endemic grasshopper species and subspecies list

Family Acrididae

Subfamily Calliptaminae

Sphodromerus marmaricus Capra, 1929 (Pl. I: Fig. 7)

Sphodromerus marmaricus Capra, 1929:146.

Type Locality. – Libya (Cyrenaica, Porto Bardia)

Type depository. – MSNG

Distribution. – Palaearctic: North Africa: **Egypt:** CS: Salloum; SP: Kaiser; **Libya.**

Activity period. – August.

Faunal Status. – Palaearctic species described from Libya (Eades *et al.* 2015), occurs in Egypt (Uvarov 1943a, Dirsh 1965) at the northwestern most corner at the Mediterranean Sea Coast near Salloum (Uvarov 1943a), and also in the Sinai Peninsula at the Gulf of Aqaba near Kaiser (Haggag 2011).

Sphodromerus pilipes (Janson, 1891) (Pl. I: Figs. 8, 9)

Caloptenus pilipes Janson, 1891: 183, 185.

Type Locality. – Palestine (Dead Sea).

Type depository. – NHM (Uvarov 1922b: 122).

Distribution. – Palaearctic: Mediterranean: **Egypt:** SP: Wadi El Arbaeine, Wadi El Rabba; **Jordan; Palestine.**

Activity period. – April, August and September.

Faunal Status. – Levant species described from Palestine (Uvarov 1943a, Eades *et al.* 2015), occurs in Jordan (Eades *et al.* 2015) and westward into Egypt at the Sinai Peninsula (Haggag 2011).

Sphodromerus serapis (Serville, 1838) (Pl. I: Fig. 10)

Calliptamus serapis Serville, 1838 [1839]: 689.

Type Locality. -Egypt (Sinai)

Type depository. -MNHN

Distribution. -Palaearctic: **Egypt:** SP: Farsh El Arab, Wadi El Arbaeine, Wadi Tarfa; **Saudi Arabia.**

Activity period. – April and September.

Faunal Status. – Palaearctic species known mainly from Egypt in the southern part of the Sinai Peninsula (Kneucker 1903, Bodenheimer 1932, Uvarov 1943a, Haggag 2011, Eades *et al.* 2015) and also recorded from Saudi Arabia (Uvarov 1943a).

Subfamily Eyprepocnemidinae***Heteracris etbaica*** (Ramme, 1928) (Pl. I: Fig. 11)*Cyclopternacris etbaica* Ramme, 1928: 115.*Type Locality.* – Egypt (Etbai desert)*Type depository.* – MfN*Distribution.* – Afrotropical: **Sudan**; Palaearctic: **Egypt**: ED: Etbai desert, Kosseir.*Activity period.* – February.*Faunal Status.* – Afrotropical species recorded from the southern part of Egypt in the Eastern Desert at the Red Sea Coast from Etbai Desert and Kosseir (Ebner 1957, Popov 1981, Haggag 2011, Eades *et al.* 2015), it also occurs to the south, in Sudan (Popov 1981).***Heteracris morbosa morbosa*** (Serville, 1838) (Pl. I: Fig. 12)*Acridium morbosum* Serville, 1838 [1839]: 682.*Caloptenus dominator* Walker, 1870: 683.*Pezotettix (Eyprepocnemis) morbosus* Stål, 1873: 75.*Type Locality.* – Egypt*Type depository.* – MNHN (Popov 1981: 155)*Distribution.* – Palaearctic: **Egypt**: SP: Farsh El Arab, Gabal Mousa, Gabal Serbal, Gabal St. Catherine, St. Catherine, Wadi Ab Orte, Wadi El Arbaeine, Wadi Isla, Wadi Mageirat, Wadi Tarfa; **Saudi Arabia**.*Activity period.* – Almost all year round (Popov 1981: 157).*Faunal Status.* – Palaearctic subspecies recorded from the southern part of Egypt in the Sinai Peninsula (Kneucker 1903, Bodenheimer 1932, Ebner 1957, Popov 1981, Haggag 2011, Eades *et al.* 2015), it also occurs in Saudi Arabia (Kneucker 1903, Ebner 1957, Popov 1981).**Subfamily Oedipodinae*****Hyalorrhypis rhamses*** (Saussure, 1889) (Pl. II: Figs. 13, 14)*Leptopternis rhamses* Saussure, 1889: 94.*Type Locality.* – Egypt*Type depository.* – MNHN*Distribution.* Palaearctic: **Egypt**: DLN: Gabal Asfar, Giza, Kerdasa, Maasara, Mazghuna, Mansouryia, ED: Hurgada, SP: Zaranik; **Libya**.*Activity period.* – From May to August.*Faunal Status.* – Palaearctic species described from Egypt. Widely distributed in the eastern part of Egypt in the vicinity of the Nile River Delta, the Eastern Desert (Rehn 1912, Uvarov 1924, Haggag *et al.* 2008), the northern part of the Sinai Peninsula (El Moursy *et al.* 2001) and Libya (Dirsh 1965, Eades *et al.* 2015).***Sphingonotus angulatus*** Uvarov, 1922 (Pl. II: Fig. 15)*Sphingonotus angulatus* Uvarov, 1922a: 85.*Type Locality.* – Palestine (Haifa)*Type depository.* – NHM*Distribution.* – Palaearctic: **Egypt**: CS: Alexandria, Balteem, Mariout, Mersa Matrouh, Port Said, Ramleh, DLN: Gabal Asfar, ED: Suez Road; **Jordan**; **Palestine**; **Syria**.*Activity period.* – From May to October.*Faunal Status.* – Levant species described from Palestine also occurs in Jordan (Mistshenko 1936, Eades *et al.* 2015) and Syria (Mistshenko 1936) and in northern Egypt (Abdel-Dayem *et al.* 2005).***Sphingonotus obscuratus obscuratus*** (Walker, 1870) (Pl. II: Fig. 16)*Oedipoda obscurata* Walker, 1870: 2300.*Sphingonotus quadrifasciatus* Innes Bey, 1918: 47.

Type Locality. – Egypt (Sinai, Wadi Genneh)

Type depository. – Unknown

Distribution. – Palaearctic: **Egypt:** DLN: Abu Rawash, Gabal Asfar, Giza, Heliopolis, Maadi, Maasara, Wardan, ED: Qassasin, GE: Wadi Sermeti, Wadi Shalal, SP: Wadi Genneh, Wadi Isla, WD: Siwa Oasis; **Libya.**

Activity period. – Almost all year round.

Faunal Status. – Palaearctic subspecies described from Egypt, widely distributed in the vicinity of the Nile River Delta, the Eastern Desert (Uvarov 1924), western Desert (Abdel-Dayem *et al.* 2005), Gabal Elba (Hassan & Fadl 2000) and Sinai Peninsula (Bodenheimer 1932, Eades *et al.* 2015), reaching Libya in the West (Mistshenko 1936, Eades *et al.* 2015).

Family Pyrgomorphidea

Subfamily Pyrgomorphinae

Poekilocerus bufonius bufonius (Klug, 1832) (Pl. II: Figs. 17, 18)

Decticus bufonius Klug, 1832: 4, 5.

Poekilocerus vulcanus Serville, 1838: 600.

Type Locality. – Egypt (Alexandria)

Type depository. – MfN (Lectotype)

Distribution. – Palaearctic: **Egypt:** CS: Alexanderia, DLN: Almazah, Cairo, Giza, Maadi, ED: Fayed, Ougret El Sheikh, Suez, Suez Road, Wadi Digla, Wadi Hof, Wadi Rashid, GE: Wadi Shalal, Wadi Um Elek, SP: Bir Safra, Wadi Barraha, Wadi El Arbaeine, Wadi Feiran, Wadi Gebi, Wadi Hebran, Wadi Isla, Wadi Karam, Wadi Mazara, Wadi Tarfa; **Jordan; Palestine; Saudi Arabia.**

Activity period. – Almost all year round.

Ecological notes. – This species is very common on Asclepiadaceae (Bodenheimer 1932).

Faunal Status. – Palaearctic subspecies described from Egypt, widely distributed in the vicinity of the Coastal Strip, the Nile River Delta (Werner 1905), the Eastern Desert, Gabal Elba (Hassan & Fadl 2000) and Sinai Peninsula (Uvarov 1924, Bodenheimer 1932, Popov 1997, Willemse 2009). It also occurs to the east in the Levant area in Palestine, Jordan and Syria (Popov 1997). It is recorded also from the north-west of Saudi Arabia (Popov 1997, Eades *et al.* 2015).

Family Pamphagidae

Subfamily Pamphaginae

Paracinipe zebrata (Brunner von Wattenwyl, 1882) (Pl. II: Figs. 19, 20)

Pamphagus zebtratus Brunner von Wattenwyl, 1882: 197, 199.

Type Locality. – Syria

Type depository. – NHM

Distribution. – Palaearctic: Mediterranean: **Egypt:** CS: Borg El Arab, Hammam, Mariout, Mersa Matrouh, DLN: Khanka Desert, Mataryia, ED: Moqattam, Suez, Suez Road, Wadi Ganadili, Wadi Um Ossad, F: Kom Osheim, SP: Arish, Mazar, Mohammedia, Romani, Wadi El Arbaeine; **Palestine; Syria.**

Activity period. – Almost all year round.

Faunal Status. – Levant species described from Syria (Massa 2013, Eades *et al.* 2015), occurs in Palestine and the north of Egypt (Massa 2013) in the Coastal Strip, the Nile River Delta, Fayoum, the Eastern Desert and the Sinai Peninsula (Uvarov 1924, Bodenheimer 1932).

DISCUSSION

Only five species and two subspecies of Caelifera are endemic (**E**) to Egypt, while ten sub-endemic (**SE**) species and subspecies are found in Egypt and its neighboring countries in North Africa and the near Middle East: *Heteracris etbaica* occurs in Sudan; *Heteracris morbosa morbosa* and *Sphodromerus serapis* occur in Saudi Arabia; *Hyalorrhypis ramses* and *Sphingonotus obscuratus obscuratus* occur in Libya; *Paracinipe zebrata*, *Sphingonotus angulatus* and *Sphodromerus pilipes* occur in the Levant area; *Poeciloceris bufonius bufonius* occurs in Palestine, Jordan and northwestern Saudi Arabia (Popov 1997); *Sphodromerus marmaricus* occurs in Libya.

All seven endemic Egyptian grasshoppers belong to the families Acrididae and Dericorythidae and subfamilies Acridinae, Calliptaminae, Dericorythinae and Oedipodinae. Acrididae in Egypt is represented by both endemic and widespread taxa (Abdel-Dayem *et al.* 2005, Haggag *et al.* 2008, Haggag 2011). Only *Duroniella cooperi* is confined to the west of Egypt, while the other six endemic species and subspecies are restricted to the east of Egypt, mostly in the northeastern part. Only *Sphingonotus balteatus latifasciatus* occurs in Gabal Elba at the most southeast corner of Egypt. Moreover, four out of the seven endemic species and subspecies occur in the Sinai Peninsula or around the Gulf of Suez to the west of Sinai.

This study represents the second investigation of the Egyptian endemic species and subspecies, after Abdel-Dayem (2012). The grasshoppers contain a comparatively low number of endemic taxa (five species and two subspecies, approximately 6.5% of Egyptian Caelifera), compared with the 39 endemic ground beetle species and subspecies (about 16% of Egyptian Carabidae; Abdel-Dayem 2012). This might result from the fact that grasshoppers are highly mobile, while ground beetles are often flightless with reduced mobility which leads to increased endemism.

None of the endemic or sub-endemic species and subspecies was recorded from the Upper Nile area, while 16 species (about 90% of species) were found in the Sinai Peninsula or near the Gulf of Suez (Table 1 & Fig. 2). Consequently, Sinai Peninsula (particularly southern Sinai) and the Eastern Desert (particularly Ischemic Desert near the Gulf of Suez), constitute the center of Egyptian grasshopper endemism, with the highest diversity of endemic grasshoppers of the regions. Sub-endemic caeliferan distribution shows a sharp separation between Palearctic and Afrotropical regions, where only *Heteracris etbaica* occurs in both.

Besides a few comprehensive works which cover all African species (Johnston 1956; 1968, Dirsh, 1965), there is no updated Orthoptera checklist for Egypt. Recent studies have focused only on Acrididae (Abdel-Dayem *et al.* 2005, Haggag *et al.* 2008, Haggag 2011). Discrepancies between the findings presented in this work and those in the Orthoptera Species File Online (OSF; Eades *et al.* 2015), the most comprehensive global database for Orthoptera, illustrate the need for taxonomic and biogeographic work focusing on North Africa and the Middle East. OSF lists 12 endemic Egyptian Caelifera and only four sub-endemic taxa for Egypt, half of which are not true endemics. The endemic species *Crinita nigripes* and its type locality (Sinai) are missing altogether. Additional errors in the distribution records of *Paracinipe zebrata*, *Sphingonotus angulatus*, and *Helioscirtus gravesi* illustrate the need to focus more research on the caeliferan fauna of Egypt.

In addition to shedding light on the need for focused study on Egyptian fauna, I hope that the results of this study can also be used by conservation practitioners in their decision-making.

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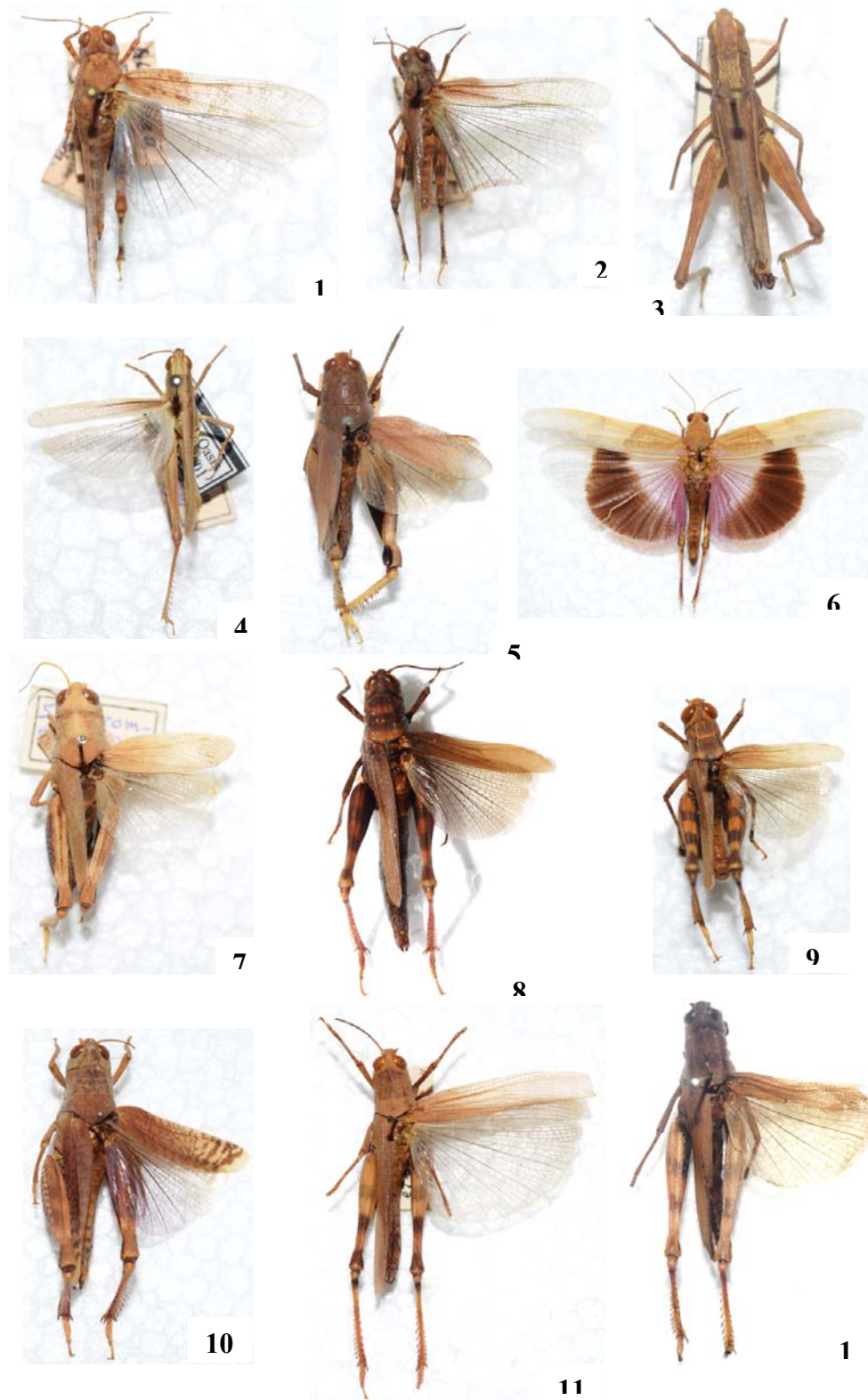


Plate I: Figure 1, 2: *Crinita nigripes* ♀♂; Figure 3, 4: *Duroniella cooperi* ♀♂; Figure 5: *Sphodromerus atakanus* ♀; Figure 6: *Sphingonotus balteatus latifasciatus* ♀; Figure 7: *Sphodromerus marmaricus* ♀; Figure 8, 9: *Sphodromerus pilipes* ♀♂; Figure 10: *Sphodromerus serapis* ♀. Figure 11: *Heteracris etbaica* ♀; Figure 12: *Heteracris morbosa morbosa* ♀.

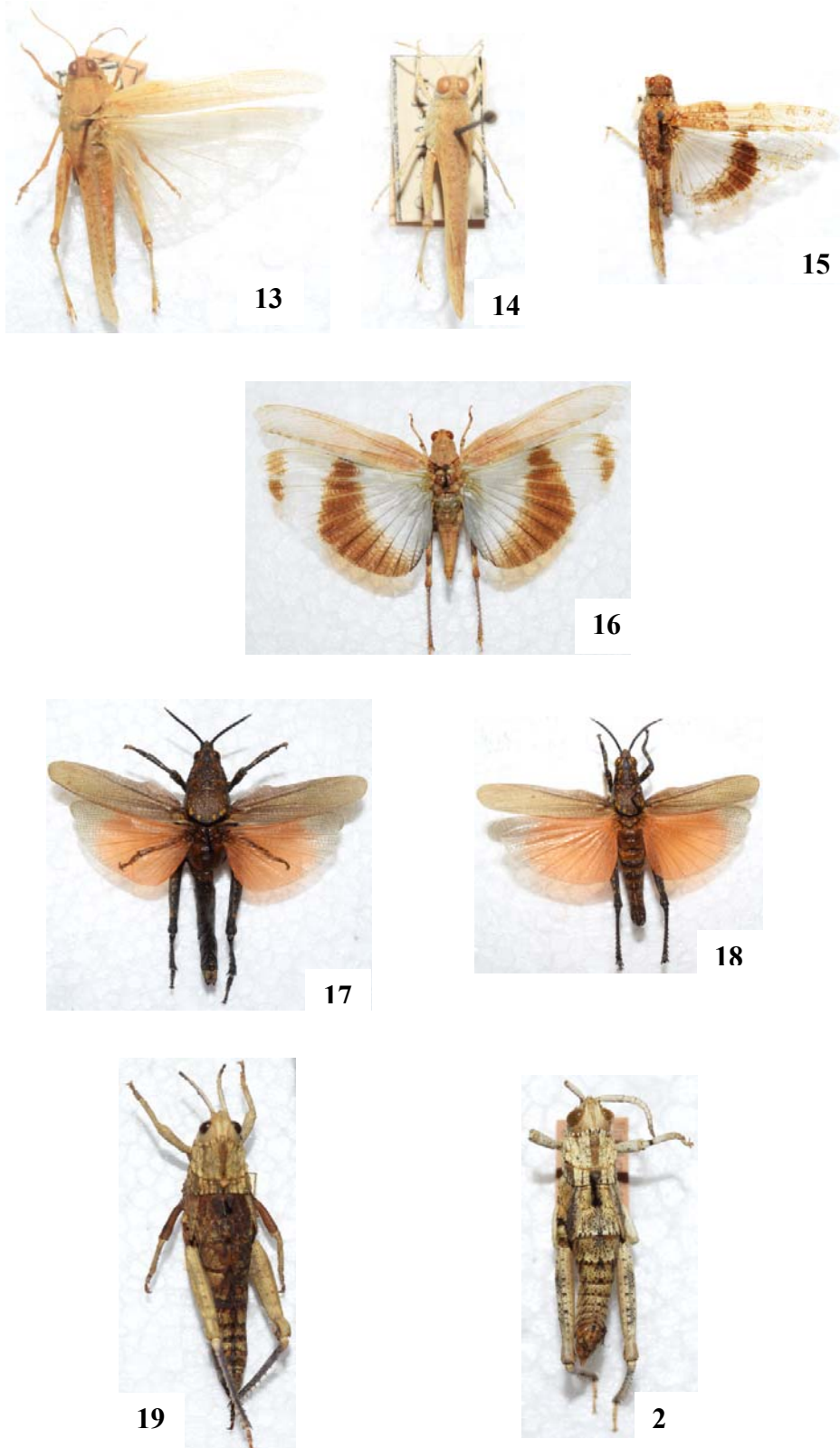


Plate II: Figure 13, 14: *Hyalorrhapis rhamses* ♀♂; Figure 15: *Sphingonotus angulatus* ♀; Figure 16: *Sphingonotus obscuratus obscuratus* ♀; Figure 17, 18: *Poekilocerus bufonius bufonius* ♀♂; Figure 19, 20: *Paracinipe zebrata* ♀♂.

ARABIC SUMMERY

قائمة مرجعية من الجنادب المتوطنة وشبه المتوطنة (مستقيمات الأجنحة : كاليفيرا) من مصر

أسماء أنس حجاج

قسم علم الحشرات – كلية العلوم – جامعة القاهرة

تعتبر الأنواع المتوطنة وبصفة خاصة الجراد المصري ذو أهمية قصوى للباحثين ولدعاة حماية البيئة لتسليط الضوء وتحديد المناطق المحورية و الأولويات في الأهتمام وانشاء المحميات الطبيعية. رغم أن مصر هي جزء من حزام الصحراء الكبرى إلا أن معظم دراسات التنوع البيولوجي تتمركز حول نهر النيل والدلتا، لذلك كان من الضروري عمل قوائم للأنواع المتوطنة والشبه متوطنة موزعة على الثمان مناطق الجيومرفولوجية المصرية. تم سرد مجموعه الجراد (الجنادب) المتوطنة وكانت تتكون من 5 أنواع و2 تحت نوع و التي تنتمي إلى 6 أجناس و 4 تحت العوائل وفصيلتين من الفونة المصرية وهم:

Crinita nigripes - *Duroniella cooperi* - *Hyalorrhypis hyalinus* - *Pamphagulus bodenheimeri bodenheimeri* - *Sphingonotus balteatus latifasciatus* - *Sphingonotus niloticus* - *Sphodromerus atakanus*.

كما تم أيضا سرد 10 أنواع وتحت أنواع أخرى شبة متوطنة في 3 فصائل، التي قد وصفت من أو تواجدت فقط في مصر والدول المجاورة لها. وقد كانت الأنواع وتحت الأنواع المتوطنة تمثل 6.5% في حين أن الأنواع وتحت الأنواع شبة المتوطنة هي 9% من إجمالي الجنادب المصرية (نوعا 108). وتعد أكثر الجنادب المصرية المتوطنة وشبه المتوطنة (90% منها) تتمركز في شبه جزيرة سيناء والصحراء الشرقية بالقرب من خليج السويس، في حين عدم تواجدها في أعالي وادي النيل. ولذلك، يشار إلى شبه جزيرة سيناء باعتبارها منطقة مهمة في مصر، حيث ينبغي أن تتركز بها جهود الحماية الطبيعية. وتم أيضا تقديم التوزيع الجغرافي، وفترات النشاط وأهم المرادفات و البيانات الخاصة بالأنواع ومكان حفظة وتتوفر صور لمعظم الأنواع. ويعد هذا العمل هو أول قائمة مرجعية للجنادب المصرية المتوطنة لتساعد الباحثين وصناع القرار في المحافظة على الفونة المصرية وتخطيط المحميات.