Addenda to the insect fauna of Al-Baha Province, Kingdom of Saudi Arabia with zoogeographical notes

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ABSTRACT

The first list of insects (Arthropoda: Hexapoda) of Al-Baha Province, Kingdom of Saudi Arabia (KSA) was published in 2013 and contained a total of 582 species. In the present study, 142 species belonging to 51 families and representing seven orders are added to the fauna of Al-Baha Province, bringing the total number of species now recorded from the province to 724. The reported species are assigned to recognized regional zoogeographical regions. Seventeen of the species are recorded for the first time for KSA, namely: *Platypleura arabica* Myers [Cicadidae, Hemiptera]; *Cletomorpha* sp.; *Gonocerus juniperi* Herrich-Schäffer [Coreidae, Hemiptera]; *Coranus lateritius* (Stål); *Rhynocoris bipustulatus* (Fieber) [Reduviidae, Hemiptera]; *Cantacader iranica* Lis; *Dictyla poecilla* Drake & Hill [Tingidae, Hemiptera]; *Mantispa scabricollis* McLachlan [Mantispidae, Neuroptera]; *Cerocoma schreberi* Fabricius [Meloidae, Coleoptera]; *Platypus parallelus* (Fabricius) [Curculionidae, Coleoptera]; *Zodion cinereum* (Fabricius) [Conopidae, Diptera]; *Ulidia ?ruficeps* Becker [Ulidiidae, Diptera]; *Atherigona reversura* Villeneuve [Muscidae, Diptera]; *Aplomya metallica* (Wiedemann); *Cylindromyia* sp. [Tachinidae, Diptera]; *Messor semirufus* (André); and *Nesomyrmex denticulatus* (Mayr) [Formicidae, Hymenoptera]. Also, the reduviid bug *Dasycnemus sahlbergi* Bergroth, that was questionably recorded from KSA is confirmed herein as occurring in KSA. The generic name *Peirates* (Reduviidae, Hemiptera) and the specific name of *Apis florea* Fabricius (Apidae, Hymenoptera) were inadvertently misspelled in the original list and are corrected here. Zoogeographically, the present study supports the original study conclusion that the insect species composition of Al-Baha Province is strongly affiliated with the Afrotropical Region rather than to the Palearctic Region or the Eremic Zone. Our insect surveys emphasize the fact that parts of the Arabian Peninsula, including Al-Baha Province, ought to be considered part of the Afrotropical Region rather than in the Palearctic Region or the Eremic Zone.

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Introduction

El-Hawagry et al. (2013) surveyed the insect fauna of Al-Baha Province, Kingdom of Saudi Arabia (KSA), reporting a total number of 582 species belonging to 129 families and representing 17 orders. Since this publication, new collections of insects were made in the province revealing additional insect records, as reported herein.

Al-Baha Province (Figure 1) is situated in the south-western part of KSA between the Holy Makkah and Asir regions (Doha 2009), It is the smallest province in KSA (about 10,362 km²), situated at 41–42° E and 19–20° N. It is characterized by natural tree cover and agricultural plateaus. The province is divided by huge and steep rocky mountains into two main sectors, a lowland coastal plain in the west, known as ‘Tihama’, and a mountainous area with an elevation of 1500–2450 m above sea level at the east, known as ‘Al-Sarat’ or ‘Al-Sarah’ which form a part of Al-Sarawat Mountains range (Ibrahim and Abdoon 2005; Alahmed et al. 2010;

Figure 1. Map of Kingdom of Saudi Arabia showing Al-Baha Province.

El-Hawagry et al. 2013). For more details on the topography and climate of Al-Baha Province, see our previous study (El-Hawagry et al. 2013).

Al-Baha Province (Figure 2) consists of six main districts, four of which are located in Al-Sarah sector beside downtown 'Al-Baha', i.e. Al-Aqiq, Al-Mandaq, Al-Qura, and Baljurashi, while two of the districts are located in Tihama sector, namely Al-Mekhwa including Dhee Ain Village (The Marble Village), and Qelwa (El-Hawagry et al. 2013).

Many authors assume that the Afrotropical Region covers all of Africa south of the Sahara, with the island of Madagascar and the nearby smaller islands, and include parts of the Arabian Peninsula in the region, but there seems to be no agreement as to how much. This may be deduced from the fact that the south-western and southern parts of the Arabian Peninsula including the study area are strongly influenced by a subtropical to tropical climate with spring and summer rains, and are thus dominated by a xeromesic tropical flora of palaeotropical origin, that in fact represents the impoverished northern part of an African flora. Examples of species with this conspicuous distribution pattern, linking south-west Arabia with the other side of the Red Sea, are *Acacia* spp., *Aloe* spp., *Celosia* spp., *Celtis* spp., *Commiphora* spp., succulent *Euphorbia* spp., *Grewia* spp., *Kalanchoe* spp., *Nuxia* spp., *Olea* spp., *Sansevieria* spp., and semi-evergreen sclerophyllous woodlands of the montane vegetation. Nevertheless, Mediterranean and northern temperate floristic elements are well represented in the study area with many plant species including *Lavandula* spp., *Nepeta sheilae*, *Erica arborea*, *Scabiosa*,

Figure 2. Map of Al-Baha Province showing its main districts.

Silene, *Trifolium*, *Arabis alpine*, *Peucedanum* and *Pimpinella* (Ghazanfar and Fisher 1998). Sclater (1858) and Wallace (1876) proposed the classical zoogeographical regions and placed the northern border of the Afrotropics along the Tropic of Cancer. Accordingly, Al-Baha Province was included in the Afrotropical Region, and the northern limit of the Afrotropical Region was placed in Taif area, about 200 km north to Al-Baha (Hölzel 1998). Crosskey (1980) used the northern boundaries of Yemen as the regional boundary between the Afrotropical and Palaearctic parts in the Arabian Peninsula. Extensive sampling of Diptera in the Arabian Peninsula by many authors, especially in Yemen, Oman, the United Arab Emirates and south-western mountains of KSA, have raised some interesting questions in respect to the true extent of the Afrotropical Region in this important transitional zone, indicating that Wallace's (1876) concept of the extent of the Afrotropical Arabian Peninsula is more accurate than Crosskey's (1980) limited concept of Yemen alone (Kirk-Spriggs and McGregor 2009). However, Uvarov (1938), Greathead (1980) and Larsen (1984) agreed that the south-western part of KSA including Al-Baha should be united with the central Arabian deserts which are either considered as a part of the Palaearctic or by some authors as an autonomous Eremic Zone (also called the Saharo-Sindian faunal region). The study of El-Hawagry et al. (2013) confirmed that the insect species composition in Al-Baha Province is representative of species typically considered Afrotropical elements, as is the present list.

Material and methods

Insect material for the present study was collected extensively from different localities in Al-Baha Province from 2011 to 2014 by the authors using sweep and aerial nets, bait traps, beating sheets, soil examination, hand picking, light traps, Malaise traps, pitfall traps, sticky traps, tray sifting of debris, and yellow pan traps (Evans 1975; Borror et al. 1989). For more details on the collecting methods for each insect group, see our previous study (El-Hawagry et al. 2013). Some of the specimens collected and deposited in King Saud University Museum of Arthropods were inadvertently not treated in our previous study (El-Hawagry et al. 2013). Literature records of some species are also noted.

All taxa are arranged in alphabetical order. Sites and dates of collection are included for the purpose of mapping distribution and activity periods of species in the study area. Each collection site is followed, between parentheses, by the district to which it belongs in Al-Baha Province. Also, the coordinates of each site are given. Data from 'Jebel Shada Al A'la', a protected area situated at the south-western Al-Baha Province, has been excluded from this study and will be published later.

Zoogeographical affiliations of species reported in each of the two main sectors of the province were detected using world catalogues and counted to calculate the percentage of Afrotropical, Palaearctic or Oriental elements in each sector. These percentages give a picture about the extent of zoogeographical affinity in each sector.

Images of newly recorded species were made using a Leica MZ 125 stereo-binocular microscope (Leica Microsystems Ltd, St. Gallen, Switzerland) fitted with a digital camera (Q-imaging Micro Publisher 5.0 RTV; Zerene Systems LLC, Richland, WA, USA) at the Plant Protection Department, College of Food and Agriculture Sciences, King Saud University. Photo automontage was performed by Zerene stacker program version 1.04 (<http://zerenesystems.com/cms/stacker>).

Many earlier studies were consulted in order to identify species collected or to determine species previously recorded from Al-Baha. These studies include Alahmed et al. (2010), Collingwood (1985), Collingwood and Agosti (1996), Cranston and Judd (1989), Dawah (2011), Dawah and Abdullah (2006), Dawah and Abdullah (2008), Deeming and Al-Dhafer (2012), El-Hawagry and Al Dhafer (2015), Greathead (1980, 1988), Hölzel (1983, 1998), Larsen (1984), Leclercq, Lelej and van Harten (2006), Lis (1999), Mei and Stuke (2008), Merz and Dawah (2005), Morgulis and Freidberg (2014), Moulet et al. (2014), Pape (1996), Setyaningrum and Al Dhafer (2014), Sharaf, Aldhafer, et al. (2014), and Steyskal (1968), Uvarov (1952).

All insect materials are deposited in King Saud University Museum of Arthropods, Riyadh, Saudi Arabia (KSMA).

Results

A total number of 142 insect species (four identified to the subspecies level and 18 identified only to the genus level) belonging to 51 families and representing seven orders are added to the fauna of Al-Baha Province by the present study.

Most species reported here are typical taxa of the Afrotropical Region rather than those associated with the Palearctic Region or the Eremic Zone. This affinity was slightly greater in Tihama (62%) than in Al-Sarah (58%). The study showed Palaearctic elements comprising 25% or less in both areas. There were a few Oriental elements (6% or less) (Table 1).

All additions and corrections are presented in the following text.

Class **INSECTA**
Subclass **PTERYGOTA**
Division **EXOPTERYGOTA**
Order **ORTHOPTERA**
Suborder **CAELIFERA**
Family **ACRIDIDAE**
Subfamily **ACRIDINAE**
Tribe **Phlaeobini**
Duroniella acuta Uvarov, 1952

Qelwa City (Qelwa) 19.949727° N, 41.240745° E: May 2013

Table 1. Zoogeographic affinities of the insect species added to the fauna of Al-Baha Province by this study.

Region	Affinities (%)	
	Tihama sector	Al-Sarah sector
Afrotropical	62	58
Palearctic	16	25
Oriental	5	6
Undetermined	17	11

Order **HEMIPTERA**
 Suborder **AUCHENORRHYNCHA**
 Family **CICADIDAE**
 Subfamily **CICADINAE**
 Tribe **Platypleurini**
Platypleura arabica Myers
 (Figure 3)

Al-Mekhwa-Namarah Road (Al-Mekhwa) 19.672591° N, 41.565185° E: June 2011. [First record in KSA].

Qelwa City (Qelwa) 19.949727° N, 41.240745° E, Adhom Road (Qelwa) 19.992703° N, 41.182981° E: November 2012.

Family **CALISCELIDAE**
 Subfamily **OMMATIDIOTINAE**
 Tribe **Adenissini**
Adenissus riadicus Dlabola

Al-Baha (Downtown) 20.018129° N, 41.470771° E: July 2012.

Suborder **HETEROPTERA**
 Family **BERYTIDAE**
 Subfamily **METACANTHINAE**
Metacanthus mollis Stusák

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May 2011.

Family **COREIDAE**
 Subfamily **PSEUDOPHLOEINAE**
 Tribe **Clavigrallini**
Clavigralla griseola (Linnavouri)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May 2011.

Subfamily **COREINAE**
 Tribe **Gonocerini**
Cletomorpha sp.
 (Figure 4)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: March–May 2011. [First record in KSA].

Cletus binotulatus obtusulus Linnavuori

Amadan (Al-Mandaq) 20.144656° N, 41.281698° E, Baljurashi City (Baljurashi) 19.877804° N, 41.571622° E, Ghabet Raghdan (Al-Baha City) 20.00575° N, 41.26974° E: May 2010.
 Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: January–October 2012.

Figures 3–8. 3, *Platypleura arabica* Myers; 4, *Cletomorpha* sp.; 5, *Gonocerus juniperi* Herrich-Schäffer; 6, *Coranus lateritius* (Stål); 7, *Rhynocoris bipustulatus* (Fieber); 8, *Cantacader iranicus* Lis.

Ghabet Raghdan (Al-Baha City) 20.00581° N, 41.26811° E: October 2010.

Gonocerus juniperi Herrich-Schäffer
(Figure 5)

Ghabet Raghdan (Al-Baha City) 20.00575° N, 41.26974° E: October 2010.
[First record in KSA].

Family **CYDNIDAE**
Subfamily **CYDNINAE**
Tribe **Geotomini**
Aethus hispidulus (Klug)

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April 2011.

Aethus ostiolatus Signoret

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April 2012.
Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May 2012.

Alonips intrusus (Wagner)

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April 2012.

Geotomus sp.

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May 2011.

Macroscytus brunneus (Fabricius)

Al-Baha (Downtown) 20.018129° N, 41.470771° E: June 2012.

Family **HEBRIDAE**
Subfamily **HEBRINAE**
Hebrus pusillus arabicus Linnavouri

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: March 2012.
Madhas Dam (Al-Mandaq) 20.222058° N, 41.274117° E: March 2012.

Family **MESOVELIIDAE**
Mesovelia vittigera Horvath

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: October 2010.

Family **NAUCORIDAE**

Subfamily **LACCCORINAE*****Heleocoris minusculus*** (Walker)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: March 2012.

Family **NEPIDAE**Subfamily **NEPINAE**Tribe **Nepini*****Laccotrephes fabricii*** Stål

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: October 2010.

Family **NOTONECTIDAE**Subfamily **NOTONECTINAE**Tribe **Notonectini*****Enithares sobria*** (Stål)

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: October 2010.

Notonecta arabiensis Hungerford

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2011.

Family **REDUVIIDAE**Subfamily **HARPACTORINAE**Tribe **Harpactorini*****Coranus angulatus*** Stål

Al-Baha (Downtown) 20.018129° N, 41.470771° E: May 2011.

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2011.

Coranus kiritshenkoi Bergevin

Wadi Jalla: May 2011

Coranus lateritius (Stål)

(Figure 6)

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2011. [First record in KSA]

Rhynocoris bipustulatus (Fieber)

(Figure 7)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May 2011. [First record in KSA]

Cosmolestes pictus (Klug)

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2011.

Subfamily **HOLOPTILINAE**

Figures 9–13. 9, *Dictyla poecilla* Drake & Hill; 10, *Mantispa scabricollis* McLachlan; 11, *Platypus parallelus* (Fabricius); 12, *Cerocoma schreberi* Fabricius; 13, *Zodion cinereum* (Fabricius).

Tribe **Dasyncnemini**
Dasyncnemus sahlbergi Bergroth

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: September 2011.

Subfamily **PEIRATINAE**
Peirates strepitans Rambur

[Inadvertently reported as *Pirates* in El-Hawagry et al. (2013).
 Wadi Genouna 19.454706° N, 41.603165° E: May 2012.

Family **RHYPAROCHROMIDAE**
 Subfamily **RHYPAROCHROMINAE**
 Tribe **Lethaeini**
Lethaeus fulvovarius Puton

Ghabet Raghdan (Al-Baha City) 20.00575° N, 41.26974° E: May 2011.

Family **TINGIDAE**
 Subfamily **CANTACADERINAE**
 Tribe **Cantacaderini**
Cantacader iranicus Lis
 (Figure 8)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: March 2012. [First record in KSA].

Subfamily **TINGINAE**
 Tribe **Tingini**
Compseuta montandoni Distant

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May–October 2010.
 Baljurashi City (Baljurashi) 19.877804° N, 41.571622° E: May 2010.

Phaenotropis cleopatra (Horváth)

Ghabet Raghdan (Al-Baha City) 20.00575° N, 41.26974° E: May 2010.

Plerochila australis (Distant)

Wadi Al-Zarayeb (Al-Mandaq) 20.03601° N, 41.23193° E: May 2014.

Tribe **Tingitini**
Dictyla nassata (Puton)

Al-Atawla (Al-Qura) 20.523609° N, 41.5954626° E: April 2013.
 Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: March 2012.
 Madhas Dam (Al-Mandaq) 20.222058° N, 41.274117° E: March–May 2012.

Dictyla poecilla Drake & Hill
(Figure 9)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: March 2012. [First record in KSA].
Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: March 2013.

Suborder **STERNORRHYNCHA**
Family **PSYLLIDAE**
Diaphorina citri Kuwayama

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: September 2012.

Division: **ENDOPTERYGOTA**
Order **NEUROPTERA**
Family **ASCALAPHIDAE**
Subfamily **ASCALAPHINAE**
Ascalaphus festivus (Rambur)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: March 2012.
Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: June 2012.

Ascalaphus krueperi (van der Weele)

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: June 2012.

Subfamily **HAPLOGLENIINAE**
Tmesibasis larseni Hölzel, 1983

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: June 2012.

Family **MANTISPIDAE**
Subfamily **MANTISPINAE**
Mantispa scabricollis McLachlan
(Figure 10)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: March–May 2012. [First record in KSA].
Ghabet Raghdan (Al-Baha City) 20.00575° N, 41.26974° E: May 2011.

Order **COLEOPTERA**
Suborder **POLYPHAGA**
Family **CURCULIONIDAE**
Subfamily **PLATYPODINAE**
Tribe **Platypodini**
Platypus parallelus (Fabricius)
(Figure 11)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: March–May 2011. [First record in KSA].

Family **MELOIDAE**
Subfamily **MELOINAE**
Tribe **Cerocomini**
Cerocoma schreberi Fabricius
(Figure 12)

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: May–June 2012. [First record in KSA].

Family **SCARABAEIDAE**
Subfamily **CETONIINAE**
Pachnoda fasciata Fabricius

Aqabet Al-Baha-Tihama 20.00000° N, 41.43758°E: March 2012.

Order **LEPIDOPTERA**
Suborder **RHOPALOCERA**
Family **LYCAENIDAE**
Subfamily **THECLINAE**
Tribe **THECLINI**
Deudorix livia (Klug)

Aqabet Al-Baha-Tihama 20.00000° N, 41.43758°E: March 2012.

Hypolycaena pachalica Butler

Aqabet Al-Baha-Tihama 20.00000° N, 41.43758°E: March 2012.

Iolaus nursei Butler

Aqabet Al-Baha-Tihama 20.00000° N, 41.43758°E: March 2012.

Family **NYMPHALIDAE**
Subfamily **NYMPHALINAE**
Tribe **Junoniini**
Junonia orithya here Lang

Aqabet Al-Baha-Tihama 20.00000° N, 41.43758°E: March 2012.

Precis limnoria (Klug)

Aqabet Al-Baha-Tihama 20.00000° N, 41.43758°E: March 2012.

Subfamily **SATYRINAE**
Ypthima asterope (Klug)

Aqabet Al-Baha-Tihama 20.00000° N, 41.43758°E: March 2012.

Suborder **HETEROCERA**
Family **SPHINGIDAE**
Subfamily **SMERINTHINAE**
Tribe **Smerinthini**
Pseudoclanis molitor subviridis Talbot

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: March 2010.

Family **ZYGAENIDAE**
Subfamily **ZYGAENINAE**
Reissita simonyi yemenicola (Tremewan)

Ghabet Raghdan (Al-Baha City) 20.00575° N, 41.26974° E: May 2010.

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: June 2010.

Order **DIPTERA**
Suborder **NEMATOCERA**
Family **BIBIONIDAE**
Dilophus tridentatus Walker

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: March 2013.

Dilophus sp.

Al-Dhafeer (Al-Baha City) 20.010225° N, 41.468368° E: May 2013.

Family **CERATOPOGONIDAE**
Culicoides (Avaritia) imicola Kieffer

Al-Baha (Al-Baha City) 20.018127° N, 41.470755° E: July 2012.

Family **CHIRONOMIDAE**
Subfamily **CHIRONOMINAE**
Tribe **Chironomini**
Chironomus calipterus Kieffer

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: November 1980.

Chironomus callichirus Kieffer

Al-Baha (Al-Baha City) 20.018332° N, 41.470578° E: August 1984.

Polypedilum (Pentapedilum) alticola Kieffer

Al-Baha (Al-Baha City) 20.018332° N, 41.470578° E: July 1981.

Subfamily **TANYPODINAE**
Larsia rutshuruiensis (Goetghebuer)

Al-Mandaq (Al-Mandaq) 20.113122° N, 41.2854791° E: April 1980.

Subfamily **ORTHOCLADIINAE**
Paratrichocladius micans (Kieffer)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: August ?.

Suborder **BRACHYCERA**
Family **ASILIDAE**
Subfamily **APOCLEINAE**
Promachus sp.

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February–March 2012.

Family **BOMBYLIIDAE**
Subfamily **BOMBYLIINAE**
Tribe **Bombyliini**
Bombyrella delicata (Wiedemann)

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: May–June 2012.

Bombylius discoidea Fabricius

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: May–June 2012.

Subfamily **ANTHRACINAE**
Tribe **Exoprosopini**
Exoprosopa linearis Bezzi

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: March 2012.

Exoprosopa minos (Meigen)

Aqabet Al-Baha-Tihama 20.00000° N, 41.43758° E: April–May 2012.

Family **DOLICHOPODIDAE**
Subfamily **DIAPHORINAE**
Asyndetus albifacies Parent

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April 2012.

Family **HYBOTIDAE**
Subfamily **TACHYDROMIINAE**
Platypalpus sp.

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April–May 2012.

Family **TABANIDAE**
Subfamily **EXORISTINAE**
Gonia bimaculata Wiedemann

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: April 2012.

Suborder **CYCLORRHAPHA**
Section **ASCHIZA**
Family **SYRPHIDAE**
Subfamily **SYRPHINAE**
Tribe **Paragini**
Paragus sp.

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: May 2012.

Tribe **Syrphini**
Asarkina sp.

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: February 2012.

Section **SCHIZOPHORA**
Subsection **ACALYPTRATAE**
Family **CARNIDAE**
Carnus hemapterus Nitzsch

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April–May 2013.

Meoneura nitidiuscula Collin

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April–May 2013.

Family **CHLOROPIDAE**
Subfamily **CHLOROPINAE**
Metopostigma sabulona Becker

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: March–April 2012.

Mepachymerus baculus Speiser

Al-Dhafeer (Al-Baha City) 20.010225° N, 41.468368° E: October 2012.

Pachylophus pellucidus Becker

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: May 2012

Figures 14–17. 14, *Atherigona reversura* Villeneuve; 15, *Cylindromyia* sp.; 16, *Messor semirufus* (André), worker [CASENT 0906385, Photographer: Estella Ortega, copyright: www.antweb.org]; 17, *Nesomyrmex denticulatus* (Mayr), dealate queen [CASENT 0906381, Photographer: Estella Ortega, copyright: www.antweb.org].

Pachylophus proximus Adams

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: March–April 2012.

Subfamily **OSCINELLINAE** *Anatrichus pygmaeus* Lamb

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April 2012.

Scoliophthalmus micantipennis Duda

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April 2012.

Scoliophthalmus trapezoides Becker

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April 2012.

Family **CONOPIDAE**

Subfamily **MYOPINAE**
Tribe **Zodionini**
Zodion cinereum (Fabricius)
(Figure 13)

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: May–June 2012.
[First record in KSA].

Family **DIOPSIDAE**
Diopsis collaris Westwood

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February–March 2012.
Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: February–March 2012.

Family **EPHYDRIDAE**
Subfamily **DISCOMYZINAE**
Psilopa nilotica (Becker)

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February–March 2013.

Subfamily **HYDRELLINAE**
Notiphila ignobilis Loew

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April 2012.

Family **LONCHAEIDAE**
Subfamily **LONCHAEINAE**
Tribe **Lonchaeini**
Silba virescens Macquart

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February–March 2013.

Family **MILICHIIDAE**
Subfamily **MADIZINAE**
Leptometopa rufifrons Becker

Aqabet Al-Baha-Tihama 20.00000° N, 41.43758° E: April–May 2013.

Subfamily **MILICHIINAE**
Enigmilichia dimorphica Deeming

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April 2012.

Family **TEPHRITIDAE**
Subfamily **DACINAE**
Tribe **Dacini**
Bactrocera cucurbitae (Coquillett)

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February–April 2012.

Subfamily **TEPHRITINAE**
Dioxyna sp.

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: April–June 2012.

Family **ULIDIIDAE**
Subfamily **ULIDIINAE**
Tribe **Ulidiini**
Physiphora alceae (Preyssler)

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February–May 2013.

Ulidia ?ruficeps Becker

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: April–May 2013. [First record in KSA]

Subsection **CALYPTRATAE**
Family **ANTHOMYIIDAE**
Subfamily **ANTHOMYIINAE**
Tribe **Hydrophoriini**
Delia sp.

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: March–April 2013.

Family **CALLIPHORIDAE**
Subfamily **CALLIPHORINAE**
Cordylobia anthropophaga (Blanchard)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May 2012.

Pericallimya greatheadi Zumpt

Al-Baha (Downtown) 20.018129° N, 41.470771° E: August 2012.

Subfamily **CHRYSOMYINAE**
Chrysomya bezziana Villeneuve

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: April–May 2013.

Chrysomya marginalis (Wiedemann)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May 2012.

Wadi Jalla: May.

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2013.

Subfamily **LUCILIINAE*****Lucilia cuprina*** (Wiedemann)

Al-Mandaq (Al-Mandaq) 20.113607° N, 41.2854624° E: May–July 2012.

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: October 2011.

Ghabet Raghdan (Al-Baha City) 20.00575° N, 41.26974° E: May–June 2012. Wadi Jalla: May 2011.

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2012.

Subfamily **POLLENIINAE*****Pollenia dasypoda*** Portschinsky

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2013.

Pollenia rudis (Fabricius)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: April–June 2012.

Wadi Jalla: May 2011.

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May–June 2012.

Subfamily **RHINIINAE*****Cosmina arabica*** Robineau-Desvoidy

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May–June 2012.

Wadi Jalla: May 2012.

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May–June 2012.

Isomyia terminata (Wiedemann)

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2012.

Rhinia apicalis (Wiedemann)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May and November.

Wadi Jalla: May 2012.

Stomorphina lunata (Fabricius)

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2012.

Stomorphina rugosa (Bigot)

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: March–May 2012.

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: March–June 2012.

Family **MUSCIDAE**
 Subfamily **ATHERIGONINAE**
 Tribe **Atherigonini**
Atherigona laevigata (Loew)

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: March–May 2012.

Atherigona orientalis (Schiner)

Al-Mekhwah City (Al-Mekhwah) 19.770576° N, 41.434293° E: February 2013.

Atherigona reversura Villeneuve
 (Figure 14)

Al-Mekhwah City (Al-Mekhwah) 19.770576° N, 41.434293° E: February 2013. [First record in KSA].

Subfamily **MYDAEINAE**
Graphomya maculata (Scopoli)

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: April 2012.

Family **SARCOPHAGIDAE**
 Subfamily **SARCOPHAGINAE**
Sarcophaga destructor Malloch

Al-Baha (Downtown) 20.018129° N, 41.470771° E: May 2012.

Family **TACHINIDAE**
 Subfamily **EXORISTINAE**
 Tribe **Eryciini**
Aplomya metallica (Wiedemann) [First record in KSA]

Ghabet Raghdan (Al-Baha City) 20.00575° N, 41.26974° E: June 2012.

Tribe **Exoristini**
Exorista xanthaspis (Wiedemann)

Al-Mekhwah City (Al-Mekhwah) 19.770576° N, 41.434293° E: June 2012.

Tribe **Goniini**
Gonia bimaculata Wiedemann

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: May–July 2012.

Subfamily **TACHININAE**
Mintho praeceps (Scopoli)

Baljurashi City (Baljurashi) 19.877804° N, 41.571622° E: March 2013.

Subfamily **PHASIINAE**
 Tribe **Cylindromyiini**
Cylindromyia sp.
 (Figure 15)

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February–March 2012. [First record in KSA].

Tribe **Phasiini**
 ? *Phasia* sp.

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2012.

Order **HYMENOPTERA**
 Suborder **APOCRITA**
 Family **APIDAE**
 Subfamily **APINAE**
 Tribe **Apini**
Apis florea Fabricius

[The specific epithet was inadvertently written as *florae* in the original study (El-Hawagry et al. 2013)].

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February–March 2011.

Wadi Jalla: May–September 2011.

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May–October 2011.

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May–August 2011.

Tribe **Anthophorini**
Amegilla sp.

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February 2012.

Tribe **Eucerini**
Tetraloniella sp.

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February 2012.

Tribe **Melectini**
Thyreus sp.

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: March 2012.

Subfamily **XYLOCOPINAE**
 Tribe **Ceratinini**
Ceratina sp.

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February–April 2012.

Tribe **Xylocopini**
Xylocopa pubescens Spinola

Al-Dhafeer (Al-Baha City) 20.010225° N, 41.468368° E: May 2012.
 Dhee Ain (Al-Mekhwah) 19.55459° N, 41.26302° E: January 2011.
 Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: March 2013.

Family **FORMICIDAE**
 Subfamily **DOLICHODERINAE**
Technomyrmex setosus Collingwood, 1985

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: March 2011.
 Al-Qamh (Baljurashi) 19.807666° N, 41.705947° E: May 2010.

Subfamily **FORMICINAE**
Camponotus atlantis Forel

Al-Mandaq (Al-Mandaq) 20.113607° N, 41.2854624° E: May 2010.

Camponotus ilgii Forel

Dhee Ain (Al-Mekhwah) 19.55459° N, 41.26302° E: May 2010.

Subfamily **MYRMICINAE**
Cardiocondyla emeryi Forel

Al-Mandaq (Al-Mandaq) 20.113607° N, 41.2854624° E: May 2012, Dhee Ain
 (Al-Mekhwah) 19.55459° N, 41.26302° E: May 2011, Wadi Turabet Zahran (Al-Mandaq)
 20.12397° N, 41.17176° E: May 2011.

Carebara arabica (Collingwood & Van Harten)

Dhee Ain (Al-Mekhwah) 19.55459° N, 41.26302° E: May 2011.

Messor semirufus (André)
 (Figure 16)

Al-Mandaq (Al-Mandaq) 20.12163° N, 41.13906° E: May 2010. [First record in KSA].

Messor ebeninus Santschi

Wadi Kheira (Al-Mandaq) 20.063572° N, 41.398428° E: May 2010.

Monomorium venustum (Smith)

Dhee Ain (Al-Mekhwah) 19.55459° N, 41.26302° E: September 2011.

Monomorium phoenicum Santschi

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May 2010.

***Nesomyrmex denticulatus* (Mayr)**
(Figure 17)

Ghabet Shahba (Al-Baha City) 20.02723° N, 41.28565° E: May 2010. [First record in KSA].

***Strumigenys arnoldi* Forel**

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: May 2011.

***Tetramorium depressiceps* Menozzi**

Wadi Turabet Zahran (Al-Mandaq) 20.12397° N, 41.17176° E: May 2011.

***Tetramorium juba* Collingwood, 1985**

Wadi Jalla: April 2011.

***Tetramorium caespitum* (Linnaeus)**

Wadi Kheira (Al-Mandaq) 20.063572° N, 41.398428° E: May 2011.

***Tetramorium khyarum* Bolton**

Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: September 2011.

Family **HALICTIDAE**
Subfamily **HALICTINAE**
Tribe **Halictini**
***Lasioglossum gibber* (Vachal)**

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: March 2012.

Tribe **Sphecodini**
***Sphecodes* sp.**

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: March 2012.

Subfamily **NOMIINAE**
***Pseudapis* sp.**

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February–April 2012.

Family **MEGACHILIDAE**
Subfamily **MEGACHILINAE**
Tribe **Anthidiini**
***Anthidium waltii* Spinola**

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February 2012.

***Icteranthidium ferrugineum* (Fabricius)**

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: March 2012.

Tribe **Megachilini**
***Chalicodoma* sp.**

Al-Mekhwa City (Al-Mekhwa) 19.770576° N, 41.434293° E: February 2012.

Family **MUTILLIDAE**
Subfamily **DASYLABRINAE**
Tribe **Dasylabrini**
***Tricholabiodes niloticus* Suárez**

Baljurashi City (Baljurashi) 19.877804° N, 41.571622° E: May 2010.

Subfamily **MUTILLINAE**
Tribe **Trogaspidiini**
***Trogaspidia floralis* (Klug)**

Baljurashi City (Baljurashi) 19.877804° N, 41.571622° E: May 2010.
Dhee Ain (Al-Mekhwa) 19.55459° N, 41.26302° E: October 2010.

Subfamily **MYRMILLINAE**
***Omotilla conjuncta* (Klug)**

Baljurashi City (Baljurashi) 19.877804° N, 41.571622° E: May 2010.

Subfamily **PSEUDOPHOTOPSIDINAE**
***Pseudophotopsis continua* (Fabricius)**

Baljurashi City (Baljurashi) 19.877804° N, 41.571622° E: May 2010.

Discussion

The Arabian Peninsula is considered by many authors to include three zoogeographical regions, the Afrotropical, the Palaearctic, and the Oriental (Hölzel 1998). Many authors include the south-western part of the Arabian Peninsula in the Afrotropical Region, but there appears to be no agreement as to the extent of this region of the Peninsula (El-Hawagry et al. 2013).

Al-Baha Province, like other areas in the south-western part of KSA, contains montane woodlands and evergreen shrub lands, with strong Afrotropical affinities (Bussmann and Beck 1995), predominantly rich in *Juniperus* spp., *Acacia* spp., *Olea* spp., introduced cactus species and many other Afrotropical trees, including *Nuxia oppositifolia*, *Maesa lanceolata* and *Celtis africana* that grow in well-watered gullies, and mixed with some Mediterranean and northern temperate elements (Ghazanfar and Fisher 1998).

Considering the insect fauna of Al-Baha Province as listed by El-Hawagry et al. (2013) and these additional taxa listed herein, it is concluded that Al-Baha Province has an extraordinarily complex and interesting insect fauna. This may be attributed to its geographical position at the junction of the Afrotropical Region with its Afromontane vegetation and the Palaearctic Region with its Mediterranean and temperate floristic elements (Bussmann and Beck 1995; Hölzel 1998). Sharaf, Fisher, et al. (2014) studied the ants in the south-western mountains of KSA and showed that ants in this region have considerable affinities with the Afrotropical fauna. The insect species listed in this study also support the assumption of El-Hawagry et al. (2013) and Sharaf, Fisher, et al. (2014) that the insect fauna of Al-Baha Province is strongly related to the Afrotropical Region, rather than to the Palearctic Region or the Eremic Zone. These results emphasize the fact that parts of the Arabian Peninsula, including Al-Baha Province, should be included in the Afrotropical Region rather than in the Palaearctic Region or the Eremic Zone. Other studies have confirmed the Afrotropical faunal affinities in south-western mountains of the Arabian Peninsula (Eig 1938; Bolton 1994; Aldawood et al. 2011; Sharaf and Aldawood 2011, 2012; Sharaf et al. 2012a, 2012b; Sharaf and Aldawood 2013; Sharaf, Fisher, et al. 2014).

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