

## SURVEY OF PREDATOR AND PARASITOID INSECTS IN DUHOK PROVINCE, KURDISTAN REGION, IRAQ

Feyroz Ramadan Hassan

Department of Plant Protection, College of Agricultural Engineering Sciences, University of Duhok, Duhok, Iraq.  
Feyroz.hassan@uod.ac

*Received Date: 24 November 2020, Accepted Date: 18 March 2021, Published Date: 20 Jun 2021*

### ABSTRACT

A total of 47 species belonging to 46 genera, 34 subfamilies, 23 families and 7 orders of predator and parasitoid insects were collected and identified. The survey was conducted throughout the program held by the General Directorate of Agriculture-Duhok, in cooperating with the College of Agricultural Engineering Sciences in Duhok Province, Kurdistan Region, Iraq from May 2013 to April 2014.

The species hosts, collecting date, locality and distributions are given. The current checklist also included some species previously collected by other researchers in Duhok Province.

Keywords: Duhok, Iraq, Parasitoids, Predators, Survey.

### INTRODUCTION

Duhok Province (Kurdistan Region), located at the Iraqi-Turkey borders, is famous for its agricultural diversity that provides suitable environment for insect's reproduction and adaptation. Usually, outbreaks of pest and natural enemy's populations are associated with changes in the ecological stability of ecosystems. The control of pest species is closely linked to their predation and parasitism by natural enemies that have occurred since the evolution of the first terrestrial ecosystems some 500 million years ago (Waage and Greathead, 1988).

Natural enemies can effectively prevent outbreaks of crop pests and control their populations (Cracraft and Grifo, 1999), which play as a key component of a 'systems approach' to integrated pest management (Bale *et al.*, 2008). The most important natural enemies belong to the insecta class within the orders Hemiptera (Anthocoridae, Miridae), Neuroptera (Chrysopidae, Conioterygidae), Diptera (Cecidomyiidae, Muscidae, Syrphidae), Coleoptera (Alleculidae, Anthribidae, Cantharidae, Coccinellidae, Cybocephalidae, Endomychidae, Nitidulidae, Staphylinidae and Tenebrionidae) and Hymenoptera (Braconidae, Platygasteridae, Pteromalidae, Encyrtidae, Eulophidae, Aphelinidae) (Vacante and Bonsignore, 2017).

## Survey of predator and parasitoid insects

In Iraq, during the period between 1960-2017, a total of 99 different parasitoid species related to 86 genus, 18 families, 3 orders parasitized 44 different insect pest species were recorded. While 119 different predator's species related to 69 genera, 22 families, 4 orders which preyed on 60 different insect pests were recorded (Alrubeai, 2017). Alrubeai (2017) also reported that the parasitoids intensively studied in Iraq were: *Apanteles angaleti* Muesebeck, 1956; *Aphidophagous* spp., *Bracon hebetor* (= *Habrobracon hebetor* (Say, 1836)); *Trichogramma* spp.; *Telenomus busseolae* Gahan, 1922; and predators intensively studied were: *Coccinella* spp, *Orius* sp., *Chrysoperla* spp., *Clitostethus arcuatus* (Rossi, 1794); *Nephus* sp.; *Stethorus gilvifrons* (Mulsant, 1850).

The current study is the first attempt done in Duhok Province, Kurdistan region- Iraq, to document the predators and parasitoids present. The current survey also included some species previously collected by some Iraqi researchers in Duhok such as: Assaf (2001), Assaf (2007), Mahmoud *et al.* (2008), Akrawi (2011) and Mirza (2014).

### MATERIALS AND METHODS

The specimens were collected from different districts in Duhok province, Kurdistan region, Iraq from May 2013 to April 2014 on fruit and forest trees, vegetables and wild plants using hand picking, aspirator and sweeping net with 2-3 field collecting trips per week. The large and medium size specimens were mounted by the insect pins, while small specimens were preserved in 70% alcohol. Then the predator and parasitoid specimens were sent to the Iraq Natural History Research Center and Museum, University of Baghdad for identification.

The name of families, subfamilies of each species, hosts and general distribution were obtained from the following catalogues; Khalaf (1958, 1963); Derwesh (1965); Abdul-Rassoul (1976); Ghahari *et al.* (2010, 2015); Aukema *et al.* (2013); Ghahari and Moulet (2013).

### RESULTS

A collection of 47 species belonging to 46 genera, 34 subfamilies, 23 families and 7 orders of predators and parasitoids which were collected from 2013 to 2014 and the information about the collection and the related previous studies were listed alphabetically as below:

#### **Predators**

##### **(A) Order, Coleoptera**

##### **(1) Family, Anthribidae Billberg, 1820**

##### **Subfamily, Anthribinae Billberg, 1820**

##### ***Anthribus fasciatus* Forster 1770**

**Materials examined:** 2 specimens, Akra District (Bijel), May 2009.

**Hosts:** *Eulecanium titiae* (Linnaeus, 1758) (Coccidae) on fig trees (Akrawi, 2011).

**General distribution:** Albania, Armenia, Austria, Azerbaijan, Belgium, Bulgaria, Bosnia and Herzegovina, Caucasus, Czech Republic, Denmark, Estonia, France, Finland, Georgia, Great Britain, Germany, Greece, Iran, Italy, Iraq, Israel, Jordan, Latvia, Luxembourg, Lebanon,

Feyroz Ramadan Hassan

Netherlands, Poland, Portugal, Romania, Serbia, Slovakia, Siberia, Spain, Syria, Sweden, Switzerland, Turkey, Montenegro, Kosovo, Ukraine (Yunakov *et al.*, 2018).

(2) **Family, Carabidae** Latreille, 1802

**Subfamily, Carabinae** Latreille, 1802

*Calosoma* sp.

**Material examined:** 1 specimen, Summel District, Summel Center, April 2014 on soil.

**General distribution:** Worldwide (GBIF Secretariat, 2019).

**Subfamily, Cicindelinae** Latreille, 1802

*Cicindela melancholica* (Fabricius, 1798)

**Material examined:** 1 specimen, Bardarash district (Kalak/ Zangal village), March 2014 on cabbage plants.

**General distribution:** Southern Europe to southern Africa and from the Cape Verde Islands to China (Wiesner, 1992); Iraq (Ali, 1978).

(3) **Family, Coccinellidae** Latreille, 1807

**Subfamily, Chilocorinae** Mulsant, 1846

*Chilocorus* sp.

**Material examined:** 1 specimen, Amadiya District (Sarsink, Duheeke Village), June 2013 on weeds.

**General distribution:** Afrotropical: Sudan; Nearctic: USA; wide distribution in Palearctic including Mongolia (Abdolahi *et al.*, 2016); Iraq (Derwesh, 1965).

*Exochomus quadripustulatus* (Linnaeus, 1758)

**Material examined:** 1 specimen, Akra District (Bijel), May 2009.

**Hosts:** *Eulecanium titiae* (Linnaeus, 1758) (Hemiptera, Coccidae) on fig trees (Akrawi, 2011).

**General distribution:** India, Palearctic: wide distribution in western Palearctic, Russia, Iraq (Roberts, 1972; Stary and Kaddou, 1975).

**Subfamily, Coccinellinae** Latreille, 1807

*Coccinella septempunctata* Linnaeus, 1758

**Materials examined:** 2 specimens, Amadiya and Summel Districts, May 2013 on weeds.

**Hosts:** *Brachycaudus amygdalinus* and *Hyalopterus pruni* (Assaf, 2001).

**General distribution:** Albania, Andorra, Azores, Austria, Balearic, Belgium, Belarus, Bulgaria, Bosnia and Herzegovina, Corsica, Cyprus, Croatia, Czech Republic, Denmark, England, Estonia, France, Finland, Greek, Germany, Hungary, Italy, Ireland, Lithuania, Latvia, Luxembourg, Liechtenstein, Madeira, Macedonia, Malta, Norway, Netherlands, Portuguese, Poland, Russia, Romania, Sardinia, Slovenia, Slovakia, Sweden, Spain, Switzerland, Ukraine and Yugoslavia former (Jafari *et al.*, 2015); Iraq (Khalaf, 1958).

*Coccinella undecimpunctata* Linnaeus, 1758

**Materials examined:** 4 specimens, Summel Districts, May 2013 on apricot and peach trees infested with aphids.

## Survey of predator and parasitoid insects

**Hosts:** *Brachycaudus amygdalinus* and *Hyalopterus pruni* (Assaf, 2001).

**General distribution:** Australia, Canada, India, Mongolia, Nepal, New Zealand, North Africa, wide distribution in western Palearctic, Pakistan and USA (Jafari *et al.*, 2015); Iraq (Khalaf, 1958).

***Hippodamia variegata*** (Goeze, 1777)

**Materials examined:** 4 specimens, Dohuk (Zawita and Mangesh); 4 specimens, Summel (Summel Center and Fayda); 4 specimens, Amadiya (Sersink and Chamanke); 2 specimens, Shekhan (Shekhan center and Qasrok); 1 specimens, Zakho, Darkar Ajam; the specimens were collected in May 2013 on tomato, cucumber, sunflower, okra, pea, apple trees and weeds infested with aphid.

**General distribution:** Albania, Andorra, Austria, Azores, Balearic, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Corsica, Croatia, Cyprus, Czech Republic, Denmark, England, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madeira, Malta, Netherlands, Norway, Poland, Portuguese, Romania, Russia, Sardinia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia former, East Palearctic, Near East, North Africa and Oriental region (Jafari *et al.*, 2015); Iraq (Khalaf, 1963).

***Oenopia conglobata*** (Linnaeus, 1759)

**Materials examined:** 2 specimens, Duhok Center; 1 specimen, Mangesh; 3 specimens, Amadiya, Sersink; the specimens were collected in June 2013 on apple, apricot and plum trees infested with aphid.

**General distribution:** Nearctic: North America; Oriental: India; Palearctic: wide distribution in Palearctic, Northern China and Pakistan (Abdolahi *et al.*, 2016); Iraq (Khalaf, 1963).

**Subfamily, Scymninae** Mulsant, 1846

***Scymnus syriacus*** Marseul, 1868

**Material examined:** One specimen, Summel District, Summel Center; June 2013 on apricot trees infested with aphid.

**Hosts:** *Brachycaudus amygdalinus* and *Hyalopterus pruni* (Assaf, 2001).

**General distribution:** Cyprus, Egypt, Israel, Iraq, Iran, Jordan, Lebanon, Saudi Arabia, Syria (Abdel-Dayem *et al.*, 2017); Iraq (Abdul-Rassoul 1976; Al Rawi *et al.*, 1977).

**(B) Order, Dermaptera**

**Family, Forficulidae** Stephens, 1829

**Subfamily, Forficulinae** Stephens, 1829

***Forficula auricularia*** Linnaeus, 1758

**Materials examined:** 2 specimens, Mangesh; 1 specimen, Amadiya, Sersink; 1 specimen, Summel, Fayda; 2 specimens, Shekhan; 2 specimens, Zakho, Darkarajam; the specimens were collected in May 2013 on okra, weeds and apple trees.

**General distribution:** Worldwide, Iraq (Derwesh, 1965).

**(C) Order, Dictyoptera**

Feyroz Ramadan Hassan

**Family, Mantidae** Burmeister, 1838

**Subfamily, Mantinae** Burmeister, 1838

*Mantis religiosa* (Linnaeus, 1758)

**Materials examined:** 2 specimens, Duhok center, August and Summel center, July 2013 on weeds.

**General distribution:** Worldwide (GBIF Secretariat, 2019).

**(D) Order, Diptera**

**(1) Family, Chamaemyiidae** Hendel, 1910

**Subfamily, Chamaemyiinae** Hendel, 1910

*Leucopis ninae* Tanasijtshuk, 1966

**Materials examined:** 2 specimens, Summel District, Summel Center, May 2000.

**Hosts:** *Brachycaudus amygdalinus* and *Hyalopterus pruni* on apricot and peach trees (Assaf, 2001).

**General distribution:** England through Europe to southern Russia, Bulgaria, Ukraine, through the Middle East and North Africa, and to the Middle Asian states through to Mongolia (Ebejer and Barták, 2019).

**(2) Family, Syrphidae** Latreille, 1802

**Subfamily, Syrphinae** Leach, 1815

*Eupeodes corollae* (Fabricius, 1794)

**Materials examined:** 2 specimens, Summel Center, May 2013 on rose plant.

**General distribution:** Worldwide (Dousti and Hayat, 2006).

**(E) Order, Hemiptera**

**(1) Family: Anthocoridae** Fieber, 1837

**Subfamily: Anthocorinae** Fieber, 1837

*Orius albidipennis* (Reuter, 1884)

**Material examined:** 1 specimen, Summel Center, June 2013, apricot trees infested with aphids.

**General distribution:** Arabian Peninsula, Canary Islands, Cape Verde Islands, Caucasus, Central Asia, India, Madeira, Near East, Pakistan, Spain, Northern and Tropical Africa (Ostovan *et al.*, 2017), Iraq (Kaddou, 1967).

**(2) Family, Geocoridae** Baerensprung, 1860

**Subfamily, Geocorinae** Baerensprung, 1860

*Geocoris* sp.

**Materials examined:** 2 specimens, Duhok Center, July 2013 on kidney bean plants infested with aphids.

**General distribution:** Worldwide (GBIF Secretariat, 2019).

**(3) Family, Miridae** Hahn, 1833

**Subfamily, Bryocorinae** Baerensprung, 1860

*Nesidiocoris tenuis* (Reuter, 1895)

## Survey of predator and parasitoid insects

**Materials examined:** 4 specimens, Summel District (Summel Center), April 2014.

**Hosts:** *Tuta absoluta* larvae on tomato plants (Mirza, 2014).

**General distribution:** Palearctic Region (Ghahari and Chérot, 2014).

**Subfamily, Deraeocorinae** Douglas & Scott, 1865

*Deracoris* sp.

**Material examined:** 1 specimen, Summel District (Batel), May 2013 on melon plants.

**General distribution:** Palearctic Region (Ghahari and Cherot, 2014).

(4) **Family, Nabidae** A. Costa, 1853

**Subfamily, Nabinae** A. Costa, 1853

*Nabis pseudoferus* Remane, 1949

**Materials examined:** 4 specimens, Summel (Summel Center), April 2014.

**Hosts:** *Tuta absoluta* larvae on tomato plants (Mirza 2014).

**General distribution:** East Turkey, Cyprus, Lebanon, Iran and Iraq (Kerzhner, 1996; Ghahari *et al.*, 2015).

(5) **Family, Reduviidae** Latreille, 1807

**Subfamily, Harpactorinae** Amyot & Audinet- Serville, 1843

*Coranus aegyptius* (Fabricius, 1775)

**Materials examined:** 3 specimens, Summel (Summel Center), April 2014.

**Hosts:** *Tuta absoluta* larvae on tomato plants (Mirza, 2014).

**General distribution:** Afghanistan, Armenia, Algeria, Canary Islands, Chad, Cape Verde Islands, Egypt, Iraq, Iran, Libya, Morocco, Mauritania, Senegal, Saudi Arabia, Syria, Turkmenistan, Tunisia, Uzbekistan, Yemen (Aukema *et al.*, 2013, Ghahari *et al.*, 2013).

**Subfamily, Reduviinae** Amyot & Serville, 1843

*Reduvius pallipes* Klug, 1830

**Material examined:** 1 specimen, Summel District (Summel Center), June 2013 on soil.

**General distribution:** North Africa, Italy (Sicily), Malta, Balkan Peninsula, Arabian Peninsula, Iran, Pakistan, Iraq (Aukema *et al.*, 2013; Ghahari *et al.*, 2013).

(F) **Order, Neuroptera**

**Family, Chrysopidae** Schneider, 1851

**Subfamily, Chrysopinae** Schneider, 1851

*Chrysoperla carnea* (Stephens, 1836)

**Materials examined:** 2 specimens, Mangesh; 2 specimens, Summel (Summel Center), Fayda, May 2013 on wheat and weed plants.

**General distribution:** widely distributed in the Palearctic region, extending to Afrotropical (Cape Verde, Oman, United Arab Emirates, Yemen) and Oriental (China, India, Nepal) regions (Letardi *et al.*, 2020).

**Parasitoids**

(A) **Order, Diptera**

**Family, Tachinidae**

**Subfamily, Phasiinae**

*Phasia* sp.

**Materials examined:** (4 specimens) Summel District (Summel Center), April 2006.

**Host:** Sunn pest *Eurygaster integriceps* adults on wheat field (Assaf, 2007).

**General distribution:** Worldwide (GBIF Secretariat, 2019).

**(B) Order, Hymenoptera**

**(1) Family, Aphelinidae** Thomson, 1876

**Subfamily, Coccophaginae** Forster, 1878

*Coccophagus* sp.

**Material examined:** 1 specimen, Akra District (Bijel), May 2009.

**Host:** *Eulecanium titiae* (Linnaeus, 1758) (Coccidae: Homoptera) on fig trees (Akrawi, 2011).

**General distribution:** Afghanistan, Armenia, Azerbaijan, Cyprus, Georgia, Greece, Iran, Iraq, Israel, Kyrgyzstan, Syria, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan (Abd-Rabou *et al.*, 2013).

**(2) Family, Braconidae** Nees, 1811

**Subfamily, Aphidiinae** Haliday, 1833

*Aphidius transcaspicus* Telenga, 1958

**Materials examined:** 3 specimens, Summel (Summel Center), May 2013.

**Hosts:** *Brachycaudus amygdalinus* and *Hyalopterus pruni* on apricot and peach trees (Assaf, 2001; Mahmoud *et al.*, 2008).

**General distribution:** Algeria, Iran, Egypt, Israel, Morocco, Tunisia, Turkey, Iraq (Stary, 1971).

*Praon volucre* (Haliday, 1833)

**Materials examined:** 1 specimen, Summel (Summel Center), May 2008.

**Hosts:** *Brachycaudus amygdalinus*, *Hyalopterus pruni* on apricot and peach trees (Assaf, 2001; Mahmoud *et al.*, 2008).

**General distribution:** Palaearctic, Neotropical and Oriental (Farahani *et al.*, 2016), Iraq (Stary, 1971).

**Subfamily, Braconinae** Nees, 1811

*Bracon osculator* Nees, 1811

**Materials examined:** 1 specimen, Summel, (Summel Center), April 2014.

**Host:** *Tuta absoluta* larvae on tomato plants (Mirza, 2014).

**General distribution:** Hungary, Iran, Mongolia, Azerbaijan, Caucasus, Russia, Yugoslavia, Italy, Romania, Poland, Switzerland, Sweden, Siberia, Spain, Finland, Denmark, Austria, Belgium, the Netherlands, Germany, France, and England (Ameri *et al.*, 2015).

*Habrobracon hebetor* (Say, 1836)

**Material examined:** 1 specimen, Summel (Summel Center) April 2014.

**Host:** *Tuta absoluta* larvae on tomato plants (Mirza, 2014).

## Survey of predator and parasitoid insects

**General distribution:** Cosmopolitan - Afrotropical ( Botswana, Lesotho, Mauritius, Mozambique, Nigeria, Senegal, South Africa, Sudan); Australian ( Australia, New South Wales, New Zealand); Eastern Palearctic (China, Mongolia, Japan, Korea, Russia); Nearctic (Mexico, USA); Neotropical ( Argentina, Barbados, Bermuda, Brazil, Cuba, Jamaica, Peru, Puerto Rico); Oriental ( Bangladesh, China, Taiwan, India, Malaysia, Myanmar, Singapore, Sri Lanka, Thailand, Vietnam); Western Palearctic ( Afghanistan, Algeria, Armenia, Azerbaijan, Azores, Belgium, Bulgaria, Canary Islands, Cape Verde Islands, Croatia, Cyprus, Czech Republic, Egypt, England, France, Georgia, Germany, Greece, Hungary, Iran, Iraq, Ireland, Israel, Italy, Kazakhstan, Lithuania, Macedonia, Madeira Islands, Moldova, Morocco, Netherlands, Niger, Pakistan, Poland, Portugal, Romania, Russia, Saudi Arabia, Serbia, Slovakia, Slovenia, Spain, Switzerland, Syria, Tajikistan, Tunisia, Turkey, Turkmenistan, Ukraine, Uzbekistan) (Ameri *et al.*, 2013).

**Subfamily, Euphorinae** Förster, 1862

*Dinocampus coccinellae* (Schrank, 1802)

**Material examined:** 1 specimen, Summel, June 2000.

**Host:** *Coccinella septempunctata* adult (Assaf, 2001).

**General distribution:** Australasian, Nearctic, Neotropical, Oceanic, Oriental and Palearctic (Farahani *et al.*, 2016).

**(3) Family, Crabronidae** Latreille, 1802

**Subfamily, Astatinae** Lepeletier de Saint Fargeau, 1845

*Astata* sp.

**Materials examined:** 1 specimen, Summel (Batel, Ashei Village), July 2013 on weeds.

**General distribution:** Austria, Afghanistan, Algeria, Albania, Belgium, Britain, Canary Island, Croatia, China, Czech Republic, Chile, Cyprus, Denmark, Egypt, Estonia, Finland, France, Greece, Germany, Hungary, Iraq, India, Iran, Israel, Italy, Korea, Kuwait, Kazakhstan, Latvia, Libya, Lithuania, Oman, Madeira, Mongolia, Malta, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Sweden, Spain, Switzerland, Socotra, Syria, South Africa, Tajikistan, Tunisia, Turkey, Turkmenistan, Ukraine, Uzbekistan, former Yugoslavia, Yemen (Gadallah *et al.*, 2013).

**Subfamily, Crabroninae** Latreille, 1802

*Larra anathema* (Rossi, 1790)

**Material examined:** (1 specimen) Zakho (Rezgari, Bezhi), June 2013 on weeds.

**General distribution:** Austria, Algeria, Belarus, Bulgaria, China, Cyprus, Croatia, Czech Republic, Egypt, France, Germany, Greece, Great Britain, Hungary, Iran, Ireland, Iraq, Israel, Italy, Kazakhstan, Libya, Macedonia, Morocco, Malta, Portugal, Russia, Romania, Slovakia, Slovenia, Spain, South Africa, Syria, Switzerland, Tajikistan, Turkey, Tunisia, Turkmenistan, United Arab Emirates, Uzbekistan, Ukraine (Gadallah *et al.*, 2013).

**(4) Family, Encyrtidae** Walker, 1837

**Subfamily, Encyrtinae** Walker, 1837

*Blastothrix* sp.



Feyroz Ramadan Hassan

**Material examined:** 1 specimen, Akra District ( Bijel), May 2009.

**Host:** *Eulecanium titiae* (Linnaeus, 1758) (Coccidae) that infested the fig trees (Akrawi, 2011).

**General distribution:** wide distribution in Palearctic Region (Japoshvili *et al.*, 2016).

*Cheiloneurus* sp.

**Materials examined:** 2 specimens, Akra District (Bijel), May 2009.

**Host:** *Eulecanium titiae* (Coccidae) that infested the fig trees (Akrawi, 2011).

**General distribution:** Wide distribution in Palearctic Region (Japoshvili *et al.*, 2016).

*Encyrtus* sp.

**Material examined:** 1 specimen, Akra District (Bijel), May 2009.

**Host:** *Eulecanium titiae* (Linnaeus, 1758) that infested of fig trees (Akrawi, 2011).

**General distribution:** Wide distribution in Palearctic Region (Japoshvili *et al.*, 2016).

*Eusemion* sp.

**Materials examined:** 2 specimens, Akra District (Bijel), May 2009.

**Host:** *Eulecanium titiae* (Linnaeus, 1758) (Coccidae) that infested of the fig trees (Akrawi, 2011).

**General distribution:** Wide distribution in Palearctic Region (Japoshvili *et al.*, 2016).

*Syrphophagus nigrocyaneus* Ashmead, 1904

**Material examined:** 1 specimen, Summel, June 2000.

**Host:** *Syrphus* pupae (Assaf, 2001).

**General distribution:** Afrotropical, China, Japan (Japoshvili *et al.*, 2016); Iraq (Abdul-Rassoul, 1976).

(5) **Family, Eulophidae** Westwood, 1829

**Subfamily, Eulophinae** Westwood, 1829

*Pnigalio* sp.

**Material examined:** 1 specimen, Summel District (Summel Center), May 2014.

**Host:** *Tuta absoluta* larvae that infested of the tomato plants (Mirza, 2014).

**General distribution:** Nearctic and Palearctic Region (GBIF Secretariat, 2019).

(6) **Family, Scelionidae** (Haliday, 1839)

**Subfamily, Telenominae** Thomson, 1860

*Trissolcus* sp.

**Materials examined:** 6 specimens, Summel District (Summel Center), March 2006.

**Host:** Sunn pest *Eurygaster integriceps* eggs on wheat field (Assaf, 2007).

**General distribution:** Worldwide (GBIF Secretariat, 2019).

(7) **Family, Sphecidae** Latreille, 1802

**Subfamily, Ammophilinae** André, 1886

*Ammophila duhokensis* Augul, Abdoul-Rassoul & Kaddou, 2013.

Survey of predator and parasitoid insects

**Materials examined:** 1 specimen, Zawita/ Rashanki village, July 2013 on weeds.

**General distribution:** Iraq (Augul *et al.*, 2013).

*Podalonia tydei* (Le Cuillou, 1841)

**Materials examined:** 2 specimens, Shekhan (Qasrok), July 2013 on weed plants.

**General distribution:** Afghanistan, Algeria, Angola, Australia, Bulgaria, Canary Islands, Chad, China, Cyprus, Egypt, Eritrea, Ethiopia, France, Greece, Hungary, India, Iraq, Iran, Italy, Israel, Jordan, Kenya, Kazakhstan, Libya, Macedonia, Malta, Morocco, Mongolia, Niger, Oman, Pakistan, Portugal, Russia, Romania, Rwanda, Saudi Arabia, South Africa, Somalia, Spain, Syria, Sudan, Tajikistan, Tunisia, Tanzania, Turkmenistan, Turkey, United Arab Emirates, Uzbekistan, Uganda, Western Sahara, Yemen, former Yugoslavia, Zimbabwe (Gadallah *et al.*, 2013).

**Subfamily, Sceliphrinae** Ashmead, 1899

*Sceliphron madraspatnam* (Fabricius, 1781)

**Materials examined:** 2 specimens Bardarash (Bishiryan), July 2013 in tomato and cucumber fields.

**General distribution:** Afghanistan, Bangladesh, Bulgaria, Central Asia, China, Croatia, Democratic Republic of the Congo, France, Greece, India, Indonesia, Iran, Iraq, Italy, Japan, Kazakhstan, Kyrgyzstan, Laos, Malaysia, Montenegro, Pakistan, Philippines, Russia (only European), Spain, Syria, Taiwan, Tajikistan, Thailand, Turkey, Turkmenistan, Ukraine, Uzbekistan, Vietnam (Gadallah *et al.*, 2013).

**Subfamily, Sphecinae** Latreille, 1802

*Prionyx viduatus* (Christ, 1791)

**Materials examined:** 2 specimens, Bajli, July 2013 on weed plant.

**General distribution:** Afghanistan, Algeria, Cameroon, Canary Islands, China, Cyprus, Egypt, Ethiopia, France, Gabon, Greece, Guinea, India, Israel, Iran, Italy, Iraq, Japan, Kyrgyzstan, Kazakhstan, Libya, Malta, Morocco, Mauritania, Namibia, Niger, Oman, Portugal, Russia, Saudi Arabia, Senegal, Somalia, South Africa, Spain, Syria, Sri Lanka, Taiwan, Thailand, Tajikistan, Tanzania, Tunisia, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan, Ukraine, Vietnam, Western Sahara, Yemen, Zaire (Gadallah *et al.*, 2013).

**(8) Family, Pteromalidae** Dalman, 1820

**Subfamily, Pteromalinae** Dalman, 1820

*Pachyneuron muscarum* (Linnaeus, 1758)

**Materials examined:** 7 specimens, Summel, May 2000.

**Hosts:** Hyperparasitoid on *Aphidius transcaspicus* Telenga, 1958 (Assaf, 2001); one specimen, unknown species of *Pachyneuron* sp., Akra District, Bijel, June 2009 on *Eulecanium titiae* on fig trees (Akrawi, 2011).

**General distribution:** Belgium, Bulgaria, Caucasus, Croatia, Czech Republic, Denmark, Europe, France, Georgia, Germany, Greece, Hungary, India, Israel, Italy, Kazakhstan, Moldova, the Netherlands, Poland, Romania, Russia, Saudi Arabia, Serbia, Slovakia, Spain,

Feyroz Ramadan Hassan

Sweden, Switzerland, Taiwan, Turkey, Ukraine, UK, former Yugoslavia (Ghahari *et al.*, 2015).

*Pteromalus puparum* (Linnaeus, 1758)

**Materials examined:** 5 specimens, Summel (Summel Center), April 2013 on *Papilio demoleus* pupae.

**General distribution:** Algeria, Australia, Austria, Azores, Barbados, Belgium, Bermuda, Bolivia, Bulgaria, Canada, Canary Islands, Chile, China, Croatia, Czech Republic, Egypt, El Salvador, Europe, Finland, France, Germany, Greece, Hawaii, Hungary, India, Iraq, Ireland (north and south), Israel, Italy, Japan, Kazakhstan, Kirgizia, Korea, South Korea, Macedonia, Madeira, Malaysia, Moldova, Mongolia, Nepal, the Netherlands, New Zealand, North Africa, Pakistan, Papua New Guinea, Poland, Portugal, Romania, Russia, Saudi Arabia, Slovakia, South Africa, Spain, Sweden, Switzerland, Tadjhikistan, Taiwan, Turkey, Ukraine, UK and USA (Ghahari *et al.*, 2015).

*Scutellista caerulea* (Fonscolombe, 1832)

**Material examined:** 1 specimen, Akra District (Bijel), August 2009.

**Host:** *Ceroplastes rusci* (L.) (Coccidae) on fig trees (Akrawi, 2011).

**General distribution:** Afrotropical, Albania, Algeria, Argentina, Australia, Azerbaijan, Bolivia, Brazil, Canary Islands, Cayman Islands, Chile, China, Colombia, Croatia, Cuba, Cyprus, Czech Republic, Dominican Republic, Egypt, El Salvador, Eritrea, Ethiopia, France, Georgia, Greece, Hawaii, India, Israel, Italy, Ivory Coast, Japan, Kenya, Lebanon, Malta, Mexico, Morocco, the Netherlands, New Zealand, North Africa, Oman, Peru, Puerto Rico, Senegal, South Africa, Spain, Sri Lanka, Trinidad & Tobago, Tunisia, Turkey, Uganda, USA and Venezuela (Ghahari *et al.*, 2015).

(9) **Family, Ichneumonidae** Latreille, 1802

**Subfamily, Diplazontinae** Viereck, 1918

*Diplazon laetatorius* (Fabricius, 1781)

**Material examined:** 1 specimen, Summel District (Summel Center), May 2000.

**Host:** *Syrphus* sp. pupae (Assaf, 2001).

**General distribution:** Afghanistan, Albania, Argentina, Australia, Austria, Azerbaijan, Belarus, Belgium, Brazil, Bulgaria, Burundi, Canada, Chile, China, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Egypt, Estonia, Ethiopia, Fiji, Finland, France, Germany, Greece, Guam, Guatemala, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Japan, Korea, Latvia, Libya, Lithuania, Luxembourg, Madagascar, Mexico, Moldova, Mongolia, Netherlands, New Zealand, Norway, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Portugal, Romania, Russia, Rwanda, Réunion, Senegal, Serbia & Montenegro, South Africa, Spain, Sudan, Sweden, Switzerland, Tajikistan, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Kingdom, Uruguay, USA, Uzbekistan, Zambia and Zimbabwe (Klopfstein, 2014); Iraq (Al-Ali, 1977).

**Subfamily, Phygadeuontinae** Forster, 1869

*Dichrogaster* sp.

## Survey of predator and parasitoid insects

**Material examined:** 1 specimen, Summel District (Summel Center), May 2000.

**Hosts:** Larvae of *Chrysoperla vulgaris* (Schneider, 1851) (Assaf, 2001).

**General distribution:** Western Palearctic region (Barahoei *et al.*, 2015).

### DISCUSSION

This study is the result of the field survey carried out in Duhok province, Kurdistan region-Iraq focuses on insect predators and parasitoids. In this paper, we listed 47 species, of which 24 were collected during the current survey; and the rest species previously collected in Duhok City. The plant biodiversity of Duhok is very rich that provides a suitable environment for insects to build up, therefore Duhok deserves further, more comprehensive entomological investigation to document the natural enemies.

The climate of Duhok is very favorable, and serves as a refuge for both plants and animals. Further studies may also lead to the discovery of host plants and biology of several poorly known species, improving our knowledge about the aspects of their life cycle, environmental conditions and needs of the nature conservation.

### LITERATURE CITED

- Abdel-Dayem, M. S., Fad, H. H., El-Torkey, A. M., Elgharbawy, A. A., Aldryhim, Y. N., Kondratieff, B. C., Al Ansi, A. N. and Aldhafer, H. M. 2017. The beetle fauna (Insecta, Coleoptera) of the RawdhatKhorim National Park, Central Saudi Arabia. *ZooKeys*, 653: 1-78.
- Abdolahi, M. R., Nozari, J., Allahyari, H. and Zare K. M. 2016. Checklist and distribution of lady beetles (Coleoptera: Coccinellidae) in Iran. *Iranian Journal of Animal Biosystematics*, 12 (1): 1-35.
- Abd-Rabou, Sh., Ghahari, H., Myartseva, S. N. and Ruíz-Cancino, E. 2013. Iranian Aphelinidae (Hymenoptera: Chalcidoidea). *Journal of Entomology and Zoology Studies*, 1 (4): 116-140.
- Abdul-Rassoul, M. S.1976. Checklist of Iraq natural history museum insect's collection. *Bulletin of the Iraq Natural History Museum*, 1(30): 41.
- Akrawi, D. S. A. 2011. Some ecological and biological studies of *Ceroplastes rusci* (L.) and *Eulecanium tiliae* (L.) (Homoptera: Coccidae) on fig trees in Akra region. M. Sc thesis, College of Agriculture, University of Salahadin, Erbil, Iraq, 72 pp.
- Ali, H. A. 1978. Faunistic Study of the Cicindelidae (Coleoptera) of Iraq and Southwest Asia. *The Coleopterists Bulletin*, 32 (1):1-20.
- Ameri, A., Talebi, A. A., Beyarslan, A., Kamali, K. and Rakhshani, E. 2013. Study of the genus *Bracon* Fabricius, 1804 (Hymenoptera: Braconidae) of Southern Iran with description of a new species. *Zootaxa*, 3754 (4): 353-380.

- Ameri, A., Talebi, A. A., Rakhshani, E., Beyarslan, A. and Kamali, K. 2015. Additional evidence and new records of the genus *Bracon* Fabricius, 1804 (Hymenoptera: Braconidae) in southern Iran. *Turkish Journal of Zoology*, 39: 1110-1120.
- Assaf, L. H. 2001. Population density of aphid *Hyalopterus pruni* Geof. and *Brachycaudus amygdalinus* Schout. On peach and apricot trees with their natural enemies and special care to the agricultural methods in Duhok. M.Sc. thesis, College of Agriculture, University of Duhok, Duhok, Iraq, 134pp.
- Assaf, L. H. 2007. Ecological study and Evaluation of activity of *Beauveria bassiana* (Bals)Vuill. and *Paecilomyces farinosus* (Dicks ex Fr.) on some biological aspects of sunn pests on wheat. Ph. D. dissertation, College of Agriculture and Forestry, University of Mosul, 231pp.
- Augul, R. S., Abdul-Rassoul, M. S. and Kaddou, I. K. 2013. A New Species of *Ammophila* Kirby, 1798 with identification key to species of Ammophilini (Hymenoptera: Sphecidae: Sphecinae) in Iraq. *Advances in Bioresearch*, 4(1):12-27.
- Aukema, B., Rieger, C. and Rabitsch, W. 2013. Catalogue of Heteroptera of the Palaearctic Region; Volume 6. Supplement. A book published by the Netherlands Entomological Society, 655pp.
- Barahoei, H., Nader, E. and Rakhshani, E. 2015. Cryptinae (Hymenoptera: Ichneumonidae) fauna of Isfahan Province of central Iran. *Turkish Journal of Zoology*, 39: 279-284.
- Cracraft, J. and Grifo, F. T. 1999. The Living Planet in Crisis: Biodiversity Science and Policy. Columbia University Press, New York, 311pp.
- Derwesh, A. I. 1965. A preliminary list of identified insects and some arachnids of Iraq. *Directorate General of Agricultural Research and Projects, Technical Bulletin*, 112: 1-123.
- Dousti, A. F. and Hayat, R. 2006. A Catalogue of the Syrphidae (Insecta: Diptera) of Iran. *Journal of the Entomological Research Society*, 8(3): 5-38.
- Ebejer, M. J. and Barták, M. 2019. An annotated list of the Chamaemyiidae (Diptera, Acalyptrata) of Turkey with new records and additional data. *Zookeys*, 838: 35-48.
- Farahani, S., Talebi, A. A and Rakhshani, E. 2016. Iranian Braconidae (Insecta: Hymenoptera: Ichneumonoidea): diversity, distribution and host association. *Journal of Insect Biodiversity and Systematics*, 2 (1): 1-92.
- Gadallah, N. S., Al Dhafer, H. M, Aldryhim, Y. N., Fadl, H. H. and Elgharbawy, A. A. 2013. The digger wasps of Saudi Arabia: New records and distribution, with a checklist of

Survey of predator and parasitoid insects

species (Hym.: Ampulicidae, Crabronidae and Sphecidae). *North-Western Journal of Zoology*, 9 (2): 345-364.

GBIF Secretariat. 2019. GBIF Backbone Taxonomy. Checklist dataset <https://doi.org/10.15468/39omei> accessed via GBIF.org on 2021-01-17.

Gebiola, M., Bernardo, U., Monti, M. M., Navone, P. and Viggiani, G. 2009. *Pnigalio agraulis* (Walker) and *Pnigalio mediterraneus* Ferrière and Delucchi (Hymenoptera: Eulophidae): two closely related valid species. *Journal of Natural History*, 43: 2465-2480.

Ghahari, H. and Chérot, F. 2014. An annotated catalog of the Iranian Miridae (Hemiptera: Heteroptera: Cimicomorpha). *Zootaxa*, 3845 (1): 1-101.

Ghahari, H., Doğanlar, M., Sureshan, P. M. and Ostovan, H. 2015. An annotated catalogue of the Iranian Pteromalidae (Hymenoptera: Chalcidoidea). *Entomofauna Zeitschrift Für Entomologie*, Supplement 19: 005-102.

Ghahari, H., Linnavuori, R. E., Moulet, P. and Ostovan, H. 2010. An annotated catalogue of the Iranian Nabidae (Hemiptera: Heteroptera). *Acta Entomologica Musei Nationalis Pragae*, 50(1): 33-44.

Jafari, R., Fürsch, H. and Zare, M. 2015. An annotated checklist of the ladybirds (Coleoptera: Coccinellidae) of Iran. *Journal of Entomological Research*, 7 (3): 31-54.

Japoshvili, G., Higashiura, Y. and Kamitani, S. 2016. A review of Japanese Encyrtidae (Hymenoptera), with descriptions of new species, new records and comments on the types described by Japanese authors. *Acta Entomologica Musei Nationalis Pragae*, 56(1): 345-401.

Kaddou, I. K. 1967. Checklist of some insect fauna of Iraq. Biological Research Center, Publication No. 1, Iraq Government Press, Baghdad, 44 pp.

Kerzhner, I. M. 1996. Family Nabidae A. Costa 1983 – damsel bugs. p 84–107. In: Aukema, B. and Rieger, C. H. (eds): Catalogue of the Heteroptera of the Palaearctic Region. Vol.2. The Netherlands Entomological Society, Amsterdam, 2(14): 360 pp.

Khalaf, K. T. 1958. Some Hymenoptera and Coleoptera from Iraq. *Iraq Natural History Museum Publication*, 14: 1-3.

Khalaf, K. T. 1963. Faunistic notes in Iraq. *Bulletin of the Iraq Natural History Museum*, 2(8):1-12.

Feyroz Ramadan Hassan

- Klopfstein, S. 2014. Revision of the Western Palaearctic Diplazontinae (Hymenoptera, Ichneumonidae). *Zootaxa*, 3801(1): 1-143.
- Kment, P. and Jindra, Z. 2005. New and interesting records of true bugs (Heteroptera) from Turkey, southeastern Europe, Near and Middle East. *Acta Entomologica Musei Nationalis Pragae*, 45: 3-16.
- Letardi, A., Abdel-Dayem, M. S. and Al Dhafer, H. M. 2020. New faunal data on lacewings (Insecta, Neuroptera) collected from Saudi Arabia. *Zookeys*, 936: 111-148.
- Mahmoud, T. T., Hassan, F. R. and Jarjees, E. 2008. Aphidophagous from Kurdistan, Iraq. *Egyptian Journal of Agricultural Research*, 86(2): 437-445 (Special issue, the fourth international conference).
- Mirza, M. S. 2014. The biological study of tomato leaf miner *Tuta absoluta* (Meyrick) and the biological effect of *Beauveria bassiana* (Bals.)Vuill. M. Sc thesis, College of Agriculture and Forestry, University of Mosul, Mosul, Iraq, 107pp.
- Ostovan, H., Ghahari, H. and Moulet, P. 2017. Updated catalogue of Iranian Anthocoridae Hemiptera: Heteroptera: Cimicomorpha). *Zootaxa*, 4311 (4): 451–479.
- Roberts, H. 1972. Forestry research, demonstration and training. Arbil. Iraq forest entomology. FAO Technical Report 6, 145 pp., Rome, FO: Dp/IRQ/68/518.
- Sary, Y. P. 1971. Fauna and Distribution of Aphid Parasites (Hym., Aphidiidae) in Iraq. *Acta Faunistica Entomologica Musei Nationalis Pragae*, 14 (169): 179-198.
- Sary, P. and Kaddou, I. K. 1975. Record of Aphidophagus insects in Iraq. Bulletin of the Biological Research Centre, Baghdad, Publication no. 3, 16 pp.
- Vacante, V. and Bonsignore, C. P. 2017. Natural enemies and pest control. Book chapter. Available at: <https://www.researchgate.net/publication>.
- Wiesner, J. 1992. Verzeichnis der Sandlaufkäfer der Welt, checklist of the tiger beetles of the world (Coleoptera, Cicindelidae). Beitrag zur Kenntnis der Cicindelidae, 17. Verlag Erna Bauer, Keltern, 364 pp.
- Yunakov, N., Nazarenko, V., Filimonov, R. and Volovnik, S. P. 2018. A survey of the weevils of Ukraine (Coleoptera: Curculionoidea). *Zootaxa*, 4404 (1): 1-494.

## مسح للمفترسات وأشباه الطفيليات الحشرية في محافظة دهوك - إقليم كوردستان العراق

فيروز رمضان حسن

قسم وقاية النبات، كلية علوم الهندسة الزراعية، جامعة دهوك، دهوك، العراق

تاريخ الاستلام: 2020/11/24، تاريخ القبول: 2021/03/18، تاريخ النشر: 2021/06/20

### الخلاصة

تم تسجيل وتشخيص 47 نوعا تعود الى 46 جنسا، 34 عويلة، 23 عائلة و 7 رتب حشرية للمفترسات والطفيليات خلال مسح أجري في محافظة دهوك- كوردستان العراق 2013-2014.

ذكرت البيانات المتعلقة بالعوائل و توزيع المناطق المتواجدة فيها؛ تضمنت القائمة المرجعية الحالية أيضاً بعض الأنواع التي جمعت سابقاً من قبل باحثين آخرين في محافظة دهوك.