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Ichneumonidae Latreille, 1802 (Hymenoptera) Diversity in Alfalfa Fields (*Medicago sativa* L.) From Two Egyptian Western Desert Oases

Neveen S. Gadallah[*]; U. M. Abu El-Ghiet[***]; Y. A. Edmardash[*] and F. J. Peris-Felipo[****]

[*]Entomology Department, Faculty of Science, Cairo University, Egypt, n_gadallah@hotmail.com.
[**]Plant Protection Department, Desert Research Center, Mataria, Cairo, Egypt.
[***]Biology Department, Faculty of Science, Jazan University, Kingdom of Saudi Arabia.
[****]Bleichestrasse 15, CH-4058 Basel, Switzerland.
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ABSTRACT

Diversity of Ichneumonidae (Hymenoptera) was studied in alfalfa fields (*Medicago sativa* L.) in two Egyptian Oases: Bahariya and Farafra. Sampling was carried out from January 2013 to December 2014. A total of 206 specimens belong to 8 subfamilies, 14 genera and 24 species was collected. Seven species were recorded for the first time for Egypt: *Barylypa bipartita* Morley, 1913; *Bathyplectes exiguus* (Gravenhorst, 1829); *Campoletis chloridae* Uchida, 1957; *Diadegma insulare* (Cresson, 1865); *Dichrogaster saharator* (Aubert, 1964); *Exochus semilividus* Vollenhoven, 1875 and *Pimpla wilchristi* Fitton, Shaw & Gauld, 1988. Also, eleven species were newly recorded in association with alfalfa: *Anomalon venustulum* (Tosquinet, 1896); *Barylypa pallida* (Gravenhorst, 1829); *Bathyplectes exiguus* (Gravenhorst, 1829); *Campolites chloridae* Uchida, 1957; *Casinaria trochanterator Aubert, 1960*; *Diadegma insulare* (Cresson, 1865); *Dichrogaster aestivalis* (Gravenhorst, 1829); *Exochus semilividus* Vollenhoven, 1875; *Enicospilus cruciator* Viktorov, 1957 and *Pimpla wilchristi* Fitton, Shaw & Gauld, 1988.

Key words: Ichneumonidae, diversity, alfalfa fields, new records, Oasis, Egypt.

INTRODUCTION

Ichneumonidae Latreille, 1802 is the largest family within Hymenoptera, with approximately 60,000 species worldwide (Townes, 1969 and Sime & Brower, 1998). However, Gauld (2000) and Gauld *et al*. (2002) estimated the total global species-richness more than 100,000 species after the exploration of recent collections. Recently, Bennett (2009) stated that Ichneumonidae represents about 1.4% of all insects and about 2.3% of all described insects. This family plays an important role as agents of biological control in regulation of a wide range of holometabolous insects belong to Coleoptera, Diptera, Lepidoptera and Hymenoptera orders (Townes, 1971; Wahl, 1993; Gauld *et al*., 2002; Finch, 2005 and Sugonyaev, 2006). Despite of the importance of these efficient parasitoids in agro-ecosystems, their diversity was not sufficiently studied in alfalfa fields, except few studies carried out in Iran (Barahoei *et al.*, 2014 and Ghahari & Jussila, 2015).

Alfalfa, *Medicago sativa* L., is one of the most important legumes used in agriculture as forage for cattle throughout the world. It has the highest feeding value of all common hay crops (Hanson *et al*., 1988 and Parker & Parker, 2003). Several insect pests damage this crop and Ichneumonidae has an effective role as biocontrol agents (Tawfik *et al*., 1976).

The present work represents a faunistic catalogue of Ichneumonidae recorded in two desert oases from Western Egypt.

MATERIALS AND METHODS

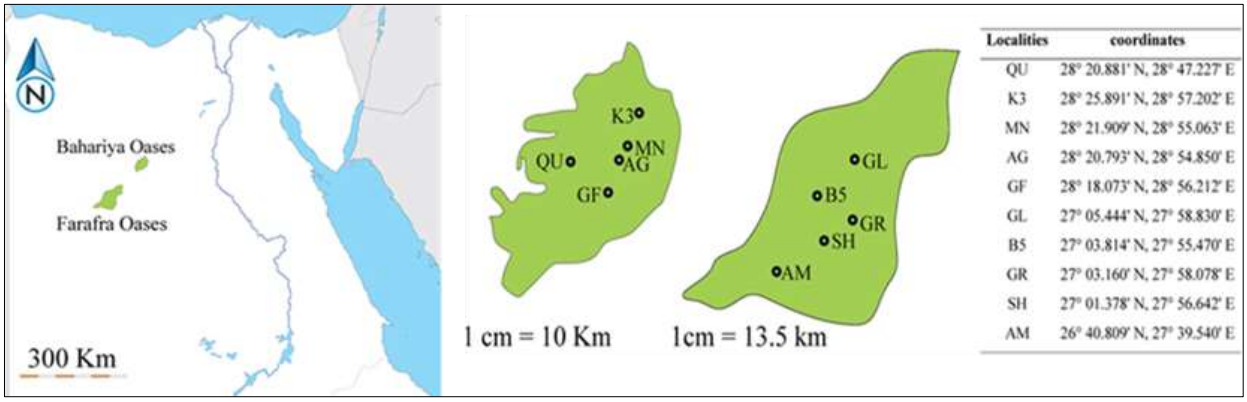
Study Area

The Western Desert of Egypt occupies most of the land west of the Nile Valley. It covers an area of 680,000 Km^2 (Sampsell, 2003), thus accounting about two thirds of Egyptian land. Four oases: Bahariya, Farafra, Dakhla and Kharga are extended from the Nile Valley in the east to the Libyan border in the west, which lie on "Great Oasis Circle".

The oases selected were Bahariya and Farafra (Fig. 1). Bahariya Oasis (27º48'00''N 28º35'00''E) is located about 360 km southwest of Cairo and 180 km west of the Nile Valley. This Oasis is an oval-shaped depression with a maximum length and width of about 94 km and 42 km, respectively. Sand is covering the tracts and small dunes are distributed around the crop. This topography provides a large number of dark hills within the depression. The climatic conditions are desertic, with annual average temperature of 22.3ºC and annual rainfall average about 4 mm. Farafra Oasis (27º20'00''N28º59'00''E) is located about 550 km in the southwest of Cairo and around 200 km southwest of Bahariya Oasis. It is a triangular-shaped depression in the Western Desert. The climatic conditions are desertic, with annual average temperature of 21.6ºC and annual rainfall average of 2 mm (Fakhry, 1974 and Zagrzejewska Fiedorowicz, 2003).

Abbreviations

Abbreviations used for the sites inside each oasis alphabetically: AG: Agoz-Gheit Baeid, AM: Abo



Localities	coordinates
QU	28° 20.881' N, 28° 47.227' E
K3	28° 25.891' N, 28° 57.202' E
MN	28° 21.909' N, 28° 55.063' E
AG	28° 20.793' N, 28° 54.850' E
GF	28° 18.073' N, 28° 56.212' E
GL	27° 05.444' N, 27° 58.830' E
B5	27° 03.814' N, 27° 55.470' E
GR	27° 03.160' N, 27° 58.078' E
SH	27° 01.378' N, 27° 56.642' E
AM	26° 40.809' N, 27° 39.540' E

Fig. (1): Map of Egypt showing the studied sites in Bahariya and Farafra Oases, Egypt.

Minqar, B5: Beir 5, GF: Al-Gafara, GL: Gelgam, GR: Garad, K3: Kassa 3, MN: Mandisha-Ghaba, QU: AL-Quser-Beir abo Eagela, SH: Shimenara (Fig. 1).

Sample collection and identifications

Specimens were collected from 10 sites: five from Bahariya and five from Farafra, using sweeping nets. Samples were carried out monthly from January 2013 to December 2014. Specimens were killed using ethyl acetate and preserved at 20°C for identification. Once separated, the specimens were determined by subfamily keys of Broad (2011). Subsequently, genera and species were determined by Aubert (1966) for *Temelucha* Förster 1869 genus; Klopfstein (2014) for Diplazontinae Viereck, 1918 subfamily; Tolkanitz (2007) for *Exochus* Gravenhorst, 1829 genus; Fitton *et al*. (1988) for *Pimpla* Fabricius, 1804 genus; Townes (1970a) for Campopleginae Förster, 1869 subfamily; Townes (1970b) for Cryptinae Kirby, 1837 subfamily and Viktorov (1957) for *Enicospilus* Stephens, 1835 genus. Also, many species were checked by the material deposited in the Natural History Museum, London (BMNH). Nomenclature and classification are based on Yu *et al*. (2012). Specimens collected are deposited in the Efflatoun bey Collection (Entomology Department, Faculty of Science, Cairo University) (CUE).

RESULTS AND DISCUSSION

During the sampling period, 206 ichneumonid specimens were collected, distributed in 8 subfamilies, 14 genera and 24 species: Anomaloninae (7), Campopleginae (6), Cremastinae (1), Cryptinae (4), Diplazontinae (1), Metopiinae (3), Ophioninae (1) and Pimplinae (1). List of collected species is given above. Species collected are listed below.

However, the specimen number analysis by Oasis showed that 117 specimens (56.8%) were collected from Farafra, while only 89 specimens from Bahariya (43.2%) were sampled. Concerning of the number of species, the most abundant was from Farafra (19 species), followed by Bahariya (14 species).

The subfamily Diplazontinae was the most abundant (85 specimens (41.3%)), represented only by one species, *Diplazon laetatorius*. The second most abundant subfamily was Campopleginae (50 specimens (24.3%)), followed by Pimplinae (32 specimens (15.5%)) represented by only one species, *Pimpla wilchristi*.

Subfamily Anomaloninae

***Anomalon cruentatum* (Geoffroy, 1785)**

Material examined: 1♀, Egypt, Farafra Oasis, Beir 5, swept on *Medicago sativa* L., 5.iii.2013 (Leg. Abu El-Ghiet); 1♀, same locality and data but, 5.v.2013; 3♀, Gelgam, 30.vii.2013; 3♀, Garad, xi.2013 (Leg. Abu El-Ghiet); 2♀, Egypt, Bahariya Oasis, Mandisha-Ghaba, swept on *Medicago sativa* L., v. 2013 (leg. Abu El-Ghiet).

Host records: This species has been recorded as a parasitoid of *Gonocephalum rusticum* (Olivier, 1811) (Cleoptera: Tenebrionidae), *Agrotis ipsilon* (Hufnagel, 1766), *Cerura palestinensis* Bartel, *Ptilodon capucina* (L., 1758) (Lepidoptera, Noctuidae) (Yu *et al*., 2012).

General distribution: Afghanistan, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, China, Croatia, Cyprus, Czech republic, Egypt, Finland, France, Germany, Greece, Hungary, India, Iran, Israel, Italy, Japan, Jordan, Kazakhstan, Korea, Latvia, Lebanon, Libya, Lithuania, Malta, Moldova, Mongolia, Myanmar, Netherlands, Pakistan, Poland, Portugal, Romania, Russia, Spain, Sri Lanka, Sweden, Switzerland, Tunisia, Turkey, Turkmenistan, Ukraine, UK, Uzbekistan, former Yugoslavia (Yu *et al*., 2012).

***Anomalon venustulum* (Tosquinet, 1896)**

Material examined: 1♀, Egypt, Farafra Oasis, Beir 5, swept on *Medicago sativa* L., v. 2013 (leg. Abu El-Ghiet).

Host records: Unknown.

General distribution: Egypt, Uzbekistan (Yu *et al*., 2012).

Remarks: *Medicago sativa* L. is a new host record for this species.

***Anomalon* sp.**
Material examined: 2♂, Egypt, Bahariya Oasis, Mandisha-Ghaba, swept on *Medicago sativa* L., iv.2013 (leg. Abu El-Ghiet).

***Barylypa amabilis* (Tosquinet, 1900)**
Material examined: 1♀, Egypt, Bahariya Oasis, Al Gafara, swept on *Medicago sativa* L., xi.2013 (leg. Abu El-Ghiet); 1♀, Egypt, Farafra Oasis, Garad, swept on *Medicago sativa* L., xi.2013 (leg. Abu El-Ghiet).

Host records: This species has been reared from *Agrotis segetum* Denis-Schiffermüler, 1775, *Helicoverpa armigera* (Hübner, 1809), *Heliothis viriplaca* (Hufnagel, 1766) and *Spodoptera exigua* (Hübner, 1808) (Lepidoptera: Noctuidae) (Yu *et al*., 2012).

General distribution: Afghanistan, Azerbaijan, former Czechoslovakia, Egypt, Iran, Israel, Kazakhstan, Poland, Romania, Russia, Tunisia, Turkey, Ukraine, Uzbekistan (Yu *et al*., 2012).

***Barylypa rufa* (Holmgren, 1857)**
Material examined: 2♀, Egypt, Farafra Oasis, Beir 5, swept on *Medicago sativa* L., 28.iii.2013 (leg. Abu El-Ghiet).

Host records: This species has been reported in Egypt as a larval-pupal parasitoid of *Spodoptera littoralis* Boisduval, 1833 (Lepidoptera: Noctuidae) (Kamal, 1951), *Helicoverpa armigera* (Hübner, 1809) (Lepidoptera: Noctuidae) (Ismail & Swailem, 1975; Megahed *et al*., 1977 and Yu *et al.*, 2012). Also, Yu *et al.* (2012) reported *Malacosoma neustria* (L., 1758), *Nadiasa undulate* (Lepidoptera: Lasiocampidae), *Agrotis segetum* (Denis and Schiffermüller, 1775), *Catocala nyphaea* (Esper, 1787), *C. catagoga* (Esper, 1787), *Helicoverpa zea* (Boddie, 1850), *Orgyia dubia* Tauscher, 1806, *Oria musculosa* (Hübner, 1808), *Spodoptera exigua* (Hübner, 1808) and *S. litura* (Fabricius, 1775).

General distribution: Afghanistan, Albania, Austria, Azerbaijan, Bulgaria, Cyprus, former Czechoslovakia, Egypt, Finland, France, Germany, Hungary, Iran, Israel, Libya, Poland, Romania, Russia, Spain, Sweden, Tunisia, Turkmenistan, Ukraine, Uzbekistan, former Yugoslavia (Yu *et al*., 2012).

***Barylypa bipartita* Morley, 1913**
Material examined: 1♀, Egypt, Farafrah Oasis, swept on *Medicago sativa* L., 28.ix.2013 (leg. Abu El-Ghiet).

Host records: In Kenya, it has been reported as larval-pupal parasitoid of *Spodoptera exempta* (Walker, 1856) (Lepidoptera: Noctuidae) (www.cabi.org).

General distribution: South Africa (Yu *et al*. 2012), Egypt (**new record**).

Remarks: *Medicago sativa* L. is a new host record to this species.

***Barylypa pallida* (Gravenhorst, 1829)**
Material examined: 1♂, Egypt, Farafrah Oasis, Beir 5, swept on *Medicago sativa* L., 28.iii.2013 (leg. Abu El-Ghiet).

Host records: It has been reported as a parasitoid of *Agrotis ipsilon* (Hufnagel, 1766), *Helicoverpa armigera* (Hübner, 1809), *Lymantria dispar* (L., 1758), *Spodoptera exigua* (Hübner, 1808) (Lepidoptera: Noctuidae) (Yu *et al.*, 2012).

General distribution: Algeria, Azerbaijan, Bulgaria, Croatia, former Czechoslovakia, Egypt, France, Germany, Hungary, Iran, Kazakhstan, Moldova, Poland, Russia, Spain, Sweden, Tunisia, Turkey, Ukraine (Yu *et al*., 2012).

Remarks: *Medicago sativa* L. is a new host record to this species.

Subfamily Cremastinae

***Temelucha observator* Aubert, 1966**
Material examined: 1♀, Egypt, Bahariya Oasis, Mandisha-Ghaba, swept on *Medicago sativa* L., iv.2013 (leg. Abu El-Ghiet).

Host records: *Spodoptera exigua* (Hübner, 1808) and *S. littoralis* Boisduval, 1833 (Yu *et al.*, 2012).

General distribution: Afghanistan, Egypt, Iran, Israel, Italy, Libya, Morocco, Romania, Tunisia, Turkey (Yu *et al*., 2012).

Subfamily Campopleginae

***Bathyplectes exiguus* (Gravenhorst, 1829)**
Material examined: 3♂ and 1♀, Egypt, Farafra Oasis, Shimenara, swept on *Medicago sativa* L., ii.2014 (leg. Abu El-Ghiet); 1♀ and 1♂, Garad, i.2014; 3♂ and 1♀, same data and locality, ii.2014; 1♀, same data and locality, iii.2014; 1♂, Shimenara, xii.2013; 1♂, Egypt, Bahariya Oasis, Kassa, swept on *Medicago sativa* L., iv.2014 (Leg. Abu El-Ghiet); 1♂, Al Gafara and ii.2014; 1♂, same data and locality, iii.2014; 1♂, Gelgam,iii. 2014; 1♂, Agoz-GheitBaeid, vi.2014.

Host records: It has been reported as an important parasitoid in the control of *Hypera nigrirostis* (Fabricius 1775), *H. punctata* (Fabricius, 1775), *H. rumices* (L., 1758), *H. variabilis* Herbst, 1795 (Coleoptera: Curculionidae), *Tischeria ekebladella* (Bjerkander, 1795) (Lepidoptera: Tischeriidae) (Yu *et al*., 2012).

General distribution: Austria, Azerbaijan, Bulgaria, Canada, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Norway, Poland, Romania, Russia, Spain, Sweden, Tunisia, Turkey, Turkmenistan, U.S.A., UK, Uzbekistan, former Yugoslavia (Yu *et al*., 2012), Egypt (**new record**).

***Campoletis chloridae* Uchida, 1957**
Material examined: 1♂, Egypt, Bahariya Oasis, Kassa 3, swept on *Medicago sativa* L., 29.v.2013 (leg. Abu El-Ghiet).

Host records: Parasitoid of a large number of insect hosts belonging to the orders: Lepidoptera (Bombycidae, Tortricidae, Pyralidae, Plutellidae, Gelechiidae, Noctuidae); it was also reported as a hyperparasitoid of a number of hymenopterous parasitoids: Ichneumonidae, Braconidae, Chalcididae, Eulophidae, Eurytomidae (Yu *et al*., 2012).

General distribution: Bangladesh, Barbados, China, India, Japan, Korea, Mauritius, Nepal, Pakistan, Syria (Yu *et al*., 2012), Egypt (**new record**).

Remarks: *Medicago sativa* L. is a new host record for this species.

***Casinaria trochanterator* Aubert, 1960**
Material examined: 1♂, Egypt, Farafra Oasis, Shimenara, swept on *Medicago sativa* L., ii.2013 (leg. Abu El-Ghiet).

Host records: Unknown.

General distribution: Belgium, Egypt, France (Yu *et al*., 2012).

Remarks: *Medicago sativa* L. is a new host record to this species.

***Diadegma insulare* (Cresson, 1865)**
Material examined: 2♂, Egypt, Baharia Oasis, Agoz-GheitBaeid), swept on *Medicago sativa* L., vi.2014 (leg. Abu El-Ghiet); 1♂, same locality and data but, vi.2014; 1♂, Egypt, Farafra Oasis, Gelgam, swept on *Medicago sativa* L., i.2014 (leg. Abu El-Ghiet).

Host records: It has been reported as a larval parasitoid of *Hellula undalis* ((Fabricius, 1794), 1781) (Lepidoptera: Pyralidae), *Phthorimae operculella* (Zeller, 1873) (Lepidoptera: Gelechiidae), *Plutella armoraciae* Busck, 1912, *P. xylostella* (L., 1758) (Lepidoptera: Plutellidae) (Yu *et al.*, 2012).

General distribution: Argentina, Canada, Columbia, Cuba, Hunduras, Israel, Jamaica, Mexico, Morocco, Peru, Philippines, Réunion, Society Islands, U.S.A., Venezuela (Yu *et al.*, 2012), Egypt (**new record**).

Remarks: *Medicago sativa* L. is a new host record for this species.

***Hyposoter* sp.**
Material examined: 2♂, Egypt, Farafra Oasis, Garad, swept on *Medicago sativa* L., i.2014 (leg. Abu El-Ghiet); 3♀, Shimenara, ii.2014; 1♂ and 6♀, Garad and ii.2014, iii.2014; 5♂, Gelgam, ii.2014, iii.2014; 2♂, Egypt, BahariyaOasis, Agoz-GheitBaeid, swept on *Medicago sativa* L., vi.2014 (leg. Abu El-Ghiet); 1♂, Kassa 3, vi.2014.

***Sinophorus xanthostomus* (Gravenhorst, 1829)**
Material examined: 1♂, Egypt, Farafra Oasis, Abo Minqar, swept on *Medicago sativa* L., 12.i.2012 (Leg. Abu El-Ghiet); 2♂, Beir 5 and iv.2014; 2♂, Egypt, Bahariya Oasis, Agoz-GheitBaeid, swept on *Medicago sativa* L., iv.2014 (leg. Abu El-Ghiet); 1♂, Al-Quser- Beir Abo Eagela, iv.2014.

Host records: In Egypt, it has been reported as a parasitoid of *Helicoverpa armigera* (Hübner, 1809) (Lepidoptera: Noctuidae) (Megahed *et al*., 1977 and Yu *et al*., 2012), *Thysanoplusia orichalcia* (Fabricius, 1775), *Spodoptera exigua* (Hübner, 1808), *S. littoralis* Boisduval, 1833, *Leucania loreyi* (Duponchel, 1827) (Lepidoptera: Noctuidae), *Pieris brassicae* (L., 1758), *P. rapae* (L., 1758) (Lepidoptera: Pieridae), *Chionodes distinctella* (Zeller, 1839) (Lepidoptera: Gelechiidae), *Loxostege sticticalis* (L., 1761), *Ostrinia nubilalis* (Hübner, 1796) (Lepidoptera: Pyralidae), *Zygaena caniolica* (Scopoli, 1763) (Lepidoptera: Zygaenidae), *Agrotis ipsilon* (Hufnagel, 1766), *A. segetum* Denis andSchiffmueller, 1775, *Cosmia exigua* (Butler, 1775), *Hadena perplexa* (Denis and Schiffmueller, 1775), *Heliothis viriplaca* (Hufnagel, 1766), *Spodoptera exigua* (Hübner, 1808) (Lepidoptera: Noctuidae) (Yu *et al.*, 2012).

General distribution: Afghanistan, Algeria, Armenia, Austria, Azerbaijan, Bulgaria, Croatia, Cyprus, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iran, Ireland, Israel, Italy, Jordan, Kazakhstan, Latvia, Libya, Luxembourg, Moldova, Netherlands, Norway, Pakistan, Poland, Romania, Russia, Saudi Arabia, Spain, Sweden, Tunisia, Turkey, Turkmenistan, Ukraine, UK, Uzbekistan, former Yugoslavia (Yu *et al*., 2012).

Subfamily Cryptinae

***Dichrogaster aestivalis* (Gravenhorst, 1829)**
Material examined: 2♂, Egypt, Farafra Oasis, Garad, swept on *Medicago sativa* L., ii.2014 (leg. Abu El-Ghiet).

Host records: It has been reared from cocoons of *Chrysopa* spp., *Cunctochrysa albolineata* (Killington, 1935) (Neuroptera: Chrysopidae), *Blastophaga spiniperda* (L., 1758) (Coleoptera: Curculionidae), *Coleophora hemerobiella* Scopoli, 1763 (Lepidoptera: Coleophoridae), *Prays citri* Milliere, 1873 (Lepidoptera: Ypomeutidae) (Yu *et al*., 2012).

General distribution: Austria, Azerbaijan, Belgium, Bulgaria, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iran, Ireland, Isle of Man, Italy, Latvia, Moldova, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, Turkey, Ukraine, UK (Yu *et al*., 2012).

Remarks: *Medicago sativa* L. is a new host record for this species.

***Dichrogaster longicaudata* (Thomson, 1884)**
Material examined: 3♀, Egypt, Bahariya Oasis, Mandisha-Ghaba, swept on *Medicago sativa* L., ii.2013 (leg.Abu El-Ghiet); 1♂, Al Gafara and vi.2014 (leg. Abu El-Ghiet); 2♂, Egypt, Farafra Oasis, Garad, swept on *Medicago sativa* L., i.2014 (Leg. Abu El-Ghiet).

Host records: *Chrysopa carnea* (Stephens, 1836) (Neuroptera: Chrysopidae) (Yu *et al*., 2012).

General distribution: Austria, Bulgaria, Canada, former Czechoslovakia, Egypt, Finland, France, Germany, Greece, Iran, Iraq, Israel, Italy, Moldova, Mongolia, Norway, Poland, Portugal, Serbia, Spain, Sweden, Turkey, U.S.A., former Yugoslavia (Yu *et al*., 2012), Malta (Vas *et al*., 2015).

Remarks: This species has been recorded for the first time in association with *Medicago sativa* L. in Khorasan (Iran) (Barahoei *et al*. 2014 and Ghahari & Jussila 2015).

***Dichrogaster saharator* (Aubert, 1964)**
Material examined: 1♂, Egypt, Bahariya Oasis, Kassa 3, swept on *Medicago sativa* L., 29.v.2013 (leg. Abu El-Ghiet).

Host records: Unknown.

General distribution: Algeria, Bulgaria, Iran, Israel, Turkey (Yu *et al*., 2012), Egypt (**new record**).

Remarks: This species has been recorded for the first time in association with *Medicago sativa* L. in Khorasan (Iran) (Barahoei *et al*., 2014; Ghahari & Jussila, 2015).

***Dichrogaster* sp.**
Material examined: 3♂, Egypt, Farafra Oasis, Shimenara, swept on *Medicago sativa* L., iv.2013 (leg. Abu El-Ghiet); 3♂, Garad andi.2014 (leg. Abu El-Ghiet).

Subfamily Diplazontinae

***Diplazon laetatorius* (Fabricius, 1781)**
Material examined: 15♂, Egypt, Bahariya Oasis, Al-Quser-Beir Abo Eagela, swept on *Medicago sativa* L., i.2014, iii.2014, iv.2014 (leg. Abu El-Ghiet); 17♂, Agoz-Gheit Baeid, v.2013, ii.2014, iii.2014;1♂, Kassa 3, i.2014; 3♂, Mandisha-Ghaba, ii.2013, iii.2014; 11♂, Al Gafara, xi.2013 and iii.2014; 16♂, Egypt, Farafra Oasis, Beir 5, swept on *Medicago sativa* L., xii.2012, xii.2013 and iv.2014 (leg. Abu El-Ghiet); 3♂, Abo Minqar, xii.2012; 10♂, Garad, 20.iii.2013, i.2014, ii.2014 and iii.2014; 5♂, Gelgam, ii.2014 and iii.2014; 5♂, Shimenara, ii.2013 and xii.2013; 2♂, Mandisha, xi.2013.

Host records: In Egypt, it has been reported as a hyperparasite of syrphids (Tawfik *et al*., 1974). It has been also reported as a parasitoid of a large number of insect hosts belonging to the Order Hemiptera (mainly Aphididae, Coccidae), Coleoptera (Chrysomelidae, Curculionidae), Lepidoptera (Noctuidae, Depressariidae, Tortricidae, Pyralidae, Gelechiidae, Plutellidae), Diptera (Syrphidae, Muscidae); and as a hyperparasitoid of hymenopteran species (Pteromalidae, Diprionidae, Pamphiliidae) (Yu *et al*., 2012).

General distribution: Afghanistan, Albania, Argentina, Australia, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Brundi, Canada, Chile, China, Cook Islands, Costa Rica, Croatia, Cyprus, Czech republic, Democratic republic of Congo, Egypt, Estonia, Ethiopia, Fiji, Finland, France, Germany, Greece, Guam, Guatemala, India, Iceland, Indonesia, Iran, Ireland, Isle of Man, Israel, Italy, Japan, Korea, Latvia, Lesotho, Libya, Lithuania, Luxemburg, Madagascar, Mariana Islands, Mexico, Midway Islands, Moldova, Mongolia, Netherlands, New Caledonia, New Zealand, Norway, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Portugal, Romania, Russia, Réunion, Rwanda, Senegal, Serbia, Society Islands, South Africa, Spain, St. Helena, Sudan, Sweden, Switzerland, Tajikistan, Tonga, Tunisia, Turkey, Turkmenistan, U.S.A., Uganda, Ukraine, UK, Uruguay, Uzbekistan, Vanuata, Western Samoa, former Yugoslavia, Zambia, Zimbabwe (Yu *et al*., 2012).

Remarks: This species has been recorded for the first time in association with *Medicago sativa* L. in Khorasan (Iran) (Barahoei *et al*., 2014).

Subfamily Metopiinae

***Exochus semilividus* Vollenhoven, 1875**
Material examined: 1♂, Egypt, Farafra Oasis, Gelgam, swept on *Medicago sativa* L., iii.2014 (leg. Abu El-Ghiet).

Host records: It has been reported from a single host *Argyrotaenia ljungiana Thunberg 1797* (Lepidoptera: Tortricidae) (Yu *et al*., 2012).

General distribution: Armenia, Austria, Azerbaijan, Belgium, Bulgaria, France, Georgia, Germany, Hungary, Italy, Latvia, Lithuania, Netherlands, Poland, Russia, Sweden, Switzerland, Turkey, Ukraine (Yu *et al*., 2012), Malta (Vas *et al*., 2015), Egypt (**new record**).

Remarks: *Medicago sativa* L. is a new host record for this species.

***Exochus* sp.1**
Material examined: 1♂, Egypt, Farafra Oasis, Gelgam, swept on *Medicago sativa* L., iii.2014 (leg. Abu El-Ghiet).

***Exochus* sp. 2**
Material examined: 1♂, Egypt, Farafra Oasis, Gelgam, swept on *Medicago sativa* L., iii.2014 (leg. Abu El-Ghiet).

Subfamily Ophioninae

***Enicospilus cruciator* Viktorov, 1957**
Material examined: 1♀, Egypt, Bahariya Oasis, Al Gafara, swept on *Medicago sativa* L., 13.vi.2012 (leg. Abu El-Ghiet).

Host records: Unknown.
General distribution: Bulgaria, Egypt, France, Iran, Israel, Italy, Kazakhstan, Mongolia, Morocco, Russia, Spain, Turkey, Turkmenistan, Ukraine (Yu *et al*., 2012).

Remarks: *Medicago sativa* L. is a new host record for this species.

Subfamily Pimplinae

***Pimpla wilchristi* Fitton, Shaw & Gauld, 1988**
Material examined: 2♂ and 4♀, Egypt, Farafra Oasis, Gelgam, swept on *Medicago sativa* L., ii.2013 and iii.2014 (leg. Abu El-Ghiet); 7♂ and 8♀, Garad, xi.2013, xii.2013, ii.2014 and iii.2014; 1♂, Shimenara, ii.2014; 1♀, 1♂, Bahariya Oasis, Mandisha-Ghaba, swept on *Medicago sativa* L., i.2013 and iii.2014 (leg. Abu El-Ghiet); 1♀, 1♂, Al Gafara, xi.2013 and i.2014; 1♀, 5♂, Kassa 3, ii.2014, iv.2014 and v.2014; 4♂, Agoz-Gheit Baeid, ii.2014 and iii.2014; 1♂, Beir Abo Eagela, xii.2013.

Host records: *Depressaria pastinacella* (Duponchel, 1838) (Lepidoptera: Depressariidae) (Yu *et al.*, 2012).

General distribution: Isle of man, Norway, UK (Yu *et al*., 2012), Egypt (**new record**).

Remarks: *Medicago sativa* L. is a new host record for this species.

In conclusion, Regarding the faunistic study, a total of 24 species were sampled from two Egyptian Western Oases. Seven species were recorded for the first time for Egypt: *Barylypa bipartita*, *Bathyplectes exiguus*, *Campoletis chloridae*, *Diadegma insulare*, *Dichrogaster saharator*, *Exochus semilividus* and *Pimpla wilchristi*. Also, 11 species were recorded as new partners to alfalfa (*Medicago sativa* L.): *Anomalon venustulum*, *Barylypa bipartita*, *B. pallida*, *Bathyplectes exiguus*, *Campoletis chloridae*, *Casinaria trochanterator*, *Diadegma insulare*, *Dichrogaster aestivalis*, *Exochus semilividus*, *Enicospilus cruciator* and *Pimpla wilchristi*. Regarding the areas of study, Farafra Oasis presents greater abundance and species diversity than Bahariya Oasis.

Finally, further studies of Ichneumonidae diversity to increase the knowledge of this family as indicators thanks to their biology and their tri-trophic relationships between host-parasitoid-plants are recommended. Consequently, studies in different areas as DNA-barcode analyses are also highly recommended in order to increase our knowledge of this large and still unknown group.

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