**Filling the Egyptian pollinator knowledge-gap: checklist of flower-visiting insects in South Sinai, with new records for Egypt.**

Running head: Checklist of flower-visiting insects in South Sinai

Includes 1 Table, 0 Figures.

**Filling the knowledge gap surrounding Egyptian pollinators: flower-visiting insects of the St Katherine Protectorate in South Sinai**

Flower visitor surveys were conducted across the St Katherine Protectorate of South Sinai, Egypt, between April-July 2012 and 2013. We present a checklist of 112 species of flower visitors belonging to the orders Coleoptera, Diptera, Hemiptera, Hymenoptera and Lepidoptera. The Hymenoptera were the most diverse group of flower visitors, consisting of 69 species from eight families: Apidae (14), Colletidae (8), Crabronidae (10), Halictidae (13), Megachilidae (19), Scoliidae (1), Sphecidae (2) and Vespidae (2). We recorded nine species that were endemic to the region and thirteen that were new to the Egyptian fauna, including one new to science, *Hylaeus oliviae* Dathe, 2015. The study provides a valuable initial checklist of pollinators within the St Katherine Protectorate, but the description of novel species and the high proportion of new records for Egypt suggest that species numbers are likely to be underestimated. We highlight the need for future research into Egyptian pollinator fauna, particularly within the St Katherine Protectorate where endemic bees are still being described.

Jeweils von April bis Juli der Jahre 2012 und 2013 wurden im gesamten St. Katherine Protektorat Süd-Sinai (Ägypten) Blütenbesuche von Insekten registriert. Im Ergebnis entstand eine Checklist von 112 blütenbesuchenden Insektenarten aus den Ordnungen Coleoptera, Diptera, Hemiptera, Hymenoptera und Lepidoptera. Dabei waren die Hymenopteren mit 69 Arten aus acht Familien in der größten Vielfalt vertreten: Apidae (14 spp.), Colletidae (8), Crabronidae (10), Halictidae (13), Megachilidae (19), Scoliidae (1), Sphecidae (2) und Vespidae (2). Wir registrierten in der Region neun endemische Arten und 13 Arten als neu für die ägyptische Fauna, darunter eine für die Wissenschaft neue Spezies, Hylaeus oliviae Dathe, 2015. Die Studie liefert eine wertvolle erste Checklist von Bestäubern im St. Katherine Protektorat, wobei die Neubeschreibung und der hohe Anteil neuer Funde für Ägypten darauf hindeuten, dass die Artenzahlen wahrscheinlich noch unterschätzt werden. Wir betonen die Notwendigkeit weiterer Forschungen zur ägyptischen Bestäuberfauna, insbesondere im St. Katherine Protektorat, wo sicherlich noch weitere endemische Bienen zu finden sind.

Keywords: Apidae, bee, butterfly, Colletidae, Crabronidae, Halictidae, hoverfly, Megachilidae, pollinator, Syrphidae, Tephritidae

# 1. Introduction

Flower-visiting insects provide valuable pollination services, helping to maintain yields of 75% of global crop species and an estimated 94% of wild flowering plants (Klein et al. 2007). Despite their high ecological and economic importance, current trends suggest that pollinators are experiencing widespread declines (Pottset al. 2010). The strongest evidence for these declines comes from Europe and USA, but there is a distinct lack of pollination research in arid regions such as Northern Africa and the Middle East (Pottset al. 2010, Mayer et al. 2011, Archer et al. 2014). There is likely to be a variety of political and social barriers slowing pollinator research across the Middle East, but efforts to prioritise pollinator research will be essential if we hope to quantify and tackle on-going pollinator declines in the region.

Despite the disproportionate lack of pollination research in the region, Middle Eastern smallholder farms tend to be heavily reliant on the economic and nutritional returns associated with pollinator-dependent crops such as fruit and vegetables (Chaplin-Kramer et al. 2014, Gallai et al. 2009, Steward et al. 2014). This is particularly true in the mountains of South Sinai, Egypt, where the local Bedouin community are highly dependent on produce grown within traditional orchards gardens. Wild pollinators have been shown to enhance the fruit set of the primary almond crop within the region (Norfolk et al. 2016) and many of the pollinator-dependent crops grown within the gardens are likely to experience similar yield benefits (Garibaldi et al. 2013). An enhanced understanding of pollinator communities within such smallholder systems can help inform management practices that support pollination services and crop yields in the region.

The St Katherine Protectorate in South Sinai is rich in biodiversity and supports over half of Egypt’s endemic flowering plants (Ayyadet al. 2000), many of which will also benefit from a diverse pollinator community. The region is known to support high butterfly diversity, with 40 of Egypt’s 60 species present within the Protectorate (Larsen 1990) and high levels of endemism have been reported within the Bombyliidae (El-Hawagry & Gilbert 2014). Other studies have assessed the diversity of beetles (Semidaet al. 2001), ground arthropods (Norfolket al. 2012) and some flower visitors in the region (Semidaet al. 2001, Zalat et al. 2001, Zalat et al. 2009, Norfolk et al. 2012), but there have been few comprehensive surveys of the pollinator fauna within the Protectorate. Here we provide a checklist of the flower visitor fauna from the St Katherine Protectorate during extensive surveys between April-July in 2012 and 2013.

**2. Methods**

We surveyed flower visitors in six localities within the St Katherine Protectorate between April-July in 2012 and 2013: Sheik Awad, St Katherine Town, Wadi Rahah, Wadi Itlah, Wadi Gebel and Wadi Tinya. Repeat monthly surveys were carried out in 500-m2 plots with all flower-visiting insects captured with a hand net (37 plots in 2012; 54 plots in 2013). Specimens were identified by C. O’Toole (Apidae), M. Kuhlmann and H.H. Dathe (Colletidae), A. Pauly (Halictidae), C. Praz and A. Müller (Megachillidae), C. Schmid-Egger (Sphecidae), A. Freidberg (Tephritidae) and O. Norfolk and F. Gilbert (Lepidoptera and Syrphidae). Reference specimens are stored in the personal collection of the lead author and respective taxonomists (indicated by their initials). Distributions were determined according to Schuh et al. (2010), Kuhlman et al. (2014), Pauly (2011), Pauly (2016), Rasmont (2014), Kugler and Freidberg (1975), Peck (1988) and Schmid-Egger (2004).

**3. Results**

In total we recorded 112 species of flower visitor belonging to Coleoptera, Diptera, Hemiptera, Hymenoptera and Lepidoptera. The Hymenoptera were the most diverse group, consisting of 69 species from eight families: Apidae (14), Colletidae (8), Crabronidae (10), Halictidae (13), Megachilidae (19), Scoliidae (1), Sphecidae (2) and Vespidae (2). We recorded nine species endemic to the region and 13 that were new to the Egyptian fauna. We also present records for *Hylaeus oliviae* Dathe, 2015, which was described as new from specimens collected during this study, and for species *Anthophora* Sinai sp1 and *Anthophora (Heliophila)* Sinai sp1 which are probably new (official description pending access to reference collection). The list below provides details about species that are new to Egypt and/or have a restricted distribution. Table 1 is a full species list.

APOIDEA

**Family: Apidae**

*Anthophora pauperata* Walker, 1871

**Material:** April 2012 - St Katherine town 28°33'N, 33°56'E (3♀), Wadi Itlah 28°35'N, 33°55'E (1♀); April 2013 - St Katherine town 28°33'N, 33°56'E (2♀), Wadi Itlah 28°35'N, 33°55'E (1♀), Wadi Gebel 28°32’N, 33°55'E (1♀). C.O’T. **Details:** Observed foraging on *Alkanna orientalis*(L.) Boiss, *Zilla spinosa* (L.) Prantl., *Stachys aegyptiaca* Pers. and *Anchusa milleri* Spreng. **Distribution:** Egypt and Saudi Arabia.

*Anthophora caelebs* Gribodo, 1924

**Material:** April 2012- St Katherine town 28°33'N, 33°56'E (2♀), Wadi Gebel 28°32’N, 33°55'E (1♀). C.O’T. **Details:** Observed foraging on *A. orientalis*and *Z. spinosa.* **Distribution**: Libya, Egypt and Israel.

*Anthophora hermanni* Schwarz and Gusenleitner, 2003

**Material:** April-May 2013- St Katherine town 28°33'N, 33°56'E (1♀), Wadi Itlah 28°35'N, 33°55'E (1♀), Wadi Tinya, 28°34'N, 33°54'E (2♀). **Details:** Observed foraging on *A. orientalis.* C.O’T. **Distribution**: Egypt.

*Anthophora* Sinai sp1

**Material:** April-May 2013 - St Katherine town 28°33'N, 33°56'E (21♂), Wadi Itlah 28°35'N, 33°55'E (25♀), Wadi Gebel 28°32’N, 33°55'E (4♀), Wadi Tinya, 28°34'N, 33°54'E (1♀). C.O’T. **Details:** Observed foraging on *A. milleri,**S. aegyptiaca* and *Z. spinosa.* Pending access to type material of Irano-Turanian species, this morphotype has been given a temporary designation and may be an undescribed species.

*Anthophora (Heliophila)* Sinai sp1

**Material:** May-June 2013 - Wadi Itlah 28°35'N, 33°55'E (2♀). C.O’T. **Details:** Observed foraging on *A. milleri* and*Tanacetum santolinoides* Feinbrun & Fertig.Pending access to type material of Irano-Turanian species, this morphotype has been given a temporary designation and may be an undescribed species.

**Family: Colletidae**

*Colletes tuberculatus* Morawitz, 1894

**Material:** June-July 2013 - Wadi Tinya, 28°34'N, 33°54'E (1♀). M.K. **Details:** Observed foraging on *Achillea santolina* L. **Distribution:** Widespread across Eastern Palaearctic, including neighbouring Israel and Jordan. First record for Egypt.

*Hylaeus sinaiticus* (Alfken, 1938)

**Material:** May-June 2012 - St Katherine town 28°33'N, 33°56'E (2♂); April-July 2013 - St Katherine town 28°33'N, 33°56'E (2♀, 1♂), Wadi Rahah 28°34'N, 33°56'E (2♀), Wadi Itlah 28°35'N, 33°55'E (3♀, 1♂), Wadi Gebel 28°32’N, 33°55'E (4♀), Wadi Tinya, 28°34'N, 33°54'E (1♀). H.D. **Details:** Observed foraging on *A. santolina*, *Diplotaxis harra* (Forssk.) Boiss. and *Foeniculum vulgare* L. **Distribution:** Sinai, Egypt.

*Hylaeus oliviae* Dathe 2015

**Material:** April-July 2013, St Katherine town 28°33'N, 33°56'E (1♀), Wadi Itlah 28°35'N, 33°55'E (1♂), Wadi Gebel 28°32’N, 33°55'E (1♀). H.D. **Details:** Observed foraging on *Anarrhinum pubescens* Fresen. and *F. vulgare*. **Distribution:** First record of this newly described species. First record for world and Egypt.

**Family: Halictidae**

*Lasioglossum erraticum* (Blüthgen, 1931)

**Material:** July 2013 - Wadi Tinya, 28°34'N, 33°54'E (1♀). A.P. **Details:** Observed foraging on *A. santolina* and *Stachys aegyptiaca* Pers. **Distribution:** Greece, Turkey, Cyprus, Armenia. First record for Egypt.

*Lasioglossum collopiense* (Pérez 1903)

**Material:** July 2013 - Wadi Gebel 28°32’N, 33°55'E (1♀). A.P. **Details:** Observed foraging on *A. santolina* and *T. santolinoides*. **Distribution:** North Africa and the Canaries. First record for Egypt.

*Halictus gemmellus* Pauly, 2015

**Material:** June 2013 –St Katherine town 28°33'N, 33°56'E (4♀,1♂), Wadi Rahah 28°34'N, 33°56'E (1♀), Wadi Itlah 28°35'N, 33°55'E (1♂), Wadi Gebel 28°32’N, 33°55'E (1♀). A.P. **Details:** Observed foraging on *A. santolina*, *T. santolinoides*, *Caylusea hexagyna* (Forssk.) M.L.Green and *F. vulgare*. **Distribution:** West Mediterranean. First record for Egypt.

**Family: Megachilidae**

*Hoplitis africana* (Warncke, 1990)

**Material:** April-May 2013 - Wadi Itlah 28°35'N, 33°55'E (5♀). A.M. **Details:** Observed foraging on *Launaea nudicaulis* (L.) Hook.f. and *C. hexagyna*. **Distribution:** Northern Africa and South West Asia. First record for Egypt.

*Hoplitis epeoliformis* (Ducke, 1899)

**Material:** May 2013 - Wadi Itlah 28°35'N, 33°55'E (1♀). **Details:** Observed foraging on *Peganum harmala* L. **Distribution:** Northern Africa and Jordan. First record for Egypt.

*Hoplitis gerofita* (Warncke, 1990)

**Material:** April-May 2013 - Wadi Itlah 28°35'N, 33°55'E (4♀). A.M. **Details:** Observed foraging on *Oligomeris linifolia* (Vahl) J.F.Macbr., *Ochradenus baccatus,* Taily Weed. and *C. hexagyna*. **Distribution:** Jordan, Israel. First record for Egypt.

*Hoplitis hofferi* Tkalců, 1977

**Material:** April-June 2012–St Katherine town 28°33'N, 33°56'E (4♀,2♂), Wadi Rahah 28°34'N, 33°56'E (1♀), Wadi Itlah 28°35'N, 33°55'E (1♀). April-July 2013–St Katherine town 28°33'N, 33°56'E (20♀,2♂), Wadi Rahah 28°34'N, 33°56'E (2♀,2♂), Wadi Itlah 28°35'N, 33°55'E (4♀,3♂), Wadi Gebel 28°32’N, 33°55'E (1♀). A.M. **Details:** Observed foraging almost exclusively on *P. harmala* and *C. hexagyna.* **Distribution:** Israel, Jordan, UAE, Oman, Pakistan. First record for Egypt.

*Megachile insignis* van der Zanden, 1996

**Material:** May-July 2013 - Wadi Itlah 28°35'N, 33°55'E (5♀), Wadi Gebel 28°32’N, 33°55'E (1♀). C.P. **Details:** Observed foraging on *Medicago sativa* L. and *C. hexagyna*. **Distribution:** Greece, Turkey, Syria, Iran and Israel. First record for Egypt.

*Megachile montenegrensis* Dours, 1873

**Material:** April 2012 - St Katherine town 28°33'N, 33°56'E (2♀). C.P. **Details:** Observed foraging on *Colutea istria* Miller. **Distribution:** Widespread across Southern Palaearctic, including neighbouring Israel. First record for Egypt.

*Osmia laticella* van der Zanden, 1986

**Material:** April-May 2013 - St Katherine town 28°33'N, 33°56'E (1♀), Wadi Itlah 28°35'N, 33°55'E (1♀). Wadi Gebel 28°32’N, 33°55'E (1♀), Wadi Tinya, 28°34'N, 33°54'E (3♀). A.M. **Details:** Observed foraging on *Arabidopsis kneuckeri* (Bornm.) O. E. Schulz, *Z. spinosa* and *Rosmarinus* officinalis L. **Distribution:** Israel and Egypt.

**Family: Crabronidae**

*Bembecinus hebraeus* de Beaumont, 1968

**Material:** June 2013 - Wadi Itlah 28°35'N, 33°55'E (x1), Wadi Gebel 28°32’N, 33°55'E (x1). C.S-E. **Distribution:** Previously only recorded in Israel. First record for Egypt.

DIPTERA

**Family: Syrphidae**

*Eristalis arbustorum* (Linnaeus, 1758)

**Material:** July 2012 – St Katherine town 28°33'N, 33°56'E (x1). F.G. **Details:** Observed foraging on *A. santolina.* Distribution: Widespread across Europe, Northern Africa and Asia (Syria, Iran and Afghanistan). First record for Egypt

*Melanostoma scalare* (Fabricius, 1794)

**Material:** April 2012 – Sheik a Wad 28°38'N, 33°53'E (x1), Wadi Itlah 28°35'N, 33°55'E (x1).F.G. **Details:** Observed foraging on *O. baccatus* and *Eruca sativa* Mill. **Distribution:** Western Europe. First record for Egypt.

**Family: Tephritidae**

*Katonaia aida* Hering, 1938

**Material:** July 2013 – Wadi Itlah 28°35'N, 33°55'E (x1). A.F. **Details:** Host plant: Lamiacae *Ballota* spp. but observed foraging on *A. santolina*. **Distribution:** Israel and Egypt.

**4. Discussion**

Here we provide an initial checklist of some of the flower visitor fauna of the St Katherine Protectorate. Out of the 112 species recorded, thirteen were new records for Egypt, highlighting the importance of continued pollinator research in the region. Solitary bees were the most diverse group of flower visitors with 53 species, which is just 10% of Egypt’s previously recorded bee species (427 species). Despite low representation of Egypt’s current species list, we recorded eleven bee species that were new records for the country, including the previously undescribed *H. oliviae* (described in Dathe, 2015).

The specimens in this study were collected between April and July, but flower visitors are known to be active both earlier and later in the season. Previous expeditions in August documented four additional bee species (*Anthophora albigena*, *Xylocopa pubescens*, *Chalicodoma maxillosa*, *Megachile submucida*) (Zalat et al., 2009), suggesting that the Protectorate actually supports at least 57 bee species. Similar numbers of bee species have been reported in the Suez Canal region to the north of Sinai (62 species) (Sheblet al., 2013, 2015), but despite the relatively close proximity of the sites, only eight of the species recorded in Suez were found in the St Katherine Protectorate. This high heterogeneity of species composition suggests that there is still much to learn about bee fauna across the Sinai Peninsula and that current species lists may be underestimates.

The St Katherine Protectorate supports a number of flower visitors that are regional endemics, such as the tephritid fly *K. aida* (Israel and Egypt) and sand wasp *B. hebraeus* (Israel and Egypt). The solitary bees showed the highest levels of such regional endemism, with four species restricted to the Egypt and Israel region (*A. hermanni, H*. *sinaiticus, H. oliviae, O. laticella*) and three with slightly wider ranges; *A. pauperata* (Egypt, Saudi Arabia), *A. caelebs* (Libya, Egypt, Israel), *H. gerofita* (Egypt, Israel, Jordan). These levels of regional endemism (13% of the bee community) were much higher than those observed in other flower visitor groups, notably the hoverflies which were dominated by widespread species.

Overall, this study provides a valuable initial checklist of flower-visiting insects within the St Katherine Protectorate. It is very likely that more undescribed species await discover. This, together with the high proportion of new records for Egypt suggests that species numbers are likely to be underestimated. We highlight the need for future research into the Egyptian pollinator fauna, particularly within the St Katherine Protectorate, where our surveys discovered undescribed and possibly endemic species.

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**Table 1**. Full species list of flower visitors observed within the St Katherine Protectorate between 2012 and 2013. E = new records for Egypt; S = records of new species; (S) = possible records of new species pending description.

|  |  |  |
| --- | --- | --- |
|  |  | Number of individuals observed |
| **COLEOPTERA** |  |  |
| Buprestidae |  | 32 |
| *Anthaxia scutellaris* Géné, 1839 |  |  |
| Coccinellidae |  |  |
| *Coccinella septempuctata* Linnaeus, 1758 |  | 133 |
| **DIPTERA** |  |  |
| Syrphidae |  |  |
| *Eristalinus aeneus* (Scopoli, 1763) |  | 22 |
| *Eristalis arbustorum* (Linnaeus, 1758) | E | 1 |
| *Eristalis tenax* (Linnaeus, 1758) |  | 14 |
| *Eristalinus taeniops* (Wiedemann, 1818) |  | 7 |
| *Eumerus vestitus* Bezzi, 1912 |  | 1 |
| *Eupeodes corollae* (Fabricius, 1794) |  | 177 |
| *Ischiodon aegyptius* (Wiedemann, 1830) |  | 47 |
| *Melanostoma scalare* (Fabricius, 1794) | E | 2 |
| *Paragus tibialis* (Fallén, 1817) |  | 2 |
| *Scaeva albomaculata* (Macquart, 1842) |  | 7 |
| *Sphaerophoria rueppellii* Weidemann, 1820 |  | 22 |
| *Sphaerophoria scripta* (Linnaeus, 1758) |  | 46 |
| *Syritta fasciata* (Wiedemann, 1830) |  | 250 |
| Tephritidae |  |  |
| *Acanthiophilus helianthi* (Rossi) |  | 22 |
| *Capitites augur* (Frauenfeld) |  | 2 |
| *Carpomya incompleta* (Becker) |  | 3 |
| *Dacus ciliatus* (Loew) |  | 1 |
| *Euarestella iphionae* (Efflatoun) |  | 9 |
| *Goniurellia spinifera* Freidberg |  | 1 |
| *Katonaia aida* Hering |  | 1 |
| *Oxyaciura tibialis* (R.D.) |  | 1 |
| *Trupanea amoena* (Frauenfeld) |  | 3 |
| *Trupanea pulcherrima* (Efflatoun) |  | 3 |
| **HEMIPTERA** |  |  |
| Lygaeidae |  |  |
| *Spilostethus pandurus*(Scopoli, 1763) |  | 4 |
| **HYMENOPTERA** |  |  |
| Apidae |  |  |
| *Amegilla cognata* (Smith, 1854) |  | 5 |
| *Amegilla mucorea* (Klug, 1845) |  | 28 |
| *Amegilla savignyi* (Lepeletier, 1841) |  | 7 |
| *Anthophora caelebs* Gribodo,1924 |  | 3 |
| *Anthophora concinna* (Klug, 1845) |  | 27 |
| *Anthophora (Heliophila)* Sinai sp1 | (S) | 5 |
| *Anthophora crassipes* Lepeletier, 1841 |  | 19 |
| *Anthophora hermanni* Schwarz & Gusenleitner, 2003 |  | 4 |
| *Anthophora pauperata* Walker, 1871 |  | 8 |
| *Anthophora senescens* Lepeletier, 1841 |  | 1 |
| *Anthophora* Sinai sp1 | (S) | 51 |
| *Apis cerana* Fabricius, 1793 |  | 2 |
| *Apis mellifera* Linnaeus, 1758 |  | 300 |
| *Xylocopa sulcatipes* Maa, 1970 |  | 28 |
| Colletidae |  |  |
| *Colletes nanus* Friese, 1898 |  | 5 |
| *Colletes perezi* Morice, 1904 |  | 20 |
| *Colletes pumilus* Morice, 1904 |  | 1 |
| *Colletes tuberculatus* Morawitz, 1894 | E | 1 |
| *Hylaeus sinaiticus* (Alfken, 1938) |  | 16 |
| *Hylaeus oliviae* Dathe, 2015 | S | 3 |
| *Hylaeus xanthopoda* (Vachal, 1895) |  | 8 |
| *Hylaeus albonotatus* (Walker, 1871) |  | 12 |
| Crabronidae |  |  |
| *Bembecinus hebraeus* de Beaumont, 1968 | E | 3 |
| *Bembix arenaria* Handlirsch, 1893 |  | 1 |
| *Bembix oculata* Panzer, 1801 |  | 7 |
| *Cerceris alboatra* Mochi,1938 |  | 5 |
| *Cerceris sabulosa* (Panzer, 1799) |  | 31 |
| *Cerceris tricolorata* Mochi, 1938 |  | 8 |
| *Palarus histrio* Spinola, 1838 |  | 1 |
| *Philanthus coarctatus* Spinola, 1839 |  | 16 |
| *Philanthus triangulum* (Fabricius, 1775) |  | 9 |
| *Prosopigastra fumipennis* Gussakovskij, 1952 |  | 2 |
| Halictidae |  |  |
| *Ceylalictus variegatus* (Olivier, 1789) |  | 5 |
| *Halictus tibalis* Walker, 1871 |  | 12 |
| *Halictus gemmellus* Pauly, 2015 |  | 7 |
| *Halictus falx* Ebmer, 2008 |  | 4 |
| *Halictus pici* Pérez, 1895 |  | 5 |
| *Lasioglossum erraticum* (Blüthgen, 1931) | E | 1 |
| *Lasioglossum kowitense* (Cockerell, 1937) |  | 1 |
| *Lasioglossum subaenescens asiaticum* (Dalla Torre, 1896) |  | 3 |
| *Lassioglossum collopiense* (Pérez, 1903) | E | 1 |
| *Nomioides rotundiceps* Handlirsch, 1888 |  | 3 |
| *Nomioides squamiger* Saunders, 1908 |  | 1 |
| *Nomioides turanicus* Morawtiz, 1876 |  | 14 |
| *Pseudapis nilotica* (Smith, 1875) |  | 2 |
| Megachilidae |  |  |
| *Anthidium amabile* Alfken, 1932 |  | 1 |
| *Anthidium bischoffi* Mavromoustakis, 1954 |  | 3 |
| *Chalicodoma montenegrense* Dours, 1873 |  | 2 |
| *Hoplitis africana* (Warncke, 1990) | E | 5 |
| *Hoplitis epeoliformis* (Ducke, 1899) | E | 1 |
| *Hoplitis gerofita* (Warncke, 1990) | E | 4 |
| *Hoplitis hofferi* Tkalců, 1977 | E | 42 |
| *Icteranthidium ferrugineum* Fabricius, 1787 |  | 4 |
| *Megachile concinna* Smith, 1879 |  | 3 |
| *Megachile inexspectata* Rebmann, 1968 |  | 1 |
| *Megachile doriae* Magretti, 1890 |  | 1 |
| *Megachile flabellipes* Pérez, 1895 |  | 1 |
| *Megachile insignis* van der Zanden, 1996 | E | 6 |
| *Megachile minutissima* Radoszkowski, 1876 |  | 1 |
| *Megachile montenegrensis* Dours, 1873 | E | 4 |
| *Megachile tenuistriga* Alfken, 1938 |  | 2 |
| *Megachile walkeri* Dalla Torre, 1896 |  | 65 |
| *Osmia alfkenii* Ducke, 1900 |  | 1 |
| *Osmia laticella* van der Zanden, 1986 |  | 6 |
| Scoliidae |  |  |
| *Scolia carbonaria* (Linnaeus, 1767) |  | 6 |
| Sphecidae |  |  |
| *Chalybion flebile* (Lepeletier, 1845) |  | 1 |
| *Podalonia tydei* (Le Guillou, 1841) |  | 1 |
| Vespidae |  |  |
| *Celonites fischeri* Spinola, 1838 |  | 1 |
| *Vespa orientalis* Linnaeus, 1771 |  | 2 |
| **LEPIDOPTERA** |  |  |
| Hesperiidae |  |  |
| *Spialia doris* (Walker, 1870) |  | 5 |
| Lycaenidae |  |  |
| *Agrodiaetus loewii* Zeller, 1847 |  | 5 |
| *Deudorix livia* (Klug, 1834) |  | 5 |
| *Iolana alfierii* Wiltshire, 1948 |  | 10 |
| *Lampides boeticus* (Linnaeus, 1767) |  | 348 |
| *Leptotes pirithous* (Linnaeus, 1767) |  | 39 |
| *Tarucus rosacea* (Austaut, 1885) |  | 85 |
| *Polyommatus icarus* (Rottemburg, 1775) |  | 1 |
| Nymphalidae |  |  |
| *Danaus chrysippus* (Linnaeus, 1758) |  | 3 |
| *Vanessa cardui* (Linnaeus, 1758) |  | 4 |
| Pieridae |  |  |
| *Belenois aurota* (Fabricius, 1793) |  | 24 |
| *Colias croceus* (Geoffroy, 1785) |  | 4 |
| *Colotis fausta* (Olivier, 1804) |  | 2 |
| *Pieris rapae* (Linnaeus, 1758) |  | 4 |
| *Pontia daplidice* (Linnaeus, 1758) |  | 17 |
| *Pontia glauconome* Klug, 1829 |  | 1 |
| Sphingidae |  |  |
| *Macroglossum stellatarum* (Linnaeus, 1758) |  | 7 |