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BRIEF COMMUNICATION

Supplementary note on the solitary bee fauna from the Suez Canal region of Egypt (Hymenoptera: Apoidea)

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Abstract. Previous surveys (2011–2013) of the bee fauna from the Suez Canal region, Egypt, recorded a total of 55 species. Those surveys did not include important floral species among the Asteraceae, a family known to be associated with various oligolectic bees. The aim of the present note is to report bees visiting four uncultivated species of Asteraceae that are common in the region during the Spring of 2014. Nine species of bees were recorded from these flowers, these increasing the number of species recorded from the Suez Canal region to 62. Some species, such as *Daypoda sinuata* Pérez (Melittidae) and *Panurgus dentatus* Friese (Andrenidae), are known oligoleges of Asteraceae.

INTRODUCTION

The melittofauna of the region around the Suez Canal has been surveyed continuously since 2011, and during this time numerous species of pollinating and cleptoparasitic bees have been recovered and recorded. In total, 55 species belonging to nearly all families of bees have been collected, with the sole exception of the Melittidae (Shebl *et al.*, 2013). Those species were sampled from a diverse flora, including some important crop plants such as alfalfa [*Medicago sativa* L. (Fabaceae)] and Egyptian clover [*Trifolium alexandrinum* L. (Fabaceae)], but not from Asteraceae (Shebl *et al.*, 2013).

Species of Asteraceae are often visited by a diverse bee fauna, some of which are oligolectic on these flowers and may not otherwise be captured in surveys that overlook the family. Some notable examples include species of *Dasypoda* Latreille and *Melitta* Kirby (*e.g.*, Michez & Patiny, 2002; Michez *et al.*, 2004; Michez & Eardley, 2007),

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Figures 1–3. Photographs of andrenid bees at flowers of Asteraceae in the Canal Region, Egypt during April 2014 (photographs by M. Shebl). **1.** Male of *Panurgus* (*Panurgus*) *dentatus* Friese foraging on *Reichardia tingitana* (L.) Roth (Cichorioideae: Cichorieae). **2.** Female of *P. (P.) dentatus* on *R. tingitana*. **3.** Female of *Andrena* (*Chrysandrena*) *aegyptiaca* Friese on *Launaea nudicaulis* (L.) Hook.f. (Cichorioideae: Cichorieae).



perhaps accounting for the absence of this family during previous sampling efforts. Indeed, many species of solitary bees exhibit a preference for flowers of Asteraceae (Willmer, 2011). Many species of bees are oligolectic on Asteraceae, relying on them exclusively for nest provisions (e.g., Müller & Bansac, 2004; Shebl, 2012). For example, in a study from Germany, 43% of all bee species were found to specialize on the collection of pollen from flowers of Asteraceae, particularly for well-studied species of the genera *Andrena* Fabricius, *Osmia* Panzer, and *Colletes* Latreille (Kratochwil, 2003). The aim of the present note was to focus on sampling bees from species of Asteraceae in the region and ascertain which additional species, if any, might be added to the previous lists, particularly toward understanding the faunal composition of solitary bees in the area of the Suez Canal.

MATERIAL AND METHODS

Specimens were netted by hand on the following species of Asteraceae during February–April 2014 (e.g., figures 1–3): *Senecio glaucus coronopifolius* (Maire) C. Alexander (Senecioneae), *Reichardia tingitana* (L.) Roth (Cichorioideae: Cichorieae), *Launaea nudicaulis* (L.) Hook.f. (Cichorioideae: Cichorieae), and *Sonchus oleraceus* L. (sow this-

Table 1. List of species collected with notation of their floral host(s) and flight period.

Species	Floral host	Phenology	Locality
Andrenidae			
<i>Andrena aegyptiaca</i> Friese	<i>Senecio glaucus coronopifolius</i> <i>Launaea nudicaulis</i>	February to April	Ismailia
<i>Panurgus dentatus</i> Friese	<i>Senecio glaucus coronopifolius</i> <i>Reichardia tingitana</i> <i>Sonchus oleraceus</i> <i>Launaea nudicaulis</i>	February to April	Ismailia Suez
Melittidae			
<i>Dasypoda sinuata</i> Pérez	<i>Reichardia tingitana</i> <i>Launaea nudicaulis</i>	March to April	Ismailia
Megachilidae			
<i>Osmia notata</i> (Fabricius)	Oligolectic on Asteraceae and others	March to April	Ismailia
<i>Osmia latreillei</i> (Spinola)	<i>Senecio glaucus coronopifolius</i> <i>Launaea nudicaulis</i>	January to March	Ismailia Suez
<i>Osmia submicans</i> Morawitz	Varied species including Asteraceae	April	Ismailia
<i>Megachile concinna</i> Smith	Varied species including Asteraceae	April	Ismailia
Halictidae			
<i>Lasioglossum</i> sp.	<i>Reichardia tingitana</i> <i>Senecio glaucus coronopifolius</i> <i>Sonchus oleraceus</i>	March, April	Ismailia Suez
<i>Halictus pollinosus</i> Sichel	Varied species of Asteraceae	April	Ismailia

tle, Cichorioideae: Cichorieae). Weekly samples were collected from the four abundant species in the region. The samples were collected from different localities of the Suez Canal area (Suez and Ismailia) but mostly from Ismailia, with average daily temperatures between 25–30 °C. Approximately 100 bee specimens were collected and prepared for examination. All specimens were studied with an Optometron D-81829 stereomicroscope. Preparations of male terminalia, when necessary, were dissected from fresh or relaxed bees. Genital sclerites were cleared with a weak solution of potassium hydroxide (10% KOH) for at least one-half day before transferring to distilled water for further dissection. Species identifications were confirmed through comparison with an authoritatively identified reference collection of Egyptian bees held in the Cairo University collection, Cairo, Egypt, as well as with the assistance of taxonomic specialists (e.g., Terry L. Griswold for Megachilinae). Specimens were deposited in the collection of the Department of Plant Protection, Faculty of Agriculture, Suez Canal University, Ismailia, Egypt. Floral hosts were identified by comparing with specimens deposited at the herbarium collection of Suez Canal University and with the aid of Waffa M. Kamel.

RESULTS AND DISCUSSION

Table 1 summarizes the various species of bees collected from the four floral species studied, and none except *Osmia* (*Helicosmia*) *latreillei* (Spinola) and *O. (Pyrosmia)*

Table 2. Biogeographic occurrences of the species discussed herein. A plus sign (+) indicates that the species has been recorded previously for the specified area.

Species	Present Around River Nile	Present in Canal Region	World Distribution
<i>Andrena aegyptiaca</i> Friese	+ (Moustafa, 1986)	+	Mediterranean Region, India, Pakistan
<i>Panurgus dentatus</i> Friese	+ (Patiny & Michez, 2007)	+	N. Africa (Egypt, Libya, Tunisia, & Morocco), Arabian Peninsula
<i>Dasypoda sinuata</i> Pérez	+ (Michez & Patiny, 2002)	New	N. Africa (Egypt, Libya, Tunisia, Algeria, & Morocco)
<i>Osmia latreillei</i> (Spinola) <i>Osmia notata</i> (Fabricius) <i>Osmia submicans</i> Morawitz	+ (Shebl <i>et al.</i> , 2013)	+	Common in Mediterranean Region
<i>Megachile concinna</i> Smith	+ (Ascher & Pickering, 2014)	+	Common in N. Africa
<i>Halictus pollinosus</i> Sichel	+ (Ascher & Pickering, 2014)	+	Mediterranean Region, Central Asia

submicans Morawitz were captured in the previous survey that excluded Asteraceae (Shebl *et al.*, 2013). While most of the species in the earlier survey were polylectic, four of those newly captured and recorded here are oligolectic and were never found in association with other plant families: *Panurgus* (*Panurgus*) *dentatus* Friese (Andrenidae: Panurginae) (Figs. 1–2), *Andrena* (*Chrysandrena*) *aegyptiaca* Friese (Andrenidae: Andreninae) (Fig. 3), *Dasypoda sinuata* Pérez (Melittidae: Dasypodainae), and *Osmia* (*Helicosmia*) *latreillei* (Spinola) (Megachilidae: Megachilinae) (Table 1). By contrast, three species are polylectic, *Megachile* (*Eutricharaea*) *concinna* Smith (Megachilidae: Megachilinae), *Lasioglossum* sp. (Halictidae: Halictinae), and *Halictus* (*Mucoreohalictus*) *pollinosus* Sichel (Halictidae: Halictinae) and may be found on varied flowers in addition to those of Asteraceae reported herein.

Several observed species exhibited different behaviors to forage on flowers of Asteraceae flowers. *Panurgus dentatus* was typically observed foraging on their sides of the capitulum (Figs. 1–2). *Panurgus dentatus* and *D. sinuata* both have dense hind-leg scopae and thus associated behaviors for accumulating pollen in these structures. Females of *A. aegyptiaca* collected pollen on their propodeal scopa (= ‘propodeal fiscina’ *sensu* Engel, 2001) and metatibial scopa, while those of *O. latreillei* packed pollen into the metasomal scopa.

Table 2 summarizes the occurrences in Egypt of those species studied along with their general distribution. *Dasypoda sinuata*, previously recorded in Egypt only from around the Nile River (Michez & Patiny, 2002), is newly recorded herein from the Suez Canal region, thus expanding its known distribution in the country. *Panurgus dentatus* and *D. sinuata* are widespread across northern Africa, as well as the southern Middle East and Arabia in the case of the former (Patiny & Michez, 2007), and it is assured

that these species are more extensively distributed across Egypt. Both certainly will be found in future surveys around the country, including the Sinai Peninsula, should suitable floral hosts be located and sampled.

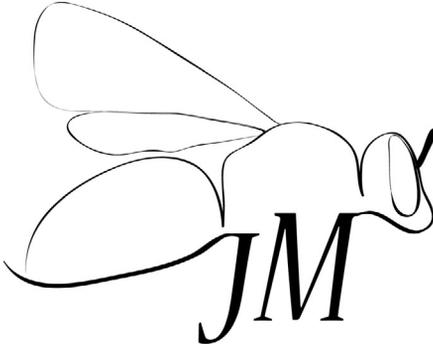
The present note is meant only as an expansion upon our earlier survey of bees in the in the Suez Canal region (Shebl *et al.*, 2013), as an aid to regional melittologists and pollination biologists, and increases to 62 the total number of bees species in the fauna. It is hoped that continuing surveys will improve this growing list and enable investigations into their nesting biology and ecology, hopefully with the eventual development of a guide to the identification and floral biology of the bees of the region.

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