

# New records of Apoidea (Hymenoptera, Apoidea, Apiformes) in Algeria

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## Abstract

*New records of Apoidea (Hymenoptera, Apoidea, Apiformes) in Algeria.* Between 2015 and 2017 we conducted a survey on Apoidea (Hymenoptera, Apoidea) and their distribution in several regions of northern Algeria. Among these pollinating insects captured on natural and cultivated vegetation we found four new species of Apoidea fauna for Algeria. These previously unreported species belonged to two families: Andrenidae and Megachilidae. We include a taxonomic list of the species recorded, together with their geographical distribution, altitude where found, habitat, flight periods, and flowers visited. A fifth species that was known to exist but was not documented has also been added to the list.

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Key words: Wild bees, New record, Distribution, Flora, *Megachile* sp., Algeria

## Resumen

*Nuevos registros de Apoidea (Himenópteros, Apoidea, Apiformes) en Argelia.* Las investigaciones se desarrollaron durante el periodo comprendido entre 2015 y 2017 en diferentes regiones del norte de Argelia. Este estudio se refiere a Apoidea (Hymenoptera, Apoidea) y su distribución. Entre estos insectos polinizadores capturados en la vegetación natural y cultivada registramos cuatro nuevas especies para la fauna de Apoidea en Argelia no reportadas previamente, distribuidas en dos familias: Andrenidae y Megachilidae. También incluimos la lista taxonómica de dichas especies con la distribución geográfica, altitud, hábitat, periodos de vuelo y flores visitadas.

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*Palabras clave:* Abejas silvestres, Nuevo registro, Distribución, Flora, *Megachile* sp., Argelia

## Resum

*Nous registres d'Apoidea (Himenòpters, Apoidea, Apiformes) a Algèria.* Les recerques es van portar a terme durant el període comprès entre 2015 i 2017 en diverses regions del nord d'Algèria. Aquest estudi es refereix a Apoidea (Hymenoptera, Apoidea) i la seva distribució. Entre aquests insectes pol·linitzadors capturats a la vegetació natural i cultivada

registrem quatre noves espècies per a la fauna d'Apoidea a Algèria no reportades fins ara, distribuïdes en dues famílies: Andrenidae i Megachilidae. També incloem la llista taxonòmica d'aquestes espècies, amb la distribució geogràfica, l'altitud, l'hàbitat, els períodes de vol i les flors visitades.

Dades publicades a [Zenodo](https://zenodo.org/record/3648692): ([10.5281/zenodo.3648692](https://zenodo.org/record/3648692))

Paraules clau: Abelles silvestres, Nou registre, Distribució, Flora, *Megachile* sp., Algèria

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## Introduction

Until recently, little was known about Apoidea fauna in Algeria and findings were fragmentary. Since the works of Saunders (1908), Alfken (1914), Schulthess (1924) and Benoist (1940), no taxonomic list of bees has been published for Algeria. Later studies were performed by Louadi and Doumandji (1998a, 1998b) and Louadi (1999) but only species of the genera *Halictus* and *Lasioglossum* harvested in Constantine NE Algeria were listed. Other studies conducted in eastern Algeria about Apoidea in general and their ecology include those of Benachour et al. (2007), Louadi et al. (2007, 2008), Benachour and Louadi (2011), Aguib et al. (2010), Scheuchl, et al. (2011) and Chichoune et al. (2018). Around Algiers, in N Algeria, some research was done by Bendifallah et al. (2010, 2012) and Aouar–Sadli et al. (2012). In eastern and central sahara of Algeria, other studies worth noting are those of Cherair et al. (2013) and Djouama et al. (2017) about the Andrenidae. Currently, the number of Apoidea recorded in Algeria is 799 taxa, according to the Discoverlife checklist (<https://www.discoverlife.org>) accessed on 30 December 2019. The objective of the present study is to present new taxa cited for the first time in Algeria. We report five species not previously recorded in Algeria. One of the five was known to exist but had never been listed. This study presents the taxonomic list of these species and their geographical distribution.

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## Material and methods

Sampling was carried out in five localities from three regions. The first region was Bordj Bou Arreridj where the survey was conducted at one station only, El Achir (36° 4' 30" N, 4° 46' 30" E, 994 m). El Achir is located in the north–eastern Algeria on the high plains. The region is characterized by a Mediterranean steppe climate. The minimum annual temperature is 1.6°C, the maximum annual temperature is 33.6°C, and the average temperature is 14.6°C. Annual rainfall is 300 to 700 mm. The second region was Bouira in the north of

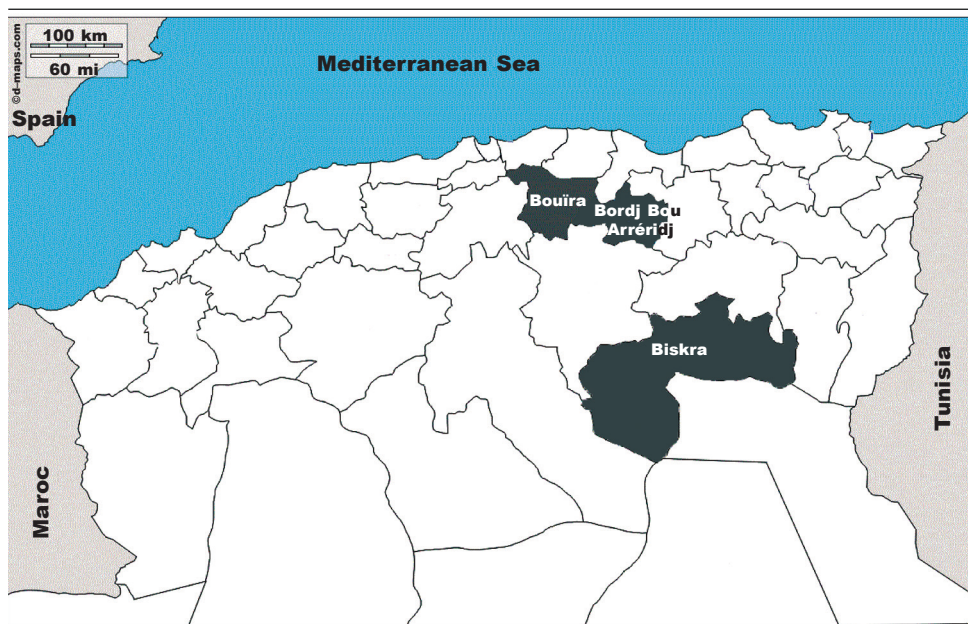


Fig. 1. Map of North Algeria showing the location of the study area.

Fig. 1. Mapa del norte de Argelia donde se muestra la localización del área de estudio.

the country, where two localities were chosen: Semmache ( $36^{\circ} 20' 36.9''$  N,  $4^{\circ} 9' 30.3''$  E, 466 m) and Aghouillal ( $36^{\circ} 24' 24''$  N,  $4^{\circ} 10' 08''$  E, 770 m). Bouira is a mountainous region in the Tellien Atlas, surrounded by forests. The region is mainly dominated by olive orchards (*Olea sativa*) followed by fig (*Ficus carica*) and prickly pear (*Opuntia ficus-indica*) orchards. The climate in this area is warm and temperate, the maximum temperature is  $32.2^{\circ}\text{C}$ , and the minimum temperature is  $3.5^{\circ}\text{C}$ . The average annual rainfall is 659 mm. The third region was Biskra in the north east of the Sahara, where two localities were sampled: El Hadjeb ( $34^{\circ} 13' 28''$  N,  $5^{\circ} 6' 15''$  E, 120 m) and Sidi khaled ( $34^{\circ} 22' 60''$  N,  $4^{\circ} 58' 60''$  E, 207 m). The area has a Saharan climate with a mild winter. Annual rainfall does not exceed 200 mm and is sometimes even less than 100 mm/year. The average maximum temperature reaches  $40.6^{\circ}\text{C}$  in July, and the minimum is recorded in January with  $5.8^{\circ}\text{C}$  (fig. 1).

In these three localities, we conducted a systematic collection of wild bees foraging on the flowers along a transect measuring 50 m, in order to establish an exhaustive inventory of pollinating fauna including Apoidea. Specimens were collected either with direct capture tools or installed traps such as Pan traps. Sampling was carried out for 45 minutes during the peak Apoidea activity period between 10:00 a.m. (GMT + 1) at 14:00 p.m. The investigations started in February 2015 and ended in May 2017. Surveys and insect captures were performed at regular frequencies in some stations and at irregular frequencies in other stations.

Whole specimens were labeled and stored in the entomological collection of Zoology at the National School of Agronomic Sciences, Algeria. The collected specimens were identified using several keys: Michener (2007), Pesenko (2005), Scheuchl (2000), and Pauly (2015a, 2015b). In addition to dichotomous keys, we used the reference collection of Italian Apoidea species prepared by Mr. M. Quaranta, and preserved in the Council for Agricultural Research and Analysis of the Agricultural Economy (CREA-AA), Bologna, Italy, to determine several species.

## Results

### Composition of Apoidea fauna

During the sampling period, 697 specimens were captured in good condition, allowing their identification. These species belonged to 21 genera and six families (Apidae, Halictidae, Andrenidae, Megachilidae, Colletidae and Melittidae). We identified four new species for the first time in Algeria from genus *Andrena* and *Megachile* (table 1). Only the new records identified and confirmed are described here (see also dataset published in [Zenodo: 10.5281/zenodo.3648692](https://zenodo.org/record/3648692)). The other taxa are under study and are subject to further publication.

In this study, 156 morphospecies of wild bees were recorded, nearly one-fifth of the Apoidian fauna listed in Algeria (568 species of Apoidea according to the checklist of <http://www.discoverlife.org> in 2019).

### New records for bee wildlife in Algeria

#### Family Andrenidae

##### *Andrena (Chlorandrena) taraxaci* Giraud, 1861 (2♀♀)

Localities: El Achir, Bordj Bou Arriridj, (36° 4' 30" N; 4° 46' 30" E, 994 m).

Flight period: April (current study).

Examined material: 1♀, 19/04/2015, leg. M. Saifi; 1♀, 12/04/2015, leg. M. Saifi, specimen trapped with pan trap.

Lecty: Oligolectic.

#### Family Megachilidae

##### *Megachile (Eutricharaea) minutissima* Radoszkowski, 1876 (1♀)

Localities: El Hadjeb, Biskra (34° 13' 28" N; 5° 6' 15" E, 120 m).

Flight period: May (current study).

Examined material: 1♀, 18/05/2015, leg. F. Bouti, plant *Sonchus oleraceus*, det. C. J. Praz.

Lecty: Polilectic.

#### Family Megachilidae

##### *Megachile (Creightonella) albisecta* (Klug, 1817) (6♀♀, 2♂♂)

Localities: Bouira, El Adjiba; Semmache, (36° 20' 36,9" N; 4° 9' 30,3" E, 466 m) and Aghouillal (36° 24' 24" N; 4° 10' 08" E, 770 m).

Flight period: From June to September (current study).

Examined material: 2♀♀, 2♂♂, 10/06/2016 in Asteraceae; leg. F. Belkacemi, det. M. Quaranta; 1♀, 30/08/2016 in *Silybum marianum* (L.) Gaertn.; 3♀♀, 21/09/2016, leg. F. Belkacemi, det. M. Quaranta, confirmed by C. J. Praz.

Lecty: Polilectic.

#### Family Megachilidae

##### *Megachile (Eutricharaea) marginata* Smith, 1853 (1♂)

Localities: Bouira, Al Adjiba; Semmache, (36° 20' 36,9" N; 4° 9' 30,3" E, 466 m).

Flight period: June (current study).

Examined material: 1♂, 10/06/2016 in Asteraceae; leg. F. Belkacemi, det. C. J. Praz.

Lecty: Polilectic.

Table 1. List of taxa sampled during the study: N, number of species; NA, number of Apoidea species in Algeria according to [www.discoverlife.org](http://www.discoverlife.org).

Tabla 1. Lista de taxones recolectados durante el estudio: N, número de especies; NA, Número de especies de Apoidea en Argelia según [www.discoverlife.org](http://www.discoverlife.org).

Genera	N	NA	Genera	N	NA
Family Andrenidae			Family Megachilidae		
<i>Andrena</i>	23	158	<i>Osmia</i>	7	45
<i>Panurgus</i>	3	13	<i>Megachile</i>	6	38
Family Colletidae			<i>Chelostoma</i>	1	4
<i>Colletes</i>	1	22	<i>Rhodanthidium</i>	2	3
<i>Hylaeus</i>	10	29	<i>Stelis</i>	1	13
Family Melittidae			Family Apidae		
<i>Melitta</i>	1	2	<i>Anthophora</i>	19	42
Family Halictidae			<i>Tetraloniella</i>	1	5
<i>Halictus</i>	13	15	<i>Xylocopa</i>	3	6
<i>Lasioglossum</i>	29	54	<i>Ceratina</i>	2	12
<i>Nomiapis/Nomia</i>	1	1	<i>Eucera</i>	23	28
<i>Nomioides</i>	6	9	<i>Bombus</i>	2	4
			<i>Nomada</i>	2	65
			<b>Total</b>	<b>156</b>	<b>568</b>

## Discussion

Several studies carried out in Algeria during the 20th century showed that the diversity of Apoidea in this country is high. Among the studies carried out during the last decade, that of Louadi et al. (2008) seems to be the most important in terms of the number of species in the northeast of Algeria. They identified 382 species of wild bees belonging to 55 genera. More recently, Bendifallah et al. (2010) reported the presence of 120 species, listed over five years in four regions in northern Algeria. Bendifallah et al. (2012) noted the presence of 173 taxa in northern Algeria and part of the Sahara in 2012. Our study confirms this by adding new species and data for the mountainous and Saharan regions of eastern Algeria. Altogether, these reports indicate that northern Algeria contains a diversified fauna of bees, possibly related to the geographical position at the temperate–Mediterranean interface. Climate plays an important role in establishing wild bee communities and the Mediterranean climate is known to be favourable to wild bees (Michener, 1979). This region probably has a very high diversity, similar to or greater than that of California (Michener, 1979), but it is relatively little known biologically and taxonomically. This study allowed us to report four new species for Apoidea wildlife in Algeria. These species are *Andrena* (*Chlorandrena*) *taraxaci* Giraud, 1861; *Megachile* (*Eutricharaea*) *minutissima* Radoszkowski, 1876; *Megachile* (*Creightonella*) *albisecta* (Klug, 1817) and *Megachile* (*Eutricharaea*) *marginata* Smith, 1853. All these new records are of bees that are also known from southern Europe, Sicily, Malta and some north African countries, but they have not been recorded previously in Algeria.

The recorded bee fauna is dominated by many palaeartic species, that is to say, recorded in Europe, North Africa and in the western and eastern Mediterranean basins (Balzan et al., 2016, 2017). Based on the present study, the number of Algerien leafcutter bees (Megachilidae) has increased from 37 to 41 species. The diversity of Andrenidae in Algeria is also important. Previous studies that list Andrenidae in Algeria counted 158 species of only the *Andrena* genus (Scheuchl et al., 2011; Cherair et al., 2013; Djouama et al., 2017). After this study, *Andrena taraxaci* was added to the faunistic list of wild bees in Algeria, and became the second *andrena* from *taraxaci*-groupe after *Andrena curtivalvis* (Schwenninger, 2015). This species has a wide distribution in the Palearctic word and extends from central Europe to eastern Europe, being found in Italy (Quaranta et al., 2004), Austria, Czech Republic, Germany, Greece, Hungary, Croatia, Poland, Romania, Serbia, Russia, Slovakia, Sierra Leone, Turkey, and the Ukraine (Schwenninger, 2015). This species has been reported in Tunisia. One specimen was collected by Lanham, Robinson and Solounias in 1976. It is preserved in the Snow Entomological Museum Collection, University of Kansas (Thomas, 2020).

In the mountains of Djurdjura, two species of Megachilidae were captured for the first time in Algeria; *M. albisecta* and *M. marginata*. *M. albisecta* is common in regions with a Mediterranean climate and low temperature such as southern Europe, France, Asia Minor, Turkestan. It has also been recorded in North Africa in Morocco (Ascher, 2020), Serbia (Mudri-Stojnić et al., 2012), Russia, Azerbaijan, Turkey, Cyprus, Syria, Iran, Turkmenistan, Uzbekistan, and Kyrgyzstan. (Fateryga and Popov, 2017). *M. marginata* is frequently observed in the Western Palearctic (Praz, 2017) and Russia (Fateryga et al., 2011), and has also been reported in Tunisia, a country bordering Algeria (Ascher, 2020).

Another new Migachile species, *M. minutissima*, was collected in the Saharan region of Biskra. This species was active during the hottest month of the year in the oasis, in a very dry climate. *Megachile minutissima* has been reported by several researchers in Morocco and Egypt (Ascher, 2020), as well as in arid regions of Middle East (Al Qarni et al., 2014) and in Iraq (Augul, 2018).

The specimens of *Andrena taraxaci* are oligolectic on asteraceae. Djouama et al. (2017) noted that *Andrena* concentrated their floral visits on the two botanical families, Brassicaceae and Asteraceae. Benarfa et al. (2013) only recorded Brassicaceae. The most highly represented botanical family of therophyte in Algeria is Asteraceae. Specimens of Megachilidae from several families, such as Borraginaceae and Apiaceae, have been observed on foraged flowers.

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