

Distribution of the genus *Larinia* in the Maghreb, with the first record of *Larinia chloris* in Algeria (Araneae: Araneidae)

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Abstract. Data on the spider fauna of the Maghreb are incomplete and the available information concerns only some parts of this region. In the present contribution, new distribution data on the genus *Larinia* Simon, 1874 in the Maghreb are given, including the first record of *Larinia chloris* (Audouin, 1826) in Algeria from two wetlands in the northern Sahara. Photos of male palps and female epigynes as well as maps of the known and new records of *Larinia chloris* and *L. lineata* (Lucas, 1846) are presented.

Keywords: North Africa, northern Sahara, species range, spiders, wetlands

Zusammenfassung. Die Verbreitung der Gattung *Larinia* im Maghreb, mit dem Erstnachweis von *Larinia chloris* in Algerien (Araneae: Araneidae). Die Daten zur Spinnenfauna des Maghreb sind unvollständig und die verfügbaren Informationen betreffen nur Teile dieser Region. Es werden neue Funde der Gattung *Larinia* Simon, 1874 im Maghreb vorgestellt, einschließlich des Erstnachweises von *Larinia chloris* (Audouin, 1826) in Algerien, aus zwei Feuchtgebieten in der nördlichen Sahara. Fotos der Palpen und Epigynen sowie Karten der bekannten und neuen Nachweise von *Larinia chloris* und *L. lineata* (Lucas, 1846) werden präsentiert.

The family Araneidae currently comprises 177 genera, and the genus *Larinia* contains 58 species (World Spider Catalog 2019). Thirteen species have been recorded from Africa, but only two of them occur in the Palearctic part: *L. chloris* and *L. lineata*. The male of *L. chloris* was described as *Epeira chloris* by Audouin (1826), in a paper on the spiders of Egypt and Syria. The juvenile female was described much later as *Larinia flavescens* by Simon (1882), in a paper on the spiders of Yemen. The synonymy of the two was discovered by Grasshoff (1970) in an important paper on the classification of the family Araneidae, in which the genus *Larinia* was also well presented. It is important to mention a great similarity of *L. chloris* to *L. phtisica* (L. Koch, 1871), as discussed by Grasshoff (1970, 1973) and Framenau & Scharff (2008), which led to questions about the status of these species. The female of *L. lineata* was described for the first time by Lucas (1846) as *Epeira lineata* from Sétif in his work on the spiders of Algeria. Later, the male was described by Simon (1895).

In the Maghreb, the genus *Larinia* is known only from two species: *L. lineata*, recorded in Algeria (Lucas 1846, Simon 1899, 1929, Grasshoff 1970), Morocco (Simon 1909, 1929, Jocqué 1977) and Tunisia (Pavesi 1880) and *L. chloris* from Libya (Simon 1908, Caporiacco 1936). The aim of this study is to present new localities for the species belonging to the genus *Larinia* in the studied region.

Material and methods

Study area

The study area comprises the whole of the Maghreb (Morocco, Algeria, Tunisia and Libya) and the region of Ghardaïa (Algeria) in particular. This Saharan region is characterized by a hot, arid climate with a mild winter. As an example, the

annual recorded precipitations and mean temperatures during 2017 were 33.79 mm, 22.5 °C for Ghardaïa and 65.28 mm, 22.8 °C for El Menia (Algeria).

Due to the aridity and the scarcity of precipitation in this region, two wetlands are of note: Kef Doukhane, located at 600 km to the south of the capital Algiers, at 390 to 430 m a.s.l. It is a channel in a riverbed of about 22 km length, supplied by treated wastewater from the treatment plant of El Atteuf. It passes different rocky and sandy structures and is characterized by vegetation on the banks, hosting several species of birds, reptiles and other animals (Fig. 1). The other is Sebkhet El Melah Lake, located in the centre of Algeria (30.4166°–30.5333°N and 2.9000°–2.9333°E). This Ramsar wetland (Fig. 2) was described by Alioua et al. (2016).

Abbreviations

CRB: Collection Robert Bosmans

CYA: Collection Youcef Alioua

MNHN: National Museum of Natural History, Paris

Sampling. Material was collected in Morocco, Algeria and Tunisia from 1984 to 2018. Between 2016 and 2018, individuals of *L. chloris* were collected by the first author directly from vegetation around the fresh water basin of Sebkhet El Melah and the Wadi Kef Doukhane. The specimens were preserved in 70% ethanol. A stereomicroscope (Nikon SMA 1270) was used for specimens' examination and a Moticam camera mounted on a Realux microscope and Olympus SZX7 stereomicroscope to take photographs of the spiders. The individuals of *L. lineata* were collected by the second author directly or with a sweep net, between 1984 and 1990 in Algeria, during 1999 in Morocco and in 1985 and 2003 in Tunisia.

Determination. *L. chloris* and *L. lineata* were determined according to the paper of Grasshoff (1970).

Results

Larinia Simon, 1874

Type species: *Epeira lineata* Lucas, 1846

Larinia chloris (Audouin, 1826) (Figs 3–8, 10)

Taxonomic references are cited in World Spider Catalog (2019).

Previous records in the Maghreb. LIBYA: Al Kufrah: El Giof (Caporiacco 1936); Tripoli: Ain Zara (Simon 1908).

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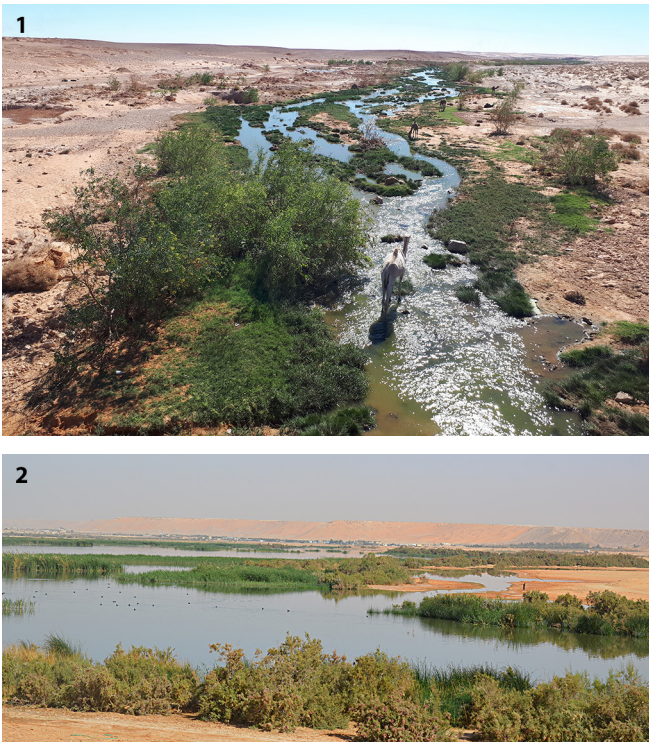
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Figs 1-2: *Larinia chloris* sampling areas: **1.** Kef Doukhane River; **2.** Sebkhet El Melah Lake

New records. ALGERIA: Ghardaïa: El Menia: Sebkhât El Melah Lake (30.5357°N, 2.9174°E), 373 m a.s.l., 1 ♀, low vegetation 25 m from water, 25. Feb. 2016, Sebkhât El Melah Lake (30.5109°N, 2.9269°E), 370 m a.s.l. 1 ♀, 20 m from water, 25. Feb. 2017; Kef Doukhane River (32.4193°N, 3.8841°E), 410 m a.s.l., 8 ♂♂, 2 ♀♀, on vegetation near the river, 14. Oct. 2017, 5 ♀♀, same habitat, 21. Oct. 2017, 4 ♂♂, 5 ♀♀, same habitat, 20. Nov. 2018 (CRB, CYA).

Distribution. Southern and Eastern Mediterranean, sub-Saharan Africa, south of the Arabian Peninsula and Indian subcontinent (World Spider Catalog 2019).

Larinia lineata (Lucas, 1846) (Figs 9, 11)

Taxonomic references are cited in the World Spider Catalog (2019).

Previous records in the Maghreb. ALGERIA: Alger: Basse Mitidja (Simon 1899). Sétif: Sétif (type locality; Lucas, 1846).

Without precise locality (Simon 1929). Without precise locality (Grasshoff 1970).

MOROCCO: Without precise locality (Simon 1929). Essaouira: Essaouira (as Mogador; Simon 1909). Rabat-Salé-Kénitra: Kénitra (Jocqué 1977).

TUNISIA: Medjerda River (as Magerdah; Pavési 1880).

New records. ALGERIA: Alger: Bab Ezzouar University Campus (36.7106°N, 3.17841°E), 14 m a.s.l., 1 ♀, among stones, 1. Dec. 1986, R. Bosmans leg. (CRB). Bejaia: Tichy (36.6667°N, 5.1667°E), 5 m a.s.l., 1 ♂, on herbs in dunes, 21. May 1988, R. Bosmans leg. (CRB). Biskra: Baniane (34.9833°N, 6.0499°E), Gorges de l'Oued El Abiodh, 350 m a.s.l., 1 ♂, on herbs along the river, 3. Nov. 1987, R. Bosmans leg. (CRB). El Bayad: Les Arbaouats (33.0883°N, 0.5781°E), 900 m a.s.l., 1 ♂, on *Phragmites* around a small pool, 20. Jan. 1988, R. Bosmans leg. (CRB). Guelma: Hammam Meskoutine (36.4599°N, 7.2708°E), 410 m a.s.l., 1 ♀, on grasses, 28. Feb. 1990, R. Bosmans leg. (CRB). M'sila: Bou Saada (35.2142°N, 4.1825°E), 560 m a.s.l., 1 ♂, in irrigated garden of hotel, 21. May 1987, R. Bosmans leg. (CRB). Saida: Merdja Maison Forestière (36.1333°N, 3.3167°E), 750 m a.s.l., 1 ♀, on herbs along small rivulet in mixed *Fraxinus*, *Platanus* and *Populus* forest, 4. May 1984, R. Bosmans leg. (CRB). Tlemcen: Col d'Hafir, Oued Tafna (35.2972°N, 1.4683°W), 900 m a.s.l., 1 ♀, sweeping in irrigated orchard, 5. May 1984, R. Bosmans leg. (CRB).

MOROCCO: Marrakech-Safi: Chichaoua (31.5272°N, 8.7628°W), 371 m a.s.l., 1 ♀, 8. Jul. 1999, R. Bosmans leg. (CRB).

TUNISIA: Beja: Oued Zerga (36.6833°N, 9.4166°E), 300 m a.s.l., 1 ♂, on herbs in *Olea* orchard, 12. Sep. 1985, R. Bosmans leg. (CRB). Kairouan: Haffouz E. (35.6667°N, 9.6667°E), 387 m a.s.l., 1 ♀, 27. Jan. 2003, R. Bosmans leg. (CRB).

Distribution. Western Mediterranean (Morocco to Tunisia, Portugal, Spain, France) (World Spider Catalog 2019). In the Maghreb, the species appears to be common in the northern parts.

Distinguishing both species

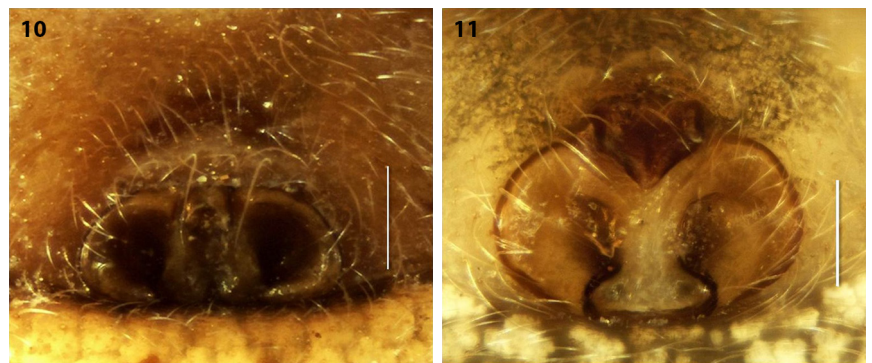
Males can be readily recognised by the structure of their palpal organs. In *Larinia chloris*, the median apophysis ends in two short, pointed processes (Figs 7, 8), which are much longer in *L. lineata* (Fig. 9). Females of *Larinia chloris* are distinguished



Figs 3-5: *Larinia chloris* from Ghardaïa (Algeria): **3.** Male, dorsal view; **4.** Female, dorsal view; **5.** Idem, ventral view. Scale line = 2 mm



Figs 6-9: Male palps of *Larinia* species. **6-8.** *Larinia chloris* from Ghardaïa (Algeria): **6.** retrolateral view; **7.** ventral view; **8.** prolateral view; **9.** *Larinia lineata* from France (Gaymard & Lecigne 2018, Oger 2019), prolateral view. Arrows show the differences in the median apophyses between males of both species. Scale line = 0.5 mm



Figs 10-11: Ventral views of epigynes. **10.** *Larinia chloris*, from Ghardaïa; **11.** *Larinia lineata*, from France (scape broken off) (Gaymard & Lecigne 2018, Oger 2019). Scale line = 0.2 mm

from *L. lineata* by the epigyne being 1.5 times as wide as long in *Larinia chloris* (Fig. 10), and as wide as long in *L. lineata* (Fig. 11). The epigynal scape is often broken off, as in Fig. 10, which does not facilitate identification. Characters useful for separating the two species occurring in the Maghreb are adequately described by Grasshoff (1973), Tikader (1982), Levy (1986) and Kunt et al. (2012).

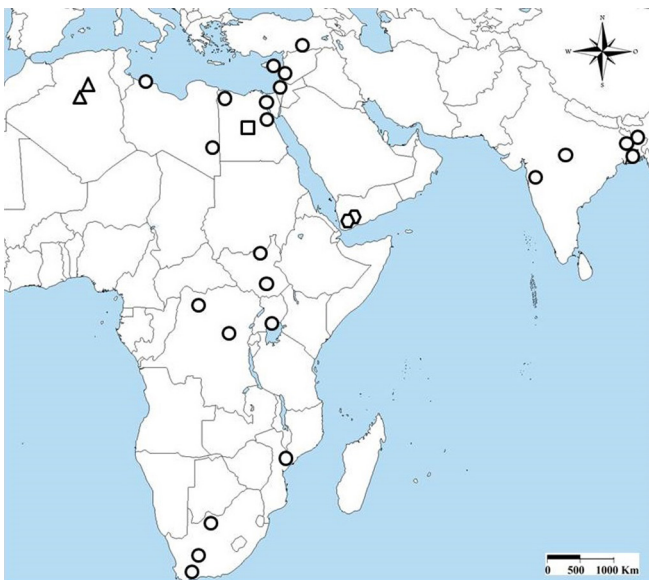


Fig. 12: Map of known and new records of *Larinia chloris* (Circles: previous records, after Cambridge 1876, Pavesi 1895, Simon 1904, 1906, 1908, Caporriacco 1936, Denis 1947, Grasshoff 1970, Tikader 1982, Levy 1986, Dippenaar-Schoeman et al. 2005, Gajbe 2007, Foord et al. 2011, Kunt et al. 2012, Biswas & Raychaudhuri 2012, Dippenaar-Schoeman et al. 2018, Soliman et al. 2018, Bosmans et al. 2019; square: type locality, after Audouin 1826; hexagon: disputable occurrence, after Simon 1882 and Grasshoff 1970; triangles: new records)

Comments

Larinia chloris was captured on low vegetation in Sebkheth El Melah and on leaves of *Nicotiana glauca* Graham, 1826 in Kef Doukhane. It is very rare at the first locality but common on vegetation along the river at the second one. According to Levy (1986), the species is found at humid sites in Israel. Kunt et al. (2012) collected it at a similar locality near the Firat River (Turkey), and Denis (1947) around the Shiata Lake (Libya). Our observations are in accordance with these previously published data, since both our localities are humid. Apparently, *L. chloris* prefers humid and hot areas with dense vegetation providing web support. The new record in Algeria is the most western point of *L. chloris*' known distribution (Fig. 12).

Larinia lineata, on the other hand, was captured at several localities in the more northern parts of Algeria, Morocco and Tunisia (Fig. 13), from the coast to the steppe region. It prefers various habitats in small wetlands along rivulets, springs and even irrigated gardens.

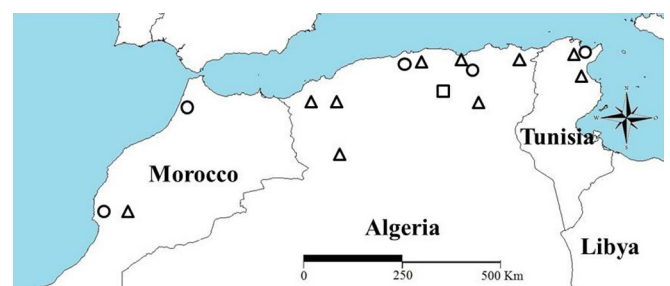


Fig. 13: Map of known and new records of *Larinia lineata* in the Maghreb (circles: previous records, after Pavesi 1880, Simon 1899, 1909, 1929, Grasshoff 1970, Jocqué 1977; square: type locality, after Lucas 1846; triangles: new records)

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