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Pseudoleria pectinata (LOEW, 1872) – a new genus and species of heleomyzid fly introduced into the European fauna (Diptera: Heleomyzidae)

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Original article

WOŹNICA A.J. 2020. *Pseudoleria pectinata* (LOEW, 1872) – a new genus and species of heleomyzid fly introduced into the European fauna (Diptera: Heleomyzidae). *Acta zool. cracov.*, **63**(2): 23-27.

Abstract. One female specimen of *Pseudoleria pectinata* (LOEW, 1872) was identified from photos taken at the Spanish Atlantic coast by Antonio J. PIZARRO MÉNDEZ, an amateur biologist. The species was observed in nature, in Rota, Spain, on 6th December 2019, and after detailed identification process, it was recorded for the first time in Europe. The pictures concerning the *Pseudoleria pectinata* specimen and the diagnostic features are presented. A discussion concerning the utilization of citizen science to help monitor invasive or introduced animals is included.

Key words: Diptera, Heleomyzidae, *Pseudoleria,* distribution, citizen science, new record, Europe, Spain.

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I. INTRODUCTION

Heleomyzidae are rather medium-sized acalyptrate flies with a yellowish, brownish, or rarely blackish body colouration and wing membrane hyaline, sometimes maculate with cross-veins infuscate (mostly *Suillia* ROBINEAU-DESVOIDY 1830 and *Trixoscelis* RONDANI 1856), and with characteristic chaetotaxy and morphology (WOŹNICA & KIRK-SPRIGGS 2021).

Most of them are generally cold-adapted flies, mostly restricted to forested regions of the Northern Hemisphere (SOSZYŃSKA-MAJ & WOŹNICA 2016), except representatives of the subfamily Trixoscelidinae, which are well-adapted to xeric, sandy, and sunny areas (WOŹNICA 2009).

The biology and ecology of Heleomyzidae are rather poorly understood and the little that is known was summarised by SMITH (1989) and ROTHERAY (2019). Recently, some data on the winter activity of European Heleomyzidae were published by SOSZYŃSKA-MAJ & WOŹNICA (2016).

Hitherto, 175 species of Heleomyzidae (in the broad sense of MCALPINE 1985) have been found in Europe. Of these, only one species, *Prosopantrum flavifrons* TONNOIR & MALLOCH 1927, was regarded as an introduced and alien species in Europe, distributed in the Atlantic European area and reported from a few islands only (PAPE et al. 2015), because of its reproduction on human faeces and on carrion (COGAN 1971; PAPP 1999).

Outside Europe, three European species of the genus *Suillia* (*S. gigantea* (MEIGEN, 1830); *S. pallida* (FALLÉN 1820); S. *univittata* (VON ROSER 1840) *sensu* MARTINEK 1972) (The PHEROBASE 2020) are regarded as invasive pests of various mushroom and truffle species, and the latter one as a pest of garlic (*Allium* spp.). One *Tephrochlamys* species, *T. rufiventris* (MEIGEN, 1830) is widely distributed in the Holarctic region and was recently reported in the USA as a pest of a food product, being bred from a form of blue cheese (KIMSEY et al. 2018).

In regards to other Heleomyzidae distributed in the Holarctic Region, among the 12 recognized species of the genus *Pseudoleria* GARRETT, 1921, which are apparently native to North America, two representatives are recorded outside the Northern Hemisphere:

P. pectinata (LOEW, 1872) and *P. placata* (HUTTON, 1901) (see EVENHUIS 2016). Until now, the former species was recorded in the Middle East (UAE) North Africa (Egypt) by VAN DER WEELE (2001), and South Africa (COGAN 1971). Both species were introduced to the Australian Region: Australia and New Zealand (MCALPINE 1984), and can be recognized as species of sanitary importance because most *Pseudoleria* species develop in mammalian and avian burrows and in birds' nests where the larvae feed on various decaying organic matter, especially dung (GARNETT & FOOTE 1967).

II. MATERIAL AND METHODS

Specimens examined: 1♀, three pictures of *Pseudoleria pectinata.* The species described below was photographed in nature using a Nikon D800 with a 105 macro lens and a hand-held flash. The specimen was not captured, so the image presented here serves as representation of the analysed material. The photos were taken on December 6, 2019 on the wall of the patio in the house of Mr. Antonio J. PIZARRO MÉNDEZ in the town of Rota, in the province of Cádiz, in southern Spain. The local climate is mild with very few cold days during the winter only and snow has never been observed there. The temperature was around 12-15 degrees Celsius. Rota is on the coast of the Atlantic Ocean, approximately 200 kilometres from the coast of Africa. A US military base is present in the town area. Morphological terminology follows that used by CUMMING & WOOD (2017) and WOŹNICA (2006). The distribution map was based on the non-commercial template available on: https://www.pngwave.com/png-clip-art-ncymd., using computer graphic techniques (Corel Photo Paint X6).

III. SYSTEMATIC PART

Pseudoleria GARRETT, 1921: 128

Type species: *Blepharoptera pectinata* LOEW, 1872: 99.
Syn. *Pseudoleria pectinerata* GARRETT, 1921: 128.

Generic diagnosis (following GILL & PETERSON 1987). Two pairs of orbital setae. Anterior one very small (ca. 1/6th of the posterior one). Arista long and with minute pubescence only. Mesonotum with 1+3 pairs of dorsocentral bristles. Prosternum and anepisternum bare, one proepimeral bristle, and one or two anepimeral bristles with a few surrounding setulae. The genus *Pseudoleria* is well keyed out in the Manual of Nearctic Diptera (GILL & PETERSON 1987).

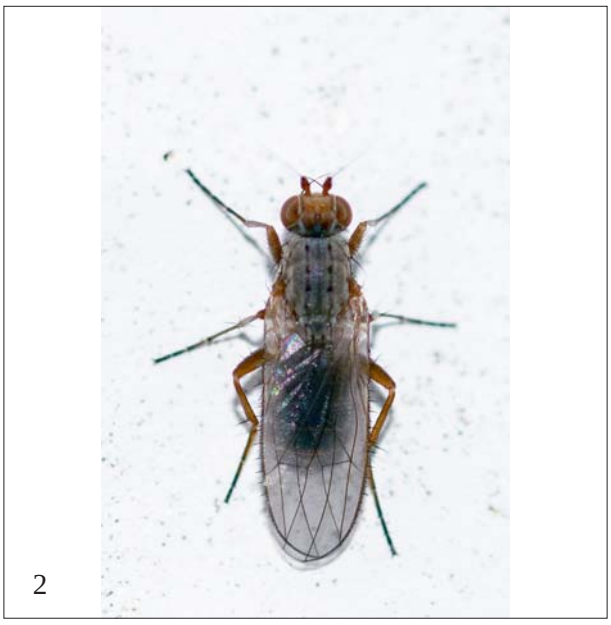
Pseudoleria pectinata (LOEW, 1872)

(Figs 1-2)

Blepharoptera pectinata LOEW, 1872: Berl. Entom. Zeitschr.: 99

Differential diagnosis (based on original unpublished data). Cheek-eye ratio from 0.40 to 0.45. Antenna with scape and pedicel orange-brownish and dark brown to blackish on the first flagellomere. Flag-cheek ratio ca. 0.70. Pronotum and mesonotum greyish. Mesonotum with distinct dark brown median vitta between the dorsocentral setae, the latter placed on dark, brownish-black spots. [In the related species *Pseudoleria placata*, the cheek-eye ratio is ca. 0.60, antenna is orange-brownish in colour, the first flagel-


1


2

Figs 1-2. *Pseudoleria pectinata* (LOEW, 1872), ♀: 1 – lateral view, 2 – dorsal view (photo: A.J. PIZARRO MÉNDEZ).

Fig. 3. Distribution of *Pseudoleria pectinata* in the Old World.

lomere is small, flag-cheek ratio ca. 0.5. Pronotum distinctly paler than the mesonotum disc (yellowish-brown in colour). Bases of dorsocentral setae with small spots only, the median vitta, not well seen]. The characteristics of male and female genitalia of both species are well described and keyed out by MCALPINE (1984) and WOŹNICA (1993).

Distribution: Australia, Egypt, Kingdom of Saudi Arabia (EL-HAWAGRY et al. 2017), New Zealand, North America (Canada and USA, native species), South Africa, the United Arab Emirates (WOŹNICA 2008), and Asiatic Turkey (WOŹNICA & KOCAK 2009). Presently, for the first time recorded in Europe (Spanish mainland).

IV. DISCUSSION

As other dipterans, the Heleomyzidae, including the *Pseudoleria* species, are potential mechanical vectors for etiological agents such as viruses, bacteria, protozoan cysts, and helminths eggs (ROYDEN et al. 2016). It must be remembered that the role of flies in the transmission of many bacterial and viral diseases is still insufficiently understood and the migration routes of the flies are possible transmission routes for many of them. In the present era of the spread of the coronavirus and the Covid-19 pandemic, understanding this role is of particular importance in terms of the observed, and ongoing climate changes, and changes in animal and plant migration (including food and human transportation systems), and spread of insects (especially flies) to new areas of our globe. The fauna of the Heleomyzidae of Spain is one of the best known in Europe thanks to numerous faunistic and taxonomic works published by Miguel CARLES-TOLRÁ (Barcelona, Spain; e.g., CARLES-TOLRÁ & BÁEZ 2002; CARLES-TOLRÁ & GÓMEZ 2016) in the last 40 years, hence it is highly probable that this species appeared there quite recently.

In the era of citizen science, sometimes called social science or online citizen science, research in this area can be conducted to a large extent by amateur (non-professional) scientists. However, this type of research should be put in perspective with the knowledge and data of professional scientists. It should be emphasised that this kind of collaboration will enhance communication between scientists and the general public.

There is a number of popular social media websites, with over 100 million registered users (Wikipedia contributors 2020), where amateur biologists present their observations, including among others Facebook, Instagram, and Twitter. Currently iNaturalist is a very popular citizen science website recording observations providing valuable public data for scientific research projects, organizations, and the general public. Recently the project has been called “a standard-bearer for natural history mobile applications”.

It is not always possible for specialists that often deal with a very specific scope of research, such as aspects related to biological diversity, to capture and analyze such a quick inflow and exchange of information.

In view of the rapid development of digital photography and the exchange of information, it is becoming increasingly desirable to organize and transfer the knowledge gathered using these new tools to specialists. The formation of groups with common interests seem to be underutilized.

In May 2020, the pictures of the analyzed fly specimen were transferred from the iNaturalist website, where they had been stored for a long time, to Facebook, with a request for help to identify the photographed specimen. With broad entomological interests, the author of the present paper has been trying for years to help non-professionals with the identification of photographed insects, especially flies, which sometimes result in the kinds of discoveries as the one presented in this manuscript.

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