



# An annotated checklist of the Crambidae of the region of Murcia (Spain) with new records, distribution and biological data (Lepidoptera: Pyraloidea, Crambidae)

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Academic editor: Shinichi Nakahara

Received: 29 May 2021 | Accepted: 20 Jul 2021 | Published: 03 Aug 2021

Citation: Garre MJ, Girdley J, Guerrero JJ, Rubio RM, Ortiz AS (2021) An annotated checklist of the Crambidae of the region of Murcia (Spain) with new records, distribution and biological data (Lepidoptera: Pyraloidea, Crambidae). Biodiversity Data Journal 9: e69388. <https://doi.org/10.3897/BDJ.9.e69388>

## Abstract

## Background

The Murcia Region (osouth-eastern Iberian Peninsula) has a great diversity of Lepidopteran fauna, as a zoogeographical crossroads and biodiversity hotspot with more than 850 butterflies and moth species recorded.

## New information

In the present paper, based on an examination of museum specimens, published records and new samples, a comprehensive and critical species list of Crambidae moths (Lepidoptera: Pyraloidea) is synthesised. In total, 8 subfamilies, 50 genera and 106 species have been recorded and these are listed along with their collection, literature references and biological data including chorotype, voltinism and the flight period in the study area. The subfamilies are as follows: Acentropinae, Crambinae, Glaphyriinae,

Lathrotelinae, Odontiinae, Pyraustinae, Scopariinae and Spilomelinae. Forty nine species are here newly recorded for the Murcia Region.

## Keywords

Lepidoptera, Crambidae, checklist, chorology, distribution, new records, phenology, Iberian Peninsula

## Introduction

The Crambidae, belonging to the superfamily Pyraloidea, are mainly nocturnal micromoths (Microlepidoptera) with an estimated 10,100 named species worldwide, of which the European fauna is represented by ca. 490 species (Leraut 2012). In the Iberian Peninsula, 256 species have been recorded (Vives-Moreno 2014). The two main evolutionary lineages within Pyraloidea, Pyralidae and Crambidae, are monophyletically distinguished by the morphology of tympanal organs (Slamka 2008, Minet 1982, Minet 1983). Crambidae are characterised by the forewing venation with R5 free and an oval sclerotisation costad on base of vein  $A_{1+2}$ ; presence of a paired tympanal organs situated ventrally in the second abdominal segment with tympanum and conjunctivum at an obtuse angle, tympanal chamber cephalad open and accessory tympana in metathorax; lobulus and praecinctorium are present; male genitalia without uncus arms; and segment A8 of larvae without sclerotised ring around base of seta SD1 (Goater et al. 2005, Slamka 2008).

The Crambidae of Europe have been relatively well studied although there is a need for further investigation on habitus and distribution. The Southern European and especially Iberian species are poorly recorded and more precise data are necessary for the production of distribution maps.

Historically, the first crambid moth recorded and described from Murcia Region was *Anania murcialis* (Ragonot, 1895). Caradja (1910) recorded *Euchromius ramburiellus* (Duponchel) and *Ancylolomia disparalis* (Hübner) and Zerny (1914) recorded *Udea institalis* (Hübner), *U. bipunctalis* (Herrich-Schäffer), *Mecyna trinalis* (Denis & Schiffermüller), *Metasia hymenalis* Guenée, *M. cuencalis* Ragonot, *Chrysoteuchia culmella* (Linnaeus), *Loxostege comptalis* (Freyer), *L. clathralis* (Hübner) and *Ephelis pudicalis* (Duponchel). Subsequently, Caradja (1916) confirmed some of these species and recorded *Pediasia ribbeellus* (Caradja) and *Evergestis desertalis* (Hübner). Bleszyński (1957) firstly recorded *Mesocrambus pallidellus* (Duponchel) and then Bleszyński (1959) also reported *Agriphila trabeatellus* (Herrich-Schäffer).

Later, Agenjo (1952) confirmed and added new records of *Udea ferrugalis* (Hübner), *Dolicharthria bruguieralis* (Duponchel), *Ecpyrrhorhoe diffusalis* (Guenée), *Pyrausta sanguinalis* (Linnaeus), *Ostrinia nubilalis* (Hübner), *Titanio tarraconensis* Leraut & Luquet (cited as *Titanio normalis* (Hübner, 1796)), *Aporodes floralis* (Hübner), *Hyperlais lutosalis* (Mann) and *Loxostege sticticalis* (Linnaeus), while Agenjo (1963) recorded *Ancylolomia*

*tentaculella* (Hübner) and *Pseudoctenella inornata* Staudinger and Agenjo (1974) recorded *Pyrausta purpuralis* (Linnaeus).

Subsequent contributions are those of Derra and Hacker (1982), De Prins (1985), Schouten (1992), Pérez de-Gregorio (2006), Pérez de-Gregorio and Requena (2008), Pérez de-Gregorio and Requena (2010), Palacios and Abad (2010), Slamka (2010), Slamka (2013), Pérez de-Gregorio et al. (2011), Gastón et al. (2015), Leraut (2012) and Fazekas (2017).

The Region of Murcia has a great diversity of Lepidopteran fauna, as a zoogeographical crossroads and biodiversity hotspot, with more than 850 butterfly and moth species (Ortiz et al. 2016, unpublished data). The study area is located in the southeast of the Iberian Peninsula with an area of 11,313 km<sup>2</sup> extending along the eastern end of the Betic Cordilleras, with ca. 27% of its surface corresponding to mountainous reliefs (Los Obispos peak, at 2,017 m a.s.l. as the highest elevation), 38% interior depressions and valleys and the remaining 35% plateaus and coastal plains. This variety of landscapes contributes to a great diversity of Lepidopteran fauna. The Region comprises areas of xeric-mediterranean and desertic climate, with high temperatures and low rainfall, making this territory one of the warmest and driest in Europe.

Temperature and precipitation are climatic factors which have a direct impact on the diversity and distribution of plants and the physiognomy of the plant landscape and are fundamental to the interpretation of the lepidopteran fauna of the Murcia Region.

Considering various bioclimatic approaches relative to temperature (thermotypes) and rainfall (ombrotypes), four different bioclimatic areas can be recognised according to Alcaraz et al. (2008): thermo-, meso-, supra- and oromediterranean (Fig. 1). Climatic and geological interactions differentiate a great variety of habitats as thermoxerophylic on the sunny slopes of the mountains and, on the other hand, as mesophylic in depressions or very dark exposures, in riparian zones amongst halophytic vegetation and on sandbanks and dunes from the inland to the coastal areas along with agricultural crops and anthropophilic areas. Altogether, they make up ten habitats and 47 special terrestrial conservation areas of community importance (Alcaraz et al. 2008).

This present checklist is intended to update the recorded species and to facilitate access to the most recent data on the Crambidae family from the Murcia Region (south-eastern Iberian Peninsula) for taxonomists providing data about distribution, chorology, phenology and voltinism.

## Materials and methods

The list contains all species of Crambidae collected by the authors until the end of 2020, along with the material deposited in the private collections of J.A. de la Calle, F. Lencina, F. Albert and F. Arcas. It also includes all of those records previously referenced in the bibliography.

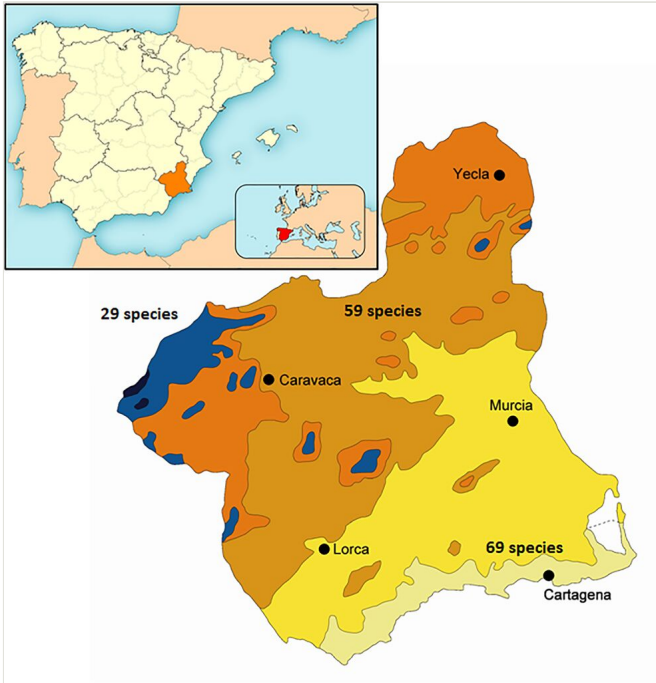


Figure 1. [doi](#)

Map of the known species diversity in the bioclimatic areas in the Murcia Region. Black and blue: Oro- and Supramediterranean; orange and light brown: Cold and mild Mesomediterranean; Yellow and light green: Upper and lower Thermomediterranean.

Black and actinic (6 and 15 W) Heath traps, 125 W Robinson traps, 125 W mercury vapour traps and 4 W LED light traps were used for nocturnal sampling. Catches taken during daytime and in the urban environment (street lighting) are also included. All these sampling points are located within the study area and, especially, in the natural protected areas like the mountainous Parks of Sierra Espuña, Sierra de la Pila, El Valle and Carrascoy, etc. and the coastal Parks of Calblanque, Monte de las Cenizas and Peña del Águila, Salinas and Arenales de San Pedro del Pinatar, etc.

## Notes on the checklist

The subfamilies are systematically ordered and identified, based on the most recent classification of Crambidae by Léger et al. (2020), Slamka (2008) and Vives-Moreno (2014) with minor modifications. The genera and species are listed under their subfamilies and are also ordered systematically, together with collection data (sampling localities, altitude, decimal coordinates, date, number of specimens). In addition, for each species, related references and biological data are provided including chorotype, voltinism and the flight period in the study area indicated by months in Roman numerals. All studied specimens are deposited in the entomological collection in the Zoology Department of Murcia University (Spain) and in the collections of Francisco Lencina, Fernando Albert and

Francisco Arcas. The occurrence data can be accessed at DOI: <https://doi.org/10.15470/kffxc0>

Goater et al. (2005), Slamka (2006), Slamka (2008), Slamka (2013) and Leraut (2012) were consulted to obtain the information on biology, voltinism and geographical distribution of the species, while Calle (1982) and Varga (2010) were consulted for biogeographic criteria.

## **Annotated checklist of Crambidae recorded in the Murcia Region**

### **Family Crambidae**

#### **Subfamily Acentropinae**

##### ***Elophila nymphaeata* (Linnaeus, 1758)**

**Distribution:** Eurasiatic

**Notes:** References: Speidel (1983). Biological data: Bivoltine.

#### **Subfamily Crambinae**

##### ***Chilo phragmitellus* (Hübner, [1810])**

**Distribution:** Eurasiatic

**Notes:** References: Palacios and Abad (2010). Biological data: Bivoltine.

##### ***Chilo luteellus* (Motschulsky, 1866)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Univoltine. Flight period: V-VIII. First record in Murcia Region.

##### ***Pseudobissetia terrestrellus* (Christoph, 1885)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Bivoltine. Flight period: VI. First record in Murcia Region.

##### ***Euchromius ocella* (Haworth, 1811)**

**Distribution:** Cosmopolitan

**Notes:** References: De Prins (1985). Biological data: Bivoltine. Flight period: V-IX.

***Euchromius rayatellus* Amsel, 1949**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Schouten (1992). Biological data: Bivoltine.

***Euchromius gozmanyi* Bleszynski, 1961**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Bivoltine. Flight period: IV-VI, VIII-IX. First record in Murcia Region.

***Euchromius ramburiellus* (Duponchel, 1836)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Caradja (1910), De Prins (1985), Schouten (1992). Biological data: Polyvoltine. Flight period: IV-X.

***Euchromius gratiosella* (Caradja, 1910)**

**Distribution:** Eurasiatic

**Notes:** References: Schouten (1992). Biological data: Bivoltine. Flight period: IV-X.

***Euchromius cambridgei* (Zeller, 1867)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Fazekas (2017). Biological data: Bivoltine. Flight period: VI-X.

***Chrysoteuchia culmella* (Linnaeus, 1758)**

**Distribution:** Palaearctic

**Notes:** References: Zerny (1914). Biological data: Univoltine.

***Angustalius malacellus* (Duponchel, 1836)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Univoltine. Flight period: V. First record in Murcia Region.

***Agriphila tristella* ([Denis & Schiffermüller], 1775)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Bivoltine. Flight period: IX. First record in Murcia Region.

***Agriphila inquinatella* (Denis & Schiffermuller, 1775)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Univoltine. Flight period: VIII. First record in Murcia Region.

***Agriphila trabeatellus* (Herrich-Schäffer, 1848)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Bleszyński (1959). Biological data: Univoltine. Flight period: VIII-X.

***Agriphila cyrenaicellus* (Ragonot, 1887)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Univoltine. Flight period: VIII-X. First record in Murcia Region.

***Agriphila geniculea* (Haworth, [1841])**

**Distribution:** Eurasiatic

**Notes:** References: Fazekas (2017). Biological data: Univoltine. Flight period: IX.

***Catoptria pinella* (Linnaeus, 1758)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Univoltine. Flight period: VIII-IX. First record in Murcia Region.

***Catoptria fulgidella* (Hübner, [1813])**

**Distribution:** Eurasiatic

**Notes:** Biological data: Univoltine. Flight period: IX. First record in Murcia Region.

***Catoptria staudingeri* (Zeller, 1863)**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Univoltine. Flight period: IX. First record in Murcia Region.

***Mesocrambus pallidellus* (Duponchel, 1836)**

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Bleszyński (1957), Derra and Hacker (1982). Biological data: Univoltine. Flight period: VII-IX.

***Mesocrambus salahinellus* (Chrétien, 1917)**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Univoltine. Flight period: VI. First record in Murcia Region.

***Xathocrambus delicatellus* (Zeller, 1863)**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Univoltine. Flight period: VI-IX. First record in Murcia Region.

***Xanthocrambus caducellus* (Muller-Rutz, 1909)**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Univoltine. Flight period: VI. First record in Murcia Region.

***Chrysocrambus sardiniellus* (Turati, 1911)**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Univoltine. Flight period: VI. First record in Murcia Region.

***Pediasia contaminella* (Hübner, 1796)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Bivoltine. Flight period: V-VII. First record in Murcia Region.

***Pediasia ribbeella* (Caradja, 1910)**

**Distribution:** Endemic

**Notes:** References: Caradja (1916). Biological data: Univoltine. Flight period: V.

***Pediasia serraticornis* (Hampson, 1900)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Univoltine. Flight period: X. First record in Murcia Region.

***Ancylolomia palpella* ([Denis & Schiffermüller], 1775)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Univoltine. Flight period: IX-X. First record in Murcia Region.



***Ancylolomia tentaculella* (Hubner, 1796)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Agenjo (1963). Biological data: Univoltine. Flight period: VIII-X.

***Ancylolomia disparalis* (Hübner, 1825)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Caradja (1910), Agenjo (1963). Biological data: Univoltine. Flight period: IX-X.

***Ancylolomia tripolitella* Rebel, 1909**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Univoltine. Flight period: IX-X. First record in Murcia Region.

***Pseudoctenella inornata* Staudinger, 1870**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Agenjo (1963), Pérez de-Gregorio and Requena (2008). Biological data: Univoltine. Flight period: VIII-X.

**Subfamily Glaphyriinae*****Hellula undalis* (Fabricius, 1775)**

**Distribution:** Cosmopolitan

**Notes:** Biological data: Bivoltine. Flight period: I-XII. First record in Murcia Region.

***Evergestis frumentalis* (Linnaeus, [1760])**

**Distribution:** Eurasiatic

**Notes:** Biological data: Bivoltine. Flight period: III-VIII. First record in Murcia Region.

***Evergestis desertalis* (Hübner, 1813)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Caradja (1916), Agenjo (1952), De Prins (1985), Palacios and Abad (2010). Biological data: Bivoltine. Flight period: III-X.

***Evergestis dusmeti* Agenjo, 1955**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Univoltine. Flight period: X-V. First record in Murcia Region.

***Evergestis extimalis* (Scopoli, 1763)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Bivoltine. Flight period: X. First record in Murcia Region.

***Evergestis marionalis* Leraut, 2003**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Bivoltine. Flight period: II, V, IX-X. First record in Murcia Region.

***Evergestis politalis* ([Denis & Schiffermüller], 1775)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Bivoltine. Flight period: IX-X. First record in Murcia Region.

***Evergestis dumerlei* Leraut, 2003**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Univoltine. Flight period: VII-XI. First record in Murcia Region.

***Evergestis mundalis* (Guenée, 1854)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Bivoltine. Flight period: VIII. First record in Murcia Region.

***Evergestis isatidalis* (Duponchel, 1833)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Palacios and Abad (2010). Biological data: Univoltine. Flight period: VIII-IV.

***Hyperlais lutosalis* (Mann, 1862)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Agenjo (1952), Leraut (2012), Gastón et al. (2015). Biological data: Bivoltine. Flight period: V-VII, IX.

**Subfamily Lathrotelinae*****Diploseustis perieresalis* (Walker, 1859)**

**Distribution:** Tropical

**Notes:** Biological data: Polyvoltine. Flight period: X. First record in Murcia Region.

**Subfamily Odontiinae*****Ephelis pudicalis* (Duponchel, [1832])**

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Zerny (1914), Caradja (1916). Biological data: Univoltine. Flight period: V-VI.

***Titanio tarraconensis* Leraut & Luquet, 1983**

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Agenjo (1952), Slamka (2006). Biological data: Bivoltine. Flight period: IV-V.

***Cynaeda dentalis* ([Denis & Schiffermüller], 1775)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Bivoltine. Flight period: VI. First record in Murcia Region.

***Tegostoma comparalis* (Hübner, 1796)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Bivoltine. Flight period: VII. First record in Murcia Region.

***Tegostoma erubescens* (Christoph, 1877)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: De Prins (1985). Biological data: Univoltine. Flight period: VII-IX.

***Aporodes floralis* (Hübner, 1809)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Agenjo (1952). Biological data: Bivoltine. Flight period: V-IX.

## Subfamily Pyraustinae

### ***Loxostege (Loxostege) scutalis* (Hübner, [1813])**

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Slamka (2013). Biological data: Univoltine. Flight period: II-IV.

### ***Loxostege (Loxostege) comptalis* (Freyer, [1848])**

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Zerny (1914), Caradja (1916), Derra and Hacker (1982), Slamka (2013). Biological data: Bivoltine. Flight period: II-VII, IX-X.

### ***Loxostege (Loxostege) clathralis* (Hübner, [1813])**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Zerny (1914). Biological data: Univoltine.

### ***Loxostege (Margaritia) sticticalis* (Linnaeus, [1760])**

**Distribution:** Holarctic

**Notes:** References: Agenjo (1952), Derra and Hacker (1982). Biological data: Bivoltine. Flight period: III-VII, IX-X.

### ***Achyra nudalis* (Hübner, 1796)**

**Distribution:** Tropical

**Notes:** References: Derra and Hacker (1982). Biological data: Bivoltine. Flight period: IV-IX.

### ***Palepicorsia ustrinalis* (Christoph, 1877)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Palacios and Abad (2010). Biological data: Univoltine. Flight period: IV-VIII.

### ***Paracorsia repandalis* ([Denis & Schiffermüller], 1775)**

**Distribution:** Holarctic

**Notes:** Biological data: Bivoltine. Flight period: V-VI, IX-X. First record in Murcia Region.

***Ecpyrrorrhoe diffusalis* (Guenée, 1854)**

**Distribution:** Tropical

**Notes:** References: Agenjo (1952), Pérez de-Gregorio et al. (2011), Slamka (2013).  
Biological data: Polyvoltine. Flight period: II-X.

***Pyrausta (Pyrausta) pellicalis* (Staudinger, 1870)**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Univoltine. Flight period: V-VII. First record in Murcia Region.

***Pyrausta (Pyrausta) sanguinalis* (Linnaeus, 1767)**

**Distribution:** Eurasiatic

**Notes:** References: Agenjo (1952), Palacios and Abad (2010). Biological data:  
Bivoltine. Flight period: II-X.

***Pyrausta (Pyrausta) despicata* (Scopoli, 1763)**

**Distribution:** Holarctic

**Notes:** Biological data: Bivoltine. Flight period: V-X. First record in Murcia Region.

***Pyrausta (Pyrausta) acontialis* (Staudinger, 1859)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Univoltine. Flight period: III-IV. First record in Murcia Region.

***Pyrausta (Pyrausta) aurata* (Scopoli, 1763)**

**Distribution:** Palaearctic

**Notes:** Biological data: Bivoltine. Flight period: VII-VIII, X. First record in Murcia Region.

***Pyrausta (Pyrausta) purpuralis* (Linnaeus, 1758)**

**Distribution:** Eurasiatic

**Notes:** References: Agenjo (1974). Biological data: Bivoltine. Flight period: V.

***Pyrausta (Pyrausta) ostrinalis* (Hubner, 1796)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Bivoltine. Flight period: IV. First record in Murcia Region.

***Pyrausta (Panstegia) limbopunctalis* (Herrich-Schäffer, 1849)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Slamka (2013). Biological data: Univoltine. Flight period: VI-IX.

***Uresiphita gilvata* (Fabricius, 1794)**

**Distribution:** Cosmopolitan

**Notes:** References: Derra and Hacker (1982). Biological data: Bivoltine. Flight period: IV-X.

***Sitochroa palealis* ([Denis & Schiffermüller], 1775)**

**Distribution:** Holarctic

**Notes:** Biological data: Bivoltine. Flight period: II-IV, VI. First record in Murcia Region.

***Euclasta varii* Popescu-Gorj & Constantinescu, 1973**

**Distribution:** Tropical

**Notes:** References: Palacios and Abad (2010). Biological data: Bivoltine. Flight period: IV-VI, VIII-X.

***Ostrinia nubilalis* (Hübner, 1796)**

**Distribution:** Holarctic

**Notes:** References: Agenjo (1952), Slamka (2013). Biological data: Polyvoltine. Flight period: V, IX-X.

***Anania (Anania) verbascalis* ([Denis & Schiffermüller], 1775)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Bivoltine. Flight period: IX. First record in Murcia Region.

***Anania (Ametasia) murcialis* (Ragonot, 1895)**

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Ragonot (1895), Agenjo (1962). Biological data: Bivoltine. Flight period: V-VI, IX.

***Anania (Ebulea) testacealis* (Zeller, 1847)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Derra and Hacker (1982). Biological data: Bivoltine. Flight period: VII.

**Subfamily Scopariinae*****Scoparia pyralella* ([Denis & Schiffermüller], 1775)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Univoltine. Flight period: VII. First record in Murcia Region.

***Scoparia staudingeralis* (Mabille, 1869)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Univoltine. Flight period: IV-VI. First record in Murcia Region.

***Scoparia gallica* Peyerimhoff, 1873**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Univoltine. Flight period: VII. First record in Murcia Region.

***Eudonia mercurella* (Linnaeus, 1758)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Univoltine. Flight period: VII-VIII. First record in Murcia Region.

***Eudonia angustea* (Curtis, 1827)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Bivoltine. Flight period: X-IV. First record in Murcia Region.

***Eudonia lineola* (Curtis, 1827)**

**Distribution:** Atlanto-Mediterranean

**Notes:** Biological data: Bivoltine. Flight period: II-V, VIII, X, XII. First record in Murcia Region.

## Subfamily Spilomelinae

### *Udea ferrugalis* (Hübner, 1796)

**Distribution:** Cosmopolitan

**Notes:** References: Agenjo (1952), Palacios and Abad (2010). Biological data: Bivoltine. Flight period: I-XII

### *Udea institalis* (Hübner, 1819)

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Zerny (1914), Derra and Hacker (1982). Biological data: Univoltine. Flight period: VI-VIII.

### *Udea bipunctalis* (Herrich-Schäffer, 1851)

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Zerny (1914). Biological data: Univoltine. Flight period: VI.

### *Udea numeralis* (Hübner, 1796)

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Derra and Hacker (1982). Biological data: Bivoltine. Flight period: II-XI.

### *Udea simplicella* (La Harpe, 1861)

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Girdley et al. (2021). Biological data: Univoltine. Flight period: IX-X.

### *Mecyna lutealis* (Duponchel, [1833])

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Univoltine. Flight period: V-VII. First record in Murcia Region.

### *Mecyna trinalis* ([Denis & Schiffermüller], 1775)

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Zerny (1914), Caradja (1916), Pérez de-Gregorio (2006), Pérez de-Gregorio et al. (2011). Biological data: Univoltine. Flight period: VI-VII.



***Mecyna auralis* (Peyerimhoff, 1872)**

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Slamka (2010), Slamka (2013). Biological data: Univoltine. Flight period: VI-VIII.

***Mecyna asinalis* (Hübner, 1819)**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Bivoltine. Flight period: I-IV, VIII, X, XII. First record in Murcia Region.

***Diasemiopsis ramburialis* (Duponchel, [1834])**

**Distribution:** Tropical

**Notes:** References: Derra and Hacker (1982). Biological data: Bivoltine. Flight period: VII.

***Duponchelia fovealis* Zeller, 1847**

**Distribution:** Cosmopolitan

**Notes:** References: Slamka (2010). Biological data: Bivoltine. Flight period: IV-X.

***Dolicharthria punctalis* ([Denis & Schiffermüller], 1775)**

**Distribution:** Eurasiatic

**Notes:** Biological data: Bivoltine. Flight period: IV-VII, IX-X. First record in Murcia Region.

***Dolicharthria bruguieralis* (Duponchel, 1833)**

**Distribution:** Tropical

**Notes:** References: Agenjo (1952), Palacios and Abad (2010). Biological data: Bivoltine. Flight period: IV-XI.

***Antigastra catalaunalis* (Duponchel, 1833)**

**Distribution:** Tropical

**Notes:** References: Palacios and Abad (2010). Biological data: Univoltine. Flight period: VII-XI.

***Spoladea recurvalis* (Fabricius, 1775)**

**Distribution:** Cosmopolitan

**Notes:** References: Palacios and Abad (2010). Biological data: Bivoltine. Flight period: VIII-XII.

***Hodebertia testalis* (Fabricius, 1794)**

**Distribution:** Tropical

**Notes:** References: Slamka (2010), Slamka (2013). Biological data: Univoltine. Flight period: VII-XI.

***Palpita vitrealis* (Rossi, 1794)**

**Distribution:** Cosmopolitan

**Notes:** References: Derra and Hacker (1982). Biological data: Polyvoltine. Flight period: I-XII.

***Hydriris ornatalis* (Duponchel, [1832])**

**Distribution:** Cosmopolitan

**Notes:** Biological data: Bivoltine. Flight period: IV-XI. First record in Murcia Region.

***Arnia nervosalis* Guenée, 1849**

**Distribution:** Mediterranean-Asiatic

**Notes:** Biological data: Bivoltine. Flight period: IV- VI, IX-X. First record in Murcia Region.

***Metasia (Metasia) suppandalis* (Hübner, 1823)**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Derra and Hacker (1982), Pérez de-Gregorio and Requena (2010). Biological data: Univoltine. Flight period: V-IX.

***Metasia (Metasia) hymenalis* Guenée, 1854**

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Zerny (1914), Caradja (1916), Agenjo (1952), Derra and Hacker (1982), Slamka (2013). Biological data: Univoltine. Flight period: V-VIII.

***Metasia (Metasia) corsicalis* (Duponchel, [1833])**

**Distribution:** Mediterranean-Asiatic

**Notes:** References: Slamka (2013). Biological data: Univoltine. Flight period: VII-VIII.

***Metasia (Metasia) ibericalis* (Ragonot, 1894)**

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Slamka (2013). Biological data: Univoltine. Flight period: VI-VIII.

***Metasia (Clasperia) cuencalis* Ragonot, 1894**

**Distribution:** Atlanto-Mediterranean

**Notes:** References: Zerny (1914), Palacios and Abad (2010), Slamka (2013). Biological data: Univoltine. Flight period: VI-IX.

***Nomophila noctuella* ([Denis & Schiffermüller], 1775)**

**Distribution:** Cosmopolitan

**Notes:** References: Palacios and Abad (2010). Biological data: Polyvoltine. Flight period: I-XII.

***Herpetogramma licarsisalis* (Walker, 1859)**

**Distribution:** Tropical

**Notes:** Biological data: Univoltine. Flight period: X. First record in Murcia Region.

**Analysis**

The list includes 106 species in 50 genera and 8 subfamilies: Acentropinae (one species), Crambinae (32 species), Glaphyriinae (11 species), Lathrotelinae (one species), Odontiinae (six species), Pyraustinae (23 species), Scopariinae (six species) and Spilomelinae (26 species). Forty nine new records from the Murcia Region are added to its Lepidopteran fauna.

The most species-rich subfamily Crambinae comprises 26% of all genera and 30.2% of all species, while Spilomelinae comprise 30% and 25.5%, followed by Pyraustinae (22% and 21.7%) and Glaphyriinae (2% and 10.3%), respectively (Table 1). The remaining subfamilies collectively constitute 18% and 13.2% of all genera and species known from the Murcia Region, respectively (10% and 5.7% for Odontiinae, 4% and 5.7% for Scopariinae and 2% and 0.9% for Acentropinae and Lathrotelinae, respectively; Table 1).

Table 1.

Numbers and percentages of known genera and species recorded for each subfamily in Murcia Region.

Subfamilies	Genus richness	% Genus	Species richness	% Species
Crambinae	13	26	32	30.2
Spilomelinae	14	30	26	25.5
Pyraustinae	11	22	23	21.7
Glaphyriinae	3	2	11	10.3
Odontiinae	5	10	6	5.7
Scopariinae	2	4	6	5.7
Acentropinae	1	2	1	0.9
Lathrotelinae	1	2	1	0.9
<b>Total</b>	<b>50</b>	<b>100</b>	<b>106</b>	<b>100</b>

The European family of Crambidae consists of ca. 90 species (Leraut 2012), whilst the Iberian Crambidae fauna comprises 256 extant species (Vives-Moreno 2014). Thus, to date, the number of species known from the Murcia Region accounts for approximately 21.63% of the European total and 41.41% of the Iberian species.

Known Crambidae diversity in the Murcia Region seem relatively rich when compared to those in other Iberian Regions and with the whole of the Iberian Peninsula, as for instance, nearby areas like the Natural Park of Cabo de Gata-Nijar in Almeria (51 species; Garre et al. 2018) or more extensive Iberian Regions, such as Catalonia (186 species; in Dantart 2019) and Aragon (181 species; Redondo et al. 2017). This may be because intensive surveys have started only recently or because the biodiversity is greater closer to the temperate areas.

Knowledge on Crambidae diversity in Murcia Region is still incomplete, but is probably even more limited in nearby Regions, with less than 65 species recorded in littoral wetlands in Catalonia (Pérez de-Gregorio 2001), coastal wetlands and saltmarshes in Huelva (Huertas 2007) and the mountainous area of Ports de Tortosa-Beseit (Pérez de-Gregorio 2008).

The most species-rich Crambidae genera in the Murcia Region are *Evergestis* (9 species, 8.49%), *Pyrausta* (8 species, 7.55%), *Euchromius* (6 species, 5.66%), *Metasia*, *Udea* and *Agriphila* (5 species, 4.72%) and *Ancylolomia*, *Mecyna* and *Loxostege* (4 species, 3.77% each, respectively). The majority of genera (10) are species-poor (2-3 species) or known in the Murcia Region from a single species (31 genera).

Species richness varies substantially amongst the different bioclimatic areas of the Murcia Region (Fig. 1). The Thermomediterranean area has the most diverse Crambidae fauna with 69 species recorded, followed by the Mesomediterranean area with 59 species, while the Supra- and Oromediterranean areas appear to be less diverse with 29 species

(Table 2). In each of these areas, 29 species are unique in the Thermo-, 12 in Meso- and 9 in Supra- and Oromediterranean areas, while 38 species were recorded in two areas and 10 in the three studied areas.

Table 2. List of unique species in each bioclimatic area or in more than one bioclimatic area.	
Oro- and Supramediterranean	<i>Agriphila inquinatella</i> (Denis & Schiffermuller, 1775)
	<i>Chrysocrambus sardiniellus</i> (Turati, 1911)
	<i>Xanthocrambus caducellus</i> (Muller-Rutz, 1909)
	<i>Evergestis mundalis</i> (Guenée, 1854)
	<i>Pyrausta ostrinalis</i> (Hubner, 1796)
	<i>Scoparia gallica</i> Peyerimhoff, 1873
	<i>Scoparia pyralella</i> ([Denis & Schiffermüller], 1775)
	<i>Mecyna lutealis</i> (Duponchel, [1833])
	<i>Udea bipunctalis</i> (Herrich-Schäffer, 1851)
Mesomediterranean	<i>Agriphila geniculea</i> (Haworth, [1841])
	<i>Agriphila tristella</i> ([Denis & Schiffermüller], 1775)
	<i>Ancylolomia palpella</i> ([Denis & Schiffermüller], 1775)
	<i>Angustalius malacellus</i> (Duponchel, 1836)
	<i>Catoptria fulgidella</i> (Hübner, [1813])
	<i>Catoptria pinella</i> (Linnaeus, 1758)
	<i>Catoptria staudingeri</i> (Zeller, 1863)
	<i>Tegostoma comparalis</i> (Hübner, 1796)
	<i>Pyrausta acontialis</i> (Staudinger, 1859)
	<i>Diasemiopsis ramburialis</i> (Duponchel, [1834])
	<i>Metasia hymenalis</i> Guenée, 1854
	<i>Udea institalis</i> (Hübner, 1819)
Thermomediterranean	<i>Ancylolomia disparalis</i> (Hübner, 1825)
	<i>Chilo luteella</i> (Motschulsky, 1866)
	<i>Euchromius cambridgei</i> (Zeller, 1867)
	<i>Euchromius gozmanyi</i> Bleszynski, 1961
	<i>Euchromius gratiosella</i> (Caradja, 1910)

	<i>Euchromius ocella</i> (Haworth, 1811)
	<i>Mesocrambus salahinellus</i> (Chrétien, 1917)
	<i>Pediasia ribbeella</i> (Caradja, 1910)
	<i>Pediasia serraticornis</i> (Hampson, 1900)
	<i>Pseudobissetia terrestrellus</i> (Christoph, 1885)
	<i>Pseudoctenella inornata</i> Staudinger, 1870
	<i>Hyperlais lutosalis</i> (Mann, 1862)
	<i>Evergestis extimalis</i> (Scopoli, 1763)
	<i>Evergestis politalis</i> ([Denis & Schiffermüller], 1775)
	<i>Cynaeda dentalis</i> ([Denis & Schiffermüller], 1775)
	<i>Tegostoma erubescens</i> (Christoph, 1877)
	<i>Anania murcialis</i> (Ragonot, 1895)
	<i>Anania verbascalis</i> ([Denis & Schiffermüller], 1775)
	<i>Euclasta varii</i> Popescu-Gorj & Constantinescu, 1973
	<i>Loxostege scutalis</i> (Hübner, [1813])
	<i>Pyrausta</i> ( <i>Pyrausta</i> ) <i>aurata</i> (Scopoli, 1763)
	<i>Sitochroa palealis</i> ([Denis & Schiffermüller], 1775)
	<i>Arnia nervosalis</i> Guenée, 1850
	<i>Diplopseustis perieresalis</i> (Walker, 1859)
	<i>Duponchelia fovealis</i> Zeller, 1850
	<i>Herpetogramma licarsisalis</i> (Walker, 1859)
	<i>Metasia corsicalis</i> (Duponchel, [1833])
	<i>Spoladea recurvalis</i> (Fabricius, 1775)
	<i>Udea simplicella</i> (La Harpe, 1861)
Oro-, Supra- and Mesomediterranean	<i>Ephelis pudicalis</i> (Duponchel, [1832])
	<i>Paracorsia repandalis</i> ([Denis & Schiffermüller], 1775)
	<i>Pyrausta limbopunctalis</i> (Herrich-Schäffer, 1849)
	<i>Pyrausta pellicalis</i> (Staudinger, 1870)
	<i>Scoparia staudingeralis</i> (Mabille, 1869)
	<i>Mecyna auralis</i> (Peyerimhoff, 1872)
	<i>Mecyna trinalis</i> ([Denis & Schiffermüller], 1775)

	<i>Metasia cuencalis</i> Ragonot, 1894
Meso- and Thermomediterranean	<i>Agriphila cyrenaicellus</i> (Ragonot, 1887)
	<i>Ancylolomia tentaculella</i> (Hubner, 1796)
	<i>Ancylolomia tripolitella</i> Rebel, 1909
	<i>Euchromius ramburiellus</i> (Duponchel, 1836)
	<i>Mesocrambus pallidellus</i> (Duponchel, 1836)
	<i>Pediasia contaminella</i> (Hübner, 1796)
	<i>Evergestis desertalis</i> (Hübner, 1813)
	<i>Evergestis dusmeti</i> Agenjo, 1960
	<i>Evergestis frumentalis</i> (Linnaeus, [1760])
	<i>Evergestis isatidalis</i> (Duponchel, 1833)
	<i>Evergestis marionalis</i> Leraut, 2003
	<i>Aporodes floralis</i> (Hübner, 1809)
	<i>Achyra nudalis</i> (Hübner, 1796)
	<i>Loxostege comptalis</i> (Freyer, [1848])
	<i>Loxostege sticticalis</i> (Linnaeus, [1760])
	<i>Ostrinia nubilalis</i> (Hübner, 1796)
	<i>Palepicorsia ustrinalis</i> (Christoph, 1877)
	<i>Eudonia angustea</i> (Curtis, 1827)
	<i>Eudonia lineola</i> (Curtis, 1827)
	<i>Dolicharthria bruguieralis</i> (Duponchel, 1833)
	<i>Dolicharthria punctalis</i> ([Denis & Schiffermüller], 1775)
	<i>Hodebertia testalis</i> (Fabricius, 1794)
	<i>Hydriris ornatalis</i> (Duponchel, [1832])
	<i>Mecyna asinalis</i> (Hübner, 1819)
	<i>Metasia ibericalis</i> (Ragonot, 1894)
	<i>Metasia suppandalis</i> (Hübner, 1823)
	<i>Nomophila noctuella</i> ([Denis & Schiffermüller], 1775)
	<i>Palpita vitrealis</i> (Rossi, 1794)
Oro- and Supra- and Thermomediterranean	<i>Agriphila trabeatellus</i> (Herrich-Schäffer, 1848)
	<i>Antigastra catalaunalis</i> (Duponchel, 1833)

All areas	<i>Xathocrambus delicatellus</i> (Zeller, 1863)
	<i>Evergestis dumerlei</i> Leraut, 2003
	<i>Hellula undalis</i> (Fabricius, 1775)
	<i>Ecpyrhorrhoe diffusalis</i> (Guenée, 1854)
	<i>Pyrausta despicata</i> (Scopoli, 1763)
	<i>Pyrausta sanguinalis</i> (Linnaeus, 1767)
	<i>Uresiphita gilvata</i> (Fabricius, 1794)
	<i>Eudonia mercurella</i> (Linnaeus, 1758)
	<i>Udea ferrugalis</i> (Hübner, 1796)
	<i>Udea numeralis</i> (Hübner, 1796)

Approximately half of the species can be considered specialists in a given bioclimatic area, while the other 50% can be considered as opportunists of different types of vegetation that characterise each of the bioclimatic areas. The detailed data for the bioclimatic areas of Crambidae in the Murcia Region are summarised in Table 2.

Chorological analysis for the family Crambidae in the Region of Murcia showed that the Mediterranean chorotype, including the endemic *Pediasia ribbeellus* (Caradja), is the most abundant with 56.6% of the total, which is consistent with the geographical position of the study area. Amongst these, the Asiatic-Mediterranean elements (34.9%) are more frequent than the Atlanto-Mediterranean elements (21.7%). On the other hand, the elements of wide distribution, such as the Eurasiatic, Holarctic and Palaearctic (26.4%), are the most common in the mountainous biotopes of the centre and north of the study area, while the tropical and cosmopolitan species (17.0%) have their origin mainly in Africa. The presence of opportunistic species is due to the agricultural crop fields that dominate a part of the Murcian territory.

Regarding the biology of the species, the environmental conditions of the study area, which affect the availability of trophic resources for reproduction, suggest that most of the species are bivoltins (47.2%) and univoltins (47.2%), while the rest are polyvoltins (5.7%). Most of the recorded species feed on plant species belonging to the Brassicaceae, Asteraceae, Lamiaceae, Chenopodiaceae, Scrophulariaceae and Amaranthaceae families, amongst others, although the species of the Crambinae subfamily feed on grasses (Poaceae). The most particular cases are those related to the genus *Eudonia* which feed on lichens and the species *Euchromius ocella*, *E. cambridgei* and *Dolicharthria bruguieralis* which feed on plant detritus. Some species, such as *Palpita vitrealis*, *Ostrinia nubilalis* and *Nomophila noctuella*, must be controlled since they are agricultural crop pests. Finally, the host plants of 34.0% of species are unknown, so it will be necessary to carry out complementary studies to further biological understanding.



## Discussion

Prior to our investigation, the number of known Crambidae moth species in the Murcia Region was 56. Our study increases this number to a total of 106, based on an examination of museum specimens, published records and sampled individuals, 41.41% of all of the Iberian species known. This study presents an updated checklist of current Crambidae moth species with their distribution and biological information for the Murcia Region in the south-eastern Iberian Peninsula.

This study serves as both a guide for collection in the poorly sampled south-western European continent and a comprehensive reference list with the Crambidae taxa and localities where conservation is an important priority for policy-makers, conservation planners and for the management of insect diversity in Spain.

We encourage lepidopterists holding additional data on systematically collected crambids to produce an updated dataset. Additionally, new intensive surveys in adjacent regions are being conducted, as well as unknown specimens being continuously identified to species level.

## Acknowledgements

Thanks are due to José A. de la Calle, Francisco Lencina, Fernando Albert and Francisco Arcas for allowing access to their personal collections, to Richard Mally from Czech University of Life Sciences in Prague for his comments and suggestion, while Claire Ward improved the manuscript linguistically. We are very grateful for this collegial and kind support. This study has been supported by the Regional Excellence 19908-GERM-15 project of the Fundación Séneca (Regional Government of Murcia, Spain). Collecting permits were issued by Environmental Authority of Murcia Region.

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