New records of Tineidae from the Maltese Islands including description of a new species *Eudarcia melitensis* sp. n. (Lepidoptera)

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ABSTRACT. A new species of Tineidae, *Eudarcia melitensis* sp. n. is described from Malta. Ovum, larva, larval case, male and female genitalia and biology of the species are described and illustrated. Four species, *Eudarcia derrai*, *Proterospastis autochthones*, *Phereoeca lodli* and *Tinea messalina* are recorded for the first time from the Maltese islands. *E. derrai* is redescribed including description of larva, larval case, female genitalia and habitat. Eight previously recorded species from Malta are also confirmed.

KEY WORDS. Lepidoptera, Tineidae, *Eudarcia melitensis* sp. n., new records, Malta.

INTRODUCTION

The family Tineidae is represented in Europe by a total of 278 species in 52 genera (Gaedike, recent investigation, unpublished data). In Malta, the group is represented by 25 species (Sammut, 2000) accommodated in 14 genera. The present work adds five species to the Maltese list, of which two are accommodated in two genera previously unrecorded from Malta.

Adults of Tineidae in Europe range from 5 mm to 50 mm in wingspan. The majority of the species construct portable cases in the larval stage where they also pupate. They feed on almost anything, from lichens, fungi, algae, seeds, dried fruits and stored vegetable foodstuffs to animal products like hair, feathers, wool and skins and because of such feeding habits, many are regarded as pests (Parenti, 2000).

The first author had the opportunity to study some tineids, collected by the second author in the past. The material contains some species which have hitherto not been recorded from Malta, together with a species which is also new to Europe, and a species which is new to science, and which will be described in the present work.

MATERIAL AND METHODS

Colour photos of set specimens were taken using a JVC digital camera KY-F75U mounted on a Leica dissection microscope with objective Z6 APO. The drawings of the genitalia by the first author where done using Askania RME 5 compound microscope. The drawings of the larvae and cases where done using a dissecting microscope (Optica Lab 2) with drawing attachment, by the second author and also the colour photos of the *Eudarcia* species in situ were taken using a digital camera (Optikam USB).

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The holotype and some paratypes of the new species, described below, and the other studied specimens are deposited in the Lepidoptera collection of the SDEI (Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany). The remaining paratypes are deposited in the private collections of the authors.

In the species list, species marked with an asterisk (*) represent new records for Malta.

SPECIES LIST

Eudarcia melitensis sp. n.

Material examined. Holotype ♂, "MALTA, Mosta Valley, ex pupa, 5.iii.2007, leg. M. Zerafa;" "Holotypus ♂, *Eudarcia melitensis* sp. n., det. R. Gaedike 2010;" (SDEI). Paratypes: 1 ♂, same location, but 18.iii.2007, ex pupa; 13 ♂♂, 13 ♀♀, Mosta, Wied il-Għasel, ex larva, 2-7.iii.2010; 1 ♀, same locality, ex larva, 19.iv.2010; 1 ♂, Wied il-Għasel, ex larva, 10.iv.2009; 1 ♀, same location, ex larva, but 10.iv.2009; 1 ♂, 1 ♀, same location, ex larva, but 6/9.vi.2009; 1 ♂, Buskett, ex larva, 13.iii.2009; 1 ♀, same location, ex larva, but 19.iv.2010; all specimens leg. M. Zerafa; in coll. M. Zerafa and in SDEI.

Description. Male: (Fig. 1a,b) Wingspan 5 mm; head brush light creamy, nearly white, antenna ca. 1.3 times longer than forewing, scapus with same coloration as head brush, flagellum light creamy-dark brown ringed, palpi nearly white; thorax and tegulae nearly white; forewing dark brown with nearly white pattern: white at base, a strip at ⅓ from costa to dorsum, broadest at dorsum, two patches on costa by ⅔ and before apex, one patch at dorsum at ¾ and fringes; hindwing narrow, pointed to apex, white. **Female**: (Fig. 1c) Micropterous, wingspan 3 mm; coloration same as male, on forewing more whitish parts than dark brown. **Male genitalia** (Figs 1d-h): Tegumen broad, uncus truncated, saccus nearly triangular, blunt pointed; valva as long as uncus, basally broad, to apex narrower, costal edge convex, ventral edge concave, blunt pointed, second half with some bristles; phallus somewhat longer than valva, narrow, apically light curved, with pointed tip, one or two very small cornuti. **Female genitalia** (Fig. 1i): Proximal apophyses forked, dorsal arm longer than ventral arm; ostium with U-shaped sclerotization, basally broad, the two arms narrower, with pointed tip; area around ostium and apically ostium with fine longitudinal sclerotizations. **Ovum**: Oval, app. 0.4 mm in diameter. Eggshell soft, smooth and without markings. Colour orange to strong yellow, with a velvet sheen when freshly laid. **Larva** (Figs 1j, k): 2.3 - 3.5 mm long and 0.7 - 1.1 mm in diameter (n=3). Body colour dark yellow. Head light brown, thoracic segments pale yellow with a scutellum on each segment. Scutellum on first thoracic segment light brown in colour. Black apodeme at back of head visible through the first scutellum. Thoracic legs light brown. Two long setae directed forward, one on each side of the first scutellum. Length of setae twice head diameter. Shorter setae on thoracic segments and last abdominal segment. Minute setae on the first nine abdominal segments. Subanal plate light brown. Abdominal legs reduced, with well developed crotchets arranged in an oval shape. Anal claspers reduced with crotchets arranged in a straight line. Ventral side of labrum with three pairs of setae. **Case** (Fig. 1l): 3.8 - 5.2 mm long, 1.2 - 1.7 mm wide and 0.9 - 1.2 mm at the highest point laterally (n=8). Oval in shape, dorsally convex and ventrally flattened. Tapering at each end then slightly widening into a rounded valve. Upper lip of valve slightly longer than lower lip and meets rock face when larva is at rest. Lower lip closes against upper lip. Constructed of silk covered with fine soil and sand particles. Inside finished smoothly with silk. **Exuvia**: light brown in colour and very thin. Collapses after imago emerges.

Biology and life cycle. Oviposition occurs around March and April. Eggs laid between the 14th and 16th of March 2010 hatched on the 13th of April 2010. The first action the young larvae take is to construct a case out of very fine dust and sand particles. The case is enlarged as often as required during the development of the larva. This is done by cutting open the case from the flattened side and adding new pieces of dust, sand and soil particles. These are attached together by silk, and completely covered on the inside. This construction is evident when different coloured particles are used. The larvae feed on green algae which grow along with lichens on shaded rocks. Around February, when larvae are fully grown they start seeking crevices and cracks where they attach one end of the case firmly to the rock face. Sometimes they bury half of the case in the soil found in these cracks. Adults emerge generally in the late afternoons and evenings. Mating takes place in the evening. Two pairs where observed mating; copulation lasted 1 hour 29 minutes and 1 hour 10 minutes respectively. After approximately 20 - 25 minutes the female starts wandering on the rocks at the lower parts and sheltered areas, searching crevices and small holes into which it deposits a number of eggs. In one crevice 18 eggs were counted. This is repeated a few times mostly in the same area. Larval cases of this species have been collected from 'Wied il-Għasel', 'Buskett' and Naxxar Gap. They are normally found attached on rocky outcrops in valley sides and in a more sunny condition than *E. derrai*.

Etymology. Named after the latin name of the island of Malta: *Melita*.

Remarks. The new species is superficially similar to *E. atlantica* (Henderickx, 1995) (also with micropterous females), but antennae of male are shorter and the head brush is light brown. Clear differences are visible in the structure of the genitalia: male genitalia without any anellus-like structure, female genitalia with characteristic U-shaped sclerotization. There are two other species with micropterous females, but they belong to the subgenus *Meessia* (*brachyptera* Passerin d'Entrèves, 1974 and *palanfreella* Baldizzone & Gaedike, 2004).

Eudarcia derrai* (Gaedike, 1983)

Material examined. MALTA: Mosta, Wied il-Għasel, 6.ii.2009/21 and 29.iv.2009, 1 ♂, 2 ♀♀, ex larva, 1 ♀, ex larva, same location but 25.iv.2010; Buskett, 2.iii.2007, 2 ♂♂, 1 ♀, ex pupa, 2 ♀♀, ex larva, same location but 29.iv/22.v.2009, 1 ♂, ex larva, same location but 4.iv.2010; Ħad Dingli, 27.iii.2009, 1 ♀, ex larva, 2 ♂♂, ex pupa, same location but 24/27. ii.2010; Mellieħa, 16.vi.2008, 1 ♂, at rest; Naxxar Gap, 15/16.iv.2010, 3 ♂♂, ex larva. All material was collected or reared by M. Zerafa.

Note. This species was to-date known only from the type material collected from Bacu Trotu Ortuabis in Sardinia (Italy). Due to the fact that the material collected from Malta contains females and represents fresh and well preserved specimens, the species is here under redescribed in more details following its original description (Gaedike, 1983).

Redescription. Adult: Wingspan 7 mm. Male (Fig. 2a, b): head brush light grey-brown, palpi whitish; thorax grey-brown, tegulae basally darker; forewing dark brown, with two white strips at 1/3 and 2/3, the second strip narrower than the first one, overlaid with dark brown scales, at costa, before apex a smaller white patch, fringe dark brown, with whitish tip; hindwing light grey. Female (Figs 2c, d): head brush from neck to insertion of antennae and below palpi nearly black, in the middle creamy; thorax nearly black, forewing with same coloration, at 1/3 a whitish strip, the strip at 2/3 interrupted at the cell into two whitish patches. **Female genitalia** (Fig. 2e): Proximal apophyses forked, dorsal arms much longer than ventral arms, curved; no ostium sclerotization.

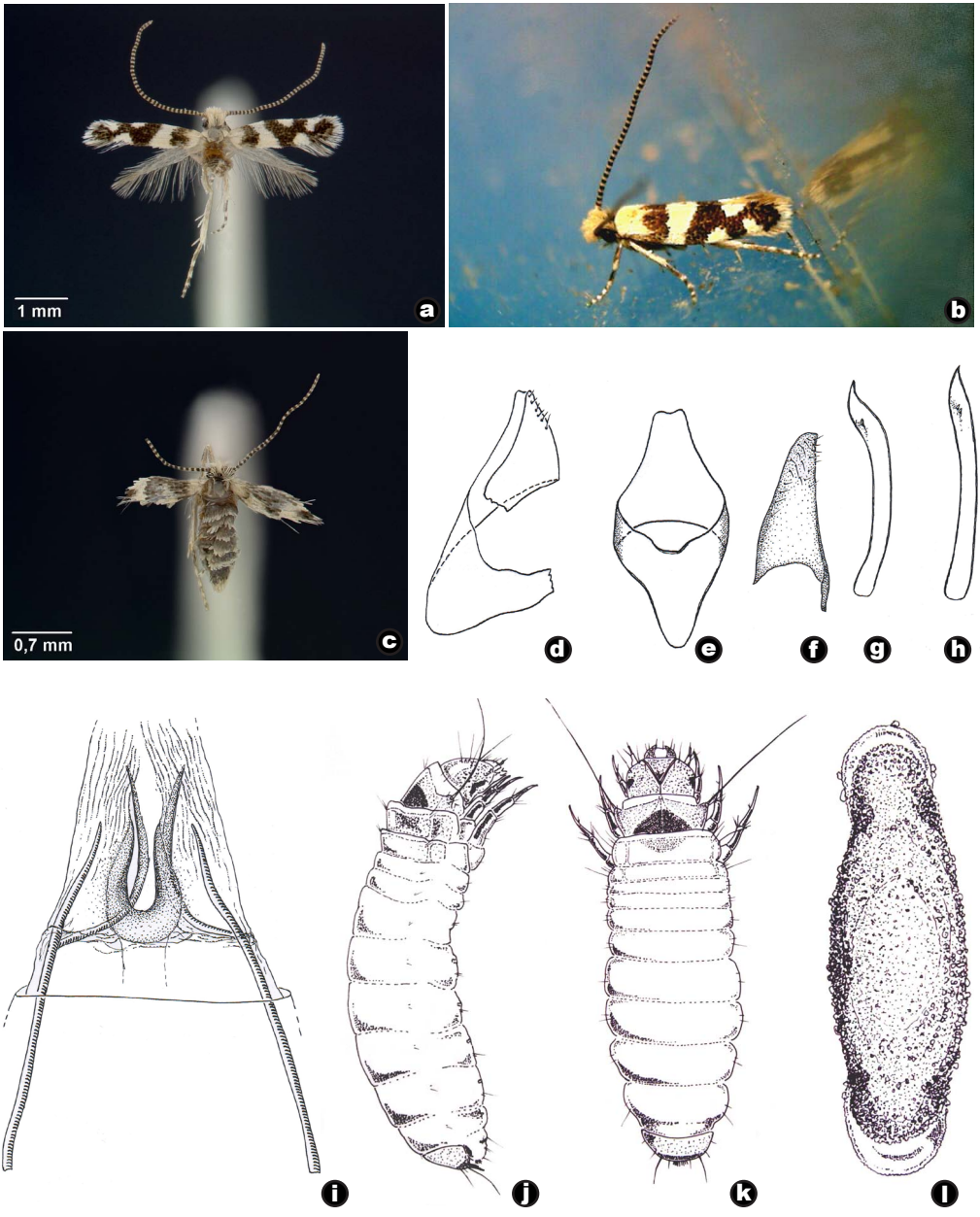

Figure 1: *Eudarcia melitensis* sp. n. **a**, **b**, male; **c**, female; **d – h**, male genetalia, uncus tegument (**d**, lateral view, **e,** ventral view), **f**, valva, **g**, **h**, phallus with variability; **i**, female genitalia; **j**, last instar larva, lateral view; **k**, last instar larva, dorsal view; **l**, larval case, ventral view.

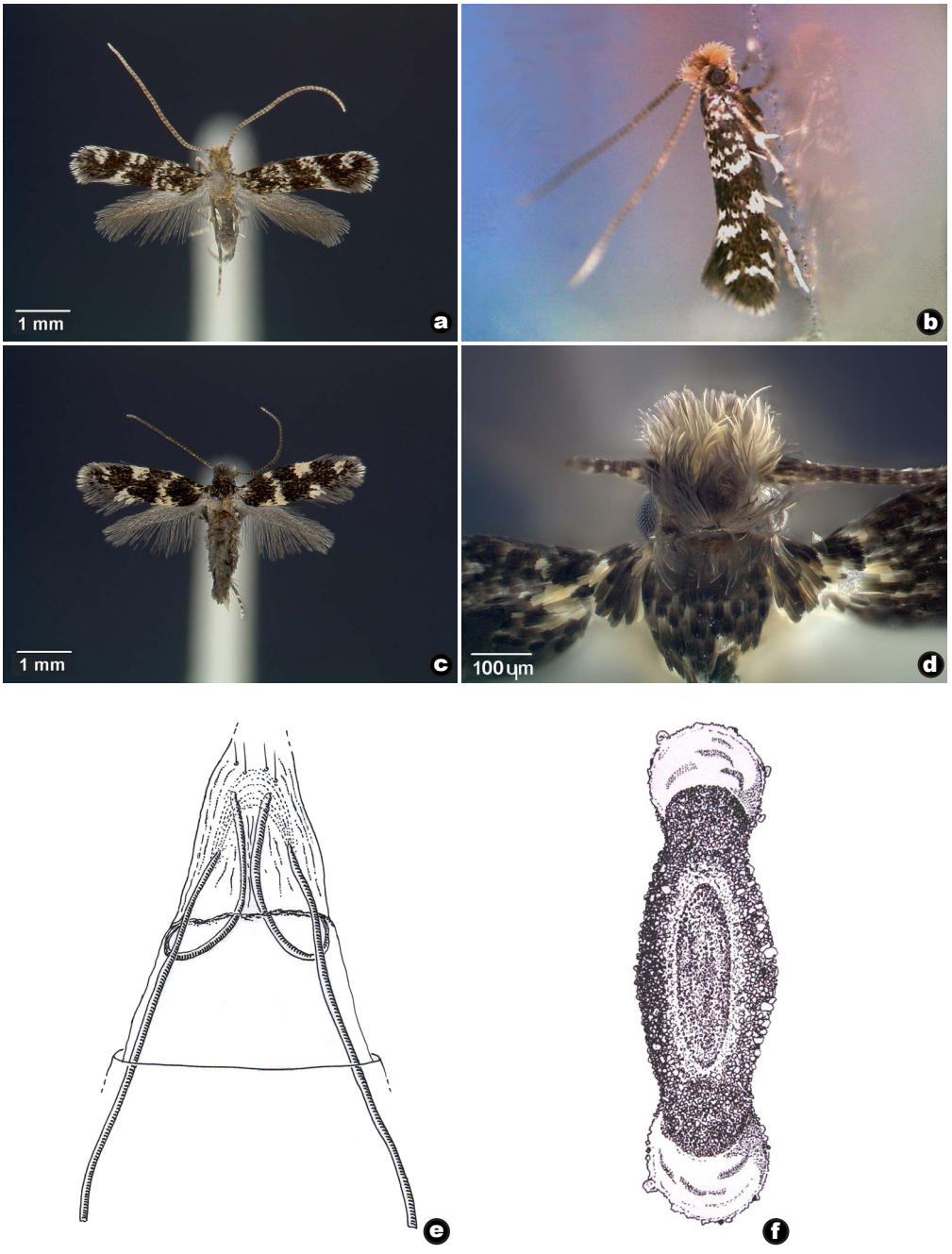

Figure 2: *Eudarcia derrai*. **a**,**b**, male; **c**, female; **d**, female head detail; **e**, female genetalia; **f**, larval case, ventral view.

Larva: 3.2 - 5.1 mm long and 1.1 - 1.2 mm in diameter (n=2). Body colour yellow. Head light brown in colour, thoracic segments and anal segment whitish. Scutellum on each thoracic segment, translucent. Thoracic legs light brown. Brown apodeme at back of head well visible through the first scutellum. Two long setae directed forward, one on each side of the first scutellum. Length of setae twice head diameter. Shorter setae on sides of thoracic segments, length 3/4 head diameter. Short setae on anal segment. Minute setae on the first nine abdominal segments. Abdominal legs reduced, with well developed crotchets arranged in an oval shape. Anal claspers reduced with crotchets arranged in a straight line. Suranal plate translucent. **Case** (Fig. 2f): 5.5 - 8.1 mm long, 1.8 - 2.7 mm wide and 1.1 - 1.3 mm at the highest point (n=5). Elongated, dorsally convex and ventrally flat. It tapers slightly at each end then widens into a rounded valve. Upper lip of valve longer than lower lip, and convex inside. Lower lip flattened and closes against upper lip tightly. The upper lip meets the rock face when the larva is at rest. Constructed of silk covered with particles of soil and sand. Larger particles are used at the outer edges. Inside finished smoothly with silk. **Exuvia**: light brown in colour; collapses after emerging because very thin; left half way out of case.

Life history. Larvae have been collected in December, January and early February from rock faces covered with green algae and lichens. The larvae construct their cases from silk covered with sand and soil particles. These are enlarged from the sides all around as often as required by the larva. The larvae feed on the green algae and lichens that grow on damp rocks. They are often found on more shaded rocks. When fully grown, the larvae find a sheltered place under rocks and attach one side of the case and pupate. This was observed to take place during late February. Adults emerged in late February, March, April and May. Emergence occurs during the day. They are active in the evenings. An adult male was taken from Mellieha in June. Larval cases have been collected from Buskett, Ħad Dingli, Wied il-Għasel and Naxxar Gap.

Ateliotum insulare (Rebel, 1896)

Material examined. MALTA: Naxxar, 20.vi.2007, 1 ♂, leg. M. Zerafa.

Global distribution. Balearic Is., Canary Is., Portugal, Sicily, Spain (Gaedike, 2009) and Malta.

Reisserita mauritanica (Bethune-Baker, 1885)

Material examined. MALTA: Attard, 10.vi.2006, 1 ♂, leg. M. Zerafa.

Global distribution. Algeria, Tunisia (Gaedike, unpublished, pers. investigations) and Malta.

Proterospastis autochthones (Walsingham, 1907)*
(Fig. 3)

Material examined. MALTA: Mellieħa, 5.vii.2002, 1 ♂, leg. H. Hendriksen (ZMUC); Bormla, 18.vi.2006/18.vi.2008, 2 ♂♂, ex larva, leg. M. Zerafa.

Global distribution. Algeria, Tunisia (Gaedike, unpublished, pers. investigations) and Malta, the latter representing the first European record.

Note. The larva constructs a flattened case with a silk covering on the outside and feeds on decomposing wood.

***Proterospastis merdella* (Zeller, 1852)**

Material examined. MALTA: Naxxar, 1.vi.2007, 1 ♂, leg. M. Zerafa.

Global distribution. Canary Is., Crete, Croatia, Greece, Portugal, Sicily, Spain (Gaedike, 2009) and Malta.

***Praeacedes atomosella* (Walker, 1863)**

Material examined. MALTA: Naxxar, 20.vi.2006, 1 ♂, leg. M. Zerafa.

Global distribution. Azores, Canary Is., Cyprus, Madeira (Gaedike, 2009) and Malta.

Phereoeca lodli* (Vives, 2001)
(Fig. 4)

Material examined. MALTA: Naxxar, 20.v/8.vi/20.viii.2006/16.v.2007, 4 ♂♂, ex larva, leg. M. Zerafa; Ħaż-Żebbug 20.v.2006, 2 ♀♀, ex larva, leg. M. Zerafa.

Global distribution. Spain (Vives, 2001; Huertas Dionisio, 2005) and Malta.

***Trichophaga bipartitella* (Ragonot, 1892)**

Material examined. MALTA: Mistra, 24.iv.2005, 1 ♂, ex pupa, leg. M. Zerafa.

Global distribution. Aegean Is., Azores, Balearic Is., Bulgaria, Canary Is., Corsica, Croatia, France, Gibraltar, Greece, Italy, Macedonia, Portugal, Sardinia, Selvagens Is. Spain, Ukrane (Gaedike, unpublished pers. investigations) and Malta.

***Niditinea fuscella* (Linnaeus, 1758)**

Material examined. MALTA: Naxxar, 17.vi.2006, 1 ♀, leg. M. Zerafa; Żejtun, 9.v.2005, 1 ♂, leg. M. Zerafa.

Global distribution. Throughout the Palaearctic Region (Gaedike, unpublished pers investigations).

Tinea messalina* (Robinson, 1979)
(Fig. 5)

Material examined. MALTA: Naxxar, 1.vi.2006, 1 ♂, ex larva, leg. M. Zerafa.

Global distribution. Canary Is., Crete, Italy, Portugal (Gaedike, unpublished pers. investigations) and Malta.

Note. Larva feeds on animal material such as feathers, wool and hair.

Figure 3: *Proterospastis autochthones*; **Figure 4**: *Phereoeca lodli*; **Figure 5**: *Tinea messalina*.

***Monopis imella* (Hübner, 1813)**

Material examined. MALTA: Mistra, 12.iii.2005, 1 ♂, leg. M. Zerafa.

Global distribution: Throughout the Palaearctic Region (Gaedike, unpublished pers. investigations).

***Monopis crocicapitella* (Clemens, 1859)**

Material examined. MALTA: Rabat, 12-14.iii.2007, 1 ♂, leg. M. Zerafa.

Global distribution. Throughout the Palaearctic Region (Gaedike, unpublished pers. investigations).

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