Depressariiinae of Madeira and the Azores Islands (Lepidoptera: Depressariiidae)

With 35 figures

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Abstract
We review and illustrate the species of Depressariiinae known from Madeira and the Azores Islands. The following six species are treated: Agonopterix scopariella (Heinemann, 1870), A. conciliatella (Rebel, 1892), A. vendettella (Chrétien, 1908) (new to Madeira), A. perezi Walsingham, 1908, Depressaria marcella Rebel, 1901 (new to Madeira and the Azores), and D. halophilella Chrétien, 1908. The latter replaces Depressaria ultimella Stainton, 1849 in the list of Lepidoptera found in Madeira. Depressaria iliensis Rebel, 1936 is a synonym of Agonopterix vendettella (Chrétien, 1908) (syn. nov.). Depressaria halophilella is new to the Canary Islands. We provide brief notes on each of the species and give short diagnoses for correctly identifying them, and we discuss previous misidentifications of Madeiran Depressariiinae.

Key words
Lepidoptera, Depressariiinae, Madeira, Azores Islands

Zusammenfassung
Wir überprüfen und illustrieren die von Madeira und den Azoren bekannten Depressariiinae. Folgende sechs Arten werden behandelt: Agonopterix scopariella (Heinemann, 1870), A. conciliatella (Rebel, 1892), A. vendettella (Chrétien, 1908) (neu für Madeira), A. perezi Walsingham, 1908, Depressaria marcella Rebel, 1901 (neu für Madeira und die Azoren), und D. halophilella Chrétien, 1908. Letztere ersetzt Depressaria ultimella Stainton, 1849 in der Liste der von Madeira nachgewiesenen Lepidoptera. Depressaria iliensis Rebel, 1936 ist ein Synonym von Agonopterix vendettella (Chrétien, 1908) (syn. nov.). Depressaria halophilella ist neu für die Kanarischen Inseln. Neben kurzen Notizen zu jeder Art verweisen wir auf die zur richtigen Bestimmung entscheidenden Merkmale und diskutieren frühere Fehlbestimmungen bei Depressariiinae von Madeira.

Schlüsselwörter
Lepidoptera, Depressariiinae, Madeira, Azoren
Introduction

The Lepidoptera fauna of the Madeira Islands is relatively poor, with only 331 recorded species (Aguiar & Karsholt, 2008). This is undoubtedly due to their small size and isolated position in the Atlantic Ocean. In spite of this they have been the subject of regular studies by lepidopterists since the middle of the 19th century. The Macrolepidoptera fauna, and especially the butterflies (Papilionoidea), is considered well known, with only a few and mostly invasive species being added in recent years. Among the Microlepidoptera, new discoveries still occur regularly, and a number of taxonomic problems still await resolution. A brief introduction to the lepidopterology in Madeira was published by Karsholt (2000). In several earlier papers different families of Microlepidoptera from Madeira have been dealt with in detail (Gaedike & Karsholt, 2001; Kaila & Karsholt, 2002; Karsholt & Sinev, 2004; Rota et al., 2014).

The Lepidoptera fauna of the Azores Islands has – with only 159 species (Karsholt & Vieira, 2005; Vieira & Karsholt, 2010) – an even lower diversity of Lepidoptera than the fauna of the Madeira Archipelago. Only one species (and probably one specimen) of supposed Depressariinae has hitherto been reported from the Azores. Godman (1870: 106) listed a “Depressaria –?” from the island of Flores. This record was referred to as questionable Depressaria conciliatella by Rebel (1940b: 8), and in later literature (e.g., Carvalho, 1995: 577 and Vieira, 1997: 14) the question mark was removed. However, it was not listed by Karsholt & Vieira (2005) or Vieira & Karsholt (2010) because its identity could not be confirmed.

The Depressariinae have had a rather stormy life in Lepidoptera systematics since they were removed from Oecophoridae. Here we follow the concept of Heikkilä et al. (2014). After having been excluded from Oecophoridae they became part of Elachistidae for a few years (Nieukerken et al., 2011), until Depressariidae was redefined in a wider sense (Heikkilä et al., 2014), including about 2300 species known so far from subfamilies Acriinae, Aeolanthinae, Cryptolechiinae, Depressariinae, Ethmiinae, Hypercalliinae, Hypertrophinae, Peleopodinae, Oditinae, Stenomatinia, and a diversity of predominantly New World taxa previously excluded from Lypusidae (Amphisbatidae of authors) but left without family position. This paper only deals with Depressariinae (which may be paryphyletic with respect to the genus Semi­oscopis), and within this subfamily only with genera Agonopterix and Depressaria. Agonopterix is currently known from 95 species in Europe, about 180 in Holarctic and 250+ species worldwide, and Depressaria is known from 64 species in Europe, about 130 in Holarctic and probably more than 150 species worldwide. Besides Depressariinae the only other representative of the family Depressariidae found in Madeira and the Azores is Ethmia bipunctella (Fabricius, 1775) (Ethmiinae).

Methods

Morphological examination: Genitalia preparations followed standard techniques (Robinson 1976). Male preparations were stained with mercuriochrome and females with chlorazol, which brings a better result than using the same stain for both sexes. Photographic documentation: Photos of whole specimens were taken with Canon EOS 5D Mark III and Canon lens EF 100 mm f2.8 L IS USM at 1:1. Specimens were illuminated with two diffused flashes, using a third flash for setting the background whiteness. Photos of specimen details were taken with Canon lens MP-E 65 at 2:1, using ring flash. Genitalia photos were taken with microscope (Wild Heerbrugg) using a 10x objective and a 2.5x ocular. All photos were taken by the first author and edited using the software Helicon Focus 4.80 and Adobe Photoshop 6.0. For creating the black and white photos, the G alpha channel of the RGB originals was used in males and the Y alpha channel of the CMYK originals in females, due to the different stains.

All slides and photos were made by P. Buchner, if not otherwise specified. Plant names follow World Flora Online (2011–2019). For each species a short description of external characters is given. The genitalia are not described, but discussed in the chapters on diagnosis.

Abbreviations

ICLAM Insect Collection Laboratório de Qualidade Agrícola, Madeira, Portugal
ZfB Zentrum für Biodokumentation des Saarlandes, Landsweiler-Reden, Germany
NHMUK The Natural History Museum, London, U.K.
NMHW Naturhistorisches Museum Wien, Austria
SMNK Staatliches Museum für Naturkunde, Karlsruhe, Germany
RCMC Research Collection Martin Corley, Faringdon, U.K.
TLMF Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria
ZMUC Zoological Museum, University of Copenhagen, Denmark
ZSM Zoologische Staatssammlung München, Germany

General remarks about the determination of Depressariinae to species level

In many species of the large genus Agonopterix one can find the same basic wing patterns. The most important are mentioned in Fig. 1. If exact information about the host-plant is available determination is usually rather simple, because every species is restricted to a few related host-plants or even
to one plant species. Specimens without information about host-plant can often be determined from external features, if they are in good condition. But there remain species pairs or species groups where external patterns do not lead to species level. Specimens from such species-groups and most worn specimens need dissection of genitalia. In males it leads (with few exceptions) to species level without problems. In females it is more difficult, because the differences are small and the structures are very delicate, so it is difficult not to destroy important features during preparation. If everything else fails, the last resort is DNA examination, usually barcoding.

The situation in the other large genus, *Depressaria* is similar to *Agonopterix*, with two differences. Even if specimens are in good condition determination from external patterns is often impossible, but genitalia patterns are usually distinct in both sexes.

**Taxonomic treatment of species**

*Agonopterix scopariella* (Heinemann, 1870)  
(Figs 2–4, 8, 10)

*Depressaria scopariella* Heinemann, 1870: 149.  
*Depressaria conciliatella* sensu auct. (nec Rebel); See remarks.

**Examined material**: Madeira. 1 ♂, Monte, coll. Bethune-Baker, genitalia slide BM 19853 (NHMUK); 1 ♀, Funchal Lido, 4–14.ix.1973, leg. N. L. Wolff; 1 ♀, 2 ♀♂, Serra d’Água, 660 m, 7.ix.1973, leg. O. Lomholdt & N. L. Wolff; 1 ♂, same data but 17.x.1994, leg. O. Karsholt; 1 ♂, Serra d’Água, Pousada, 660 m, 31.viii.1975, leg. N. L. Wolff; 1 ♂, same data but Pousada dos Vinhaticos, 15–16.vi.1976; 1 ♀, same data but Central, 600 m, found dead, 15.–16.vi.1976; 1 ♀, Madeira, Fajã da Nogueira, 1000 m, 20.viii.1974, leg. E. Traugott-Olsen; 1 ♀, Rabaçal, 1050 m, 22.viii.1974, leg. E. Traugott-Olsen; 1 ♂, Ribeira das Cales, 1000 m, 28.VIII.1975, leg. N. L. Wolff; 1 ♀, Madeira, Caniço, 12–18.ix.1977, leg. O. Lomholdt & N. L. Wolff (all ZMUC); 1 ♀, Ilha, Quinta Grande, Cabo Girao, 22.v.1989, leg. M. Hellers (ZfB); 1 ♀, Ponta del Sol, 0–10 m, 12.vi.1993, leg. O. Karsholt; 1 ♀, Encumeada, 1000 m, 18.vi.1993, leg. O. Karsholt; 1 ♂, Eira de Serrado, 1450 m, 15.x.1997, leg. B. Skule (all ZMUC); 1 ♀, C. Lobos, Curral das Freiras, road to Colmeal, 29.ix.1998, leg. F. Aguia (ICLAM).

**Description**: Adult (Figs 2–4). Wingspan 18–22 mm, ground colour variable, e.g. pale greyish, pale yellowish, reddish brown, dark brown. Dark scales irregularly interspersed, number varying from nearly absent to rather dense. Oblique pair of dots at 1/3 (Fig. 1C) and pair of dots at 1/2 (Fig. 1E) present, usually all accompanied with white scales especially on outer margin, diffuse dark spot (Fig. 1D) present. Basal field (Fig. 1B) markedly paler than ground colour of forewing, divided from ground colour by a narrow dark line in rear half, confluent with ground colour in front.
Fig. 2: *A. scopariella* ♂, Madeira, Santo da Serra, 15.v.1967, e. l. *Sarothenanus*, leg. F. Kasy, coll. NHMW. – Fig. 3: *A. scopariella* ♀, Greece, Peloponnes, Mystras, 3.vi.2009, ex larva, leg. & coll. P. Sonderegger. – Fig. 4: *A. scopariella* ♂, Spain, Mallorca, Puig Mayor, 22.vi.1969, e. l. *Calycotome spinosa*, leg. J. Klimsch, coll. ZSM.
half. Outer margin (termen, Fig. 1F) concave or at least straight, but not convex.

Diagnosis: Similar to *A. conciliatella*, for details see there. *A. subpropinquella* (not found in Madeira), a species frequently confused with *A. scopariella*, has no white scales in the forewing dots and a much less distinct basal field.

For genitalia differences of *A. scopariella* and *A. conciliatella* see paragraph “diagnosis” under the next species.

Bionomics: Larvae on Fabaceae, e.g. *Cytisus scoparius* (L.) Link.

Distribution: A widespread and in the Mediterranean area a very common species.

Remarks: *A. scopariella* is the only species of Depressariinae which is common in Madeira. It was first recorded by Carvalho (1995: 563), but most earlier records of *Depressaria conciliatella* by e.g. Walsingham (1894: 546) refer to *A. scopariella*.

Fig. 5: *A. conciliatella* ♀, Spain, La Gomera, El Cedro, 26.v.1965, e.l. *Adenocarpus*, leg. J. Klimesch, coll. ZSM. – Fig. 6: *A. conciliatella* ♂, Portugal, Madeira, Encumeada, 1000 m, 16.vi.1993, e. l. *Genista tenera*, leg. O. Karsholt, coll. ZMUC.
Fig. 7: *A. conciliatella* ♂, Spain, La Gomera, El Cedro, 31.v.1965, e.l. *Adenocarpus*, leg. J. Klimesch, coll. ZSM. –

Fig. 8: *A. scopariella* ♂, Croatia, Novi Vinodolsky, 20.v.2001, leg. & coll. L. Srnka; insert (8C): The Nederlands, 1870, coll. NHMW.
Agonopterix conciliatella (REBEL, 1892)
(Figs 5–7, 9)

Depressaria conciliatella Rebel, 1892: 272, pl. 17, fig. 14.
Agonopterix mutatella Hannemann, 1989: 391, figs 4–5, pl. 10,
figs 1–3, pl. 11, figs 1–2.

Examined material: 1 ♂, Ilha, Quinta Grande, Fortinhos,
7.vii.1991, leg. M. Meyer (ZfB); 1 ♂, Encumeada, 1000 m,
l. 15.vi.1993, Genista tenera, leg. O. Karsholt (ZMUC);
2 ♂♀, Encumeada, Fortinhos, 13.x.1993, leg. M. Meyer (ZfB).

Description: Adult (Figs 5–6). Size, basic patterns and
wing shape as in A. scopariella, but variability markedly
larger. Forms with rather uniform ground colour (Fig. 5)
are separable from A. scopariella only by dissection (or
barcoding), but forms with strongly contrasting dark
veins against pale ground colour (Fig. 6) are not found
in A. scopariella and therefore these forms can be deter-
mined as A. conciliatella at first glance.

Diagnosis: Similar to A. scopariella.
In the male genitalia the cuillier (A) is blunt in
A. conciliatella (Fig. 7) and pointed in A. scopariella
(Fig. 8); anellus lobes (B) are shorter and broader than in
A. scopariella, not overlapping in standard preparations.
To avoid overlapping, which can cause technical problems
during spreading, in A. scopariella the anellus lobes are
some times turned outward (insert C, Fig. 8), but this is
not standard preparation.
In the female genitalia the caudal margin of sternite
VIII is evenly rounded in A. conciliatella (Fig. 9A), and
straight with sharply upcurved structure in A. scopariella
(Fig. 10B).

Bionomics: Larvae on Fabaceae, e.g. Cytisus spec.,
Genista spec.; it has also been reared from Adenocar-
pus foliosus in Canary Islands. In Madeira the larva is
recorded from Genista tenera (Murray) Kuntze.

Distribution: Canary Islands and Madeira.

Fig. 9: A. conciliatella ♂, Spain, Gran Canaria 3 km S Lanzarote, 7.9.2012, leg. & coll. A. Stübner. – Fig. 10: A. scopariella ♂,
Marokko, Marrakesch, Tensift al Haouz, Toufine, 2100 m, 23.5.2010, leg. & coll. A. Werno.
Remarks: Walsingham (1894: 546) recorded ‘Depressaria conciliatella’ from Madeira, based on a misidentified specimen of Agonopterix scopariella (listed above under examined material of A. scopariella). Most subsequent records of A. conciliatella from Madeira (see Aguiar & Karsholt, 2006: 46–47 for details) are not based on additional material, but refer to Walsingham, and the specimens listed above are the only correctly identified ones from Madeira known to us. Rebel (1940a: 22) recorded three specimens from Madeira, Rabaçal as ‘Depressaria conciliatella’. One of these is kept in the NHMW, but it is unfortunately without abdomen and its identity cannot be established.

Agonopterix conciliatella was listed in the genus Exaeretia Stainton, 1849 by Aguiar & Karsholt (2006: 20, 47; 2008: 340). That was based on a mismatch of the slide-labels of the holotypes of Exaeretia thurneri and Agonopterix conciliatella, caused by Hannemann in year 1952, leading to publication of A. conciliatella in the genus Exaeretia (and E. thurneri in the genus Agonopterix) by Hannemann (1953). These two species were consequently treated in the wrong genera until the clarification of this mismatch (Buchner, 2015).

Agonopterix vendettella (Chrétien, 1908)  
(Figs 11–14, 16, 18)

Depressaria vendettella Chrétien, 1908b: 258.

Depressaria ilensis Rebel, 1936: 36; syn. nov.

Examined material: Madeira. 2♂♂, Fajã da Nogueira, 600 m, 27.vii.1975, leg. N. L. Wolff (ZMUC); 1♀, same data but 500 m, la. 20.vi.1993, Oenanthe pteridifolia, leg. O. Karsholt (ZMUC); 10♂♂♀, 4♀♀♀, Encumeada, 1000 m, la. 8.vi.1993, Oenanthe pteridifolia, leg. O. Karsholt (ZMUC).

Description: Adult (Figs 11–13). Wingspan 18–22 mm, ground colour brown (Figs 11–12) or greyish brown (Fig. 13). Oblique pair of dots at 1/3 accompanied with pale or whitish scales especially on outer margin, the dark part of the lower usually elongated, the dark part of the dots may be confluent which creates a comma-shaped dark marking (Fig. 11, intermediate in Fig. 12), or the dark parts of the dots are divided by ground colour (Fig. 13). Diffuse dark spot present. From the pair of dots at 1/2 only the inner one present, usually (but not always) with white scales in the centre and at inner margin. Basal field markedly paler than ground colour of forewing, divided from ground colour by a rather broad dark line in rear 2/3, confluent with ground colour in costal 1/3. Outer margin (termen) convex.

Diagnosis: The warm brown form with confluent dots at 1/3 found in Madeira is very similar to A. perezi (for external differences see under that species). The continental form is very similar to A. curvipunctosa and determination needs dissection. Differential diagnosis of the closely related species A. vendettella and A. curvipunctosa (not found in Madeira so far) based on genitalia.

In the male genitalia the base of anellus in both species shows a structure which is not found in other Agonopterix species. In A. vendettella (Fig. 14) this structure shows two elongated, narrow tips directed towards vinculum (Fig. 14A, also as an inset where this structure is highlighted in black). In A. curvipunctosa (Fig. 15) these tips are shorter and evenly rounded (Fig. 15C). The phallus in A. vendettella has a basal process of about 30 % of the phallus length (which is markedly longer than in most other Agonopterix spec.), phallus not becoming broader from base to tip in lateral view, and teeth on outer surface (if present, Fig. 14B) are predominately dorsal at about 3/4. In A. curvipunctosa the basal process is also remarkable long, even slightly longer than in A. vendettella with about 35–40 % of phallus length, phallus becoming broader from base to tip in lateral view with broadest part at about 3/4, and teeth on outer surface (if present, Fig. 15D) are predominately ventral at about 3/4.

Also the female genitalia of both species show a structure which is not found in other Agonopterix species. The first part of ductus bursae, from ostium to caudal margin of sternite VIII (colliculum) is strongly sclerotised, and a short unsclerotised part is followed by a second sclerotisation. In A. vendettella the colliculum is longer than broad with deeply excavated caudal margin (Fig. 16A), and ductus between colliculum and the second sclerotisation is swollen and appearing globose in standard preparations (Fig. 16B). In A. curvipunctosa the colliculum is about as long as broad with shallow excavated caudal margin (Fig. 17A), and ductus below colliculum is dilated, but not forming a globose structure (Fig. 17B).

Bionomics: Larvae on Apiaceae. The most important host plant is Smyrnium olusatrum L., but it has also been found on Conium maculatum L. in mainland Portugal (M. Corley, pers. comm.). Specimens from Madeira have been reared from Oenanthe pteridifolia Lowe.

Distribution: Italy, France, Spain, Portugal, Morocco, the Canary Islands and Madeira, usually near the coast.

Remarks: All examined specimens from Madeira represent the warm brown form with confluent dots at 1/3. On the Canary Islands, this form dominates but the more grey coloured form with separated dots at 1/3 also can be found; the last mentioned is the common form of continental Europe.

Agonopterix ilensis (Rebel, 1936), so far reported from Italian mainland and Sardinia, is conspecific with A. vendettella (according to genitalia slide from the holotype, Fig. 18: Aritzo, 10. 9. 34, Predota, gen. slide
Fig. 11: *A. vendettella* ♀, Spain, Tenerife, Guimar, 14.iii.1969, ex larva, leg. J. Klimesch, coll. ZSM. – Fig. 12: *A. vendettella* ♂, Portugal, Madeira, Faja da Nogueira, 500 m, la. 20.vi.1993, *Oenanthe pteridifolia*, leg. O. Karsholt, coll. ZMUC. – Fig. 13: *A. vendettella* ♂, Spain, La Palma, 540 m, 11.xi. 2010, leg. & coll. B. Müller.
Fig. 14: *A. vendettella* ♀, Spain, Tenerife, Las Montanas de Anaga, El Bailadero, 700 m, 22.iv. 1998, leg. & coll. K. Larsen. Inserted second (right) phallus: Italy, Sardegna, Mela Murgia, Quartucciu, 9.xii.2011, leg. P.F. Murgia, coll. L. Morin. – Fig. 15: *A. curvipunctosa* ♂, Austria, Oberloiben, 17.iv.2011, leg. & coll. W. Stark. Inserted second (right) phallus: Austria, Hundsheimer Berge, 26.vii.2008, leg. & coll. P. Buchner.
Mus. Vind. 16.508, prep. Peter Huemer). In the original description the holotype is stated to be a male, but in fact it is a female.

*Agonopterix perezi* Walsingham, 1908

(*Figs 19–22*)

*Agonopterix perezi* Walsingham, 1908: 957, pl. 52, fig. 8. *Depressaria applana* auct. (not Fabricius). See remarks.

**Examined types:** Holotype ♀, Funchal, 7.ii., leg. T. V. Wollaston (NHMUK); Paratype ♂, “Madeira, B.-Baker coll.” (NHMUK).

**Other examined material:** Madeira. 2 ♂♂, 1 ♀, Ponta de São Lourenço, 0–10 m, 26.vi.1993, leg. O. Karsholt; 1 ♂, Porto Santo, 0–10 m, 14.iv.1996, leg. O. Karsholt (all ZMUC); 1 ♀, Funchal, Santo António, Casas Próximas, 12.i.2003, leg. J. Jesus; 1 ♀, Ribeira Brava, Campanário, Corujeria, 10.iii.2003, leg. Y. Gonçalves; 6 ♂♂, Santa Cruz, Caniço, Assomada, 9.iv.2010, *Ruta chalepensis*, leg. C. Brazão (all ICLAM); 1 ♀, Funchal, 12.ii.2004, leg. M. Corley, genitalia slide Corley 2276 (RCMC).

**Description:** Adult (*Figs 19–20*). Wingspan 18–21 mm. Ground colour greyish brown (*Fig. 19*) or warm brown to reddish brown (*Fig. 20*). Oblique pair of dots at 1/3 accompanied by pale yellowish scales especially on outer margin, the dark part of the dots usually confluent. Diffuse dark spot present. Pair of dots at 1/2 usually present and with pale yellowish scales in the centre, but these dots may be weak or even invisible. Basal field pale, with distinct contrast against a rather broad dark line in rear 2/3, confluent with ground colour in front 1/3. Outer margin (termen) concave or at least straight.

**Diagnosis:** Externally very similar to the form of *A. vendetella* with the warm brown ground colour and confluent dots at 1/3. Best feature to separate these two...
species is the wing shape: outer margin evenly rounded in _A. vendettella_, convex or at least straight in some part in _A. perezi_. The dark line which separates the rear 2/3 of basal field from ground colour is markedly more distinct in _A. perezi_ than in _A. vendettella_. Genitalia (Figs 21, 22) are clearly different, which indicates there is no close relationship between the two species.

**Bionomics:** _A. perezi_ has been reared from _Ruta pinnata_ L. on Canary Islands (Klimesch). The record from _Oenanthe divaricate_ R.Br. (Mabb.) (a synonym of _O. pteridifolia_ Lowe) by Aguiar & Karsholt (2006: 47) refers to _A. vendettella_.

**Distribution:** Canary Islands and Madeira.

**Remarks:** _Agonopterix heracliana_ (Linnaeus) was recorded from Madeira by Walsingham (1894, 1908), Rebel (1901, 1911) and Carvalho (1995). These literature records are based on two specimens: one found by Wollaston and recorded as _Depressaria applana_ (Fabricius) by Walsingham (1894: 546). Later, when describing _A. perezi_ Walsingham (1908: 957–958) pointed out that Wollaston’s specimen of ‘applana’ belongs to _perezi_. Carvalho (1995: 563) recorded a second specimen of _heracliana_ from Curral das Freiras, 11.vi.1980, but on the same page he also recorded a specimen of _perezi_ from the same locality and date. We have not examined Carvalho’s specimens, but these two species are very similar, and we find it likely that records of both belong to one species: _perezi_, and we agree with Aguiar & Karsholt (2006: 46–47) that _A. heracliana_ should be removed from the list of Madeiran Lepidoptera until its presence there is confirmed. This case is extraordinarily confusing because the name _heracliana_ (Linnaeus, 1758) was used until about 1970 for a widespread species of _Depressaria_ (see next note), but now it is considered the valid name of one of the most common species of European _Agonopterix_ (Karsholt et al., 2006).

The paratype listed above has an additional label “Paralectotype”, but to our knowledge no lectotype has been published.

*Depressaria marcella* Rebel, 1901

(Fig 22–27)

**Examined material:** Madeira: 1 ♂, Assomada, 15.vi.1969, leg. Pinker (LNK); 1 ♂, Funchal Lido, 17–22.iv.1974, leg. N. L. Wolff, genitalia slide Wolff 4256; 2 ♂♂, Serra d’Água, Pousada dos Vinhaticos, 650 m, 8.vi.1976, leg. N. L. Wolff, genitalia slide Wolff 4340; 1 ♂, Ponta do São Lourenço, Serra de Picolade, 80 m, 4.vii.1991, leg. M. Meyer; 1 ♀, Ponta de São Lourenço, 0–10 m, 26.vi.1993, leg. O. Karsholt; 2 ♀♀, Porto Santo, 0–10 m, 23–24.x.1994, leg. O. Karsholt (all ZMUC). Azores: 3 ♂♂, Terceira, Porto Judea, 10 m, 10–14.vi.2018, genitalia slide Karsholt 5357 (ZMUC).

**Description:** Adult (Figs 23–24). Wingspan 14–17 mm, ground colour blackish brown, usually interspersed by pale brown arches forming 3 diffuse and irregular transverse bands (Fig. 23) or whole forewing very diffuse blackish brown (Fig. 24). Differs by its small size from most other _Depressaria_ species.

**Bionomics:** Larva on Apiaceae, e.g. _Daucus carota_ L. and _Foeniculum vulgare_ Mill.

**Distribution:** Azores Islands (new record), Madeira (new record). Widespread in South Europe and North Africa.

**Diagnosis:** The form with transverse fasciae is usually very distinct, but forms with more or less uniform forewings may be confused with different other species, including some non-Depressariidae (especially of Gelechiidae) which, however, have a more or less distinct emargination at the termen of the hindwing. Moreover the labial palps (Fig. 25) can help to exclude Gelechiidae and the genitalia (Figs 26, 27) in both sexes are characteristic.
Depressaria halophilella Chrétien, 1908

Examined material: Madeira. 1 ♀, Funchal Lido, 17–22.iv.1974, leg. N. L. Wolff (ZMUC); 5 ♂ ♂, 3 ♀ ♀, Porto Moniz, 0–10 m, 4–7.vii.1993, leg. O. Karsholt, genitalia slide Corley 2384, Karsholt 5039; 3 ♂ ♂, same data but 13.x.1994; 1 ♂, same data but 19–22.iv.1996 (all ZMUC).

Canary Islands: 1 ♀, Gran Canaria, Baranco Virgen, Moya, 400 m, 20.vii.1984, leg. P. Olsen, B. Skule & P. S. Nielsen (ZMUC).

Description: Adult (Figs 28–30). Wingspan 15–18 mm, in fresh specimens ground colour of forewings a warm medium brown, veins covered by black scales, especially in distal part, black lines usually accompanied with some whitish scales. In older specimens ground colour turns to pale or translucent, while the black lines stay distinct, at least in part, which produce an increase of contrast in such specimens (Fig. 30).

Diagnosis: Closely related and similar to D. ultimella. Fresh specimens are usually distinguishable by a longitudinal concentration of white scales in the centre of the forewings (Fig. 31A) and a sharply angled transverse fascia at 3/4 (red underlined in Fig. 31B), often also by a much darker ground colour.
In the male genitalia of *D. halophilella* (Fig. 33) A is an acute angle and B an obtuse angle; lateral outline of vinculum moderately to markedly convex (C), the number of cornuti (D) is usually eight or more (note, that cornuti can be lost and a small number may be an artefact). In *D. ultimella* (Fig. 34) A and B both about right angles; lateral outline of vinculum straight or slightly convex, cornuti usually 3–8.

In the female genitalia (Fig. 35) *D. halophilella* differs from nearly all other *Depressaria* species by its very short apophyses anteriores (E). Only *D. ultimella* shows the same feature, and female genitalia of these two species are not separable.

**Bionomics:** Monophagous on *Crithmum maritimum* L. (Apiaceae), a strictly coastal plant.

**Distribution:** Widespread on coasts around the Mediterranean Sea, but not reaching the northern range of *Crithmum maritimum* (e.g. Great Britain). Larvae of *D. ultimella* feed on *Oenanthe* spec., *Aptium* spec. and *Sium* spec. (Apiaceae).

**Remarks:** Whereas *D. halophilella* is a new name on the list of Lepidoptera found in Madeira the species has been known there for a long time, being misidentified under different names. We believe that *halophilella* was already found in Madeira by Wollaston in the 1850s and recorded (as *Siganorosis heracliana* DeGeer) by Walsingham (1894: 546). Later Walsingham (1908: 959–960) corrected his identification of the specimen to *D. apiella* (Hübner) (a junior synonym of *D. daucella* (Denis & Schiffermüller)). This was followed by Rebel (1917: 12; 1940: 8). Carvalho (1995: 577) listed *Depressaria rubricella* (Denis & Schiffermüller) (another synonym of *D. daucella*) from Madeira without exact date and locality, probably based on the records by Walsingham and Rebel. The records of *D. heracliana* by Rebel (1901: 173) and *D. pastinacella* (Duponchel) by Zhang (1994: 178) most likely date back to Walsingham’s record of Wollaston’s specimen (see the note above under *A. perezi* for discussion of the synonymy of *heracliana*). *D. daucella* is externally similar to *halophilella*, and since Walsingham changed his opinion about the single specimen it may not have been in perfect condition. We were unable to trace Wollaston’s specimen in the NHMUK, but we find it likely that it belonged to *D. halophilella*. The record of *D. apiella* (Hübner) from Tenerife by Walsingham (1908: 959) refers to *Depressaria sarahae* Gastón & Vives, 2017 ssp. tabelli Buchner, 2017. Aguiar & Karsholt (2006: 21, 47) listed *D. halophilella* from Madeira under the name of *D. ultimella Stainton* because of misidentification.
Discussion: One of the aims of this paper is to provide the necessary information for correctly identifying Madeiran Depressariinae, because misidentifications have been common in the past. Despite the low number of species of this subfamily found in Madeira: four in Aguiar & Karsholt (2008: 340), six in Lvovsky (2004–2019) (*Ethmia bipunctella* not included), these are unusually confused. The differences in the number between these two lists are due to the inclusion of two additional, misidentified species (*A. heracliana* and *A. daucella*) in the latter.

Many Depressariinae moths are difficult to identify, especially if only limited material in more or less worn condition is available. In former days the species of the subfamily were highly confused. If fresh specimens, preferably bred from larvae (and the host plant is noted) are available, many specimens can be identified from external characters. Moreover, the genitalia exhibit in most cases reliable characters for identification. And nowadays problematic specimens can be identified from their DNA-barcode. These tools were not available for lepidopterists in the 19th and first part of the 20th century, and it is therefore no wonder that the few specimens of Depressariinae available to them were often misidentified.

Both Madeira and the Azores Islands are well known for their many endemic animals and plants, and that is also the case for their Lepidoptera faunas. It is therefore rather surprising that none of these archipelagos house endemic species of Depressariinae – although two of the species

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Fig. 22: *A. perezi* ♂, Spain, Puerto de la Cruz, 5.iv.1971, c. l. *Ruta pinnata*, leg. J. Klimesch, coll. ZSM.
listed above (A. conciliatella and A. perezi) are Macaro-
nesian endemics, being only found in Madeira and in the
Canary Islands.
Throughout the years the authors examined the collec-
tions of Microlepidoptera kept in most major natural
history museums in Europe, and we were surprised that
we found no or only very few specimens of Depressariinae
from this area there. The short lists of examined material
for each species listed above is thus not a result of super-
ficility, but reflects that these species are rare (or at least
little collected) in Madeira and the Azores. It is therefore
quite possible that these islands contain at least a few addi-
tional species which may turn up during future field work.
For that we can especially recommend to search for larvae,
especially on endemic plants of Apiaceae or Asteraceae.

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Fig. 27: *D. marcella* ♂, Turkey, Side, 16.v.1990, leg. & coll. R. Keller.
Fig. 28: *D. halophilella* ♀, Spain, Portbou, 29.ix.1974, e.l. *Crithmum maritimum*, leg. J. Klimesch, coll. ZSM. –
Fig. 29: *D. halophilella* ♀, France, Var, Port d’Alon, 31.iii.2014, e.l. *Crithmum maritimum*, leg. & coll. P. Sonderegger. –
Fig. 30: *D. halophilella* ♂, Spain, Mallorca, Albufera, 13.vi.2013, leg. D. Nilsson, coll. ZMUC.
Fig. 31: *D. ultimella* ♂, Sweden, Öland, Långlött, Ästad, e. l. *Conium*, leg. R. Johansson, coll. ZMUC. – Fig. 32: *D. ultimella* ♀, Belgium, Mons, e. l. *Apium graveolens*, leg. A. Dufrane, coll. ZSM.
Fig. 33: *D. halophilella* ♂, France, Var, Port d’Alon, 31.iii.2014, e. l. *Crithmum maritimum*, leg. & coll. P. Sonderegger. –
Fig. 34: *D. ultimella* ♂, Austria, Drösing/March, 14.vii.1990, leg. F. Lichtenberger, coll. TLMF.
Fig. 35. *D. halophilella* ♀, France, Var, Port d’Alon, 12.iii.1995, e. l. *Crithmum maritimum*, leg. & cult. J. Nel (RCMC).