

# MISCELLANEOUS PAPERS

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Centre for Entomological Studies Ankara

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No 196

05 September 2019

ISSN 1015-8235

<http://zoobank.org/urn:lsid:zoobank.org:pub:156ED121-3275-4D2E-A509-C7B802BA17A9>

## *Agonopterix olusatri*, a new species of Depressariidae (Lepidoptera) from the West Palaearctic region

Peter Buchner<sup>1</sup> & Martin Corley<sup>2,3</sup>

**Abstract:** *Agonopterix olusatri*, a new species of Depressariidae (Lepidoptera) from the West Palaearctic region. *Misc. Pap.* 196: 1-13.

*Agonopterix olusatri* sp. n. is described. The new species is both similar to and closely related to *A. thapsiella* (Zeller, 1847) and *A. chironiella* (Constant, 1893). Specimens have been found in several museum collections under the name *A. chironiella*. Differences in DNA-barcode led to closer examination of genitalia, and finally clear differences in both sexes were found. It occurs in Portugal, Spain, Gibraltar, France, Italy, Malta, Greece, Cyprus, Israel and Morocco and its larva has been found feeding on *Ferula communis* L., *F. tingitana* L., *Foeniculum vulgare* Miller and *Smyrniolum olusatrum* L. (Apiaceae). The moth and the genitalia of the new species and some of its relatives are illustrated.

**Keywords:** Lepidoptera, Depressariidae, *Agonopterix*, Europe, Israel, new species, DNA barcoding.

### Introduction

*Agonopterix chironiella* (Constant, 1893) was described from Alpes-Maritimes in south-east France from specimens reared from *Opopanax chironium* (L.) W.D.J. Koch (Apiaceae). Later it was recorded elsewhere in south-west Europe, particularly in Spain and Portugal where its host-plants are *Foeniculum*, *Ferula* and *Smyrniolum*. There are museum specimens from France and Italy in NHMW and from Sicily in ZSM under the name *A. chironiella*. It has recently become clear that these records belong to another species which can be distinguished from *A. chironiella* Constant by forewing markings and by male and female genitalia. The distinction is also supported by DNA barcode. We describe this species here as *Agonopterix olusatri* sp. nov. and compare it with *A. thapsiella* (Zeller, 1847), which is widely distributed in southern Europe and *A. chironiella*, which seems to be restricted to France and Italy.

### Methods

**Morphological examination:** all genitalia preparations were made by P. Buchner and all photographs were taken by him, if not otherwise specified. The preparations follow standard techniques (Robinson, 1976). Male preparations were stained with mercurochrome and females with chlorazol black E, which brings a better result than using the same stain for both sexes.

**Photographic documentation:** photographs of set specimens were taken with Canon EOS 5D Mark III and Canon lens EF 100mm 2.8 L IS USM at 1:1. Photographs of specimen details were taken with Canon lens MP-E 65 at 2:1, using ring flash. Genitalia photographs were taken through a

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microscope (Wild Heerbrugg) using a 10x objective and a 2.5x ocular. All photographs were edited using the software Helicon Focus 4.80 and Adobe Photoshop 6.0.

## Abbreviations

**DEEUR** “Depressariinae of Europe”, prefix for specimen-number of Depressariinae studied by P.Buchner (here also used for non-European specimens).

Museums and private collections, studied for this paper:

**HNHM** Hungarian Natural History Museum, Budapest, Hungary  
**NHMW** Natural History Museum Vienna, Austria  
**NHMUK** Natural History Museum, London, U.K.  
**NMBE** Naturhistorisches Museum Bern, Switzerland  
**NMPC** National Muzeum, Prague, Czech Republic  
**RCAM** Research Collection Anton Mayr, Feldkirch, Austria  
**RCHR** Research Collection Hans Retzlaff, Switzerland  
**RCAW** Research Collection Andreas Werno, Germany  
**ECKU** Collection of Ecology-Centre, Kiel University, Germany,  
**RCJJ** Research Collection Jari Junnilainen, Vantaa, Finland  
**RCKL** Research Collection Knud Larsen, Dyssegård, Denmark  
**RCKN** Research Collection Kari and Timo Nupponen, Espoo, Finland  
**RCMC** Research Collection Martin Corley, Faringdon, England  
**RCPS** Research Collection Paul Sammut, Rabat, Malta  
**RCWP** Research Collection Walter Pavlas, Deining, Germany  
**SMNK** Staatliches Museum für Naturkunde Karlsruhe, Germany  
**TLMF** Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria  
**ZMHU** Zoologisches Museum, Humboldt University, Berlin, Germany  
**ZMUC** Zoological Museum, University of Copenhagen, Denmark  
**ZSM** Zoologische Staatssammlung München, Germany

Depressariidae collections were studied in full by the first author in all the above-mentioned museums. This was not the case with all private collections, where sometimes only pre-selected samples, predominantly for determination, were available.

## *Agonopterix olusatri* Corley & Buchner sp.n.

<http://zoobank.org/urn:lsid:zoobank.org:act:7288EFE8-DC49-43D5-9B95-4E17A079A827>

*Depressaria chironiella* auct. nec Constant, 1893.

## Material

Holotype: ♂, Portugal, Algarve, São Romão, 41.25° N, 7.583° W, larva from *Smyrnum olusatum* iii. 2011, e.p. 7. v. 2011, specimen id P9818, gen. prep. DEEUR 0805 with DNA barcode sample id TLMF Lep 06996 (658bp[on]), M. Corley leg., to be deposited in NHMUK.

Paratypes: ♂, Cyprus, 6 km W Kilicaslan, 15. v. 2007, gen. prep. DEEUR 5384, B. Skule leg. (ZMUC).

1 ♂, Cyprus, Hisarköy, 3. xii. 2007, gen. prep. DEEUR 7469, C. Hviid & B. Skule leg. (ZMUC).

1 ♂, France, Vernet[-les-Bains], Pyr[énées] or[ientales], vi. 1924, DEEUR 0098, Predota leg. (NHMW)

3 ♂, France, Sète, larva from *Foeniculum vulgare*, e.p. 19. v. 2008, DEEUR 7705, 7706 & 7713, P. Sonderegger leg. (NMBE).

1 ♂, Gibraltar, 36.133° N, 5.35° W, larva from *Ferula tingitana* iii. 2006, e.p. 26. iv. 2006, DEEUR 0745 with DNA barcode sample id. TLMF Lep 07025 (658bp[on]), M. Corley genitalia slide 2734, C. Perez leg. (ZMUC).

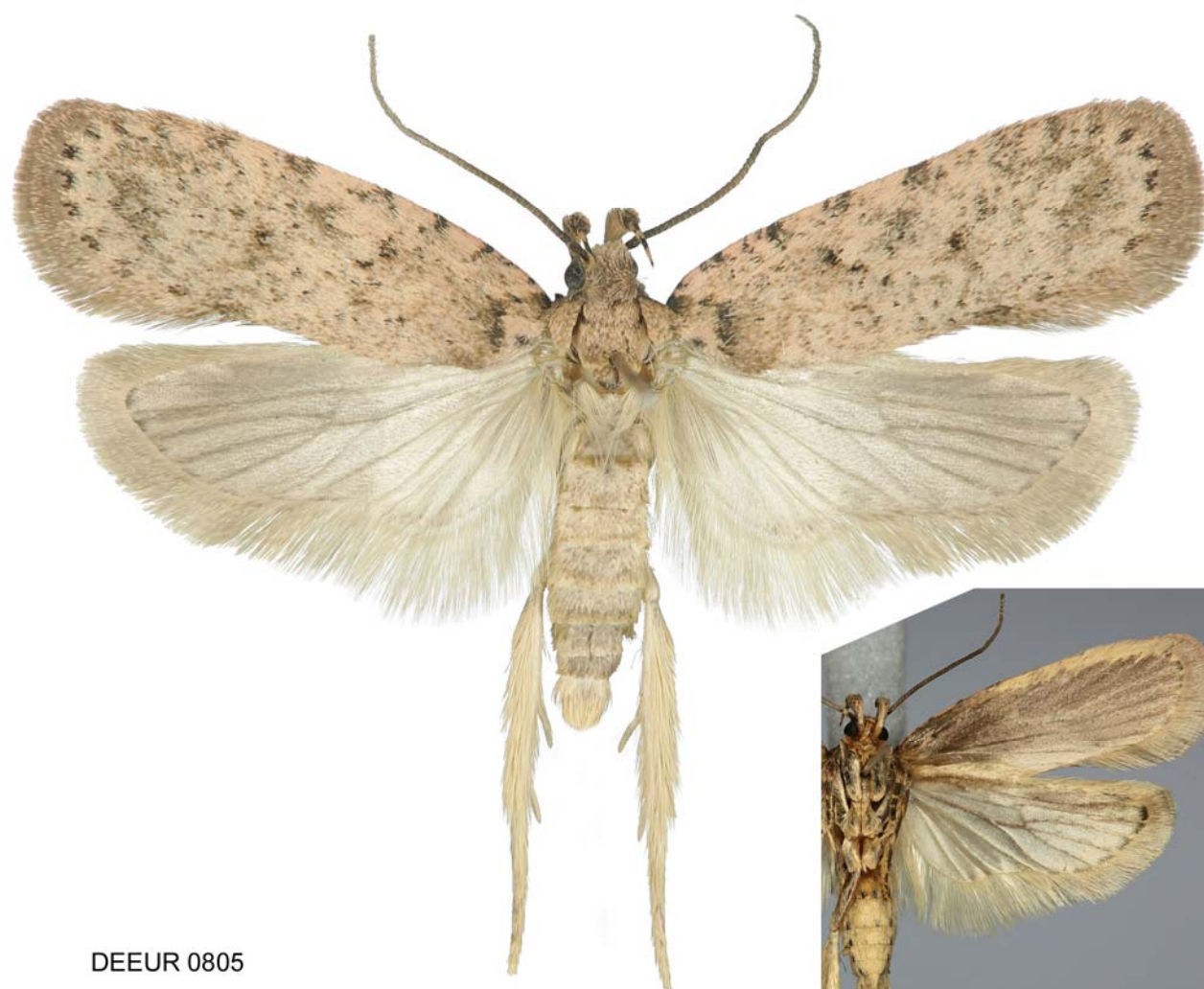
- 1 ♂, Greece, Rhodos, Faliraki, 36.33° N, 28.2° E, 25. v. 1988, e.l. *Foeniculum* sp., gen. prep. DEEUR 4216 with DNA barcode sample id TLMF Lep 19251 (653bp[on]), J. Klimesch leg. (ZMUC).
- 1 ♂, Greece, Crete, north of Lassithi, Agia Joannis, 19. v. 2000, gen. prep. DEEUR 3630, W. Ruckdeschel leg. (TLMF).
- 2 ♂, 1 ♀, Greece, Samos, Kokkari, 16. vi. 2000, DEEUR 5633 & 20. v. 2001, DEEUR 5600, R. Sutter genitalia slide 6654 (♂) & 24. v. 2001, DEEUR 5601, R. Sutter genitalia slide 6604 (♀), R. Sutter leg. (SMNK).
- 1 ♂, 1 ♀, Greece, Crete, north of Rethimnis, Agia Galini, 6. + 7. v. 2003, male gen. prep. DEEUR 3631 & female gen. prep. DEEUR 3632, W. Ruckdeschel leg. (TLMF).
- 1 ♂, Israel, Nahal Oren, Mt. Carmel, 32.73° N, 35.0167° E, 17. v. 1997, DEEUR 6158 with DNA barcode sample id TLMF Lep 023276 (658bp[on]), Pavlíček & Kravchenko leg. (NMPC).
- 1 ♂, Italy, Sardinia, Teulada, 6. vi. 1935, DEEUR 0700, NHMW genitalia slide MV18232, Predota leg. (NHMW).
- 1 ♂, 1 ♀, Italy, Sicily, Mistretta, Mercuore, 30. vi. 1952, DEEUR 4217-4218, J. Klimesch leg. (ZSM).
- 1 ♂, Italy, Sardinia south, Villacidro, Cucurimannu, 29. v. 1974, DEEUR 5899, L. Gozmány leg. (HNHM).
- 1 ♀, Italy, Sicily, San Stefano, 6. vi. 2005, DEEUR 2449, P. Skou leg. (ZMUC).
- 1 ♂, 1 ♀, Italy, Sardinia, San Giovanni, 39.88° N, 8.43° E, 1. ii. 2017, female gen. prep. DEEUR 6776 with DNA barcode sample id TLMF Lep 26327 (658bp[on]) & Meana Sardo, 27. v. 2017, DEEUR 6777, Ch. Siegel leg. (RCAM).
- 1 ♀, Malta, Mellieka, 25. v. 1995, DEEUR 7610, U. Seneca leg. (ZMUC).
- 2 ♂, Malta North, Marfa Ridge, 9. iv. 2004, gen. prep. DEEUR 3742 & 3743, B. Skule leg. (ZMUC).
- 1 ♀, Malta, year 200?, gen. prep. DEEUR 4978, P. Sammut leg. (RCPS).
- 1 ♂, Morocco, Anti-Atlas, 36 km south of Ait Baha, 30. i. 1988, e.l. cf. *Foeniculum*, gen. prep. DEEUR 4317, H. Retzlaff leg. (RCHR).
- 1 ♂, Morocco, 15 km north of Tioulit, 9. iv. 1998, gen. prep. DEEUR 5765, H. Hoppe leg. (ZMHU).
- 1 ♂, Morocco, Marrakesch, Tensift, Al Haouz-Tizi-n-Test, 32.6° N, 4.5° W, 23. v. 2010, gen. prep. DEEUR 1947 with DNA barcode sample id TLMF Lep 17723 (658 bp[on]), A. Werno leg. (RCAW).
- 2 ♂, Morocco, High Atlas, Ouirgane, 31.183° N, 8.083° W, 31. v. 2015, DEEUR 3745 with DNA barcode sample id TLMF Lep 26145 (658 bp[on]) & 2. vi. 2015, DEEUR 3748 with DNA barcode sample id TLMF Lep 19375 (658 bp[on]), C. Hviid, O. Karsholt & K. Larsen leg. (ZMUC).
- 1 ♂, Morocco, High Atlas, 5 km north of Ouirgane, 2. v. 2016, DEEUR 6724, C. Hviid, K. Larsen & D. Nilsson leg. (RCKL).
- 1 ♂, Portugal, Algarve, Santa Catarina da Fonte do Bispo, larva from *Ferula* 20. iv. 1993, e.p. 5. vi. 1993, specimen id P1638, M. Corley genitalia slide 424, M. Corley leg. (RCMC).
- 1 ♂, Portugal, Algarve, Loulé, Cerro de Apra, 5. v. 1995, specimen id P2757, M. Corley leg. (RCMC).
- 1 ♂, Portugal, Algarve, Loulé, Fonte de Apra, larva from *Smyrniolum olusatrum* 15. iii. 1996, e. p. 27. v. 1996, specimen id P3611, M. Corley leg. (RCMC).
- 1 ♂, Portugal, Algarve, São Romão, 11. xi. 2000, specimen id P5779, M. Corley leg. (RCMC).
- 1 ♂, Portugal, Algarve, Serra de Monte Figo, 19. v. 2002, specimen id P6410, M. Corley genitalia slide 1863, M. Corley leg. (RCMC).
- 1 ♀, Portugal, Algarve, Serra de Monte Figo, 37.1° N, 7.85° W, larva from *Foeniculum vulgare* iii. 2011, e.p. 2. v. 2011, specimen id P9811, DEEUR 0801 with DNA barcode sample id TLMF Lep 06983 (658 bp[on]), M. Corley leg. (RCMC).
- 1 ♂, Portugal, Algarve, São Romão, 41.25° N, 7.583° W, larva from *Smyrniolum olusatrum* iii. 2011, e.p. 3. v. 2011, specimen id P9813, DEEUR 0797 with DNA barcode sample id TLMF Lep 06998 (658 bp[on]), M. Corley leg. (RCMC).

- 1 ♂, Portugal, Algarve, São Romão, 41.25° N, 7.583° W, larva from *Smyrnum olusatrum* iii. 2011, e.p. 7. v. 2011, specimen id P9819, gen. prep. DEEUR 0807 with DNA barcode sample id TLMF Lep 06979 (658 bp[on]), M. Corley leg. (RCMC).
- 1 ♀, Portugal, Algarve, Serra de Monte Figo, 37.1° N, 7.85° W, larva from *Foeniculum vulgare* iii. 2011, e.p. 10. v. 2011, specimen id P9821, DEEUR 0795 with DNA barcode sample id TLMF Lep 07005 (658 bp[on]), M. Corley leg. (RCMC).
- 1 ♀, Spain, Chiclana, 26. v. 1880, e.l. “Fenchel” (*Foeniculum* sp.), [with hand written remark “sp.?” and with small, green circular additional label], DEEUR 5736, ex coll. Staudinger (ZMHU).
- 2 ♀, 1 ♂, Spain, e.l. “Fenchel” (*Foeniculum* sp.), ex coll. Staudinger, [obviously same collecting data as DEEUR 5736, but without detailed label data], DEEUR 5737 - 5739 (ZMHU).
- 1 ♂, 1 ♀, Spain, Chiclana, without further label data, ex coll. C.S. Larsen, DEEUR 3841-3842 (ZMUC).
- 2 ♂, Spain, Port Bou, 24. & 26. iv. 1967, e.l. *Foeniculum vulgare*, DEEUR 4212 (gen. prep.) & 4219, J. Klimesch leg. (ZSM).
- 1 ♂, Spain, Ebro Delta, Rionar, 2. v. 1986, e.l. “Fenchel” (*Foeniculum* sp.), DEEUR 4316, H. Retzlaff leg. (RCHR).
- 2 ♂, Spain, Gerona, Llanca, 7. vi. & 13. ix. 1991, DEEUR 1880-1881, Pavlas leg. (RCWP).
- 3 ♂, Spain, Granada, Albulol, 36.8° N, 3.2° W, 5. v. 2000, DEEUR 0743 with DNA barcode sample id TLMF Lep 07019 (658 bp[on]), DEEUR 0744 with DNA barcode sample id TLMF Lep 07023 (658 bp[3n]), DEEUR 0746, M. Corley genitalia slide 2305, P. Skou leg. (ZMUC).
- 1 ♀, Spain, Granada, Otivar, 7. v. 2000, DEEUR 7611, P. Skou leg. (ZMUC).
- 1 ♂, 1 ♀, Spain, Granada, Almunecar, 22. v. 2002 (♂, DEEUR 7595, S. Montagud genitalia slide 30-003) & 23. v. 2002 (♀, DEEUR 7592, S. Montagud genitalia slide 30-007), G. Jeppesen leg. (ZMUC, will be deposited in MNCN [Museo Nacional de Ciencias Naturales, Madrid]).
- 1 ♂, 1 ♀, Spain, Malaga, Sedella la Rahige, 16. v. 2006, DEEUR 2466 (♀) & 3786 (♂), P. Skou leg. (ZMUC).
- 1 ♀, Spain, Malaga, Rio Genal, 2. xi. 2009, gen. prep. DEEUR 2295, M. Fibiger & M. Top-Jensen leg. (ZMUC).
- 1 ♂, Spain, Canary Islands, Lanzarote, El Bosquecillo, 29.1167° N, 13.5167° W, 6. xi. 2018, DEEUR 7621 with DNA barcode sample id TLMF Lep 26145 (658 bp[on]), C. Hviid & B. Skule leg. (ZMUC).

## Description

**Adult:** Wingspan 22.5-26.5 mm. Head fuscous, scales tipped buff, face buff. Labial palp pinkish buff, segment 2 speckled fuscous on outer side and ventrally, segment 3 with a partial dark fuscous ring at base, a complete ring at two-thirds and tip. Antenna fuscous. Thorax light grey-brown with slight pinkish tinge. Forewing light brownish buff with faint pink tinge, with a scattering of dark fuscous scales; subdorsal spot dark fuscous; basal field buff, tinged pink, edged by broad dark fuscous basal fascia reaching dorsal margin of cell; costa with deep brown dot at base; costal spots blackish, extending along whole length of costa; terminal spots blackish; oblique dots blackish, another at end of cell, occasionally associated with one or two whitish scales; diffuse spot on costal margin of cell dark grey, indistinct; plical dot blackish; cilia light brownish buff, with two cilia lines. Hindwing light grey-buff, greyer towards termen, with a few dark grey spots between veins; cilia pale grey-buff with two or more cilia lines. Abdomen grey.

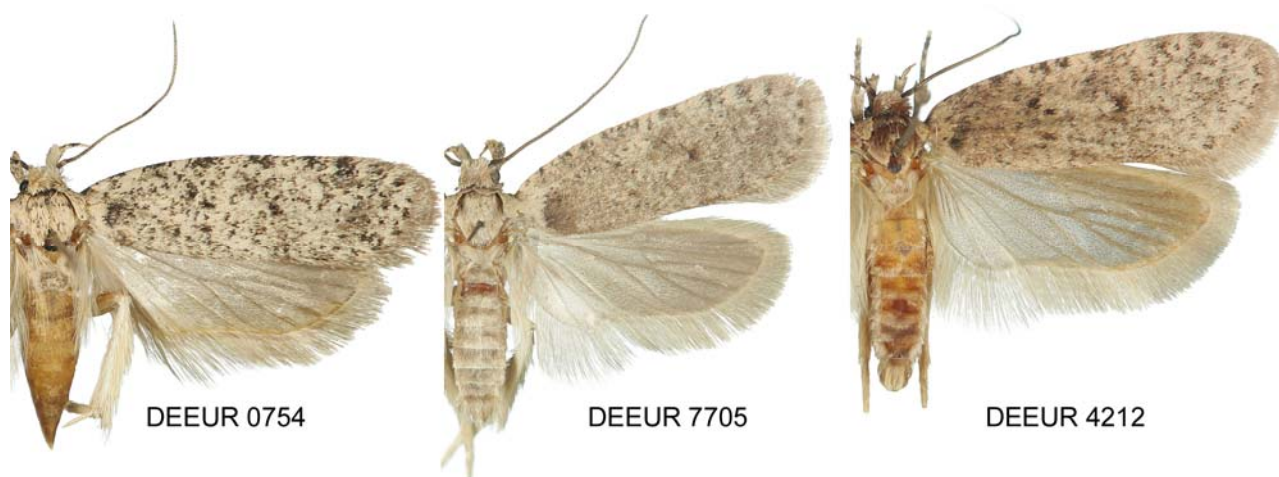
Variation. The pink tinge of reared specimens is usually lost in specimens collected by other means. Ground colour sometimes buff, to mid-brownish buff with weak pink tinge, but there is considerable variation in the amount of fuscous overlay and sometimes the overlaid coloration is light rusty-brown; there is also considerable variation in the amount and coloration of speckles scattered over the wing surface from nearly black to light grey or light brown; the oblique dots and end of cell dot vary in size, both absolutely and relative to one another; the diffuse spot is weak at best, but can be very faint. There is a form in Andalusia and Gibraltar, where the host-plant is *Ferula tingitana*, with creamy buff ground colour and black scales scattered all over wings.



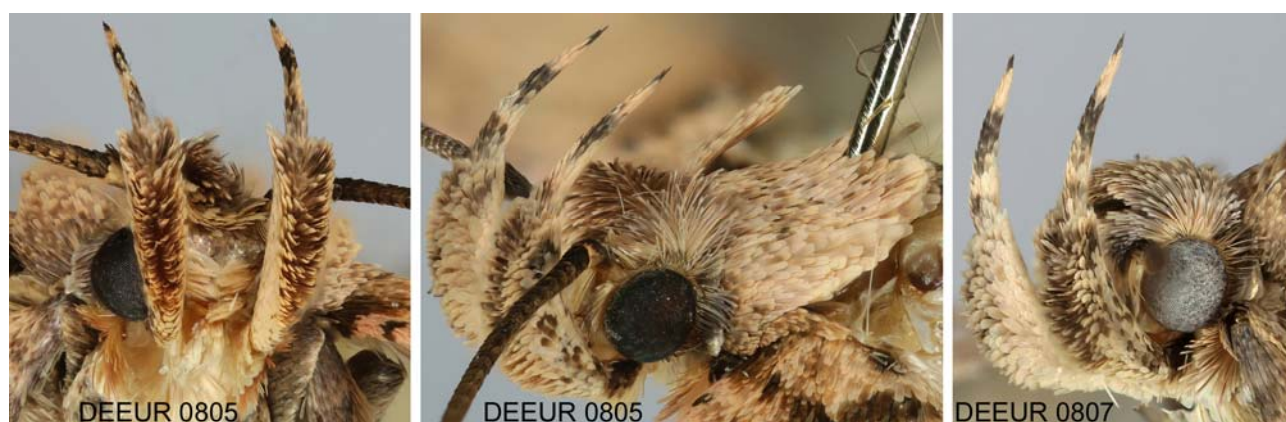
**FIGURE 1:** *Agonopterix olusatri*, holotype, general view and underside





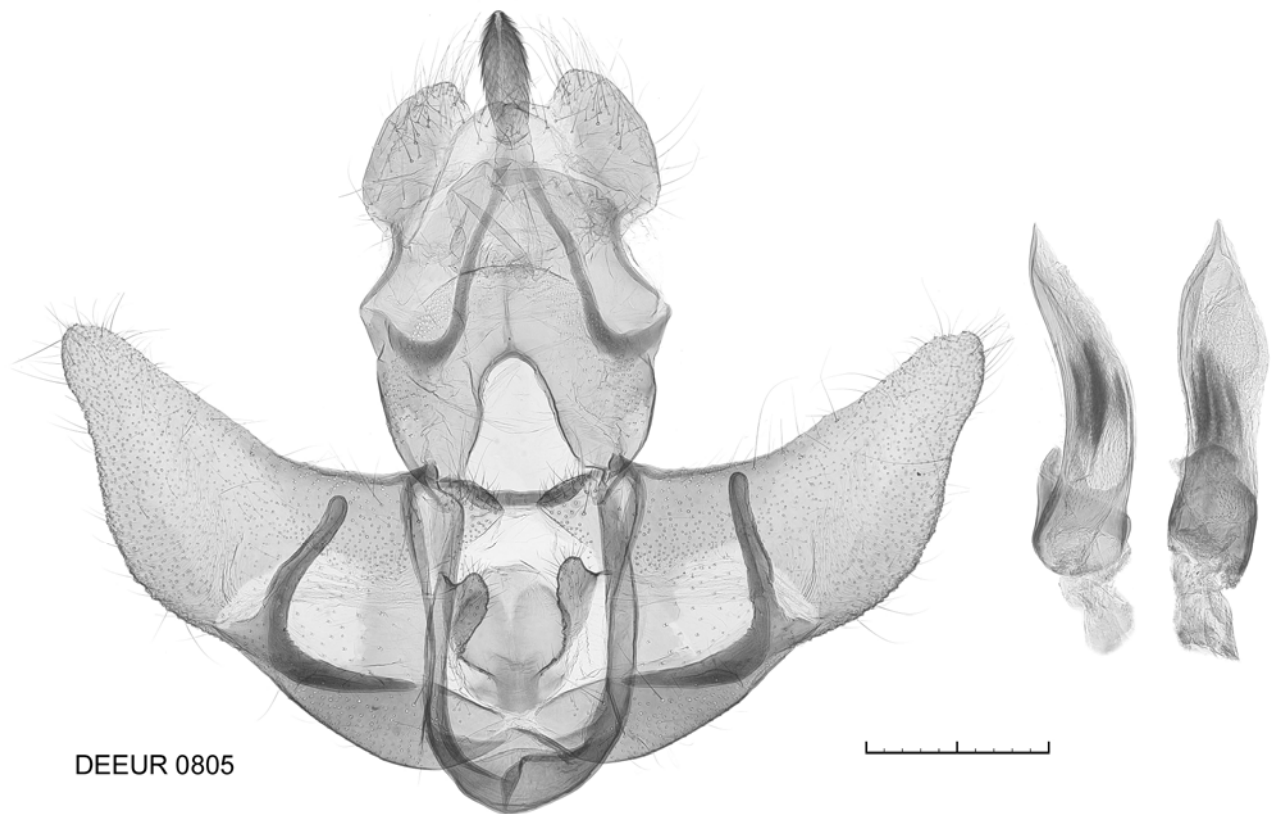


**FIGURE 2:** *Agonopterix olusatri*, 6 paratypes. For detailed data see paratype list

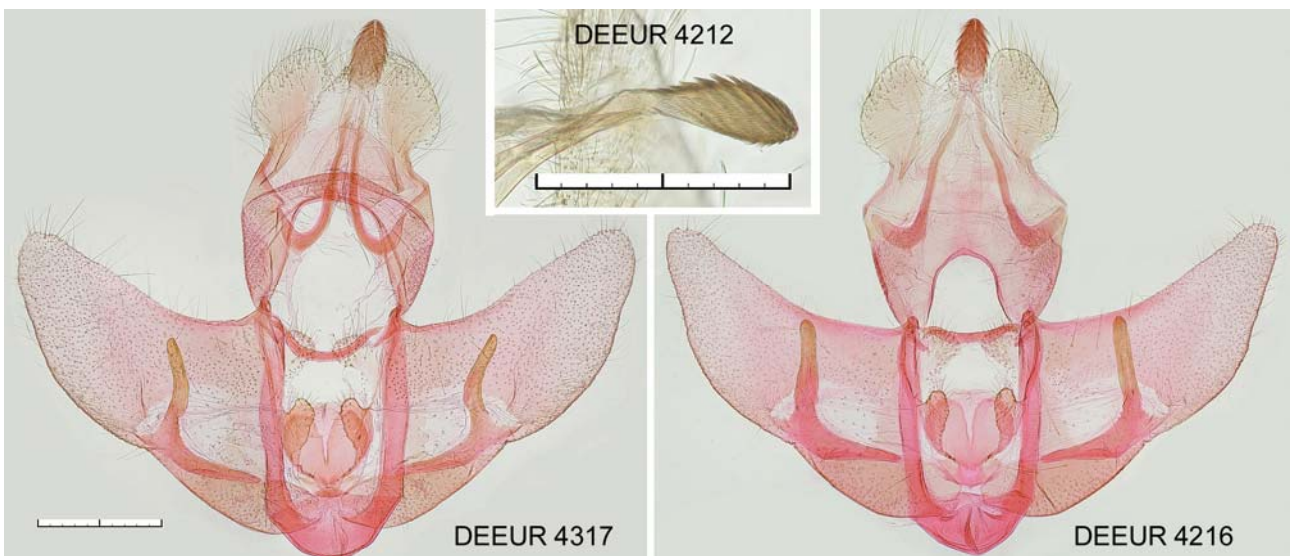


**FIGURE 3:** *Agonopterix olusatri*, head and labial palps frontal and lateral

**Male genitalia** (figs. 4-6, inserted scalebar = 1 mm, measurements refer to standard preparation): Socii large, broadly elliptic with 0.5 - 0.6 mm wide and 0.7 - 0.8 mm long, uncus triangular, indistinct, gnathos narrow elliptic, medium-sized with 0.3 mm wide and 0.6 mm long, overtopping socii in standard preparation by about half its length; transtilla narrow, not or very slightly widened medially, transtilla lobes semi-elliptic, 0.3 mm wide and long, gap between them 0.15 mm; anellus medium-sized, round, length/breadth 0.6/0.6 mm, gap to transtilla 0.3 - 0.4 mm, caudal margin with a distinct, V-shaped central incision filled with a thin membrane, anellus lobes medium-sized, with a distinct bulge toward transtilla which gives them a semicordate appearance, outer margin 0.4 - 0.5 mm, length 0.5 - 0.6 mm, width 0.3 mm; valva about 3.5 mm long and 1.5 mm broad at base; tapering to about 1.0 mm at origin of cuiller, then widening a little before evenly tapering to its rounded tip, cuiller 0.1 mm diameter, hardly tapering, very slightly bent outward or completely straight, just reaching costa or ending shortly (up to 0.2 mm) before it, blunt. Aedeagus 2 mm long, slightly bent (15 - 20°) in lateral view, diameter 0.4 mm except the somewhat swollen base where it reaches 0.5 mm, sclerotised basal parts with a total length of 0.7 mm, free section 0.3 mm, aedeagus in lateral view (basal process and concave edge must be on the left side!) with a distinct, U-shaped area paler than the rest, this area extending from tip to distal end of basal sclerotisation or nearly so (most important feature in male genitalia to separate from *A. thapsiella* and *A. chironiella*, where this area ends far from basal sclerotisation, for comparison see fig. 6); in ventral view about as wide as in lateral view, but somewhat expanded at about 3/5 from base up to 0.5 mm before tapering slightly asymmetrically to a sharp tip, free part of basal sclerotisation about as broad as aedeagus and terminating convex. Vesica (uneverted) with numerous tiny cornuti in 2 or 3 not clearly separable groups of about 1/3 of aedeagus length.

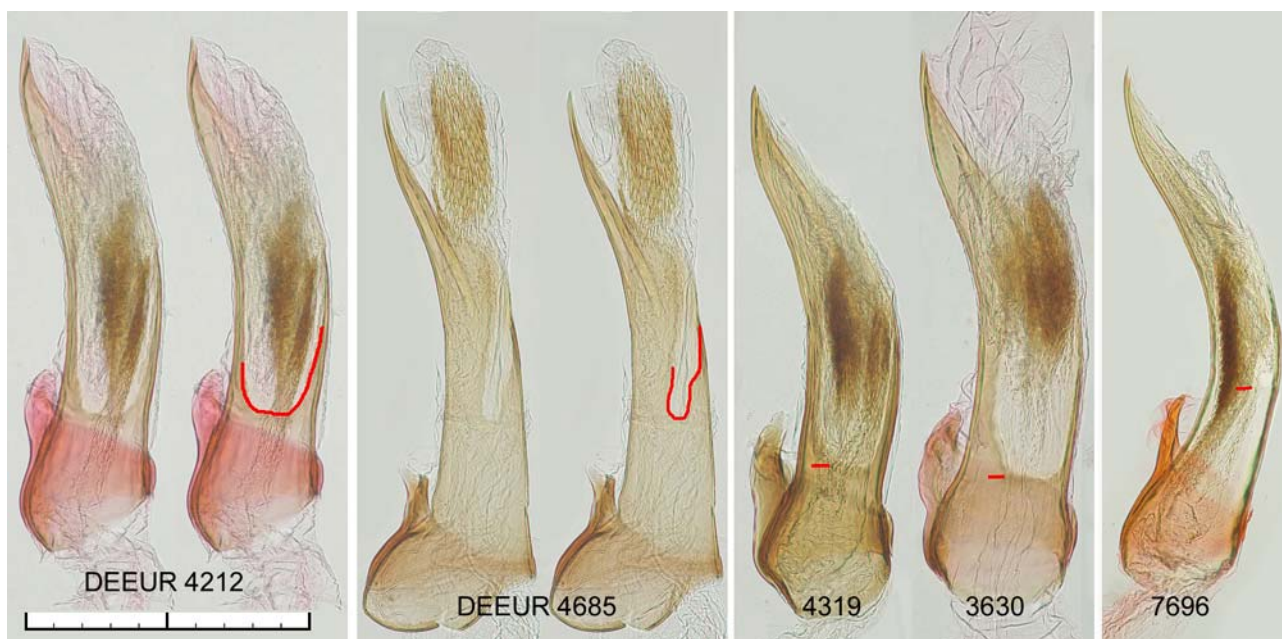


**FIGURE 4:** *Agonopterix olusatri*, holotype



**FIGURE 5:** *Agonopterix olusatri*, paratypes. DEEUR 4317 & 4216: valva-complex to show intraspecific variability, especially in shape of cuiller. Insert DEEUR 4212: gnathos, lateral view, photo taken from free-floating genitalia





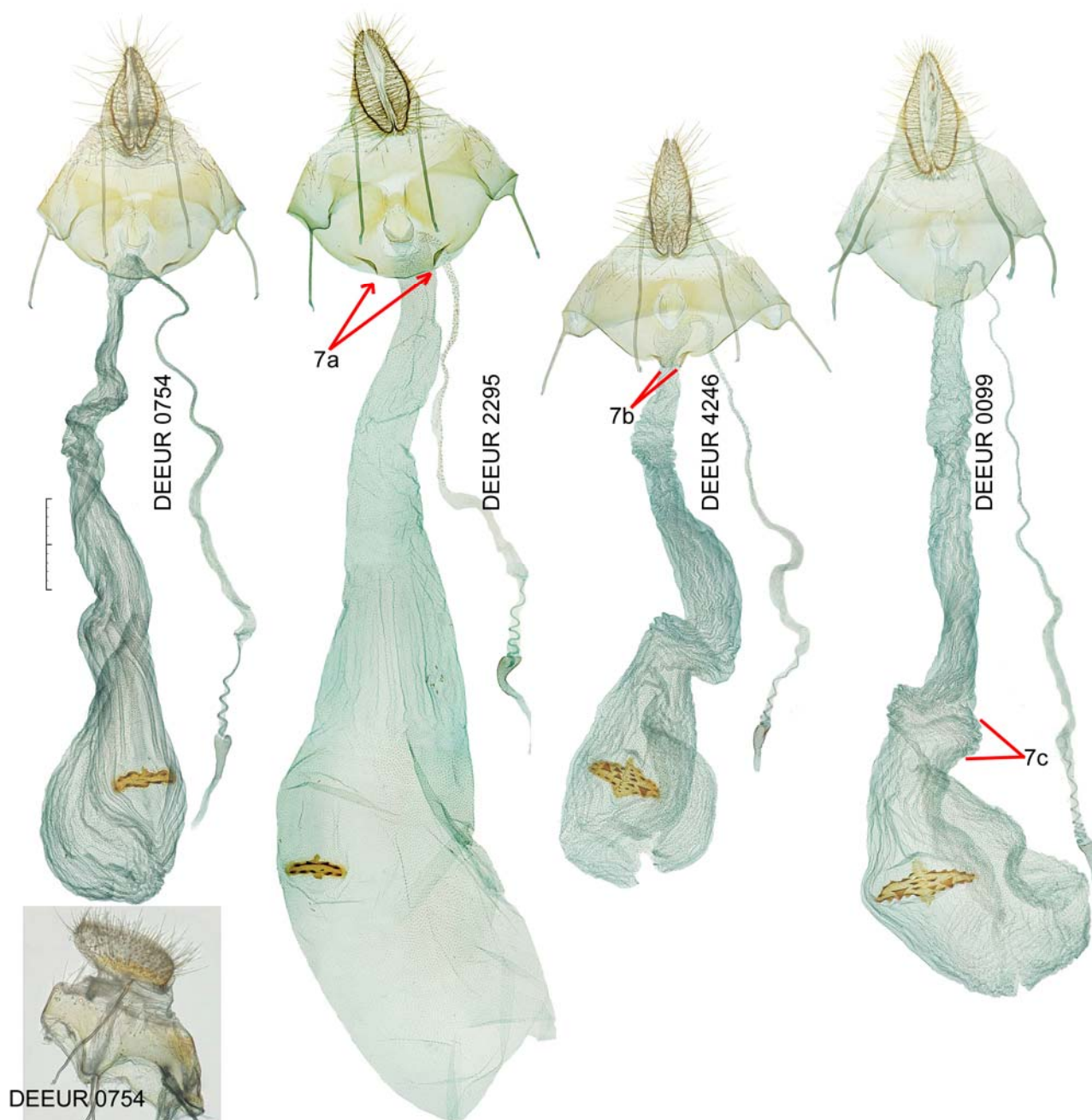
**FIGURE 6:** *Agonopterix olusatri* (DEEUR 4212, 4319 & 3630, detailed data in paratype list) *A. chironiella* (DEEUR 7696), and *A. thapsiella* (DEEUR 4685), aedeagus compared. DEEUR 4212 and 4685 figured twice, with the important structure highlighted in one copy.

DEEUR 4685: Greece, Crete, Ideon Andron, 23. vii. 2011, T. Nupponen leg. (RCKN).

DEEUR 7696: Italy, Puglia, Mt. St. Angelo, larva from *Opopanax chironium* 7. iv. 2016, e.p. 7. v. 2016, P. Sonderegger leg. (NMBE)

**Female genitalia** (fig. 7, inserted scalebar = 1 mm, measurements refer to standard preparation): Papilla analis about 1.2 mm long and 0.5 mm broad in lateral view, posterior apophysis 1.5 mm; sternite VIII 1.0 mm long, maximum width 2.7 mm in standard preparation, anterior apophysis 0.9 mm; distal edge of sternite VIII with an U-shaped excavation in its middle of about the width of ostium, proximal edge of sternite VIII evenly concave, with a fold of 0.25 - 0.3 mm length on either side, distance between inner ends of the folds 0.6 mm (fig. 7a, most important single feature to separate from *A. thapsiella* and *A. chironiella*, where these folds are at a distance of about 0.2 mm, fig. 7b), ostium in the middle of sternite VIII, round with a diameter of about 0.3 mm, ductus bursae starting with a width of about 0.2 - 0.4 mm without distinct structures apart from fine longitudinal folds (details of this area reflect life history - especially if the specimen has mated or not - rather than specific features, which makes a detailed description useless, compare fig. 7, DEEUR 0754 and 2295), gradually widening into corpus bursae, with maximum width about equalling transverse diameter of sternite VIII; signum remarkably small with a width/length of about 0.7/0.2 mm and with only a few teeth at its margin; origin of ductus spermathecae very close to the ostium and ending with about 4 turns.

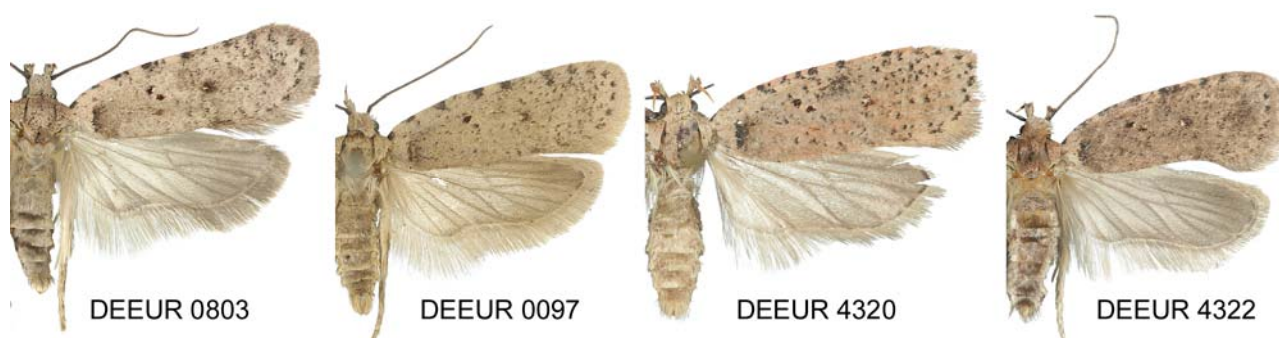




**FIGURE 7:** *Agonopterix olusatri* DEEUR 0754, DEEUR 2295. Insert in lateral view, free floating, DEEUR 0754. DEEUR 4246: *A. thapsiella*, Greece, Samos, Pyrgos, 10. v. 2010, P. Sonderegger leg. (NMBE). DEEUR 0099: *A. chironiella*, Gal. mer. [southern France], without date, ex coll. Constant (NHMW, may belong to type series).

### Diagnosis

Externally, it is not possible to distinguish the new species from *A. thapsiella* safely, but there are tendencies: in *A. olusatri* sp.n. the whitish dot at end of cell is usually absent but weak if present, the darker elements irregularly scattered throughout the ground colour of forewings are more diffuse and they extend to margin of basal field; in *A. thapsiella* whitish dot at end of cell usually distinct, darker elements irregularly scattered throughout the ground colour of forewings are more sharply contrasting, present in higher proportion in distal half of forewing, becoming less and sometimes even absent toward basal field. *A. chironiella* in its typical form (with large, distinct blackish spot in centre and ground colour grey, lacking rusty brown or pinkish tinge, fig. 9, DEEUR 1634) is easily discernable, but in specimens with reduced blackish central spot (fig. 9, DEEUR 4213 & 4214) and more warm brown ground colour (fig. 9, DEEUR 1596), only a more distinct whitish dot at end of cell can indicate the specific difference from *A. olusatri*.

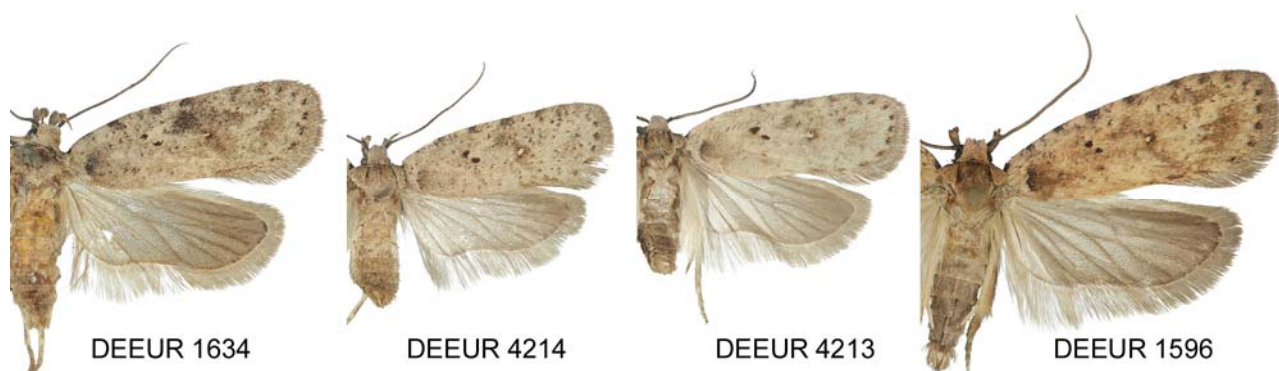
**FIGURE 8:** *Agonopterix thapsiella*

DEEUR 0803: Portugal, Algarve, São Romão, reared from *Thapsia transtagana*, larva iii. 2011, e.p. 28.iv.2011, M. Corley leg. (RCMC)

DEEUR 0097: France, "Gal. mer." [southern France] reared from *Thapsia villosa*, without date, Constant leg. (NHMW).

DEEUR 4320: Bulgaria, Russalka, 18. x. 2004, H. Retzlaff leg. (RCHR).

DEEUR 4322: Italy, Sardinia, Fluminimaggiore, 16. iv. 2008, N. Savenkov leg. (ECKU).

**FIGURE 9:** *Agonopterix chironiella*, all reared from *Opopanax chironium*

DEEUR 1634 (typical appearance): Italy, Mt. Vulture, mid of vi. 1967, Hartig leg. (TLMF).

DEEUR 4214 (with reduced central spot): Italy, Mt. Vulture, 20. vi. 1967, Hartig leg. (TLMF).

DEEUR 4213 (untypical pale specimen): Italy, Mt. Vulture, 30. v. 1966, J. Klimesch leg. (ZSM).

DEEUR 1596 (untypical warm brown): France, St. Anne d'Evenos, 12. iv. 1995 (larva?), J. Nel leg. (TLMF).

### Diagnosis based on male genitalia

To separate *A. olusatri* from *A. thapsiella* and *A. chironiella*, the feature of aedeagus mentioned in the description is sufficient: an U-shaped area paler than the rest on the left side, which extends from tip to distal end of basal sclerotisation or nearly so in *A. olusatri*, while in *A. thapsiella* and *A. chironiella*, this paler area is much smaller and ends near the middle, compare fig. 6. While in *A. olusatri* it is usually easy to find, it may be difficult to see or even nearly invisible in *A. thapsiella* and *A. chironiella*, if cornuti are just located in this area. Further differences, especially in shape of cuiller, exist and may be helpful, see fig. 10: male genitalia with cuiller either clearly exceeding costa of valva (DEEUR 0802), or remarkably thin and swollen at the end (DEEUR 1635) or distinctly swollen in basal half (DEEUR 3623) have not been found in *A. olusatri*.

**FIGURE 10:**

DEEUR 0802: *A. thapsiella*, Portugal, Algarve, São Romão, reared from *Thapsia transtagana*, larva iii. 2011, e.p. 22. iv. 2011, M. Corley leg. (RCMC).

DEEUR 1635: *A. chironiella*, Italy, Mt. Vulture, reared from *Opopanax chironium*, 16. vi. 1967, Hartig leg. (TLMF).

DEEUR 3623: *A. thapsiella*, Greece, Crete, Tzermiadou, 11. xi. 2004, W. Ruckdeschel leg. (TLMF).

### Diagnosis based on female genitalia

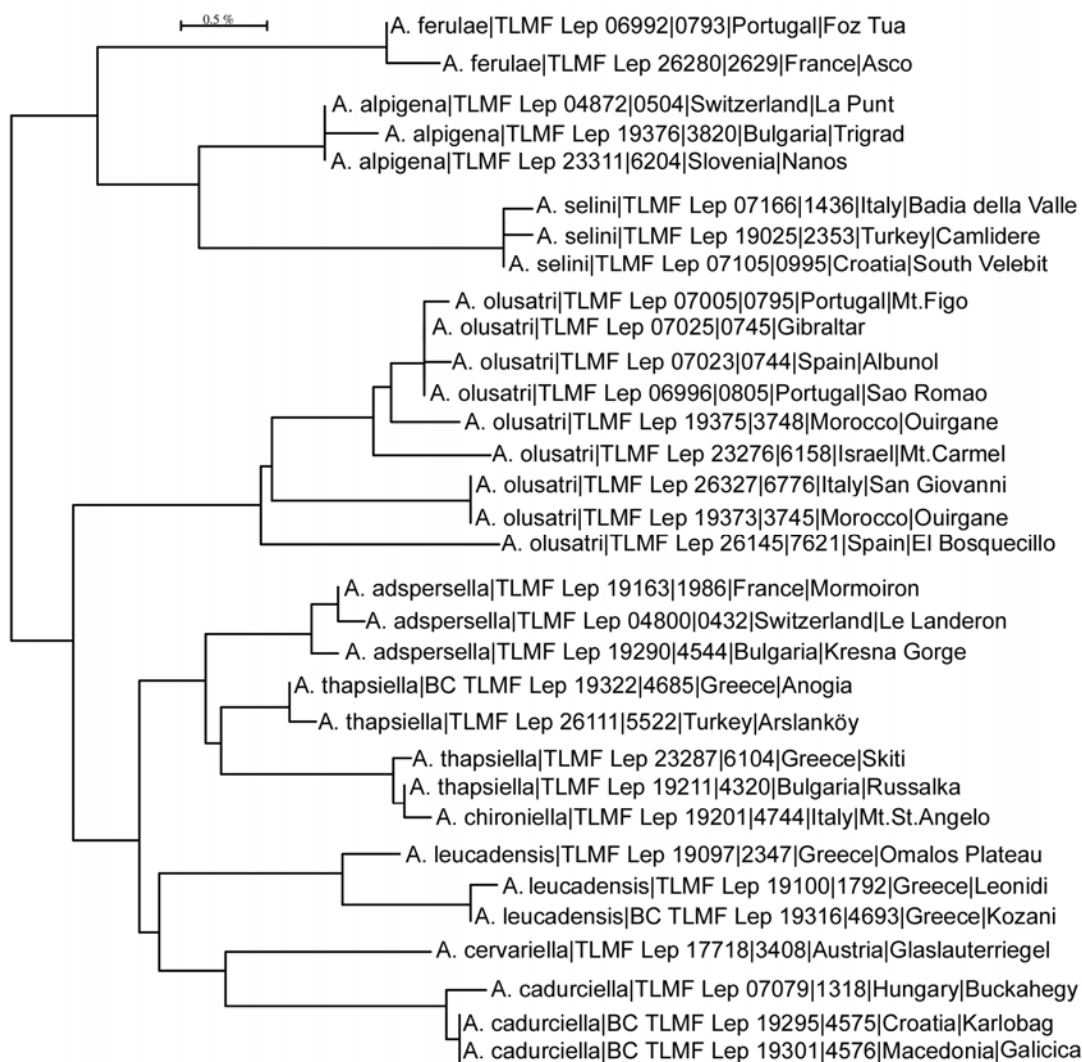
To separate *A. olusatri* from *A. thapsiella* and *A. chironiella*, the distance between the 2 folds in middle of proximal edge of sternite VIII mentioned in the description and shown in fig. 7 is sufficient: distance between inner end of folds 0.6 mm in *A. olusatri* (fig. 7a), about 0.2 mm in *A. thapsiella* and *A. chironiella* (fig. 7b). Diagnostic differences are also found in structure of ductus bursae: with fine longitudinal folds (may be indistinct in some specimens) over all its length in *A. olusatri*, but with a section of transverse folds before beginning of corpus bursae in *A. thapsiella* and *A. chironiella* (fig. 7c).

### Genetic data

15 specimens have been sequenced, here only mentioned with DEEUR-number and sample ID. Details concerning collecting place and sequence quality are found in the type list (paragraph "Material"). Further data are accessible via the public dataset [http://www.boldsystems.org/index.php/MAS\\_Management\\_DataConsole?codes=DS-DEEUR365](http://www.boldsystems.org/index.php/MAS_Management_DataConsole?codes=DS-DEEUR365).

DEEUR 0743: TLMF Lep 07019  
 DEEUR 0744: TLMF Lep 07023  
 DEEUR 0745: TLMF Lep 07025  
 DEEUR 0795: TLMF Lep 07005  
 DEEUR 0797: TLMF Lep 06998  
 DEEUR 0801: TLMF Lep 06983  
 DEEUR 0805: TLMF Lep 06996  
 DEEUR 0807: TLMF Lep 06979  
 DEEUR 1947: TLMF Lep 17723  
 DEEUR 3745: BC TLMF Lep 19373  
 DEEUR 3748: BC TLMF Lep 19375  
 DEEUR 4216: TLMF Lep 19251  
 DEEUR 6158: TLMF Lep 23276  
 DEEUR 6776: TLMF Lep 26327  
 DEEUR 7621: TLMF Lep 26145





**FIGURE 11:** Neighbour-joining tree, constructed with sequences from *Agonopterix adpersella* species group and *A. selini* (HEINEMANN, 1870), *A. ferulae* (ZELLER, 1847) and *A. alpigena* (FREY, 1870) as an outgroup.

The result corresponds well with the expected position, based on genitalia features: *A. olusatri* and all included species of the *Agonopterix adpersella*-group (*A. adpersella* (KOLLAR, 1832), *A. thapsiella*, *A. chironiella*, *A. cervariella* (CONSTANT, 1884), *A. leucadensis* (REBEL, 1932), *A. cadurciella* (CHRÉTIEN, 1914)) form a distinctly separated group of clusters. Despite the split into several subclusters with maximal intraspecific distance of 2.79 %, *A. olusatri*-sequences form a distinct cluster within this group. It is not possible to locate the closest related species within the *A. adpersella* group, either by barcode or by comparison of genitalia.

### Distribution

Portugal, Spain including Lanzarote (Canary Islands), Gibraltar, France, Italy (Sardinia, Sicily), Malta, Greece (Crete, Samos), Cyprus, Israel, Morocco.

### Larva

When full grown about 18 mm long, dull pale green, with three dull darker green dorsal lines, the central one narrowest; head yellow-green, with black marking on lateral margin; prothoracic plate pale green, with small black spot on each side in posterior angle; anal plate pale green; pinacula black; prothoracic legs yellow-green. Earlier instars have more black on the head.

### Remarks

Constant (1893) described *Depressaria chironiella* from France, from a series of moths reared from larvae found on *Opopanax chironium*. Hannemann (1953) examined French



specimens and figured the male genitalia. Subsequently the name became attached to a different species found in southern Europe. However, Constant's *chironiella* has a distinct white dot at end of cell and clearly belongs to *A. adpersella sensu lato*. Likewise his description of the larva also agrees with *thapsiella* and not with *olusatri*. The species that has until now been recognised as *A. chironiella* in southernmost Europe is different from Constant's *A. chironiella* and therefore needs a new name, which is provided here.

It is not clear how the name *chironiella* came to be used for *A. olusatri*. The earliest specimens we have found are in ZMHU, from Chiclana, Spain, reared by Staudinger from *Foeniculum* in 1880, but these had not been named. A specimen in ZSM collected by Klimesch in Sicily in 1952 was determined by Amsel as *A. chironiella* in 1954, which may be the original misidentification, but there is a possibility that there were other independent misidentifications. Vives (1985) listed *A. chironiella* for Spain but does not give the origin of the record. *A. olusatri* is represented under the name *chironiella* in NHMW.

The form of *A. olusatri* in southern Spain and Gibraltar with cream ground colour and heavy blackish speckling looks rather different, but has no difference in barcode from typical *A. olusatri*.

### Biology

Larva on *Ferula communis* L., *Foeniculum vulgare* Miller and *Smyrniolum olusatrum* L. (Corley, 2015); *Ferula tingitana* L. (C. Perez, pers. comm.).

In Portugal, larvae had been collected in March and specimens emerged end of April and first half of May; in Morocco one larva was found at end of January. Collected adults have predominantly been found in spring, from second half of April, followed by a distinct peak in May, decreasing in June. No specimen has been found in July or August. A few findings follow in autumn and early winter (late September to end December), some of these specimens are worn, but some are fresh, and one fresh female was collected in Sardinia on 1st February. Based on these data it is most likely that the adults aestivate for several months and eggs are laid in autumn or winter. At the moment this is only a hypothesis, it should be confirmed by larval findings.

### Etymology

The species name derives from one of the host-plants, *Smyrniolum olusatrum*.

### Acknowledgements

The authors are most grateful to Dr Laszlo Ronkay (HNHM), Dr David Lees (NHMUK), Dr Martin Lödl and Dr Sabine Gaal-Haszler (NHMW), Hannes Baur and Hans-Peter Wymann (NMBE), Ing. Jan Šumpich (NMPC), Dr Robert Trusch (SMNK), Dr Peter Huemer (TLMF), Dr Wolfram Mey (ZMHU), Dr Andreas Segerer (ZMS), Mr Ole Karsholt (ZMUC) and all the private collectors mentioned in this paper for the loan of specimens; to Charlie Perez (Gibraltar) for the gift of larvae from *Ferula tingitana*; the Canadian Centre for DNA Barcoding (Guelph, Canada), whose sequencing work was enabled by funding from the Government of Canada to Genome Canada through the Ontario Genomics Institute; Jan Šumpich for a final review and Prof Dr Ahmet Ö. Koçak for the offer to publish in this journal.

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