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Kasyniana shardana Baldizzone, sp. n. (Lepidoptera: Oecophoridae)

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Kasyniana shardana Baldizzone, sp. n. (Lepidoptera: Oecophoridae)

G. Baldizzone & J.-F. Landry

Abstract

This work describes *Kasyniana shardana* Baldizzone, sp. n., a species discovered in Sardinia. It closely resembles *K. diminutella* (Rebel, 1931) which occurs in continental Europe. The two species can be distinguished by their colouration, differences in male and female genitalia, and DNA barcode sequences (mitochondrial cytochrome c oxidase I, or COI gene).

KEY WORDS: Lepidoptera, Oecophoridae, *Kasyniana*, new species, Sardinia, genitalia, DNA barcode.

Kasyniana shardana Baldizzone, sp. n.
(Lepidoptera: Oecophoridae)

Resumen

Este trabajo describe una nueva especie *Kasyniana shardana* Baldizzone, sp. n., en Cerdeña. Se parece mucho a *K. diminutella* (Rebel, 1931) que se encuentra en Europa continental. Las dos especies pueden distinguirse por su coloración, diferencias en la genitalia del macho y de la hembra, y código de barras de la secuencia del ADN (mitocondrial citocromo c oxidasa I, o gen COI).

PALABRAS CLAVE: Lepidoptera, Oecophoridae, *Kasyniana*, nueva especie, Cerdeña, genitalia, código de barras ADN.

Introduction

In 2004, the first author and Paolo Triberti (Verona, Italy) surveyed Microlepidoptera in the WWF Nature Reserve of Monte Arcosu in southern Sardinia. Many interesting specimens were collected both within the Nature Reserve and in the surrounding areas. Among the Oecophoridae were several specimens closely resembling *Kasyniana diminutella* (Rebel, 1931) in habitus and size, but dark-grey coloured, instead of the usual yellowish ochre colouration typical of that species (Figs. 4-5). An examination of their genitalia revealed good and constant differences with *diminutella*. DNA barcode analysis conducted by the second author showed significant differences in mitochondrial COI congruent with the morphological differences. The Sardinia specimens represent a new species, which is described below.

Abbreviations

Bldz = Giorgio Baldizzone.

CNC = Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Canada.

PG = Genital preparation.

***Kasyniana shardana* Baldizzzone, sp. n. (Figs. 2-3)**

Holotype ♂: "SARDEGNA merid. | M.te ARCOSU (CA) | Paddera 600 m | 26-06-2004 (lux) | G. Baldizzzone & P. Triberti leg.", coll. Baldizzzone.

Paratypes: 4 ♀♀ (PG Bldz 14970), idem, coll. Baldizzzone; 1 ♀ with sampleID CNCLEP00029201, idem, CNC. 1 ♂ (PG Bldz 14968), 1 ♀: "SARDEGNA merid. | M.te ARCOSU (CA) | Perdu Melis | 25-06-2004 (lux) | G. Baldizzzone & P. Triberti leg.", coll. Baldizzzone. 1 ♂, 3 ♀♀ (PG Bldz 14956, 14969): "SARDEGNA merid. | Domusnovas (CA) | Sa Duchessa 350 m | 28-06-2004 | G. Baldizzzone & P. Triberti leg.", coll. Baldizzzone; 2 ♂♂ (PG Bldz 14967), 5 ♀♀, ibidem, 30-06-2004 (lux), G. Baldizzzone & P. Triberti leg.", 4 in coll. Baldizzzone, 1 in CNC with sampleID CNCLEP00029202; 3 ♂♂ (PG Bldz 14954), 3 ♀♀ (PG Bldz 14957), ibidem, 2-07-2004 (lux), G. Baldizzzone & P. Triberti leg.", coll. Baldizzzone. 23 ♂♂ (PG Bldz 14959, 14960), (1 with sampleID CNCLEP00076669, 1 with sampleID CNCLEP00076667) 2 ♀♀ (1 with sampleID CNCLEP00076668): "SARDEGNA sett. | Monte Pinu (OT) | loc. Austinacciu | 20-30-VI-2009 - lux | P. Barberis leg.", coll. Baldizzzone. 4 ♂♂: "SARDEGNA, Arbus (CA) dint. Piscinas, 23-VI-2004, legit G. Bassi", coll. Bassi. 1 ♂: "SARDEGNA, Porto Rotondo, Arzachena, 23-28-VI-2008, legit G. Bassi", coll. Bassi.

Description (Figs. 2-3): Wingspan 10-15 mm. Head brownish grey, slightly paler on vertex than on frons. Antenna brownish grey, first segment with an elongate, downwardly directed scale tuft. Labial palp short, brownish grey, darker on outer side, third article apically pointed, paler, about 4/5 length of second article. Thorax and tegulae uniformly grey or brownish grey. Forewing brownish grey with a slightly paler band along costa extended from base to 3/4; pale band more pronounced and paler dirty white in female than in male; wing with dark-tipped scales scattered throughout but denser in distal half; costal fringe brownish grey with some brown scales basally; dorsal fringe grey. Hindwing brownish grey with similarly coloured fringe. Abdomen dark grey. Female slightly smaller than male (10 mm vs 13 mm wingspan), forewing with apex more rounded, paler colouration, and wider and more pronounced pale costal band.

Male genitalia (Figs. 6-7, 14-17): Generally similar to those of *K. diminutella* as illustrated in TOKÁR *et al.* (1999, 2005). The most notable and constant differences are in the shape of the juxta and the aedeagus. In *shardana* (Fig. 7), the juxta base is smaller and the paired lobes are elongate, whereas in *diminutella* (Fig. 8), the base is broader and the paired lobes are proportionally shorter and more compact. In *shardana* (Figs. 14-17) the aedeagus is comparatively more elongate and narrower apically, with more numerous small dentate plates (cornuti) in the vesica wall, and with a large spine-like apical cornutus that is straight and comparatively twice as long as that of *diminutella*; in *diminutella* (Figs. 10-13) the apical cornutus of the aedeagus is slightly curved with a smaller and less sclerotized basal socket.

Female genitalia (Figs. 9, 21-23): Generally similar to those of *diminutella* but differing mainly in details of the ductus bursae: in *shardana* (Figs. 21-23) the sclerotized distal portion of the ductus (colliculum) is more sclerotized and narrowed anteriorly, posteriorly with a prominent, almost beak-like lateral protrusion at the inception point of the ductus seminalis; in *diminutella* (Figs. 18-20) the protrusion is proportionally smaller, the colliculum is more or less evenly cylindrical, and the signum larger.

Biology: Unknown for both *shardana* and *diminutella*. All *shardana* specimens were attracted to UV-light in typical Sardinian habitats of Mediterranean chaparral (macchia) with *Quercus ilex* (Fig. 1). Larvae possibly develop in the leaf litter.

Distribution: *Kasyniana shardana* is known only from Sardinia where it is distributed throughout the island. Possibly it could also occur in Corsica. *Kasyniana diminutella* is distributed in central, eastern, and southern Europe, including southern France, Italy, Sicily, Slovenia, Croatia, Albania; it is also known from Morocco and Asia Minor (TOKÁR *et al.*, 2005).

Etymology: The species epithet is derived from the ancient Shardana people, after which the island of Sardinia was probably named.

Genetic analysis

DNA sequences were produced at the Canadian Centre for DNA barcoding at the Biodiversity

Institute of Ontario, University of Guelph. Barcoded specimens were labelled with individual voucher codes (Sample IDs), databased, and photographed. DNA was extracted from 1-2 legs removed from adult moths. Primers LepF1 and LepR1 were used to sequence 658bp fragments from the 5' end of mitochondrial cytochrome c oxidase I -or COI- gene (HEBERT *et al.*, 2003; FLOYD *et al.*, 2009) following standard protocols (www.dnabarcoding.ca). All collecting data, images, sequences, and trace files were deposited in the Barcode of Life Database (BOLD) (www.barcodinglife.org) (RATNASINGHAM & HEBERT, 2007). Sequences were also deposited in GenBank. Sample IDs, Barcode IDs, and GenBank Accession numbers are listed in Table 1. Neighbor-joining (NJ) similarity tree and genetic distances were estimated with MEGA 5.05 (<http://www.megasoftware.net>; accessed 20 Sep 2011; TAMURA *et al.*, 2011) using the Kimura 2-parameter model of base substitution.

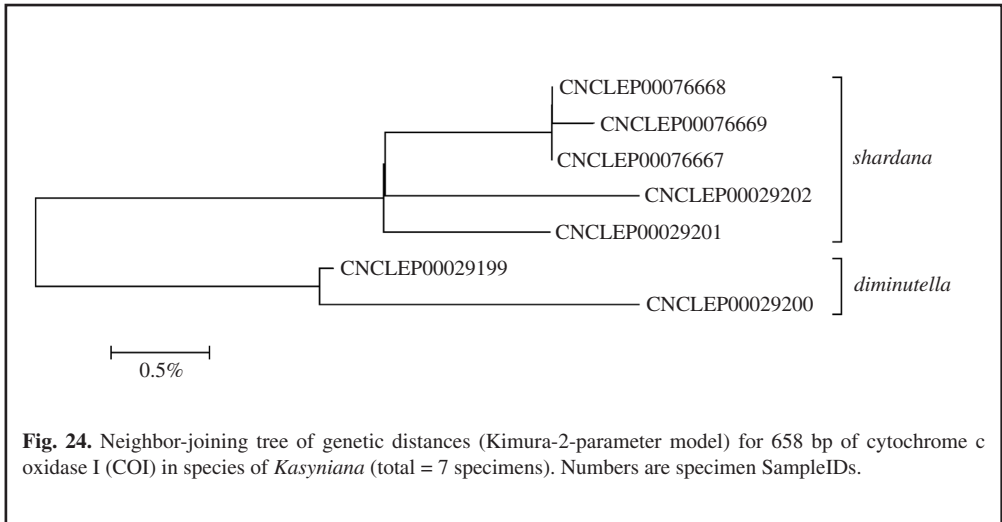
Species	Locality	Sample ID	Barcode ID	GenBank Accession	Sequence Length	BOLD Project Code
<i>K. diminutella</i>	Italy: Piedmont: Parco Nat. Reg. Capanne di Marcarolo	CNCLEP00029199	MPEA062-07	JN988473	657[0n]	KASYN
<i>K. diminutella</i>	Italy: Piedmont: Parco Nat. Reg. Capanne di Marcarolo	CNCLEP00029200	MPEA063-07	JN988472	497[13n]	KASYN
<i>K. diminutella</i>	Croatia: Krk Island, Branurine	CNCLEP00076670	MNAD914-11	n/a	0	KASYN
<i>K. diminutella</i>	Italy: Piedmont: Parco Nat. Reg. Capanne di Marcarolo	CNCLEP00076671	MNAD915-11	n/a	0	KASYN
<i>K. diminutella</i>	Italy: Sicily: Mt. Etna, Nicolosi	CNCLEP00076672	MNAD916-11	JN988471	658[0n]	KASYN
<i>K. diminutella</i>	Italy: Piedmont: Parco Nat. Reg. Alta Valle Pesio e Tanaro	CNCLEP00076673	MNAD917-11	n/a	0	KASYN
<i>K. shardana</i>	Italy: Sardinia: Mte Arcosu, Paddera	CNCLEP00029201	MPEA064-07	JN988470	658[0n]	KASYN
<i>K. shardana</i>	Italy: Sardinia: Dumusnovas, Sa Duchessa	CNCLEP00029202	MPEA065-07	JN988469	658[0n]	KASYN
<i>K. shardana</i>	Italy: Sardinia: Monte Pinu, Loc Austinacciu	CNCLEP00076667	MNAD911-11	JN274711	658[0n]	KASYN
<i>K. shardana</i>	Italy: Sardinia: Monte Pinu, Loc Austinacciu	CNCLEP00076668	MNAD912-11	JN274712	658[0n]	KASYN
<i>K. shardana</i>	Italy: Sardinia: Monte Pinu, Loc Austinacciu	CNCLEP00076669	MNAD913-11	JN274713	658[0n]	KASYN

Table 1.– Sample information for specimens of *Kasyniana* included in the DNA barcode analysis. Sample IDs are specimen identifiers; Barcode IDs (or Process IDs in BOLD) are sequence identifiers. Details of collecting data, images, sequences, and trace files for the 11 specimens listed are in the Barcode of Life Database (BOLD) (www.barcodinglife.org) in the project codes indicated.

Barcodes were analyzed for 7 specimens of *K. shardana* (5 paratypes) and 4 specimens of *K. diminutella*. Three of the *diminutella* specimens inexplicably failed to yield sequences despite the fact that they were quite recently collected (2003–2008). One specimen of *shardana* yielded a short, low-quality barcode with several ambiguous positions. Despite mixed sequencing results, the barcoded specimens clustered congruently with their respective morphologically defined species (Fig. 24). The sequence divergence between the two species was 3.47 ± 0.78 %. However, intraspecific variation was surprisingly high (Table 2). Barcode sampling was very limited but for *shardana* would suggest a relatively high level of haplotype variation within a relatively small geographic area. The situation with *diminutella* is less clear due to the uncertainty introduced by the incomplete sequence of one of the specimens.

	<i>K. diminutella</i>	<i>K. shardana</i>
<i>K. diminutella</i> [2]	1.69 ± 0.59	
<i>K. shardana</i> [5]	3.47 ± 0.78	1.45 ± 0.37

Table 2.– Percent mitochondrial cytochrome c oxidase I (COI) sequence divergence between species of *Kasyniana* (mean ± standard error). Cells below diagonal = net between-species mean distances in %. Diagonal (shaded) cells = mean within-species distances in %. Number of sequences in square brackets after species names.



Acknowledgements

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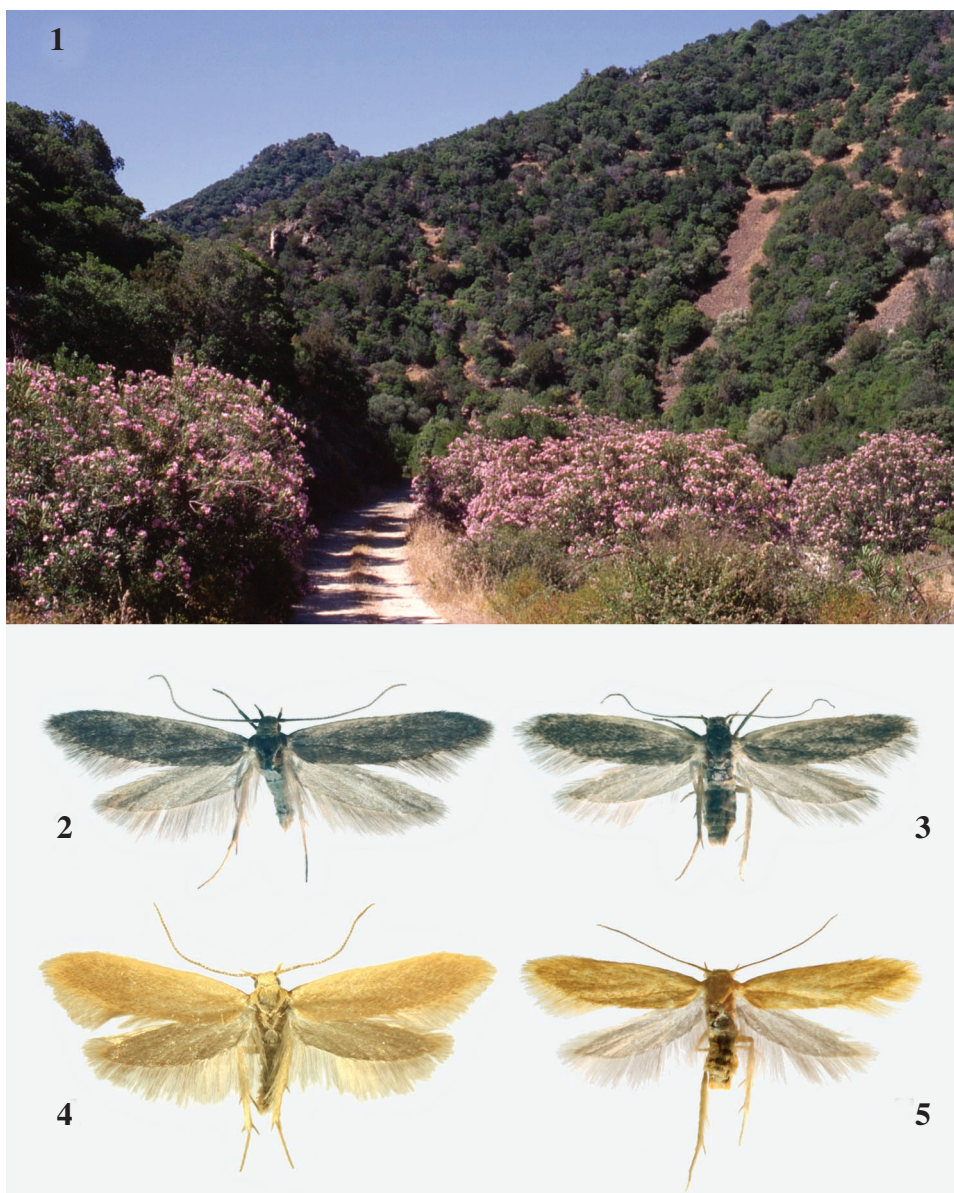
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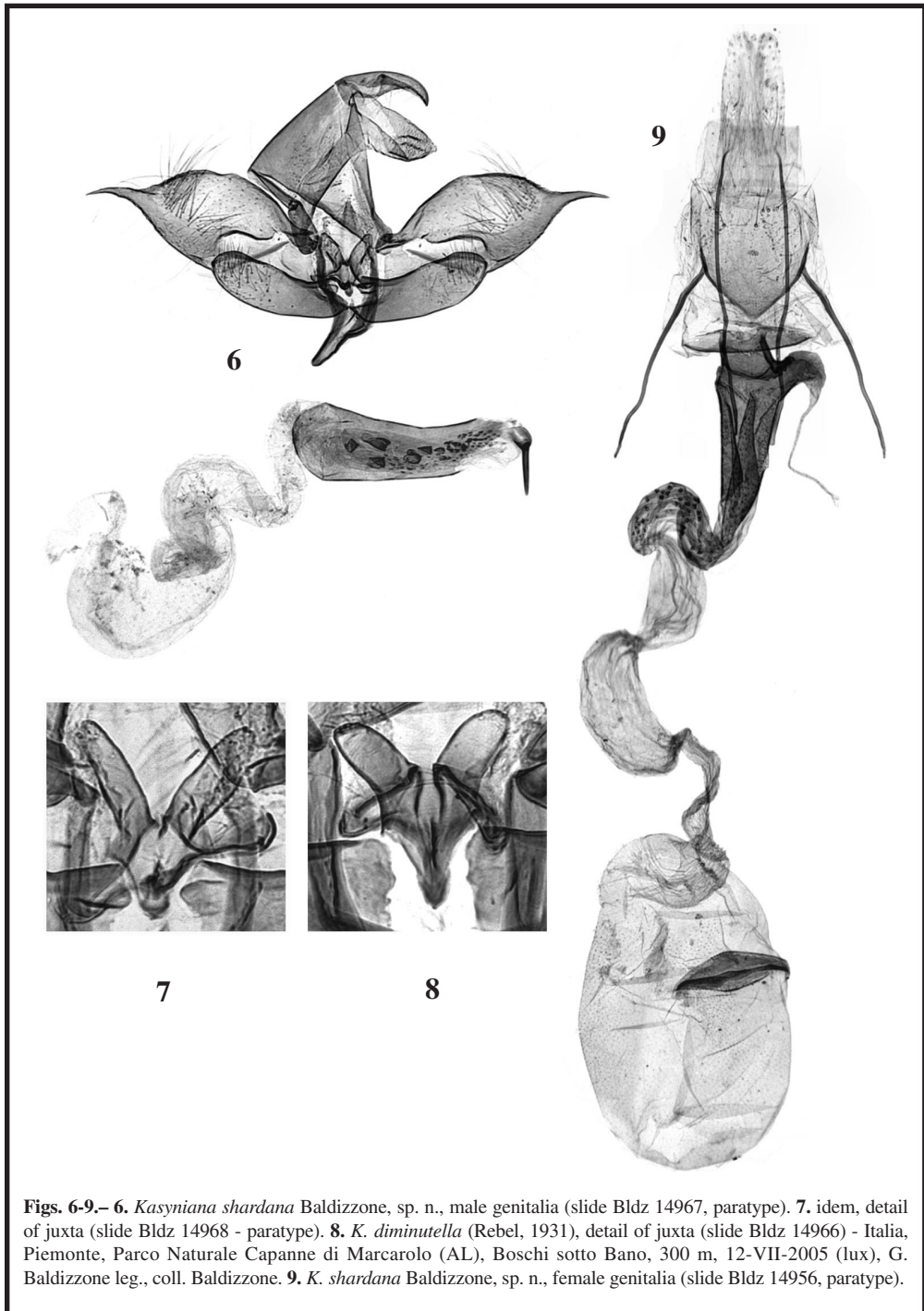
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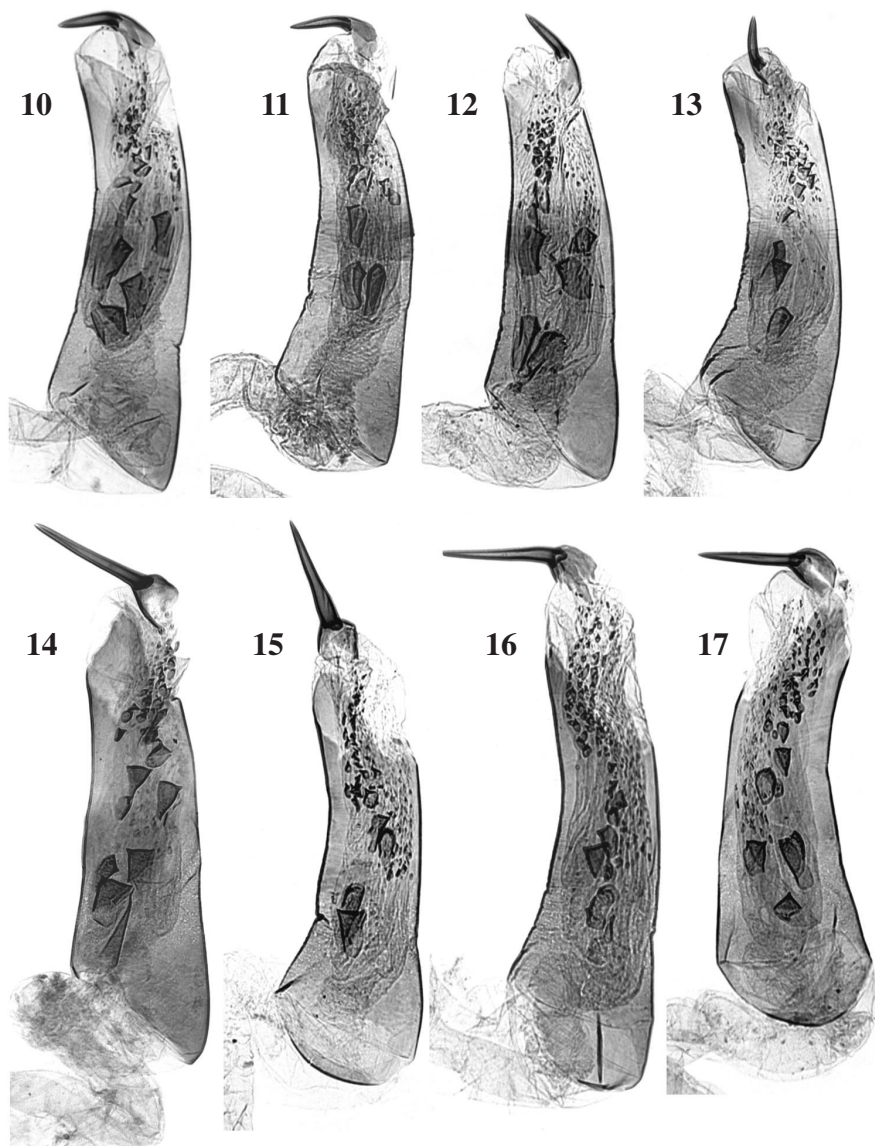
(Publicado / *Published* 30-VI-2012)



Figs. 1-5.— **1.** Sardinia, Oase WWF “Monte Arcosu”, “Rio Gutturreddu” Valley (photo G. Baldizzone). **2.** *Kasyniana shardana* Baldizzone, sp. n. ♂, holotype (wingspan 13 mm). **3.** *K.shardana* Baldizzone, sp. n. ♀, paratype (wingspan 11.5 mm) - Sardegna merid., Monte Arcosu, Paddera, 600 m, 28-VI-2004, lux, leg. G. Baldizzone & P. Triberti. **4.** *K. diminutella* (Rebel, 1931), ♂ (wingspan 14 mm) - Italia, Piemonte, Asti, Boschi di Valmanera, 16-VII-1975, G. Baldizzone leg. **5.** *K. diminutella* (Rebel, 1931) ♀ (wingspan 12 mm) - Italia, Piemonte, Parco Naturale Capanne di Marcarolo (AL), str. Cirimilla-Capanne, 350 m, 6-VII-2006 (lux), G. Baldizzone leg., coll. Baldizzone.



Figs. 6-9.– 6. *Kasyniana shardana* Baldizzone, sp. n., male genitalia (slide Bldz 14967, paratype). 7. idem, detail of juxta (slide Bldz 14968 - paratype). 8. *K. diminutella* (Rebel, 1931), detail of juxta (slide Bldz 14966) - Italia, Piemonte, Parco Naturale Capanne di Marcarolo (AL), Boschi sotto Bano, 300 m, 12-VII-2005 (lux), G. Baldizzone leg., coll. Baldizzone. 9. *K. shardana* Baldizzone, sp. n., female genitalia (slide Bldz 14956, paratype).



Figs. 10-17.– **10-13.** *K. diminutella* (Rebel, 1931), male aedeagus: **10.** (slide Bldz 14966) Italia, Piemonte, Parco Naturale Capanne di Marcarolo (AL), Boschi sotto Bano, 300 m, 12-VII-2005 (lux), G. Baldizzone leg., coll. Baldizzone. **11.** (slide Bldz 14953) Italia, Piemonte, Asti, Boschi di Valmanera, 16-VII-1975, G. Baldizzone leg., coll. Baldizzone. **12.** (slide 14961) Italia, Piemonte, Parco Naturale Capanne di Marcarolo (AL), Cascina Macerona, 500 m, 21-VI-2005 (lux), G. Baldizzone leg., coll. Baldizzone. **13.** (slide Bldz 14964), Croatia, Krk Isl., Vrh, 9-VIII-1975 (lux), G. Baldizzone leg., coll. Baldizzone. **14-17.** *K. shardana* Baldizzone, sp. n., idem: **14.** (slide Bldz 14968, paratype). **15.** (slide Bldz 14959, paratype). **16.** (slide Bldz 14954, paratype). **17.** (slide Bldz 14967, paratype).



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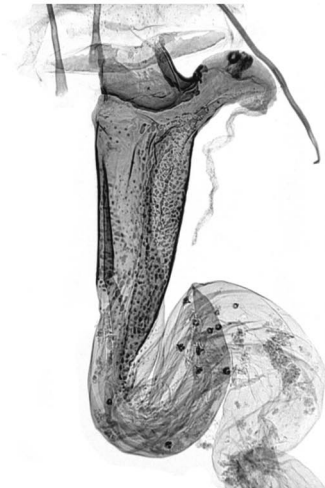
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Figs. 18-23.– **18-20.** *K. diminutella* (Rebel, 1931), female genitalia, detail of distal section of ductus bursae and colliculum. **18.** (slide Bldz 14965) Croatia, Is. Krk, Branužine, sotto Mt. Hlam, 180 m, 29-VII-2008 (lux), G. Baldizzone leg., coll. Baldizzone. **19.** (slide Bldz 14955) Italia, Piemonte, Asti, Boschi di Valmanera, Oasi WWF, 180 m, 19-VII-2004 (lux), G. Baldizzone leg., coll. Baldizzone. **20.** (slide Bldz 14962) Italia, Piemonte, Parco Naturale Capanne di Marcarolo (AL), Laghi della Lavagnina, 370 m, 28-VI-2005 (lux), G. Baldizzone leg., coll. Baldizzone. **21-23.** *K. shardana* Baldizzone, sp. n., idem: **21.** (slide Bldz 14957, paratype). **22.** (slide Bldz 14970, paratype). **23.** (slide Bldz 14969, paratype).