

# The genus *Tegostoma* in Armenia, with description of a new species (Crambidae, Odontiinae)

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**Abstract.** A small but beautifully coloured species of *Tegostoma* Zeller, 1847, which was collected by the authors in Armenia, has turned out to be unnamed and is here described as *Tegostoma burtoni* sp. nov. The description is supported by morphology and DNA barcodes. Photographs of the adults and genitalia of both sexes are provided. *Tegostoma lepidalis* (Herrich-Schäffer, 1851) and *Pyrausta gulpembe* Kemal & Koçak, 2018 are recorded as new species for Armenia.

## Introduction

The genus *Tegostoma* Zeller, 1847 comprises 31 species (Nuss et al. 2003–2022). The authors' concept accepts the synonymization of some genera with the genus *Tegostoma*, namely *Anthophilodes* Guenée, 1854 and *Anthophilopsis* Ragonot, 1891 as proposed by Amsel (1949: 305, 1970: 63), and this taxonomic status is also followed in Lepiforum (2008–2021). However, some current works consider these genera to be valid, including the genus *Aeschremon* Lederer, 1863 for *T. disparalis* (Herrich-Schäffer, [1855]), e.g., Slamka (2006) and Anikin et al. (2017). We follow the systematic arrangement proposed by Nuss et al. (2003–2022), however, we are aware that generic combinations of some taxa may not be final. Phylogenetic studies including the type species of all generic names are needed to shed more light on this issue.

The aim of this contribution is to present the description of a new species, which is very conspicuous by its external appearance. Apart from consulting relevant literature, we have continuously searched for this species in various museum collections, including the museums in Vienna, Berlin and St Petersburg, which in Lepidoptera from Armenia, and where it would be easily recognizable due to its striking colouration. As a result, we came to the conclusion that this is a hitherto undescribed species, the description of which we present here.

## Materials and methods

### Specimens

The study material collected was attracted at ultraviolet light (8W/12V tubes and 80W mercury vapour bulbs) installed in portable light traps.

### DNA Barcoding

Tissue samples (dry legs) from specimens of *Tegostoma* and *Pyrausta gulpembe* were successfully processed at the Canadian Centre for DNA Barcoding (CCBG, Biodiversity Institute of Ontario, University of Guelph) (deWaard *et al.* 2008), resulting in 576–658 base-pair DNA barcode segments of the mitochondrial COI gene (cytochrome c oxidase 1). The sequences together with details of the sequenced voucher specimens were uploaded to the Barcode of Life Data Systems (BOLD; Ratnasingham and Hebert 2007). Degrees of intra- and interspecific variation of DNA barcode fragments were calculated under the Kimura 2-parameter model of nucleotide substitution using the analytical tools of BOLD. A neighbour-joining tree of DNA barcode data of selected taxa (Fig. 13) was constructed using MEGA 6 (Tamura *et al.* 2013) under the Kimura 2 parameter model for nucleotide substitutions.

### Photographic documentation

The pinned specimens were photographed with a Canon 750D camera and a Canon MP-E-65 mm lens. Genitalia preparations were photographed with a Canon EOS 200D camera mounted on an Olympus CX31 stereomicroscope.

### Terminology

The descriptions of the genitalia and the descriptions of the wing patterns are based on the terminology in Slamka (2006, 2013).

### Abbreviations of collections

<b>ECKU</b>	Collection of Ecology-Centre, Kiel University, Germany
<b>LNMH</b>	Latvian National Museum of Natural History
<b>NMPC</b>	National Museum, Prague, Czech Republic
<b>NRC</b>	Collection of Nature Research Center, Vilnius, Lithuania
<b>ZMUC</b>	Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark

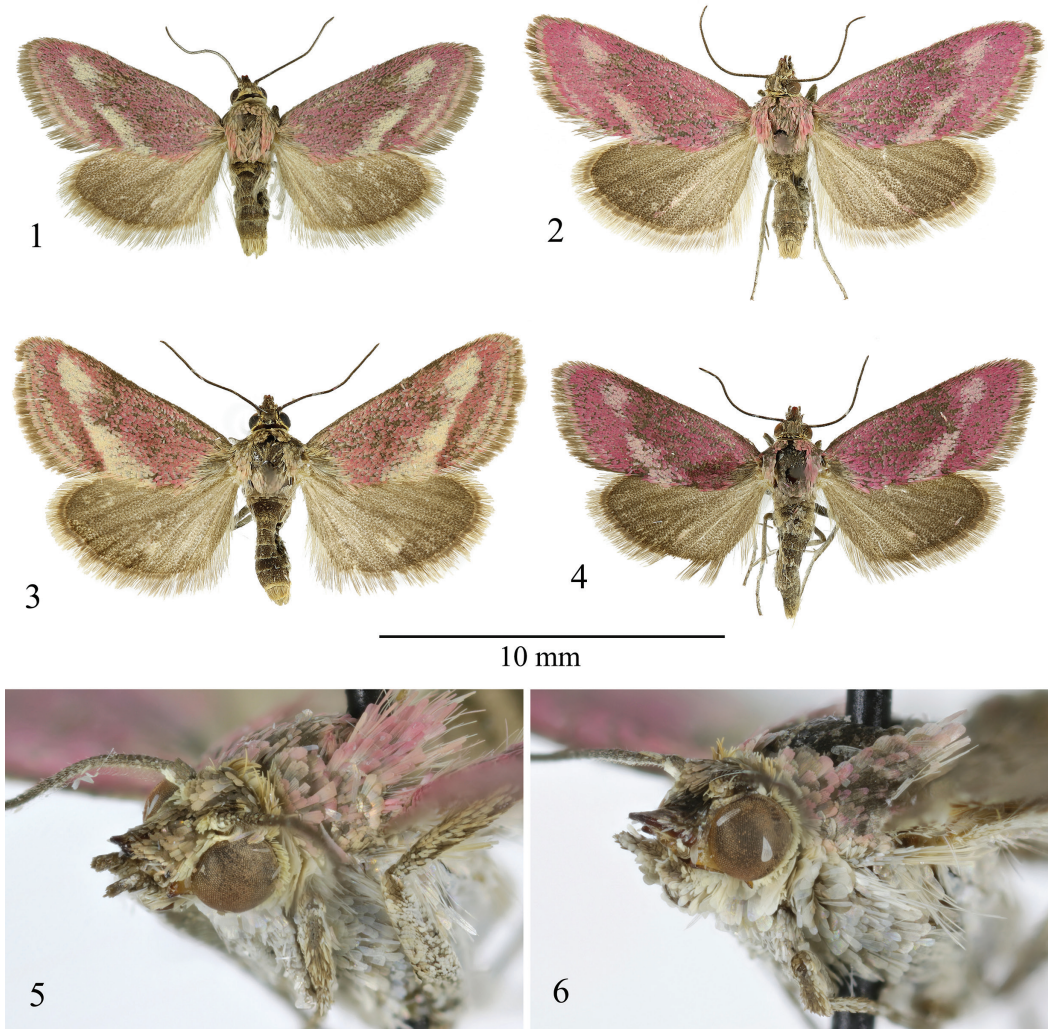
## Results

### *Tegostoma burtoni* sp. nov.

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Figs 1–12

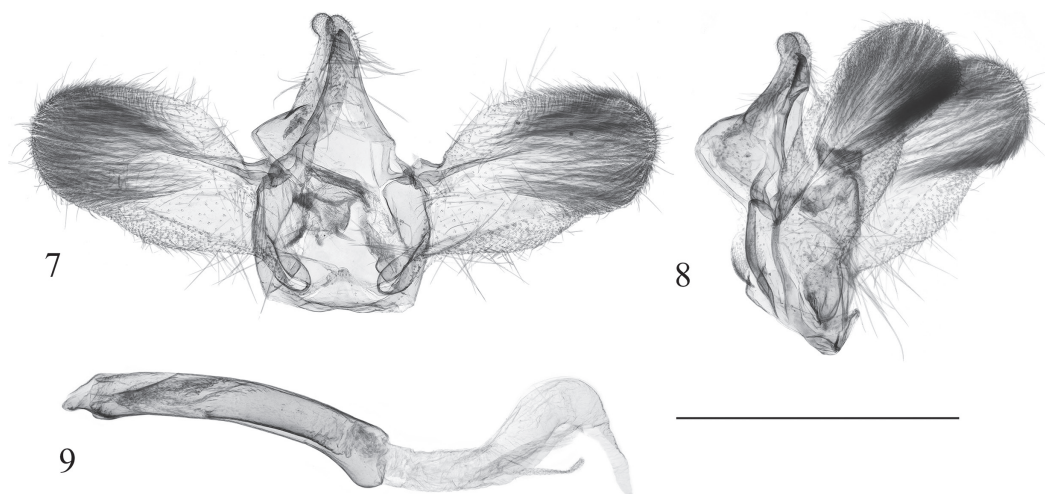
**Material examined. Type material. Holotype** ♂: Armenia mer., Vedi env., Goravan vill., Gorovan Sands, 956 m, 39°53'20"N, 44°43'58"E, sandy steppe, 31.v.2017 (Barcode NMPC-Lep-0714), Jan Šumpich leg. (NMPC). **Paratypes:** 40 ♂, 5 ♀, same data as holotype (gen. slides 22025, 22026 and 22027 J. Šumpich) (Barcode NMPC-Lep-0713) (NMPC); 71 ♂, 13 ♀, same data as holotype, but 910 m, 39°53'35"N, 44°43'03"E, 25.–27.v.2019, O. Karsholt, H. Roweck & N. Savenkov leg. (ECKU, ZMUC, LNMNH).



**Figures 1–6.** *Tegostoma burtoni* sp. nov. 1–4. Adults: 1. Holotype, male; 2–4. Paratypes; 2–3. Males; 4. Female; 5–6. Head (enlarged): 5. Male; 6. Female. All coll. NMPC.

**Diagnosis.** *Tegostoma burtoni* sp. nov. is similar to some other *Tegostoma* species, mainly *T. lepidalis* (Herrich-Schäffer, 1851), and to *Pyrausta gulpembe* Kemal & Koçak, 2018 in external appearance, but it differs by its smaller wingspan. It differs from all *Tegostoma* species of comparable size by the distinctive purple colour of the forewings.

**Description. External appearance** (Figs 1–6, 12). Forewing length ♂: 13.4–15.0 mm (mean 14.8), ♀: 14 mm. Vertex covered by ochreous scales, maxillary palpus short, brown with yellowish scales, collar of yellow scales around the eyes and the caudal border of the head. Antennae filiform ciliate, cilia whitish, flagellomeres black dorsally but distinctly white ventrally, scape brown, yellowish ventrally. Patagia, tegulae and thorax usually pinkish to purplish, with admixtures of brownish scales. Forewings pinkish to purplish with discontinuous pale postmedial fascia and a very narrow pale subterminal fascia, often not present; postmedial fascia pale buffish almost



**Figures 7–9.** Male genitalia of *Tegostoma burtoni* sp. nov. **7.** Ventral view; **8.** Lateral view; **9.** Aedeagus. Scale bar: 1 mm.

parallel to termen and of irregular width, subterminal fascia pale buffish almost parallel with termen. Fringes brown, proximal third paler. Hindwings brown, distinctly darker near margin, distinctly paler basally. Fringes ochreous, brown in the basal third.

**Variation.** Sexual dimorphism not observed, it seems females differ in smaller size and less pronounced light fascia. The ground colour of most specimens is pinkish to purple, however, this is less pronounced in some specimens. Both fasciae are always paler compared with the ground colour but in some specimens they can be yellowish-buff, not pinkish. Specimens with a pinkish streak usually do not have a pale marginal line.

**Male genitalia.** (Figs 7–9). Valva 1.6 times as long as wide, ovoid, dorsal margin slightly convex, sacculus slightly rounded caudally, rounded apex with a setose tuft. Saccus nearly rectangular with a slightly concave depression. Tegumen triangular, distinctly protuberant posteriorly, uncus bilobed, lobes rounded distally, gnathos strongly sclerotised, narrow, with two points on the distal margin, not reaching the distal margin of the uncus. Vinculum elongate, slightly more than twice as broad as long. Aedeagus narrow, slightly curved, bluntly pointed; vesica stoutly compressed in distal third resembling a broad, oblong cornutus [“denticulate plate” sensu Slamka (2013)], bulbus ejaculatorius membranous, as wide as aedeagus, without lamina.

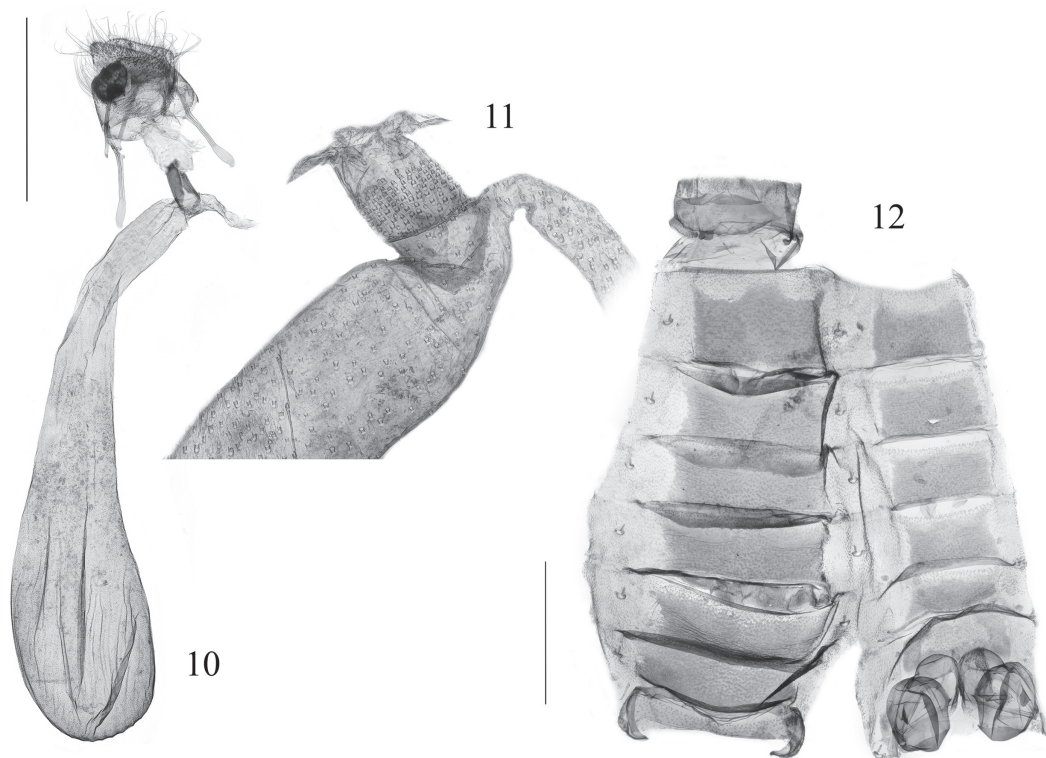
**Female genitalia** (Figs 10–11). Papillae anales rectangular, slightly elongate laterally, apophyses posteriores short, 2/3 the length of the apophyses anteriores. Ostium bursae broad, membranous. Antrum narrow, sclerotised, in the shape of a coiled leaf. Ductus bursae comparatively narrow, membranous, continuously gradually expanding anteriorly, and eventually becoming the bursa copulatrix, which is an elongate ovoid, membranous, without signa.

**Molecular data.** BIN: BOLD:AEL8899 ( $n = 2$ ). The intraspecific average distance of the barcode region is 0.0% ( $n = 2$ ). The minimum distance to the nearest neighbour, *Tegostoma lepidalis*, is 3.24% (Fig. 13).

**Distribution.** Armenia.

**Biology.** The new species was collected in sandy habitats with sparse vegetation at an altitude of about 1000 m (Fig. 16). The type locality, Gorovan Sands is one of the steppe habitats in





**Figures 10–12.** Female genitalia and male abdomen of *Tegostoma burtoni* sp. nov. **10.** General view of the female genitalia; **11.** Detail of ostium area (different view of the same genitalia slide, photographed before being removed from the abdomen), enlarged; **12.** Male abdomen (open view). Scale bar: 1 mm.

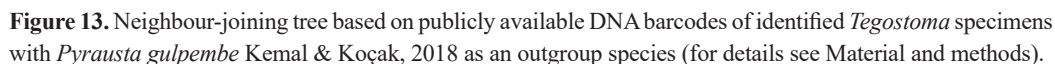
Armenia, areas which have not been intensively cultivated until recently. For more details see following Section.

**Etymology.** The species name is derived from the name of John Andrew Burton, a worldwide active conservationist, in honour of his strong support of establishing nature reserves in Armenia. It is to his merit to have established the Artsakh Nature fund and that more than 30,000 hectares of unique habitats are now protected within the borders of the Caucasus Wildlife Refuge.

**Note.** The nature reserve is named after the old name of the village Gorovan, which has later become Goravan. But the official name of this protected area remained in its original spelling. Therefore, the names of the municipality and the protected area differ.

### **Brief characterization of Gorovan Sands – the type locality of the new species**

The National Sanctuary Gorovan Sands was established in 1959 in order to protect the habitats for endangered animals, as well as the site conditions with their unique vegetation. One of the most typical ecosystems of the arid zone are sandy *Artemisia* semi-deserts with a fauna and flora well adapted to extreme drought and temperature variation. Gorovan Sands Sanctuary, with roughly 175 (originally ca 200) ha, represents the largest of this type in the whole of Armenia. Like other deserts of this type it is dominated by cold winters, dry and hot summer months and an annual precipitation of just 200–300 mm.



Besides overgrazing and a rather intensive collecting of edible plants by local people, even more important for the future of this sanctuary is to keep reclamation, sand and travertine mining, dumping, and offroad driving within boundaries and thus allow processes of regeneration on the remainder of the site.

**List of *Tegostoma* Zeller, 1847 recorded in Armenia*****Tegostoma albizonalis* Hampson, 1900**

**Distribution.** Armenia, Turkmenistan (Hampson 1900).

**Remarks.** Part of type series originated from Armenia.

***Tegostoma burtoni* sp. nov.**

**Material examined.** (see above).

**Distribution.** Armenia (this paper).

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

**Material examined.** Armenia, Gorovan Sands, 910 m, 39°53'35"N, 44°43'03"E, 4 ♂, 2 ♀, 25.–27.v.2019, O. Karsholt & N. Savenkov; prov. Ararat, Urtsadzor, Caucasus Wildlife Reserve, Eco Lodge, 1250 m, 39°56'58"N, 44°53'14"E, 1 ♂, 22.–30.v.2019, O. Karsholt, H. Roweck, & N. Savenkov leg. (ZMUC).

**Distribution.** Southern Europe (Karsholt and Razowski 1996), Russia (SW parts) (Sinev and Streltsov 2019).

***Tegostoma disparalis* (Herrich-Schäffer, [1855])**

**Material examined.** Armenia, Gorovan Sands, 910 m, 39°53'35"N, 44°43'03"E, 5 ♂, 1 ♀, 25.–27.v.2019, O. Karsholt & N. Savenkov (ZMUC).

**Distribution.** Turkey (Herrich-Schäffer 1843–1855), Southern Caucasus (Martin 1986), Armenia (Slamka 2006).

***Tegostoma lepidalis* (Herrich-Schäffer, 1851)**

Fig. 14

**Material examined.** Armenia, Ararat Province, National Park of Khosrov, Vedi River Valley, 1298 m., 9.vi.2015, 1 ♂, 1 ♀ (barcode data NMPC-Lep-0717, NMPC-Lep-0716), P. Vicherek leg. (NMPC).

**Distribution.** Turkey (Herrich-Schäffer 1851), Iran (Amsel 1961), Armenia (this paper).

***Tegostoma rutilineale* Zerny, 1914**

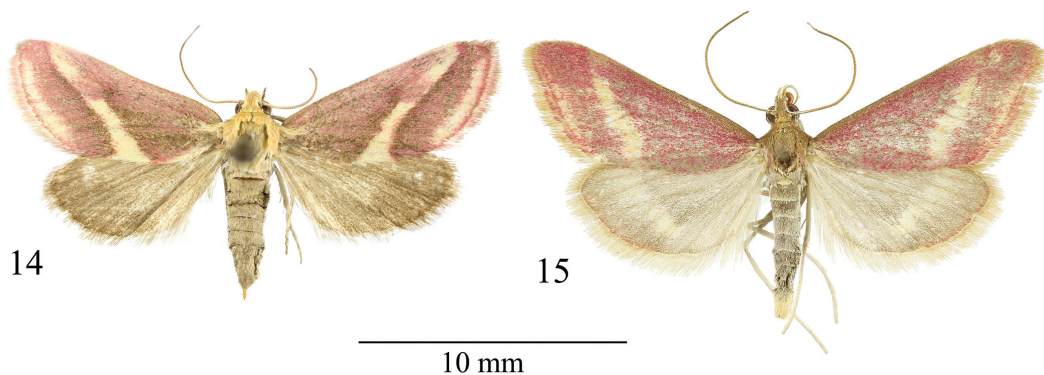
**Distribution.** Armenia (Zerny 1914).

**Remarks.** The species was described from Armenia.

**Faunistic data for *Pyrausta gulpembe*, used as an outgroup in the phylogenetic tree*****Pyrausta gulpembe* Kemal & Koçak, 2018**

Fig. 15

**Material examined.** Armenia, Areni env., Noravank monastery, 2.vi.2017 (Barcode NMPC-LEP-0715), J. Šumpich leg. (NMPC); Armenia, prov. Ararat, Urtsadzor, Caucasus Wildlife Reserve, Eco Lodge, 1250 m, 39°56'58"N, 44°53'14"E, 1 ♂, 1 ♀, 22.–30.v.2019, O. Karsholt, H. Roweck & N. Savenkov leg. (ZMUC); 3 specimens (not sexed), the same locality but 26.iv.–7.v.2022, H. Roweck & N. Savenkov leg. (ECKU); 1 specimen (not sexed), the same locality and date but P. Ivinskis leg. (NRC).



**Figures 14–15.** Comparative specimens. **14.** *Tegostoma lepidalis* (Herrich-Schäffer, 1851), Armenia (barcoded); **15.** *Pyrausta gulpembe* Kemal & Koçak, 2018, Armenia (barcoded).



**Figure 16.** Gorovan Sands near Vedi in Armenia, habitat of *Tegostoma burtoni* sp. nov. (Photo A. Pavlíčko).



**Molecular data.** BIN: BOLD:AEG0940. The intraspecific average distance of the barcode region is 0.48% ( $n = 2$ ). The minimum distance to the nearest neighbour, unidentified *Evergestis* Hübner, [1825] from Iran (BOLD:AAH6764), is 5.61% (p-dist).

**Distribution.** Turkey (Kemal and Koçak 2018), Armenia (this paper).

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## References

- Amsel HG (1949) Die Microlepidopteren der Brandt'schen Iran-Ausbeute. 1. Teil. Bulletin de la Société Fouad ler d'Entomologie 33: 227–269.
- Amsel HG (1961) Die Microlepidopteren der Brandt'schen Iran-Ausbeute. Arkiv för Zoologi. 5. Teil. (series 2) 13(17)(1960): 323–445[. pls. 1–9].
- Amsel HG (1970) Afghanische Pyraustinae (Lepidoptera: Pyralidae). Beiträge zur Naturkundlichen Forschung in Südwestdeutschland 29(1): 25–66.
- Anikin VV, Sachkov SA, Zolotuhin VV (2017) “Fauna lepidopterologica Volgo-Uralensis”: from P. Pallas to present days. Proceedings of the Museum Witt Munich 7: 1–696.
- deWaard JR, Ivanova NV, Hajibabaei M, Hebert PDN (2008) Assembling DNA Barcodes: Analytical Protocols. In: Martin CC (Ed.) Methods in Molecular Biology: Environmental Genomics. Humana Press Inc., Totowa, USA, 275–293. [364 pp] [https://doi.org/10.1007/978-1-59745-548-0\\_15](https://doi.org/10.1007/978-1-59745-548-0_15)
- Hampson GF (1900) New Palaearctic Pyralidae. Transactions of the Entomological Society of London 1900: 369–401[. pl. 3]. <https://doi.org/10.1111/j.1365-2311.1900.tb02380.x>
- Herrich-Schäffer GAW (1843–1855) Systematische Bearbeitung der Schmetterlinge von Europa, zugleich als Text, Revision und Supplement zu Jakob Hübner's Sammlung europäischer Schmetterlinge. 2: Die Schwärmer, Spinner und Eulen. G. J. Manz, Regensburg. [1]–2–450 + (Index) [a1]–2–64, pls. 1+1+2+16+10+4+22+32+124+1.
- Karsholt O, Razowski J [Eds] (1996) The Lepidoptera of Europe. A Distributional Checklist. Apollo Books, Stenstrup, 380 pp.
- Keith D, Sabatinelli G, Uliana M (2015) Synopsis of the genus *Pharaonus* (Coleoptera: Scarabaeidae: Rutelinae), with descriptions of new taxa. Zootaxa 4012(1): 167–180. <https://doi.org/10.11646/zootaxa.4012.1.9>
- Kemal M, Koçak AÖ (2018) Vernal aspect of the Lepidoptera from Nemrut Mountain and the vicinity of Karadut in the Kahta district with a description of a new species (SE Turkey, Adiyaman Province). Niscellaneous Papers, Centre for Entomological Studies Ankara 174: 1–21.

- Lepiforum e V [Ed.] (2008–2021) Bestimmungshilfe für die in Europa nachgewiesenen Schmetterlingsarten. <http://lepiforum.org/wiki/taxonomy/> [accessed 20 March 2022]
- Martin MO (1986) Pyraustidae. In: Medwedjewa GS (Ed.) *Opredelitel Nasekomych Evropejskoj Tschasti SSSR* 4(3). Nauka, Leningrad, 340–429. [503 pp] [In Russian]
- Nuss M, Landry B, Mally R, Vegliante F, Tränkner A, Bauer F, Hayden J, Segerer A, Schouten R, Li H, Trofimova T, Solis MA, De Prins J, Speidel W (2003–2022) Global Information System on Pyraloidea. [www.pyraloidea.org](http://www.pyraloidea.org) [accessed 5 March 2022]
- Ratnasingham S, Hebert PDN (2007) BOLD: The Barcode of Life Data System (<http://www.barcodinglife.org>). *Molecular Ecology Notes* 7: 355–364. <https://doi.org/10.1111/j.1471-8286.2007.01678.x>
- Sinev SYu, Streltsov AN (2019) Crambidae. In: Sinev SYu (Ed.) *Catalogue of the Lepidoptera of Russia. Edition 2*. Zoological Institute RAS., St Petersburg, 165–178. [In Russian]
- Slamka F (2006) Pyraloidea (Lepidoptera) of Europe / Europas. 1. Pyralinae, Galleriinae, Epipaschiinae, Cathariinae & Odontiinae. Identification - Distribution - Habitat - Biology / Bestimmung - Verbreitung - Habitat - Bionomie. František Slamka, Bratislava, 138 pp.
- Slamka F (2013) Pyraloidea (Lepidoptera) of Europe. 3. Pyraustinae & Spilomelinae. Identification - Distribution - Habitat - Biology. František Slamka, Bratislava, 357 pp.
- Tadevosyan T (2001) *Ex Situ Conservation of Rare and Endangered Psammophilic Species of The Flora and Plant Associations of Ararat Valley*. Ph.D. Candidate Dissertation. Institute of Botany, National Academy of Sciences, Yerevan, 161 pp.
- Tamura K, Stecher G, Peterson D, Filipski A, Kumar S (2013) MEGA6: Molecular Evolutionary Genetics Analysis version 6.0. *Molecular Biology and Evolution* 30: 2725–2729. <https://doi.org/10.1093/molbev/mst197>
- Zerny H (1914) Über paläarktische Pyraliden des k. k. naturhistorischen Hofmuseums in Wien. *Annalen des K. K. Naturhistorischen Hofmuseums* 28(3–4): 295–348[. pls 25–26].

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