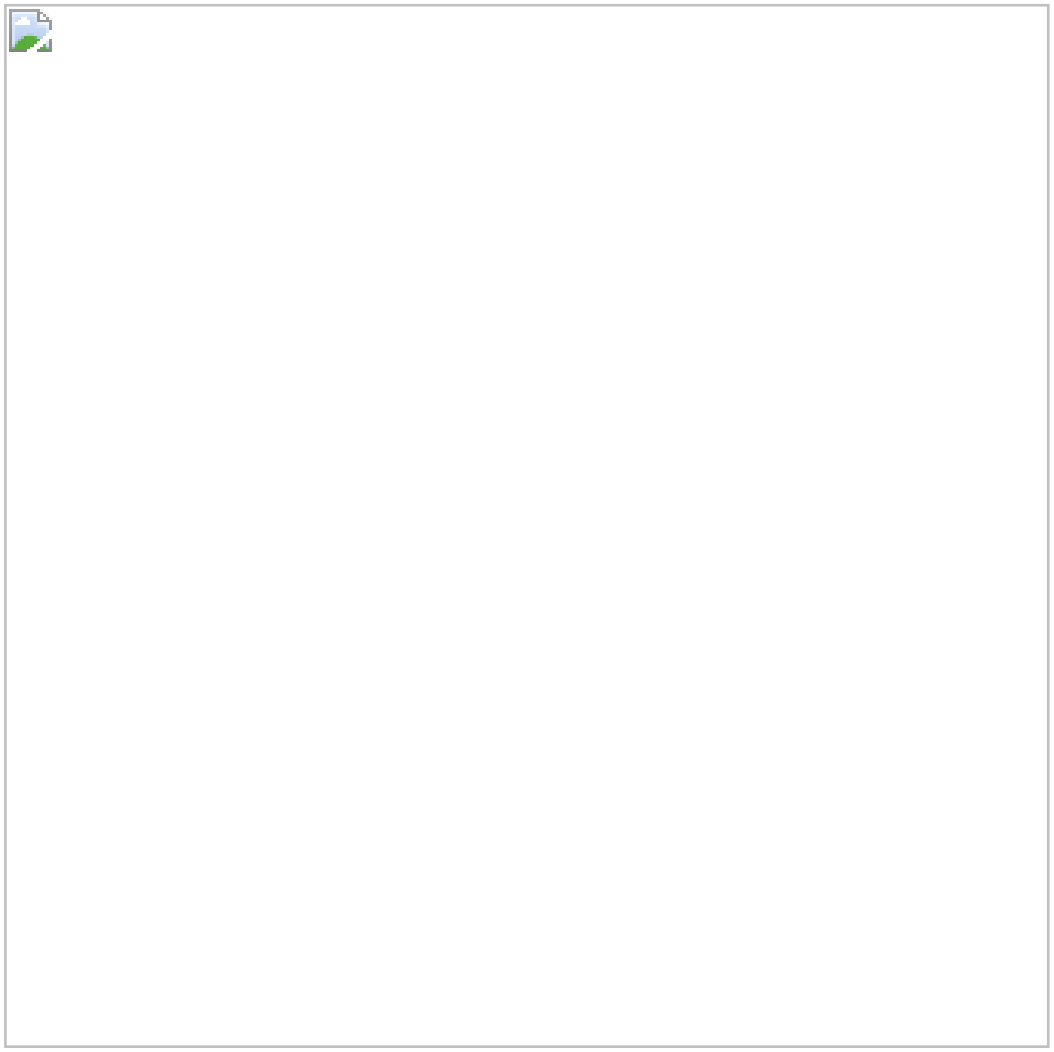


Taxonomic note on Synopsia centralis (Wiltshire, 1966) (Lepidoptera: Geometridae: Ennominae), and additional faunistic data on the genus Synopsia Hübner, 1825 in Iran

Authors: Wanke, Dominic, and Rajaei, Hossein

Source: Integrative Systematics: Stuttgart Contributions to Natural History, 5(1) : 105-108

Published By: Stuttgart State Museum of Natural History

URL: https://doi.org/10.18476/2022.556903

SHORT COMMUNICATION

Taxonomic note on *Synopsia centralis* (Wiltshire, 1966) (Lepidoptera: Geometridae: Ennominae), and additional faunistic data on the genus *Synopsia* Hübner, 1825 in Iran

Dominic Wanke[1,2] & Hossein Rajaei[1]

Abstract

The taxonomic rank of *Synopsia centralis* (Wiltshire, 1966), recently raised from subspecies to species, is validated through investigation of the paratype. The genitalia of the paratype are illustrated for the first time. Additional faunistic data are given for *Synopsia sociaria* (Hübner, 1899) and *Synopsia phasidaria phasidaria* (Rogenhofer, 1873), extending knowledge on their distribution in Iran.

Keywords: genitalia structure, Gnophini, Middle East, *Synopsidia*.

Zusammenfassung

Der taxonomische Rang von *Synopsia centralis* (Wiltshire, 1966), die kürzlich von Unterart auf Artebene erhoben wurde, wird durch die Untersuchung des Paratypus bestätigt. Die Genitalien des Paratypus werden zum ersten Mal abgebildet. Für *Synopsia sociaria* (Hübner, 1899) und *Synopsia phasidaria phasidaria* (Rogenhofer, 1873) werden zusätzliche faunistische Daten angegeben, die das Wissen über ihre Verbreitung im Iran erweitern.

Synopsia Hübner, 1825 is a small genus including three species, namely *S. sociaria* (Hübner, 1899), *S. phasidaria* (Rogenhofer, 1873)—including the nominotypical subspecies and the subspecies *S. phasidaria afghana* (Wiltshire, 1966)—and *S. centralis* (Wiltshire, 1966) (Scoble & Hausmann 2007; Müller et al. 2019; Wanke et al. 2020). The type species of the genus, *Synopsia sociaria*, is widespread from Portugal to Kazakhstan, whereas *S. phasidaria* is distributed from the Caucasus to Afghanistan and *S. centralis* is endemic to Iran (Müller et al. 2019; Wanke et al. 2020). *Synopsia* species are externally characterized by their beige to brown wings, with light white to grey areas and some brown spots on the wings (Müller et al. 2019; Wanke et al. 2020) (see Figs 1–4). Recently, the genus *Synopsidia* Djakonov, 1935 was synonymized with the genus *Synopsia* Hübner, 1825 by Wanke et al. (2020). Additionally, *Synopsia centralis*, which was originally described as a subspecies of *Synopsidia phasidaria* based on the male holotype and one male paratype collected in the southern Iranian province Fars (Wiltshire 1966), was tentatively raised from subspecies to species rank by Wanke et al. (2020) based on the genitalia morphology of the holotype, which was examined from photographs only. During a recent visit to the Natural History Museum in London, the genitalia preparation of the holotype of *S. phasidaria centralis* was examined together with the paratype, which was dissected to validate the previous decision to elevate this taxon to the rank of species. Furthermore, as distributional data for *S. sociaria* in Iran is only sparse (Barou 1967; Wieser et al. 2002; Lehmann & Zahiri 2011) and specimens from Iran are rather rare in collections, we report the species as new for some Iranian provinces. Finally, the distribution area of *S. phasidaria phasidaria* is extended further to include Southwest Iran.

Material and methods

Specimens from the following collections were examined: NHMUK—Natural History Museum London, United Kingdom; PCJM—Private collection of Jörg-Uwe Meineke, Kippenheim, Germany; SMNS—Staatliches Museum für Naturkunde Stuttgart, Germany.

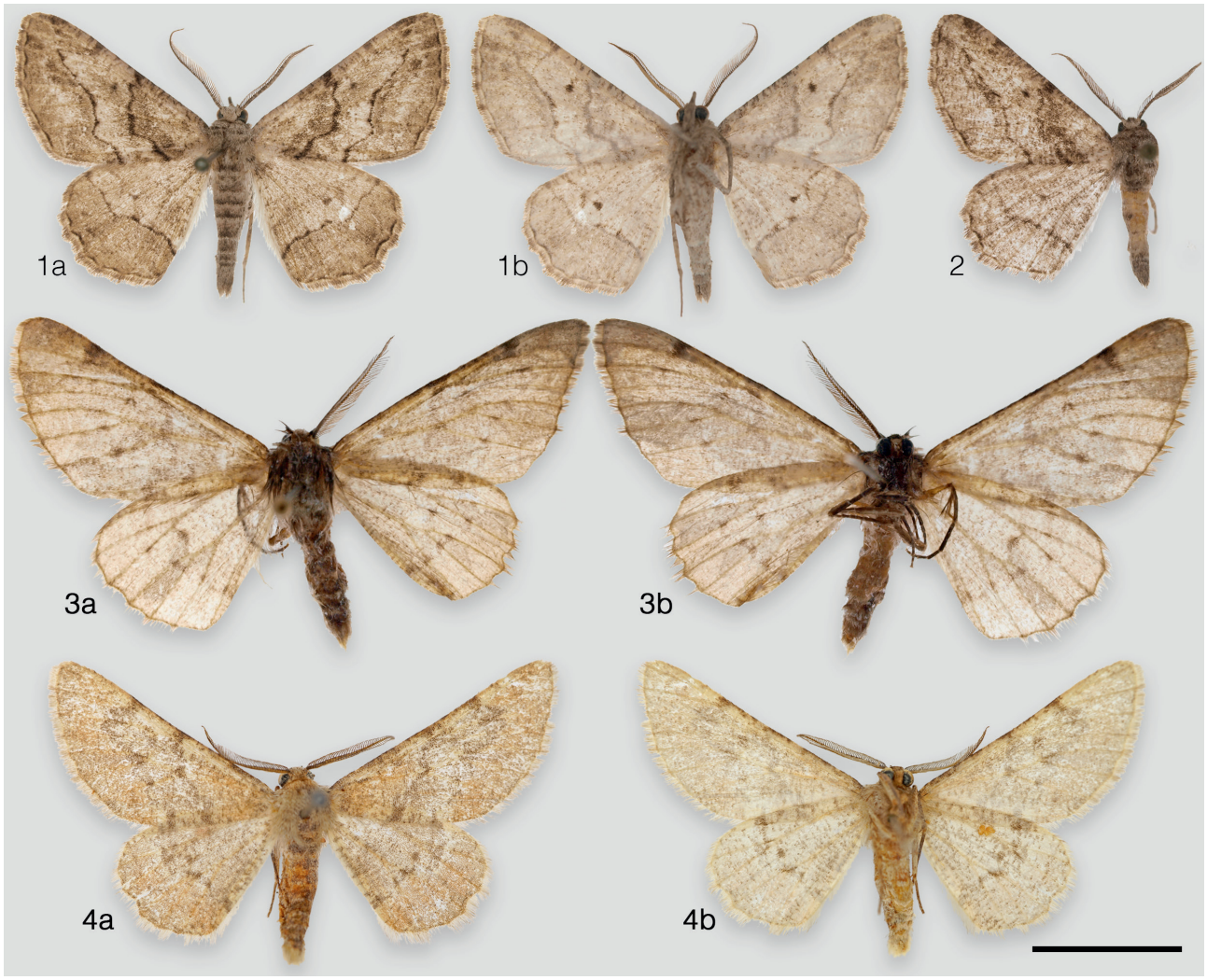
Documentation of external characters was carried out using an Olympus E3 digital camera. For genitalia preparation, standard techniques were followed and the dissected genitalia were embedded in Euparal on permanent microscope slides (Robinson 1976). A Keyence VHX-5000 photomicroscope was used for photography of the slides.

Synopsia sociaria (Hübner, 1899)

(Figs. 1, 2, 5)

Material examined

1 ♂, Iran, Masanderan, Tschamestan, 100 m, viii.1951, leg. F. Schäuffele, g. prep. 1265/2022 D. Wanke; 2 ♂, Nordpersien [Iran], Umg. Shahabad [Golestan] Nationalpark, 1300 m, 21.-



Figs. 1–4. Wing pattern of *Synopsia* Hübner, 1825 species (a = upperside; b = underside). – **1–2**. *S. sociaria* (Hübner, 1899) (1: Iran, Masanderan, g.prep. 1265/2022 D. Wanke; 2: Iran, Golestan, g.prep. 1266/2022 D. Wanke). **3**. *S. phasidaria phasidaria* (Rogenhofer, 1873) (Iran, Kerman, g.prep. 1258/2022 D. Wanke). **4**. Paratype of *Synopsia centralis* (Wiltshire, 1966) (Iran, Fars, NHMUK014172450). Scale bar: 1 cm.

22.viii.1977, [leg.] de Freina, g. prep. 1266/2022 D. Wanke; 1 ♂, NW-Iran, Kaleibar, 1700 m, 3.viii.1977, leg. W. Thomas, g. prep. 1267/2022 D. Wanke; 1 ♂, Iran, Elburs, Valiabad, 1700 m, 14. & 16.viii.1978, leg. W. Thomas; 2 ♂, Iran, Elburs, 15 km S Chalus, 1700 m, 15–18.v.1975, leg. W. Thomas; all in SMNS.

Distribution in Iran

Records of this species from Iran are scarce. So far it is known from three provinces, namely Azerbaijan-e-Sharqi (W Kaleibar, Arasbaran Forest, Al Hord), Esfahan (Esfahan) and Golestan (Tange Gol) (Barou 1967; Wieser et al. 2002; Lehmann & Zahiri 2011). We present additional records for the provinces Azerbaijan-e-Sharqi, Golestan, Mazandaran (first record) and Tehran (first record).

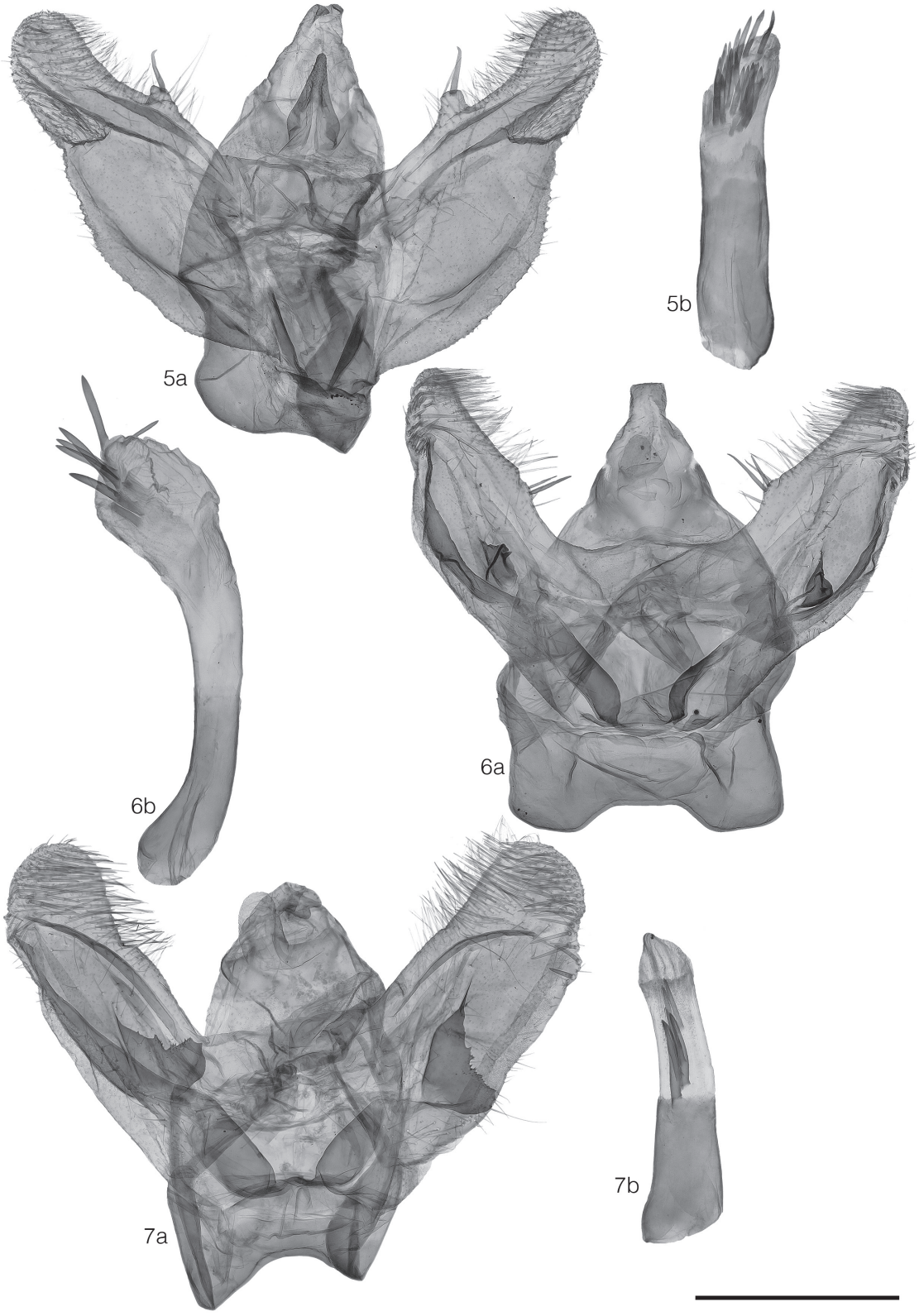
***Synopsia phasidaria phasidaria* (Rogenhofer, 1873)**
(Figs. 3, 6)

Material examined

1 ♂, Iran, Kerman, Rayen SW, Kuh-e Hesar, Abshar, 2700-3000 m, 24./25.v.2004, leg. A. Hofmann, J.-U. Meineke, G. Tremewan, g. prep. 1258/2022 D. Wanke; in PCJM.

Distribution in Iran

Wanke et al. (2020) reported on the distribution of this subspecies from northern Iran to the southern province Fars through the Zargos Mountains in the West. Here, we provide the first record for the southern province of Kerman.



Figs. 5–7. Male genitalia of *Synopsia* Hübner, 1825 species (a = genitalia capsule; b = aedeagus). – **5**. *S. sociaria* (Hübner, 1899) (Iran, Masanderan, g.prep. 1265/2022 D. Wanke). **6**. *S. phasidaria phasidaria* (Rogenhofer, 1873) (Iran, Kerman, g.prep. 1258/2022 D. Wanke). **7**. Paratype of *Synopsia centralis* (Wiltshire, 1966) (Iran, Fars, slide NHMUK010317480). Scale bar: 1 mm.

Synopsia centralis (Wiltshire, 1966)

(Figs. 4, 7)

Material examined

Holotype, ♂, Persia [Iran], N. Fars, Bavant, Kuh Taj Kirmani, 8500 feet [2591 m], 7.viii.[19]50, leg. E. P. Wiltshire, NHMUK010920114, g.prep. E. P. Wiltshire 1467. Paratype, 1 ♂, same data as holotype, NHMUK014172450, slide NHMUK010317480; all in NHMUK.

Taxonomic note

Synopsia centralis was tentatively raised from the rank of subspecies of *S. phasidaria* to species rank by Wanke et al. (2020) based on the lack of a central projection on the costa of the valva of the male genitalia, a feature strongly developed in the other two species of this genus (Wanke et al. 2020) (see Figs. 5–7). At the time of that study, only habitus photos of the holotype and paratype and photos of the holotype's slide-mounted genitalia were available for examination. Therefore, we could not completely exclude that this character of the costa was not destroyed by the preparation or folded over during embedding, which led to the tentative elevation of this taxon from subspecies to species rank. During a recent visit to the Natural History Museum, London, we were able to check this character through genitalia dissection of the paratype. Our investigation confirmed the lack of a central projection on the costa also in the paratype, thus reinforcing our previous taxonomic decision to consider *S. centralis* a valid taxon at the species level (Fig. 7).

Acknowledgements

We are grateful to Geoff Martin, David Lees and Alberto Zilli (Natural History Museum, London, UK) for their support during our stay in London. Many thanks to Jörg-Uwe Meineke (Kippenheim, Germany) for the loan of valuable specimens from his collection. Copyright of images of the paratype of *Synopsia centralis* belong to the Trustees of the Natural History Museum, London, and they are published here under a Creative Commons License 4.0 (https://creativecommons.org/licenses/by/4.0/). We are thankful to two anonymous reviewers for their critical review and constructive comments to the submitted version of the paper. This research received support from the SYNTHESYS+ Project (http://www.synthesys.info/), which is financed by European Community Research Infrastructure Action under the H2020 Integrating Activities Programme, Project number 823827, and from the Research Incentive Grant of the State Museum of Natural History, Stuttgart, Germany.

References

Barou, P. J. (1967): Contribution à la connaissance la faune des Lépidoptères de l'Iran. – Entomologie et Phytopathologie Appliquées **26**: 41–58.

Lehmann, L. & Zahiri, R. (2011): Results of a lepidopterological expedition to North and Northwest Iran in summer 2007 with new records for Iran (Lepidoptera). – Esperiana **16**: 135–165. http://esperiana.net/mediapool/86/862516/data/Esperiana_16-_135-165.pdf

Robinson, G. S. (1976): The preparation of slides of Lepidoptera genitalia with special reference to the Microlepidoptera. – Entomologist's Gazette **27**: 127–132.

Müller, B., Erlacher, S., Hausmann, A., Rajaei, H., Sihvonen, P. & Skou, P. (2019): Ennominae II. – In: Hausmann, A., Rajaei, H., Sihvonen, P. & Skou, P. (eds.): The Geometrid Moths of Europe, Vol. 6., pp. 1–906; Leiden (Brill). https://doi.org/10.1163/9789004387485_001

Scoble, M. J. & Hausmann, A. (2007): Online list of valid and available names of the Geometridae of the World. Updated. Available from: http://www.herbulot.de/globalspecieslist.htm (accessed 18 November 2018)

Wanke, D., Hausmann, A., Sihvonen, P., Krogmann, L. & Rajaei, H. (2020): Integrative taxonomic review of the genus *Synopsia* Hübner, 1825 in the Middle East (Lepidoptera: Geometridae: Ennominae). – Zootaxa **4885** (1): 027–050. https://doi.org/10.11646/zootaxa.4885.1.2

Wieser, C., Huemer, P., Stangelmaier, G. & Plössl, B. (2002): Artenliste Schmetterlinge (Lepidoptera). – In: Gutleb, B. & Wieser, C.: Ergebnisse einer zoologischen Exkursion in den Nordiran, 2001. – Carinthia II **192/112**: 33–140.

Wiltshire, E. P. (1966): Österreichische entomologische Iran-Afghanistan-Expeditionen, Beiträge zur Lepidopterenfauna, Teil 10, Subfamilien Larentiinae und Ennominae (sensu lato) (Lepidoptera, Geometridae). Middle East Lepidoptera XXIII. – Zeitschrift der Wiener Entomologischen Gesellschaft **51**: 138–152.

Authors' addresses:

[1]State Museum of Natural History Stuttgart—Entomology, Rosenstein 1, D–70191 Stuttgart, Germany;
e-mail (corresponding author): dominic.wanke@smns-bw.de; https://orcid.org/0000-0001-5390-8993 (DW),
https://orcid.org/0000-0002-3940-3734 (HR)

[2]University of Hohenheim—Systematic Entomology (190n), Garbenstr. 30, D–70599 Stuttgart, Germany

ZooBank registration: https://zoobank.org/References/5B8D8EAE-7A9D-4130-A130-EC669649592F

Manuscript received: 13.V.2022; accepted: 9.VI.2022.