

Rhodostrophia crypta, a new species from Middle Asia (Lepidoptera: Geometridae)

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Academic editor: Axel Hausmann

ZooBank: [urn:lsid:zoobank.org:pub:CB6381E3-1AD7-4407-B148-5C0B122832BF](https://www.zoobank.org/pub/CB6381E3-1AD7-4407-B148-5C0B122832BF)

Abstract

Background

Rhodostrophia is a speciose genus which is widespread in arid landscapes of Central Asia.

New information

A new species, *Rhodostrophia crypta* sp. n. is described below from Kazakhstan.

Keywords

Taxonomy, morphology, new species, Kazakhstan, Turkmenistan

Introduction

Hugo Christoph (Christoph 1877, Christoph 1885) collected a series of moths in the vicinity of Krasnovodsk (now Turkmenbashi) on the Turkmen shore of the Caspian Sea and supplemented his original description of *Rhodostrophia vastaria* Christoph, 1877 with line illustrations of a male and a female moth. Uvarov (1910) referred to *R. vastaria* from the South Urals.

Rhodostrophia vastaria was recorded as occurring in the territories of the Turkmen and Kazakh Soviet Republics in check lists by Viidalepp (1976), Viidalepp (1988) and Hausmann (2004), with a figure of male genitalia. However, a recent search for *R. vastaria* types in the collection of the ZISP, St. Petersburg has yielded information about two female specimens (Trusch and Hausmann 2007). New localities for *R. vastaria* in western

Kazakhstan were listed by Gorbunov (2011). The species is repeatedly collected on the Ustjurt plateau, some hundreds of kilometres north of the type locality of *R. vastaria*.

Materials and methods

Materials from the collections of the Estonian University of Life Sciences, Tartu (the Institute of Zoology and Botany of Estonian Academy of Sciences - IZBE collection), the Zoological Museum of the Taras Shevchenko National University, Kyiv and the Zoologischer Staatssammlung München were studied.

New '*Rhodostrophia vastaria* Christoph' records come from eastern Kazakhstan, specifically in the vicinity of Balkhash lake when the large lepidopterological collection of Dr A. Pototski was deposited in the IZBE insect collection. The distance between western collecting sites and new localities near Lake Balkhash is quite large. Authentic lectotype data for *R. vastaria* were published by Trusch and Hausmann (2007) and some material of *Rhodostrophia vastaria* for dissection was found in the Museum of Zoology of the Taras Shevchenko National University.

Digital images of the female lectotype of *R. vastaria* and the corresponding genitalia slide were studied, as well as digital images of *R. vastaria* moths and their genitalia slides from Ustjurt plateau (western Kazakhstan) from D. Shovkoon and a paper photo of a male from "Ili" in the collection of the Zoologisches Forschungsinstitut und Museum A. Koenig (Bonn).

Detailed comparison of moths from eastern and western populations of putative *R. vastaria* yields differences both in the external appearance of adults and in the build of their genitalia. In this study we describe the eastern Kazakh populations as a new species.

Taxon treatment

Rhodostrophia crypta sp. nov.

- ZooBank [urn:lsid:zoobank.org:act:2AA0D50E-CCB7-4554-8C9B-B595CD9AE5EC](https://zoobank.org/urn:lsid:zoobank.org:act:2AA0D50E-CCB7-4554-8C9B-B595CD9AE5EC)

Materials

Holotype:

- a. order: Lepidoptera; family: Geometridae; taxonRank: species; genus: *Rhodostrophia*; specificEpithet: *crypta*; continent: Asia; country: Kazakhstan; locality: NW of Uch-Aral; verbatimElevation: 400 m; decimalLatitude: 46.39666667; decimalLongitude: 80.71555556; samplingProtocol: at light; eventDate: 21-5-2004; year: 2004; month: 5; day: 21; individualCount: 1; sex: male; recordedBy: A. Pototski; U. Jürivete; otherCatalogNumbers: IZBE3026002; identifiedBy: Jaan Viidalepp; Igor Kostjuk; type: Physical object; institutionID: Estonian University of Life Sciences, Entomological Collection; collectionCode: IZBE; basisOfRecord: Preserved specimen; occurrenceID: 026BABF9-9FC9-5DA0-B054-EE256553FB6E

Paratypes:

- a. order: Lepidoptera; family: Geometridae; taxonRank: specie; genus: *Rhodostrophia*; specificEpithet: *crypta*; continent: Asia; country: Kazakhstan; locality: Khantau 800 m, Balkhash-See; samplingProtocol: at light; eventDate: 12-5-1991; year: 2014; month: 6; day: 1; individualCount: 1; sex: female; recordedBy: Danilevsky; identifiedBy: Jaan Viidalepp; Igor Kostjuk; type: Physical object; institutionID: Museum of Zoology, Kyiv National Taras Shevchenko University; collectionCode: ZMKU; basisOfRecord: Preserved specimen; occurrenceID: DAF6CCE6-F262-58B1-8599-68B3C13F788C
- b. order: Lepidoptera; family: Geometridae; taxonRank: species; genus: *Rhodostrophia*; specificEpithet: *crypta*; continent: Asia; country: Kazakhstan; locality: Charyn valley; verbatimElevation: 1200 m; eventID: collecting at light; samplingProtocol: at light; eventDate: 1-6-2014; year: 2014; month: 6; day: 1; individualCount: 1; sex: male; recordedBy: A. Pototski; U. Jürivete; otherCatalogNumbers: IZBE3026001; identificationID: BarcodeZSM Lep 54333; identifiedBy: Jaan Viidalepp; Igor Kostjuk; identificationQualifier: identified by dissection and barcoding; type: Physical object; institutionID: Estonian University of Life Sciences; collectionCode: IZBE; basisOfRecord: Preserved specimen; occurrenceID: 247E70F6-E812-500D-9BAA-61445E2AD780
- c. order: Lepidoptera; family: Geometridae; taxonRank: species; genus: *Rhodostrophia*; specificEpithet: *crypta*; continent: Asia; country: Kazakhstan; locality: Charyn vally; verbatimElevation: 1200 m; samplingProtocol: at light; eventDate: 1-6-2014; year: 2014; month: 6; individualCount: 1; sex: male; recordedBy: A. Pototski; U. Jürivete; otherCatalogNumbers: IZBE3026000; identifiedBy: Jaan Viidalepp; Igor Kostjuk; type: Physical object; institutionID: Estonian University of Life Sciences; collectionCode: IZBE; basisOfRecord: Preserved specimen; occurrenceID: FD35A09E-F386-5C9F-A9DB-6629E370DCE6
- d. order: Lepidoptera; family: Geometridae; taxonRank: species; genus: *Rhodostrophia*; specificEpithet: *crypta*; continent: Asia; country: Kazakhstan; locality: Tarbagatai distict.; Zhagalbaily Mts; samplingProtocol: at light; eventDate: 18-6-2014; year: 2014; month: 6; day: 18; individualCount: 2; sex: female; recordedBy: R. Yakovlev; otherCatalogNumbers: BC ZSM Lep 54333; identifiedBy: Axel Hausmann, Jaan Viidalepp, Igor Kostjuk; type: Physical object; institutionID: Zoologisches Staatssammlung München; collectionCode: ZSM; basisOfRecord: Preserved specimen; occurrenceID: 29ED5E9A-5E07-58B0-B61B-613FF1BF5E40

Description

Sandy yellowish-grey moths with wing span 25–26 mm. Dark irroration stronger on wings, forewing postmedial fascia broader at costa; wing markings are less reduced than in *R. vastaria*. Underside of wings almost monotonous, greyish.

Diagnosis

The genus *Rhodostrophia* is characterised by their quadripectinate male antennae (i.e. there are two pairs of long rami on each antennomere) and by the presence of two accessory cells in the forewing venation. All species of *Rhodostrophia* have the number of their hind tibial spurs reduced, with exception of *R. jacularia* Hübner, *R. vastaria*, *R. tabestana* Trusch & Hausmann and the new species *Rhodostrophia crypta* sp. n. Wings of *R. vastaria* and *R. crypta*, sp. n. are scaled yellowish-grey, forewings with fragmented postmedial and antemedial fasciae.

Rhodostrophia vastaria and *Rhodostrophia crypta*, sp. n. are superficially similar but differing in characteristics of male and female genitalia, as discussed below.

Rhodostrophia crypta, sp. n. This new species is characterized with a wing span of 25–26 mm (Fig. 1a, b). The Uch-Aral male is grey with a conspicuous dark grey pattern and dusting (Fig. 1a); its hindwing postmedial line is outwardly dentate at the vein M3 and the forewing medial area seems relatively broader. West Kazakh moths (Fig. 1c, d) of *R. vastaria* are evenly sand-coloured, yellowish-grey and with sparse grey maculation. The sandy grey ground colour of the moths from the Balkhash region is more intensively covered by brown spots and the postmedial line is more suffused on hindwings (Fig. 1a, b).

The distal edge of the valva in the male genitalia is roundly bulged at the saccular corner in *R. vastaria* (Fig. 2a; Hausmann 2004: Fig. 174b), but it is straight in *R. crypta*, sp. n. (Fig. 2b). Female genitalia of moths are also different; moths of western population have the seventh segment of the abdomen and the tubular sclerotisation of the ductus bursae distinctly longer in moths of the western population (Fig. 3a) and the forked sclerite in the corpus bursae is also larger in western moths than in those moths from the eastern Kazakh population (Fig. 3b).

The differences in male and female genitalia structures and wing pattern between the western and eastern Kazakh populations justify the separation of the Balkhash lake shore populations as *Rhodostrophia crypta* Viidalepp & Kostjuk, sp. n.

Rhodostrophia jacularia (Hübner) has a very different, clear and contrasting wing pattern but similar male genitalia (with the distal margin of the valva smoothly rounded) and *R. tabestana* (Trusch and Hausmann 2007) has quite similar wings and colouration, but the distal margins of valvae are not straight; rather they are slightly concave. Genetically nearest species: *Rhodostrophia jacularia* (3.7%). The distally truncate shape of valva and the presence of a cornutus on the vesica in *R. jacularia*, *R. crypta*, sp. n., *R. vastaria* and *R. tabestana* allow them to be combined together in the *Rhodostrophia jacularia* species group.

Etymology

The species name "crypta", as a noun, is a derivative from "cryptic" ~hidden.

Ecology

The moths of the new species were collected in steppe landscapes.

Distribution of *Rhodostrophia vastaria* and *R. crypta*, sp. n.

The distribution area of *Rhodostrophia vastaria* is fragmented between Turkmenbashi in Turkmenistan, the Ustjurt plateau in western Kazakhstan and the southern Urals (Fig. 4). *Rhodostrophia crypta*, sp. n. is an eastern Kazakh species. Both species do not appear in the recent review of Chinese *Rhodostrophia* (Cui et al. 2019).

Acknowledgements

We would like to thank Dr Robert Trusch and Dr Vladimir Mironov for their kind offer to provide information about the types of *Rhodostrophia vastaria* Christoph. We are thankful to Oleksyi Bidzilya (Ukraine, Kyiv) and Aare Lindt (Estonia, Tallinn) for photos of the genital slides and Dmitryi Shovkoon (Russia, Samara) for the photos of *R. vastaria* and its genitalia and information about the spatial distribution and bioecology of these moths. Dr Robert B. Davis kindly corrected the text linguistically. The study was partially supported by institutional research funding (IUT21-1) of the Estonian Ministry of Education and Research.

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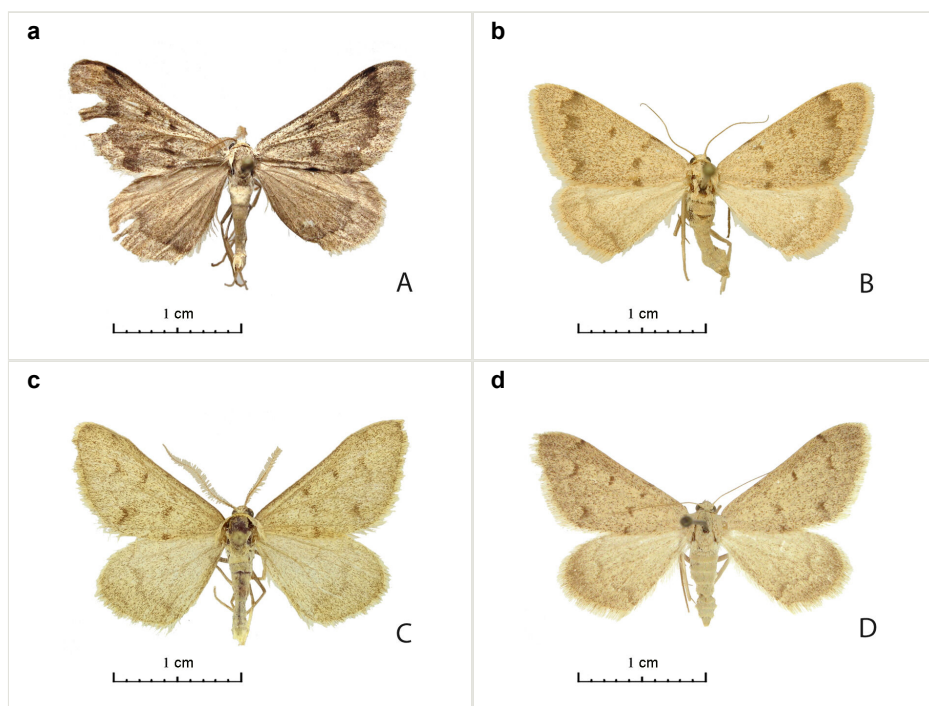


Figure 1.

Rhodostrophia moths.

a: *Rhodostrophia crypta*, sp. n. (Holotype, male, IZBE)

b: *Rhodostrophia crypta*, sp. n. (Paratype, female, ZMKU)

c: *Rhodostrophia vastaria* Christoph, male, Ustjurt plateau, Sai-Utjos, Shovkoon leg.

d: *Rhodostrophia vastaria* Christoph (Lectotype, female, ZISP)

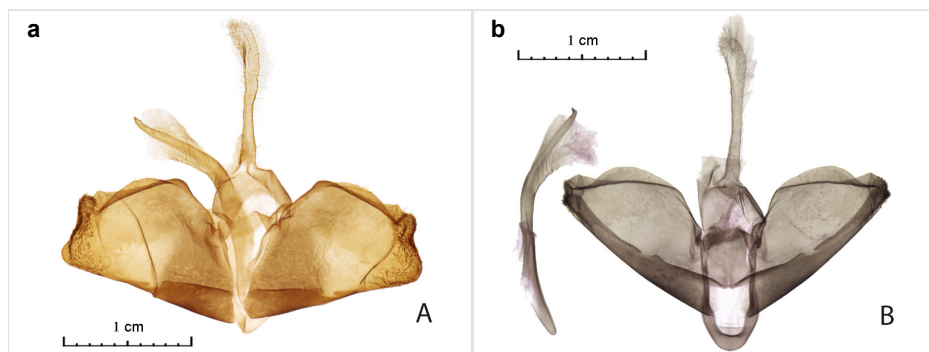


Figure 2.

Male genitalia and aedeagus of *Rhodostrophia* spp.

a: *Rhodostrophia vastaria*, male, Ustyurt plateau, slide 114, Shovkoon

b: *Rhodostrophia crypta*, sp. n. (Paratype, male, slide 8976 IZBE)

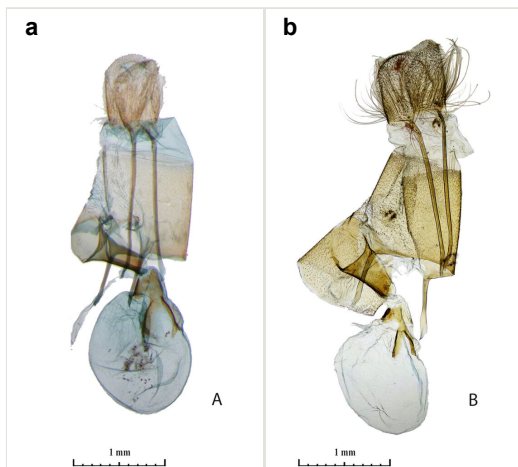


Figure 3.

Female genitalia of *Rhodostrophia* spp.

a: *Rhodostrophia vastaria* (Lectotype, female, gen. prep. 634/2005 Trusch, ZISP)

b: *Rhodostrophia crypta*, sp. n. (Paratype, female slide 488, ZMKU)

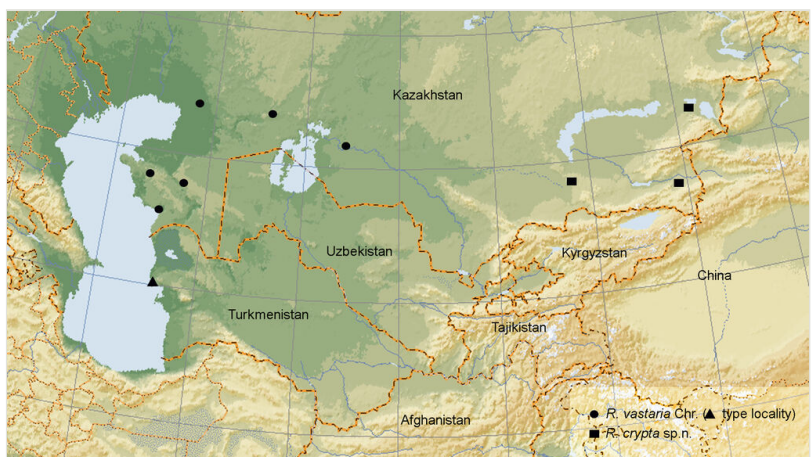


Figure 4.
Distribution map of *R. vastaria* and *R. crypta*, sp. n.