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Michael Seizmair

Department of Entomology,
Bavarian State Collection of
Zoology Munich, Munich,
Germany

First records of the genus *Cirrhochrista* Lederer, 1883 (Lepidoptera, Crambidae, Spilomelinae) from the Arabian Peninsula with the description of *Cirrhochrista seminivea* SP.N

Michael Seizmair**Abstract**

The presence of the genus *Cirrhochrista* Lederer, 1883 (Lepidoptera, Crambidae, Spilomelinae) is reported as new to the entomofauna of the Arabian Peninsula on the basis of specimens collected in south-western Oman (province Dhofar). The specimens collected show significant differences in external and genital-morphological characters with regard to closely related congeners in the Afrotropical, Oriental and Indo-Australian zones. These differences result in the description of the new species *Cirrhochrista seminivea* S.P.N. The external characters, the male genitalia and the tympanal organs of the new species are described and figured. The differential character states with regard to the closest congeners are listed. The female is still unknown.

Keywords: Pyraloidea, new species, morphology, taxonomy, Afrotropical zone

Introduction

The genus *Cirrhochrista* Lederer, 1883 was treated in the past within several different subfamilies. Hampson assigned the genus to the subfamily Schoenobiinae [1]. Viette and Inoue listed the genus under the subfamily Pyrautinae [2, 3]. Shaffer and Munroe assigned the genus to the subfamily Spilomelinae [4]. The association of the genus with the subfamily Spilomelinae was confirmed on the basis of the phylogenetic results in [5]. In the latter study the genus was assigned to the tribus Margaroniini Swinhoe & Cotes, 1889. Recent partial revisions of the genus for the Oriental zone have been given in [6, 7]. The genus presently comprises 38 species in total [5, 8]. 14 species are distributed in the Afrotropical zone [9], the rest is distributed in the Oriental and Indo-Australian zones – China, Japan, India, Australia [4, 7]. 50% of the Afrotropical species are viewed as endemic to islands in the Mascarene [10, 11, 12] and Malagasy [2, 13, 14, 15] regions. The presence of the genus on the Arabian Peninsula is hitherto unknown [9]. In this paper, records from the Arabian Peninsula based on specimens collected in Dhofar, the south-western province of Oman are reported for the first time. The geographically nearest known occurrences of the genus with regard to Dhofar are situated in East Africa [9] and in India [16]. The records collected in Dhofar show significant differences in external and morphological character states with regard to the closest congeners in external and genital-morphological characters. These differences result in the description of the new species *Cirrhochrista seminivea* S.P.N.

Materials and Methods**Sampling**

The specimens were collected by the author in two research expeditions to Dhofar in January 2017 and November 2019. The specimens were captured at night by means of a light-trap equipped with a 20W tube of infra-blue light.

Macro-Preparation and Dissection

The adults were photographed with a SONY HX400V after relaxation and subsequent preparation. For examining the genitalia and tympanal organs, dissection, preparation and slide-mounting techniques were applied on the specimens on the basis of the protocol described in Robinson (1976).

Corresponding Author:**Michael Seizmair**

Department of Entomology,
Bavarian State Collection of
Zoology Munich, Munich,
Germany

The preparation of the tympanal organs and of the genitalia was done under a Motic stereomicroscope (SMZ-171). The slides were photographed with a TouPCam c-mount camera (TouPTek Inc., Zhejiang, China) under a resolution of 18 megapixels. The images were post-processed by means of the imaging software TouPView, Version 1.0.

Morphological Analyses

Analyses of wing pattern characters and morphological structures were done on the images.

Structural ratios in external characters, genitalia and tympanal organs were calculated on the images by means of the imaging software ZEISS AxioVision, Version 4.2.

Terminology and Abbreviations

The descriptions of wing pattern characters, genitalia and tympanal organs follow the terminology in [18]. The denotations of the veins follow [4]. Descriptions of characters and character states in the genitalia were adopted from [5]. Abbreviations: ZSM = Zoological State Collection Munich, Germany.

Results and Discussion

Cirrhochrta seminivea S.P.N.

Material: Holotype: ♂, Oman, Dhofar, 4 km W Dalkuth, 24-XI-2019, leg. M. Seizmair, coll. ZSM, slide no. 21GP006. Paratypes: 1♂, Oman, Dhofar, 2km E Dalkuth, 31-I-2017, leg. et coll. M. Seizmair, slide no. GPPYR4019.

External characters (Fig 1): Wing span of the holotype 15,0 mm, forewing length of the holotype 8,9 mm. Wing span of the paratype 16, 0 mm, forewing length of the paratype 9,0 mm. Head (Fig 1C, 1D): Ocelli absent. Chaetosemata absent. Frons and vertex yellowish-white. Labial palpus with black lateral borders, with the dorsal scaling white and the ventral scaling brownish-ochre, porrect, elongate, anterior end strongly tapered and acute, ratio length / diameter of the eye 1,5. Maxillary palpus yellowish-brown in segment 1, white in segments 2 and 3, of constant width, rounded anteriorly, ratio length / length of labial palpus 0,3. Antennae filiform with slight ciliae, flagellum yellowish-brown, ciliae whitish-grey. Thorax: Dorsal pro- and mesothorax yellowish ochre, dorsal metathorax darkish-brown, ventral thorax yellowish-ochre. Tegula yellowish. Fore- and hindlegs yellowish-brown. Abdomen: Scaling black on the segments, intersegmental scaling yellowish-brown between A1 and A4, greyish-white from A5 onwards.

Forewing upper side: Ground white. Costa and sub-costa with yellowish scaling. Antemedial area with two distinct greyish-fuscous patches, one below, the other above the cubital stem. Medial area with a sub-costal triangular-shaped yellowish-brown stigma with black borders from which two angled, strongly interrupted and fainted black lines develop. Postmedial line black, developing from a further triangular-shaped sub-costal stigma concolorous with the sub-costal stigma in the medial area, angled, interrupted fainted and terminating in a yellowish-fuscous anteterminal stigma located at M3. Anteterminal line yellowish-fuscous, with four further small sub-triangular stigmata at R5, M1 and M2. Termen greyish-yellow. Fringe greyish-fuscous. Forewing underside like forewing upper side.

Hindwing upper side: Ground white. Termen yellowish-fuscous. Fringe greyish-white. No further markings present. Hindwing underside like hindwing upper side.

Male genitalia (Fig 2): Uncus of constant width, significantly shorter than the tuba analis, ratio length / length of the tuba analis 0,32, distal uncus with long chaetae supero-laterally, with two distinct lateral sclerites, with the ventro-lateral sclerite s-shaped and strongly protuberant, the dorso-lateral sclerite significantly shorter, claviform, terminating at the apex (Fig 2C). Tuba analis well developed, with a distinct bulbous dilatation at the posterior end and lateral sclerites developing from the base to the posterior dilatation. Posterior tegumen triangular-shaped. Transtillum arms very small, lobe-shaped, connected. Tegumen border with lobe-shaped processes directed anteriorly. Tegumen-vinculum connection with an elongate, slender androconical hair pencil. Juxta bilobed, with the split ranging over the length of the entire juxta, lobes slightly asymmetrical. Saccus v-shaped. Valva 1,3 times as long as broad, ratio length of the ventral border / length of the costal border 2,7. Basal part of the ventral border slightly concave, post-basal and distal parts straight. Costa straight. Basal costa with a pair of rod-shaped sclerites. Apex with a flat medial rounding. Medial area of the valva with a pair of fibulae with the bases spatially separate from each other, each of them pointed ventrad, the anterior-most fibula with a significant convex curvature, the posterior-most fibula straight and parallel to the costa. Basal and distal sacculus strongly tapered, of sub-triangular shape, medial sacculus dilated, distal sacculus strongly sclerotized with a rod-shaped, strongly curved process dorsally terminating posteriorly from the posterior-most fibula. Vesical surface of the phallus apodeme (Fig 2B) with an elongate cornutus and two distinct spinose pads. The cornutus is with a slight convex curvature, the posterior sixth with a strong narrowing followed by an arrow-like, sub-triangular shape.

Tympanal organs (Fig 3): Ala tympani oviform, ratio maximum length / maximum width 1,6. Bulba tympani strongly invaginated. Tergo-sternal sclerites asymmetrical, strongly differing in length. Zona glabra tympani with a pair of spine-shaped sclerites forming a sub-triangular structure.

Differential diagnosis: The new species is closest to the Afrotropical *Cirrhochrta metisalis* Viette, 1961, *Cirrhochrta nivea* (Joannis, 1932), *Cirrhochrta etiennei* (Viette, 1976) and to the Oriental *Cirrhochrta brizoalis* (Walker, 1859), *Cirrhochrta spinuella* Chen, Song & Wu, 2006, *Cirrhochrta aetherialis* Lederer, 1863 and *Cirrhochrta arcusalis* (Walker, 1859).

The new species shares with these closely related species characters in the forewing pattern, namely the strongly reduced to absent black line pattern in the medial area below the subcostal medial stigma and the strongly reduced to absent black postmedial line. In these forewing pattern characters these species are clearly differentiated from a cluster of Afrotropical species encompassing *Cirrhochrta grabchewskyi* Hering, 1903, *Cirrhochrta griveaudalis* Viette, 1961, *Cirrhochrta oxylalis* Viette, 1961, *Cirrhochrta cygnalis* Pagenstecher, 1907, *Cirrhochrta poecylocygnalis* Strand, 1915, *Cirrhochrta quinquemaculalis* Strand, 1915, each of which are characterised by distinct medial line markings of ellipsoid shapes and a distinct, uninterrupted postmedial line. The

distributions of *C. grabchewskyi*, *C. poecylocygnalis*, and *C. quinquemaculalis* are centered on the East and Central African Mainland [9], *C. oxylalis*, *C. cygnalis* and *C. griveaaudalis* are viewed as endemic to the Malagasy region [2, 4, 12].

The character states differentiating the new species from its closest relatives are given as follows: Presence of subcostal sub-triangular shaped stigmata in the antemedial-medial-postmedial areas of the forewing (0: absent, 1: present): 0-1-1 in the new species, 1-1-1 in *C. metisalis*, *C. brizoalis*, *C. spinuella*, *C. aetherialis*, *C. arcusalis*, 0-0-0 in *C. nivea* and *C. etiennei*. Presence of an antemedial line following the antemedial subcostal stigma on the forewing (0: absent, 1: present): 0 in the new species and in *C. nivea*, *C. etiennei*, *C. spinuella*, *C. aetherialis*, 1 in *C. metisalis*, *C. brizoalis*, *C. arcusalis*. Presence of black antemedial stigmata below and above the cubital stem in the forewing (0: absent, 1: present): 1 in the new species and in the male of *C. nivea*, 0 in each of the other comparative species. Presence of a distinct yellowish-fuscous anteterminal line in the hindwing (0: absent, 1: present): 0 in the new species, *C. nivea* and *C. etiennei*, 1 in each of the other comparative species.

The new species is furthermore distinguished in the male genitalia from *C. metisalis*, *C. etiennei*, *C. brizoalis* and *C. spinuella* in the following character states. The male genitalia of *C. metisalis* are partially figured in [2], the male genitalia of *C. etiennei* are figured in [12], the male genitalia of *C. brizoalis* and *C. spinuella* are figured in [6, 7]. Number of spinose pads on the vesical surface of the phallus apodeme separated from the cornutus and from each other: 2 in the new species, 0 in *C. metisalis*, *C. brizoalis*, 1 in *C. etiennei* and in *C. spinuella*. Number of cornuti: 2 in *C. brizoalis*, 1 in the new species, *C. etiennei*, *C. metisalis* and *C. spinuella*. Shape of the single cornutus in the new species, *C. etiennei*, *C. metisalis* and *C. spinuella* – transition to the posterior fifth / sixth: distinct in the new species with a narrowed offset, without curvature, distinct in *C. spinuella* with a significant convex curvature, distinct in *C. etiennei* with a slight convex curvature, the posterior fifth slightly broadened, smooth in *C. metisalis*, the distal fifth slightly tapered.

Furthermore, the new species is differentiated in the valva, the tegumen and the saccus from *C. etiennei*, *C. brizoalis* and *C. spinuella* as follows: Form of the cucullus: with a slight medial rounding in the new species and in *C. brizoalis*, strongly rounded of semi-circular shape in *C. etiennei*, obliquely rounded ventrad in *C. spinuella*. Connectedness of the fibula bases: Connected in *C. brizoalis* and in *C. spinuella*, separate, spatially displaced from each other in the new species and in *C. etiennei*. Directedness of the fibulae: parallel to the costa in the new species and in *C. etiennei*, orthogonal to the costa in *C. brizoalis* and in *C. spinuella*. Form of the transtillum arms: lobe-shaped in the new species and in *C. brizoalis* and in *C. spinuella*, band-shaped and large in *C. etiennei*. Presence of a tuba analis (0: absent, 1: present): 1 in the new species and in *C. etiennei*, 0 in *C. brizoalis* and in *C. spinuella*. Ratio length uncus / length tuba analis (if present) < 0.5 in the new species, ≈ 1 in *C. etiennei*. Presence of a (second) strongly protuberant sclerite in the distal uncus (0: absent, 1: present): 1 in the new species, 0 in *C. etiennei*, *C. brizoalis* and in *C. spinuella*. Shape of the saccus: v-shaped in the new species, u-shaped in *C. etiennei*, *C. brizoalis* and in *C. spinuella*.

Distribution: At present only known from the type locality in south-western Oman.

Bionomics: The life-cycle is unknown. The type material was collected in an escarpment on the border of a mangrove forest zone (Fig 4).

Etymology: The epitheton refers to one of the external characters, the white hindwings devoid of any marking, a character shared with *C. nivea* (greek semi- = half).

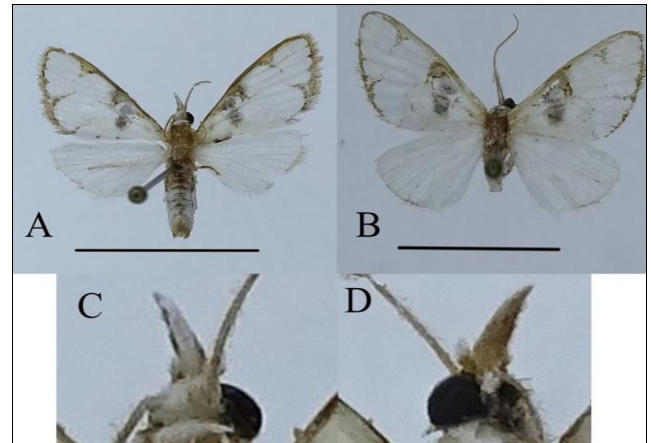


Fig 1: *Cirrhochrsta seminivea* S.P.N, male adults. A. Holotype, Oman, Dhogar, 4km W Dalkuth. B: Paratype, Oman, Dhofar, 2km E Dalkuth. C: Holotype, head, dorsal view. D: Holotype, head, ventral view. Scale bars = 10 mm.

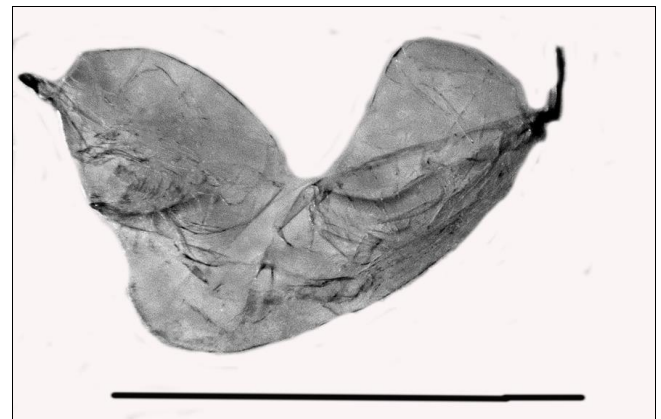


Fig 2: *Cirrhochrsta seminivea* S.P.N, male genitalia, slide no. 21GP006. A: Global view. B: Close-up view of the vesical surface of the phallus apodeme. C: Close-up view of the distal uncus – lateral sclerotizations. Scale bar = 2 mm.

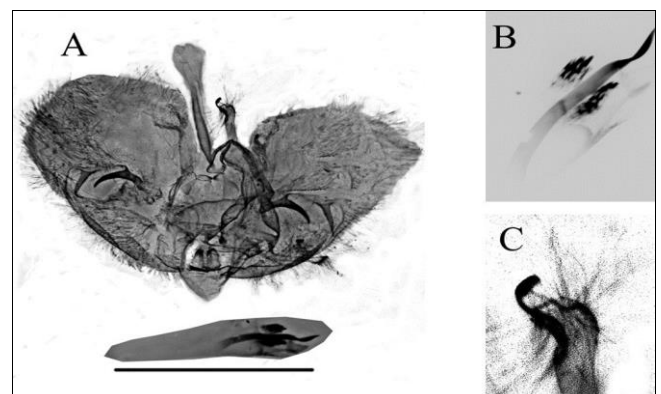


Fig 3: *Cirrhochrsta seminivea* S.P.N, tympanal organs, slide no. 21GP006. Scale bar = 2 mm.



Fig 4: Type habitat of *Cirrhochrista seminivea*, S.P.N, Oman, Dhofar, 4km W Dalkuth.

Conclusion

The presence of the genus *Cirrhochrista* Lederer, 1883 is reported as new to the entomofauna of the Arabian Peninsula. The specimens significantly differ in external and genital-morphological characters from the closest congeners, which results in the attribution of the sample to the new species *Cirrhochrista seminivea* S.P.N. The new species is significantly closer in external characters to species viewed as endemic to islands of the Mascarene and Malagasy region – *C. metisalis*, *C. eteinnei* and *C. nivea* and to species of the Oriental zone than to the geographically nearest species of the Eastern and Central African Mainland. In characters of the male genitalia, in particular in the shape, directedness and connectedness of the fibulae the new species is closer to the Afrotropical species *C. eteinnei* than to the closest Oriental congeners. The phylogenetic relationships between the Afrotropical, Oriental and Indo-Australian species of the genus are in need of further investigation.

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