

Re-evaluation of some problematic taxa of Palaearctic Scythrididae, with two new synonyms and descriptions of three new species (Lepidoptera: Scythrididae)

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Abstract

Some problematic taxa of Palaearctic Scythrididae were re-evaluated using a combination of morphological and genetical methods for determination. Three new species are described: *Apostibes ustyurtensis* Nupponen, sp. n. and *Scythris praecox* Nupponen, sp. n. from Kazakhstan, and *S. kuldchuktaui* Nupponen, sp. n. from Uzbekistan. *Scythris rotundella* Nupponen, 2010 is synonymized with *S. cretacella* Nupponen & Nupponen, 2000, syn. n., and *S. parenthesella* Bengtsson, 2002 with *S. aciella* Bengtsson, 1997, syn. n.

KEY WORDS: Lepidoptera, Scythrididae, new species, new synonyms, Palaearctic region.

Reevaluación de algunas taxa problemáticas de Scythrididae paleárticos con dos nueva sinonimias y descripción de tres nuevas especies (Lepidoptera: Scythrididae)

Resumen

Fueron reevaluadas algunas taxa problemáticas de Scythrididae paleárticos usando métodos morfológicos y genéticos para la determinación. Se describen tres nuevas especies: *Apostibes ustyurtensis* Nupponen, sp. n. y *Scythris praecox* Nupponen, sp. n. de Kazajstán y *S. kuldchuktaui* Nupponen, sp. n. de Uzbekistán. *Scythris rotundella* Nupponen, 2010 se sinonimiza con *S. cretacella* Nupponen & Nupponen, 2000, syn. n. y *S. parenthesella* Bengtsson, 2002 con *S. aciella* Bengtsson, 1997, syn. n.

PALABRAS CLAVE: Lepidoptera, Scythrididae, nuevas especies, nuevas sinonimias, región Paleártica.

Introduction

The Central Asian and Turanian fauna of Scythrididae has studied intensively by the author since 2008. The majority of the results of these investigations have been published earlier in several separate articles. However, records of species comprising various kinds of hitherto unresolved taxonomical problems have remained unpublished, mainly due to insufficient materials, but also a few misinterpreted specimens or material determined tentatively. Recent studies on the new material with morphological and genetical methods revealed interesting results, including discovery of three undescribed species and new synonyms of two species. The results of re-evaluations are summarized in the present paper.

Material and methods

The new materials originate mainly from intensive collecting by the author from different parts of

Kazakhstan during the last ten years. Some misidentified specimens from Uzbekistan were re-evaluated. Additionally, a few important specimens from Oman were donated to me by Aidan Saldaitis and Alessandro Floriani.

Tissue samples (dried legs) of several specimens were shipped to the Canadian Centre for DNA Barcoding in Guelph for DNA sequence analysis. The barcodes are preserved in the Barcode of Life Data Systems (BOLD; see <http://v4.boldsystems.org>), and were used to calculate genetic distances reported below. The holotypes of new species were chosen from specimens with the 621–658 bp long fragment of the mitochondrial DNA barcode region (COI), on the other hand to support the morphological differences presented, but also to allow genetical determinations and comparisons in the future. The material is deposited in the research collection of Kari and Timo Nupponen (Espoo, Finland). The types are available for loan via the Finnish Museum of Natural History, University of Helsinki, Finland, or directly from the author.

Abbreviations

NUPP = research collection of Kari and Timo Nupponen, Espoo, Finland.

FMNH = Finnish Museum of Natural History, University of Helsinki, Finland.

Descriptions of new species

Apostibes ustyurtensis Nupponen, sp. n.

Type material: Holotype ♂, SW KAZAKHSTAN, 42° 36' 25-35" N 54° 08' 35-59" E, 0-47 m, Ustyurt Nature Reserve, Onere spring, 16-V-2011, K. Nupponen leg. Genitalia slide: K. Nupponen prep. no. 1/28-XII-2019. DNA sample (Lepid. Phyl., green label): KN00463. In coll. NUPP (FMNH). Paratypes (31 ♂♂): Ibidem, 16-V-2011, 19 ♂♂, 17-V-2011, 11 ♂♂, K. Nupponen leg.; 16-V-2008, 1 ♂, P. Gorbunov leg. Genitalia slide: K. Nupponen prep. no. 1/06-II-2010. DNA samples (Lepid. Phyl., green labels): KN00461, KN00462, KN00671, KN00672. In coll. NUPP.

Diagnosis *A. ustyurtensis* Nupponen, sp. n. is the largest known species of the genus, and characteristic by the chalk white forewings with very indistinct streaks. Fresh specimens may possible to determine only by external characters (see Remarks). The male genitalia of *A. ustyurtensis* differ from those of the other *Apostibes* by combination of details: the spatulate valva is broad (similar to that of *A. dhahrani*), the phallus a little longer than valva (much shorter than in *A. afghana* and *A. inota*; longer than in *A. dhahrani*), the uncus is broad and quadrangular without ventral sclerotizations and pegs, the gnathos arm is long and distally distinctly upcurved with three apical horn-like extensions. The aforesaid morphological differences are well supported by the DNA barcodes, which reveal distinct K2P divergences between the four taxa of *Apostibes* with barcodes available: *A. ustyurtensis* - *A. griseolineata* 3.45 %, *A. ustyurtensis* - *A. dhahrani* 4.91 %, and *A. ustyurtensis* - *A. halmyrodes* 4.75 %. The five DNA barcodes of *A. ustyurtensis* are identical to each other.

Description (Fig. 1): Wingspan 15-18.5 mm (most specimens 17-18 mm). Head, haustellum, neck tuft, collar, tegula, thorax and scape chalk white shallowly suffused with pale fuscous. Scape dorsally chalk fuscous, ventrally chalk white; pecten at ventral surface chalk white, longer than diameter of scape. Flagellum 0.7 x length of forewing, pale fuscous; in male ciliate, sensillae as long as diameter of flagellum. Labial palp chalk white, lower surfaces of segments II and III suffused with pale fuscous. Legs chalk white, upper surfaces more or less mixed with pale fuscous. Abdomen dorsally pale fuscous, ventrally chalk white. Forewing chalk white, on veins sparsely pale grey scales forming very indistinct streaks (visible only in fresh specimens). Hindwing fuscous white, a little darker than forewing.

Male genitalia (Figs. 2-3): Uncus quadrangular, laterally sparsely setose. Basal plate of gnathos hood-shaped, posteriorly heavily sclerotized and about 0.7 x width of uncus; gnathos arm long and narrow, ventrally a membrane attached to tegumen; distal 0.2 of arm upcurved 45°, tip with three bent

horn-like processes, two directed upstairs and one downstairs. Phallus 1.1 x length of valva, slender, bent at middle third. Juxta 0.4 x length of valva. Valvae symmetrical and straight, more than twice longer than tegumen, distal half broadly spatulate. Sternum VIII triangular, anterior margin concave; sub-anteriorly a narrow transverse sclerotized reinforcement, anterolaterally a pair of converging processes. Tergum VIII subtrapezoid, three times wider than high, with rounded posterior corners and reinforced anterior margin.

Female genitalia: Unknown.

Bionomy: The moth is nocturnal. The flight period is in May, and probably extends to June. The habitat is a xerothermic gypsum desert. The type locality is illustrated in KAILA *et al.* (2019; Fig. 12 b).

Distribution: SW Kazakhstan. Only known from the type locality.

Etymology: The name of the species refers to its geographical origin.

Remarks: The genus *Apostibes* Walsingham, 1907 comprise eight described species in the Old World: *A. afghana* Passerin d'Entrèves & Roggero, 2003, *A. deckerti* Bengtsson, 2014, *A. dhahrani* Passerin d'Entrèves & Roggero, 2003, *A. griseolineata* Walsingham, 1907, *A. halmyrodes* (Meyrick, 1921), *A. inota* (Meyrick, 1924), *A. raguae* Bengtsson, 1997 and *A. samburensis* Bengtsson, 2014. According to the original description *A. dhahrani*, its longitudinal striae of forewings are imperceptible. However, based on new material: UAE, Abu Dhabi, Sameih, 1 ♂, I-2013, 2 ♀♀, 31-V-2013, R. Breithaupt leg.; Genitalia slide: Wf. 11.889 ♂; DNA sample (Lepid. Phyl., green labels): KN00638; (coll. NUPP), the striae are distinct, and the moths are easily separable from *A. ustyurtensis*. The new taxon was tentatively reported as *A. griseolineata* Walsingham, 1907 (NUPPONEN, 2010, 2012). However, all specimens collected in Ustyurt Nature Reserve belong to *A. ustyurtensis*.

Scythris kuldchuktaui Nupponen, sp. n.

Type material: Holotype ♂, UZBEKISTAN, Buchara district, 40° 44' 59.6" N 63° 47' 07.5" E, 404 m a.s.l., Kuldchuktau Mts., Churuk village 7 km N, 02-V-2008, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 1/12-XII-2008. DNA sample (Lepid. Phyl., green label): KN00557. In coll. NUPP (FMNH).

Diagnosis: Externally *S. kuldchuktaui* Nupponen, sp. n. is quite easily separated from other taxa of the *caroxylella* species complex by its large size, and broad unicolor pale cream white forewings. The male genitalia of *S. kuldchuktaui* are superficially similar to those of the *caroxylella* species complex, but readily separated from those by peculiar broad and apically cut off gnathos with extensions upwards and downwards, as well as by straight and broad valvae. The aforesaid morphological differences are well supported by the DNA barcodes, which reveal distinct K2P divergences between the five taxa of barcodes available: *kuldchuktaui-cretacella* 3.50 %; *kuldchuktaui-praecox* 3.86 %; *kuldchuktaui-caroxylella* 4.40 %; *kuldchuktaui-cramella* 4.57 %; *kuldchuktaui-fluxilis* 4.92 %.

Description (Fig. 4): Wingspan 17.5 mm. Head, haustellum, labial palp, neck tuft, collar, tegula, thorax and legs unicolor, pale cream white (same colour as forewing). Scape pale cream white, pecten longer than diameter of scape. Flagellum 0.55 x length of forewing, pale fuscous; in male ciliate, length of sensillae about 1.1 x diameter of flagellum. Abdomen dorsally pale cream fuscous, ventrally cream white. Forewing pale cream white, unicolor without pattern, moderately broad. Hindwing cream white, a little paler than and as broad as forewing.

Male genitalia (Fig. 5): Uncus stout, Y-shaped, posterior branches rather short, circular. Gnathos broad, subbasally large semicircular extension upwards, and another shallow extension subapically upwards; apex cut off with extensions directed upwards and downwards, of which latter one longer. Tegumen wide, semicircular, dorsal V-shaped depression 0.65 x length of tegumen. Phallus 0.85 x length of valva, curved 90° at basal half; distal half evenly tapered, straight, tip pointed. Valva spatulate, broad, more or less straight, apex with nine short and thick thorns. Vinculum labiate, 0.6 x length of valva. Sternum VIII triangular; posteriorly blunt, anterior margin medially concave. Tergum VIII subpentagonal, about 2.5 times wider than high, posterior margin medially shallowly concave, anterior margin widely incurved.

Female genitalia: Unknown.

Bionomy: The moth is nocturnal. The habitat is a stony desert with sparse vegetation. The habitat is illustrated in NUPPONEN (2009: Fig. 1).

Distribution: Uzbekistan.

Etymology: The species name refers to the type locality, the Kuldchuktau Mts., a low mountain range located at middle of the Kyzylkum desert.

Remarks: The present specimen was originally misidentified and reported as *S. pallidella* Passerin d'Entrèves & Roggero, 2006 (NUPPONEN, 2009). The mistake was later detected while barcoding Turanian Scythrididae. The barcode gap between *S. kuldchuktaui* and *S. pallidella* is 6.02 %, and the two species are readily separated by both externally and details in the genitalia. The *caroxylella* species complex comprising six species: *S. caroxylella* Falkovitsh, 1969, *S. fluxilis* Falkovitsh, 1986, *S. cretacella* K. Nupponen & T. Nupponen, 2000 (= *S. rotundella* K. Nupponen, 2010 [see below]), *S. cramella* K. Nupponen, 2010, *S. kuldchuktaui* K. Nupponen, sp. n. and *S. praecox* K. Nupponen, sp. n. [see below]. In addition, *S. parafluxilis* Passerin d'Entrèves & Roggero, 2007 may belong to the same complex, but it cannot be confirmed until a male of the species is found. Male genitalia of the six species are superficially of each other, but readily separated by details, particularly shape of the gnathos, and characterized by spatulate valvae with short thick apical thorns. The *caroxylella* complex is tentatively placed to the heterogeneous *pascuella* species-group.

Scythris praecox Nupponen, sp. n.

Type material: Holotype ♂, KAZAKHSTAN, 43° 46' 43" N 79° 55' 16" E, 515 m a.s.l., desert near Rakhat Kuduk by Ketmen Mts., 04-VI-2014, K. Nupponen & R. Haverinen leg. Genitalia slide: K. Nupponen prep. no. 1/20-XII-2019. DNA sample (Lepid. Phyl., green label): KN00501. In coll. NUPP (FMNH). Paratypes (19 ♂♂, 17 ♀♀): Idem, 10 ♂♂, 2 ♀♀; KAZAKHSTAN, 43° 47' 03" N 68° 03' 15" E, 540 m a.s.l., Karatau Mts., Turkestan town 50 km N, 1 ♂, 8-V-2010, K. Nupponen leg.; KAZAKHSTAN, 47° 12' 02" N 55° 29' 13" E, 45 m a.s.l., Emba River, Besbai village 2 km E, 1 ♂, 11-V-2011, K. Nupponen leg.; Kazakhstan, 43° 32' 52" N 67° 30' 09" E, 170 m a.s.l., Syr-Darya River, tugai forest, Talap station 13 km SW, 1 ♂, 19-IV-2014, K. Nupponen leg.; KAZAKHSTAN, 47° 26' 23" N 60° 49' 04" E, 150 m a.s.l., Malye Barsuki sands, Karachokat village 5 km NW, 1 ♂, 30-IV-2014, K. Nupponen leg.; KAZAKHSTAN, 43° 59' 37" N 79° 34' 20" E, 495 m a.s.l., Ili River valley, Aidarly sands, Aidarly village 6 km SE, 1 ♂, 6 ♀♀, 02-VI-2017, K. Nupponen & R. Haverinen leg.; KAZAKHSTAN, 44° 07' 50" N 79° 23' 44" E, 792 m a.s.l., foothills of Katutau Mts., Konyrolen River, 2 ♂♂, 1 ♀, 04-VI-2017, K. Nupponen & R. Haverinen leg.; Kazakhstan, 44° 00' 04" N 79° 31' 00" E, 515 m a.s.l., sand dunes by Ili River, Aidarly village 3 km S, 1 ♀, 03-VI-2017, K. Nupponen & R. Haverinen leg.; KAZAKHSTAN, 43° 46' 08" N 80° 03' 51" E, 518 m a.s.l., Rakhat Kuduk, desert & sand dunes, 2 ♂♂, 7 ♀♀, 05-VI-2017, K. Nupponen & R. Haverinen leg. Genitalia slides: K. Nupponen prep. no. 8/30-XI-2010 ♂, 2/24-VIII-2014 ♀, 1/23-XII-2019 ♀. Four genitalia preparations preserved in glycerol. DNA samples (Lepid. Phyl., green labels): KN00500, KN00502. In coll. NUPP.

Diagnosis: Externally *S. praecox* Nupponen, sp. n. is separable from other taxa of the *caroxylella* species complex by its narrow and elongate pale grey forewings with characteristic darker patches along dorsum, and medium size (*S. kuldchuktaui*, *S. fluxilis* and *S. parafluxilis* are distinctly larger, and *S. cretacella*, *S. caroxylella* and *S. cramella* smaller). The male genitalia of *S. praecox* are superficially similar to those of the *caroxylella* species complex, but readily separated by a peculiar gnathos with a large subbasal extension and apical processes, as well as a short phallus. The female genitalia of *S. praecox* resemble those of *S. cramella*, but differ by narrower sterigma with a larger ostium. In *S. praecox*, the ostium is opening near anterior margin of the sterigma, while in *S. fluxilis* and *S. parafluxilis* the sterigma is anteriorly widely open and the ostium is situated at anterior incisure. In *S. praecox*, medioposterior incision of the sternum VII is narrower than that of *S. parafluxilis*, but much deeper than in *S. fluxilis*. The aforesaid morphological differences are well supported by the DNA barcodes, which reveal distinct K2P divergences between the five taxa of barcodes available: *praecox*-

cretacella 2.24 %; *praecox-kuldchuktaui* 3.86 %; *praecox-fluxilis* 4.54 %; *praecox-caroxylella* 4.93 %; *praecox-cramella* 5.99 %.

Description (Fig. 6): Wingspan 11.5-14 mm. Head, collar, neck tuft, haustellum and thorax pale grey mixed with fuscous. Scape fuscous; pecten dirty white, about 1.5 x longer than diameter of scape. Flagellum 0.55 x length of forewing, fuscous; in male ciliate, sensillae as long as diameter of flagellum. Labial palp dirty white, posterior half of segment II and segment III with a few dark fuscous scales at lower surface. Legs pale grey, forelegs a little darker than mid- and hindlegs. Abdomen dorsally fuscous, ventrally dirty white. Forewing narrow and elongate, pale grey, irregularly suffused with dark fuscous over the wing; fuscous scales form indistinct patches between fold and dorsum at 0.2, 0.4, 0.6, and apically near cilia line. Hindwing pale fuscous.

Male genitalia (Fig. 7; see also NUPPONEN, 2011: Figs. 28-29): Uncus stout, Y-shaped, posterior branches elongated and distally rounded. Gnathos broad, subbasally large sub-semicircular extension upwards; distal part thick, apex strongly elongated upwards with tip shortly bifurcate; downwards directed extension short. Tegumen wide, semicircular, dorsal V-shaped depression 0.7 x length of tegumen. Phallus 0.6 x length of valva, curved 90° at basal quarter; distal 0.75 about of equal width, straight, tip more or less blunt. Valva spatulate; distal third bent inwards, apex with 5-6 short and thick thorns. Vinculum broad, triangular, 0.6 x length of valva. Sternum VIII triangular, elongated (length somewhat variable); posteriorly blunt, anterior margin somewhat variable (straight or medially incurved). Tergum VIII subpentagonal, about 1.75 x wider than high, posterior margin more or less shallowly concave, anterior margin widely incurved.

Female genitalia (Figs. 8-9): Sterigma a rectangular plate, 1.8 x higher than wide, posteriorly slightly narrowed; ostium large, sub-circular, situated near anterior margin of sterigma at middle. Sternum VII quadrangular, posterior margin with deep (0.4 x height of sternum VII) V-shaped medial incision; anterior margin medially slightly concave. Apophyses posteriores 1.3 x length of apophyses anteriores.

Bionomy: The moth is nocturnal. Flight period is early, starting already from mid-April, and ending in first half of June. The habitats are various kinds of deserts. The type locality is illustrated in NUPPONEN *et al.* (2016: Fig. 13).

Distribution: Kazakhstan. Widely distributed in the desert zone of southern Kazakhstan, from the Ili River valley in Central Asia westwards to the Emba River in western part of the country.

Etymology: Latin *praecox* = very early. The species name alludes to early onset of flight period of the moth.

Remarks: *S. praecox* Nupponen, sp. n. belongs to the *caroxylella* species complex (see Remarks of *S. kuldchuktaui* above). The taxon is earlier regarded with some doubt as *S. parafluxilis* Passerin d'Entrèves & Roggero, 2007 (NUPPONEN, 2011; NUPPONEN *et al.*, 2016). The new material including females allow to confirm that *S. praecox* Nupponen, sp. n. is not conspecific with *S. parafluxilis*. The exact status of the Mongolian *S. parafluxilis* in the *caroxylella* species complex still remains a little doubtful, due to scarce material with unknown male and a moderately rough original description (PASSERIN D'ENTRÈVES & ROGGERO, 2007).

Taxonomic accounts

Scythis aciella Bengtsson, 1997

Scythis parenthesella Bengtsson, 2002, **syn. n.**

Type material studied only from original descriptions.

Other material (5 ♂♂, 2 ♀♀): TUNISIA, 33° 51-53' N 7° 47-49' E, Nefta village 6 km W, Sahara semidesert, 20-30 m a.s.l., 29-IV-2000, 2 ♂♂, K. Nupponen leg., one genitalia preparation preserved in glycerol. In coll. NUPP; TUNISIA, 33° 51-53' N 7° 47 49' E, Tozeur 30 km W, Nefta env., 20-30 m a.s.l., 15-XI-2009, 2 ♂♂, 1 ♀, T. Nupponen leg., Genitalia slides: K. Nupponen prep. no. 1/23-I-2010 (♂), 5/23-I-2010 (♀), DNA samples (Lepid. Phyl., green labels): KN00547 ♀, KN00548 ♂. In coll. NUPP; N OMAN, 20° 57.926' N 58° 47.610' E, coast line, 0-5 m a.s.l., 1 ♂, 1 ♀, 13-III-2016, A. Floriani & A.

Saldaitis leg., Genitalia slides: K. Nupponen prep. no. 1/13-V-2017 ♂, 1/04-XII-2017 ♀, DNA samples (Lepid. Phyl., green labels): KN01028 ♂, KN01029 ♀. In coll. NUPP.

Distribution: Egypt, Lebanon, Oman, Tunisia, Yemen.

Remarks: *Scythris aciella* was described on the basis of two males from Egypt and Lebanon (BENGTSSON, 1997). The description of *S. parenthesesella* is based on a single female from Yemen (BENGTSSON, 2002). The two taxa were expected to be conspecific (NUPPONEN, 2013), but available material was not sufficient to make final conclusions. Examination of new material from Oman allow to study not only morphological features of *S. parenthesesella*, but also compare the two taxa by the DNA barcodes. The female genitalia of the Oman specimen are identical to those of the holotype of *S. parenthesesella*. The genitalia of both male and female of the Omani specimens are identical to those of *S. aciella* from Tunisia, and the male genitalia also perfectly coincide with drawing of those of holotype of *S. aciella* (BENGTSSON, 1997). The morphological uniformity by the genitalia of the taxa is well supported by the DNA barcodes. The barcodes (K2P) of the Omani male and female are identical with each other, and exhibit only a minor intraspecific difference with those of Tunisian male and female, which are identical by the DNA barcodes. Thus, *S. parenthesesella* is a junior synonym of *S. aciella*, syn. n. Genitalia of the taxa are illustrated as follows: *S. aciella* (BENGTSSON 1997: holotype, male, Fig. 47 drawing; sternum VIII and tergum VIII are mixed up); NUPPONEN, 2013: female, Figs. 13-14); *S. parenthesesella* (BENGTSSON, 2002: holotype, female, Figs. 89-90). Genitalia of the barcoded Omani male and female are illustrated in the present paper (Fig. 10 ♂, Fig. 11 ♀). *S. aciella* is externally a variable species, and can be safely determined only by dissection. The DNA barcodes reveal distinct K2P divergences between *S. aciella* and the allopatric two taxa (*S. curtiphallus* Nupponen, 2016, *S. digitibasella* Nupponen & Saldaitis, 2013) with similar structure of the male genitalia: *aciella* - *curtiphallus* 9.01 % and *aciella* - *digitibasella* 6.75 %.

Scythris cretacella K. Nupponen & T. Nupponen, 2000

Scythris rotundella K. Nupponen, 2010, **syn. n.**

Material studied: *Scythris cretacella* K. Nupponen & T. Nupponen, 2000. Type material: Holotype (♀: Fig. 12): RUSSIA, Southern Urals, 50° 45' N 54° 28' E, 170 m a.s.l., Orenburg oblast, Pokrovka village 20 km S, Schibendy valley, 6-VI-1998, T. & K. Nupponen leg.; Genitalia slide: K. Nupponen prep. no. 3/18-X-1999. In coll. NUPP.

Scythris rotundella K. Nupponen, 2010. Type material: Holotype (♀): UZBEKISTAN, Buchara district, 40° 34' 30.8" N 64° 07' 03.4" E, 195 m a.s.l., Turt Kuduk village 20 km SW, 20-VII-2009, K. Nupponen leg. In coll. NUPP. Paratypes (1 ♂, 1 ♀): 1 ♀, UZBEKISTAN, Buchara district, 40° 34' 30.8" N 64° 07' 03.4" E, 195 m a.s.l., Turt Kuduk village 20 km SW, 20-VII-2009, K. Nupponen leg.; 1 ♂, UZBEKISTAN, Buchara district, 40° 44' 59.6" N 63° 47' 07.5" E, 404 m, Kuldchuktau Mts, Churuk village 7 km N, 18-VII-2009, K. Nupponen leg. Genitalia slides: K. Nupponen prep. no. 2/30-XII-2009 ♂, 4/28-XII-2009, ♀. In coll. NUPP.

Other material (50 ♂♂, 8 ♀♀): KAZAKHSTAN, 47° 16' 58" N 55° 35' 50" E, 55 m a.s.l., Emba river bank, near Mijaly village, 1 ♂, 18-V-2010, K. Nupponen leg.; SW Kazakhstan, 45° 30' 20" N 55° 17' 07" E, 110 m a.s.l., Beineu town 18 km N, 28-V-2011, 7 ♂♂, K. Nupponen leg.; Kazakhstan, 46° 20' 21" N 59° 41' 49" E, 45 m a.s.l., Aral Sea, N shore, Tamshima well, 35 ♂♂, 4 ♀♀, 30-V-2011, K. Nupponen leg.; KAZAKHSTAN, 46° 19' 53" N 59° 41' 36" E, 35 m a.s.l., Aral Sea, dunes at N shore, Tamshima well, 1 ♀, 31-V-2011, K. Nupponen leg.; Kazakhstan, 46° 17' 13" N 58° 50' 35" E, 130 m a.s.l., S Barsuki desert, near Bozoi village, 3 ♂♂, 1-VI-2011, K. Nupponen leg.; Kazakhstan, 47° 37' 43" N 59° 31' 14" E, 190 m a.s.l., N Barsuki desert, Chelkar settlement 25 km S, 3-VI-2011, K. Nupponen leg.; KAZAKHSTAN, 47° 16' 36" N 61° 01' 07" E, 200 m a.s.l., Saxaulsky village 20 km NW, Tynshokysu hills, 1 ♀, 10-IX-2011, K. Nupponen leg.; Kazakhstan, 43° 37' 52" N 79° 55' 50" E, 650 m a.s.l., Rakhata Kuduk by Ketmen Mts., 1 ♂, 2 ♀♀, 2-VI-2014, K. Nupponen & R. Haverinen leg.; Genitalia slides: K. Nupponen prep. no. 1/08-I-2011 ♂, 3/29.XI.2014 ♀. Six genitalia preparations preserved in glycerol. In coll. NUPP.

Distribution: Russia (S Ural), Uzbekistan, Kazakhstan. Widely distributed in the desert zone of

southern Kazakhstan, from the Ili River valley in Central Asia westwards to the Emba River in western part of the country.

Remarks: *Scythris cretacella* was described from Southern Urals on the basis of a single female. The specimen was collected on chalk hills of the Schibendy valley, a well known locality by abnormally coloured moths reflecting chalk white colour of the soil. *S. rotundella* was described on the basis of two females and one male from Uzbekistan. The holotype (female) of *S. rotundella* is mixed with brown, giving externally quite a different impression than *S. cretacella*. However, examination of large material from different regions of Kazakhstan reveal that there exist all colour forms between the types of *S. cretacella* and *S. rotundella*. The female genitalia of *S. cretacella* and *S. rotundella* are identical, and evidently the two taxa are conspecific. Thus, *S. rotundella* is a junior synonym of *S. cretacella*, syn. n. The taxa are illustrated as follows: *S. cretacella* (NUPPONEN *et al.*, 2000: holotype, adult Fig. 20, female genitalia Fig. 21); *S. rotundella* (NUPPONEN, 2010: holotype, adult Fig. 10, paratype female genitalia Fig. 30, paratype male genitalia Figs. 28-29). Further notes on determination of the taxon (as *S. rotundella*) is given in NUPPONEN (2010).

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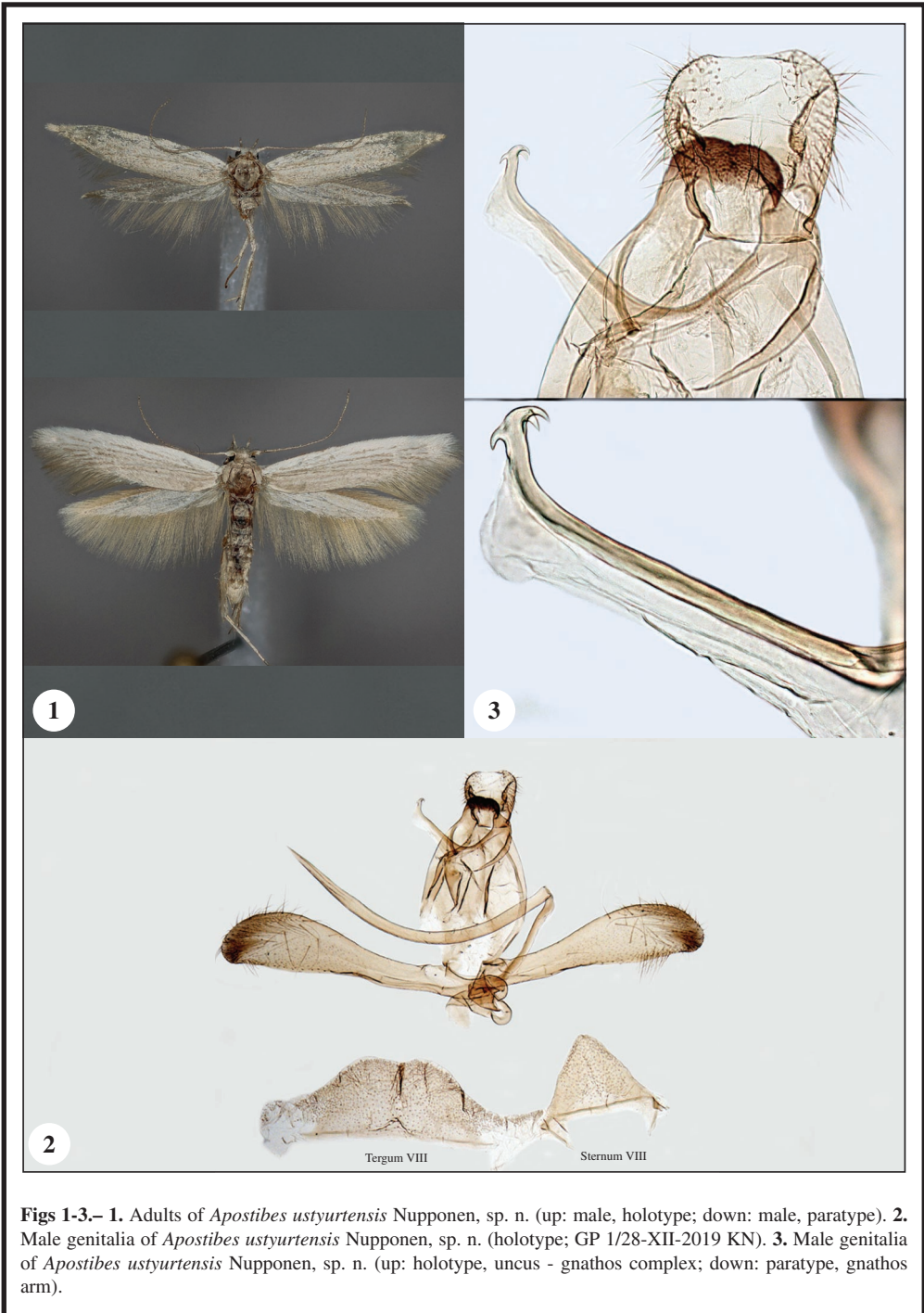
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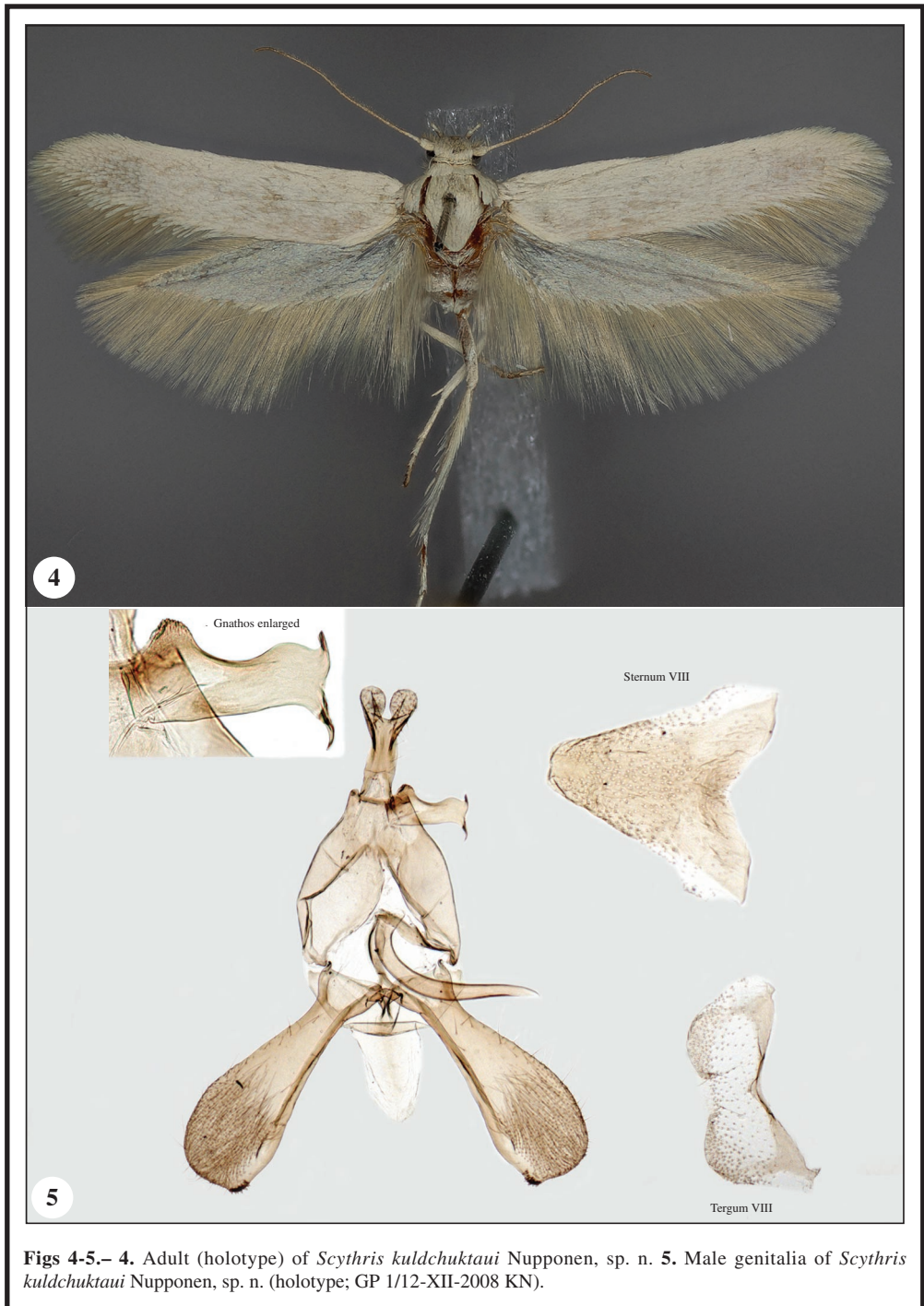
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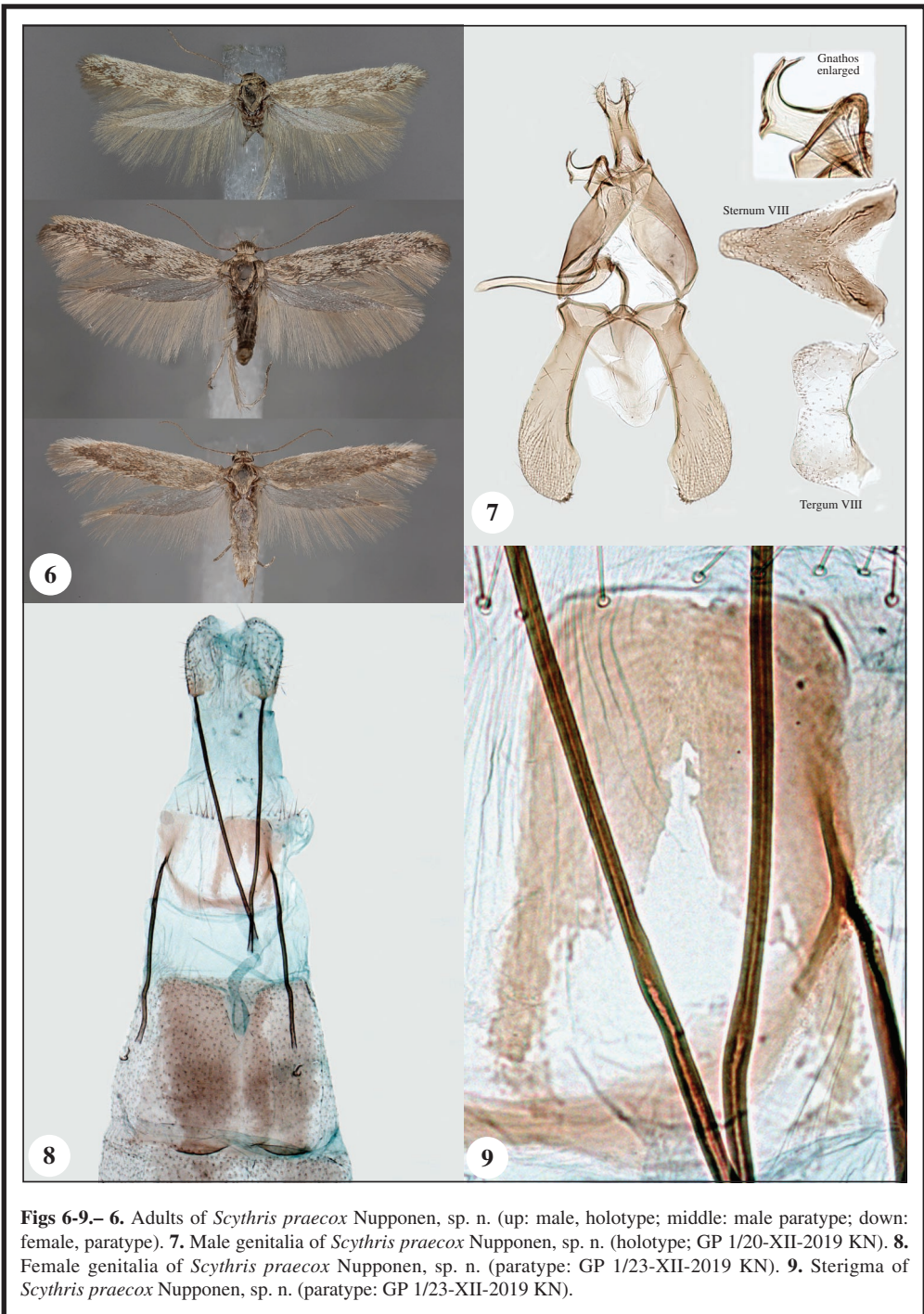
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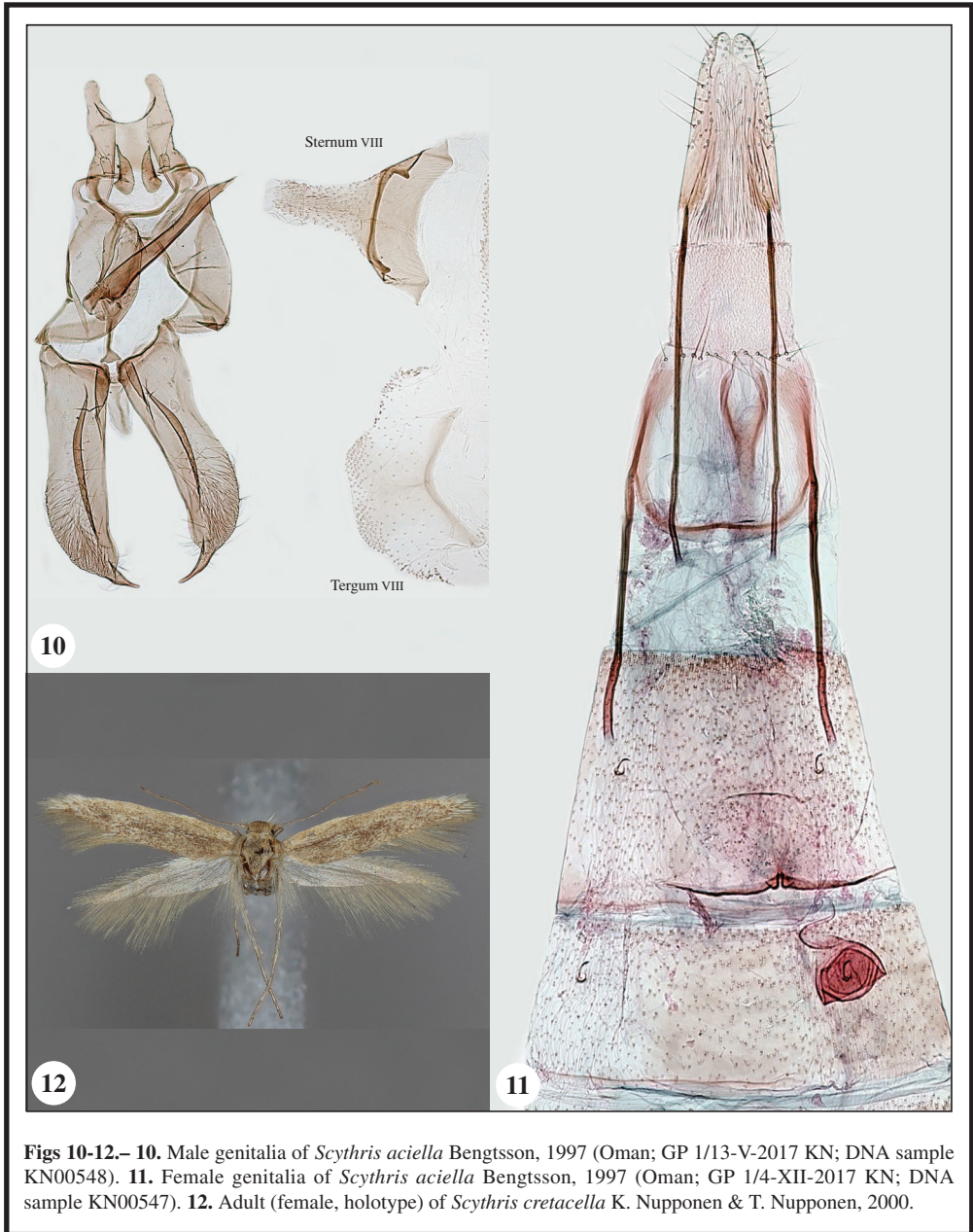




Figs 4-5.— 4. Adult (holotype) of *Scythris kuldchuktai* Nupponen, sp. n. 5. Male genitalia of *Scythris kuldchuktai* Nupponen, sp. n. (holotype; GP 1/12-XII-2008 KN).



Figs 6-9.— 6. Adults of *Scythris praecox* Nupponen, sp. n. (up: male, holotype; middle: male paratype; down: female, paratype). 7. Male genitalia of *Scythris praecox* Nupponen, sp. n. (holotype; GP 1/20-XII-2019 KN). 8. Female genitalia of *Scythris praecox* Nupponen, sp. n. (paratype: GP 1/23-XII-2019 KN). 9. Sterigma of *Scythris praecox* Nupponen, sp. n. (paratype: GP 1/23-XII-2019 KN).



Figs 10-12. 10. Male genitalia of *Scythris aciella* Bengtsson, 1997 (Oman; GP 1/13-V-2017 KN; DNA sample KN00548). 11. Female genitalia of *Scythris aciella* Bengtsson, 1997 (Oman; GP 1/4-XII-2017 KN; DNA sample KN00547). 12. Adult (female, holotype) of *Scythris cretacella* K. Nupponen & T. Nupponen, 2000.