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avives@eresmas.net

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Nupponen, K.

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Scythris antisymmetrica Nupponen, sp. n. from Central Spain, an example of antisymmetric male genitalia in the order Lepidoptera (Lepidoptera: Scythrididae)

K. Nupponen

Abstract

Scythris antisymmetrica Nupponen, sp. n. is described from Central Spain. Altogether 22 specimens were collected during 2006-2008 in two different localities. The male genitalia of the new taxon are antisymmetric, representing the first such case in the order Lepidoptera.

KEY WORD: Lepidoptera, Scythrididae, new species, antisymmetry, Spain.

Scythris antisymmetrica Nupponen, sp. n. de España central, un ejemplo de genitalia del macho antisimétrica en el orden Lepidoptera (Lepidoptera: Scythrididae)

Resumen

Se describe de España central a *Scythris antisymmetrica* Nupponen, sp. n.. En total 22 especímenes fueron reunidos durante 2006-2008 en dos localidades diferentes. La genitalia del macho del nuevo taxon es antisimétrica, representando el primer caso de este tipo en el orden Lepidoptera.

PALABRAS CLAVE: Lepidoptera, Scythrididae, nueva especie, antisimetría, España.

Introduction

The *pulicella*-group of the genus *Scythris* is characterized by the strongly asymmetrical male genitalia with a posteriorly transformed tegumen and densely setose valvae. The group is most richest in species in the western Mediterranean area, especially the Iberian Peninsula. Subsequently four species were described from the central and eastern part of the Palaearctic region (NUPPONEN *et al.*, 2000, NUPPONEN & NUPPONEN, 2001, NUPPONEN, 2007). Altogether 13 described species are included in the *pulicella*-group (BENGTSSON, unpublished).

During a short collecting trip in Central Spain in early June 2006, Timo Nupponen found three specimens of a small scythridid moth that appeared to belong to the previously unknown taxon of the *pulicella*-group. In 2007 and 2008, I visited the same region to obtain further material for description. I found another locality for the species, and succeeded in collecting 19 specimens over four days. The male genitalia are very characteristic in the *pulicella*-group, and in most cases the valvae are visible in such a way that it is possible to determine the males without dissecting. While studying the material at home, I surprisingly discovered that in males there are both left- and right-sided genitalia in equal amounts. However, the female genitalia are superficially symmetrical. The new taxon is described below.

Scythris antisymmetrica Nupponen, sp. n.

Type material: Holotype: ♂ (Fig. 1): Spain, 40° 25' N 1° 04' W, Aragon, Teruel 9 km NNE, Villalba Baja, 960-1030 m a.s.l., 18-V-2007, K. Nupponen leg. In coll. T. & K. Nupponen.

Paratypes (13 ♂♂ and 8 ♀♀): Spain, 40° 25' N 1° 04' W, Aragon, Teruel 9 km NNE, Villalba Baja, 960-1030 m a. s. l., 16-V-2007, 2 ♂♂; 17-V-2007, 2 ♂♂, 2 ♀♀; 18-V-2007, 4 ♂♂, 4 ♀♀; 13-VI-2008, 4 ♂♂, 1 ♀, K. Nupponen leg.; Spain, 40 27' N 1° 02' W, Aragon, Teruel 13 km N, 975-1000 m a.s.l., 01-VI-2006, 2 ♂♂, 1 ♀, T. Nupponen leg. Genitalia slides: K. Nupponen prep. no. 3/29-X-2006 (♂), 1/30-X-2006 (♀), 1/20-VIII-2007 (♂), 2/20-VIII-2007 (♀), 1/20-XI-2008 (♂), 2/21-XII-2008 (♂). DNA samples (Lepid. Phyl., green labels): 05831, 05832, 06006, 06007, 06008, 06009. In colls. T. & K. Nupponen and Museo Nacional de Ciencias Naturales, Madrid, Spain.

Diagnosis: Externally *S. antisymmetrica* Nupponen, sp. n. can be confused with many small, dark scythrids, e. g. *S. lafauryi* Passerin d'Entrèves, 1986, *S. lempkei* Bengtsson & Langohr, 1989 and *S. gladiella* K. & T. Nupponen, 2004. The male genitalia of *S. antisymmetrica* are typical for the *pulicella*-group, but easy to separate from closely related species by the asymmetrical and antisymmetrical valvae: one long, chute-shaped and terminally pouch-like, the other shovel-shaped and dorsally extended with a strongly curved, sclerotized and pointed apical portion. The female genitalia of *S. antisymmetrica* are close to those of *S. pilella* Bengtsson, 1991, but differ by a furrowed sternum VII with elliptical cup-shaped posterolateral extensions and stouter mid-posterior processes.

Description: Wingspan 8-10 mm. Head, antenna, collar, tegula and thorax dark brown, thorax with a few pale scales medioterminally. Neck tuft mixed with dark brown and pale ochreous. Haustellum dark brown mixed with dirty beige. Labial palp: segment I white, segments II-III dark brown with scattered dirty beige scales. Forelegs and midlegs dark brown, more (femur) or less (tibia and tarsus) mixed with dirty beige. Hindleg: femur dirty beige; tibia and tarsus dark brown, tibia with broad ochreous rings anteriorly, medially and posteriorly; in tarsus indistinct dirty beige ring at middle. Abdomen in male dorsally dark fuscous, ventrally dirty beige, anal tuft ochreous. Female abdomen dorsally dark brown, densely scattered with greyish scales, segments VII-VIII dirty beige; laterally fuscous; ventrally whitish ochreous, basally darker. Forewing dark brown; narrow. Indistinct pale ochreous streak in fold from subbasal area to 0.7, cut by three black dashes at 0.2, 0.4 and 0.6; further black spot at cell end; a few pale ochreous and dirty white scales in apical area near margins. Hindwing fuscous.

Male genitalia (Figs. 2-9): Antisymmetrical. Uncus short, digitate. Gnathos stout, sclerotized, asymmetrical hood; subbasally broad ridges attached to tegumen. Tegumen strongly asymmetrical, proximally membranous, enlarged to cup-shaped formations at base of both valvae. Aedeagus 0.85 x length of shorter valva, slender, bent, distally tapered. Longer valva chute-shaped, terminal 1/3 pouch-like; at apex long, sclerotized thorn; subapically at dorsal margin a stout spine, which is reduced in most specimens; setose ridge from subbasal area to apex; whole valva sparsely setose. Shorter valva basically shovel-shaped, sparsely setose, dorsal margin triangularly extended; subapically strongly curved; apical portion sclerotized, bent and tapered, tip pointed. Tergum VIII subpentagonal, anterior margin concave; posteriorly strongly sclerotized, bifurcate, tips more or less pointed, medial incision deep and narrow, V-shaped; one posterolateral corner more elongated and pointed forwards than the other, always located at same side as shorter valva. Sternum VIII rectangular, membranous.

Female genitalia (Fig. 10): Sterigma triangular, strongly sclerotized, anterior margin incised. Sternum VII pentagonal, sclerotized and furrowed plate; posterior margin slightly elongated with stout paired processes forming V-shaped indentation mid-posteriorly; posterolateral margins with large, elliptical, cup-shaped extensions. Apophyses anteriores 0.2 x length of apophyses posteriores.

Bionomy: The specimens were collected by sweeping in sunshine during middle part of the

day. The flight period extends from mid-May to mid-June. The habitats are xerothermic slopes with sparse vegetation (e.g. *Thymus* and *Helianthemum*).

Distribution: Central Spain. Only known from two patches located close to each other.

Etymology: The species name alludes to the antisymmetrical male genitalia of the new taxon.

Remarks: *S. antisymmetrica* Nupponen, sp. n. belongs to the *pulicella* species-group. On the grounds of the genitalia structure of both sexes, its closest relatives are *S. pulicella* (Staudinger, 1859), *S. pilella* Bengtsson, 1991 and *S. gladiella* K. & T. Nupponen, 2004.

Of the available 14 males of *S. antisymmetrica*, there are seven specimens with right-sided and seven specimens with left-sided genitalia, which indicates pure antisymmetry (see HUBER *et al.*, 2007). It is remarkable that antisymmetry doesn't exist only in the valvae, but also in the uncus-gnathos-tegumen complex and even in the 8th tergal segment. Thus, the left-sided genitalia are like a mirror image of the right-sided one. There is also some variation in the length of the valvae, as well as in a subapical stout spine at dorsal margin of the longer valva. However, the variation is equal in left- and right-sided specimens. To ensure that all specimens belong to a same taxon, the DNA barcode sequence (CO1) of three left-sided and three right-sided specimens was analysed. The DNA barcodes showed less than 1% difference between the specimens, and therefore it is unlikely that two different species are involved (Marko Mutanen, pers. comm.).

Discussion

Genital asymmetry in Lepidoptera is a widespread phenomenon, having originated many times independently and involving a wide array of structures (HUBER *et al.*, 2007). However, most insect genital asymmetries are directional, i.e. all individuals in the population are either left- or right-sided. By contrast, morphological antisymmetry in the genitalia is extremely rare among all insects. It is so far known to exist in four species only, belonging to the orders Dictyoptera, Hemiptera and Trichoptera (HUBER *et al.*, 2007). Thus, *S. antisymmetrica* is the first such case in the order Lepidoptera.

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BIBLIOGRAPHY

- BENGTSSON, B. Å., 1997a.– Scythrididae. In: P. HUEMER, O. KARSHOLT & L. LYNEBORG (eds.).– *Microlepidoptera of Europe*, **2**: 1-301.
- HUBER, B. A., SINCLAIR, B. J. & SCHMITT, M., 2007.– The evolution of asymmetric genitalia in spiders and insects.– *Biol. Rev. Camb. Philos. Soc.*, **82**(4): 647-698.
- NUPPONEN, K., 2007.– Notes on the Scythrididae fauna of the Volgo-Ural region and southern Buryatia, with one new synonym and descriptions of six new species (Lepidoptera: Scythrididae).– *SHILAP Revta. lepid.*, **35**(138): 231-249.
- NUPPONEN, K., BENGTSSON, B. Å., KAITILA, J.-P., NUPPONEN, T., JUNNILAINEN, J. & OLSCHWANG, V., 2000.– The scythridid fauna of the southern Ural Mountains, with description of fourteen new species (Lepidoptera: Scythrididae).– *Entomologica fenn.*, **11**: 5-34.

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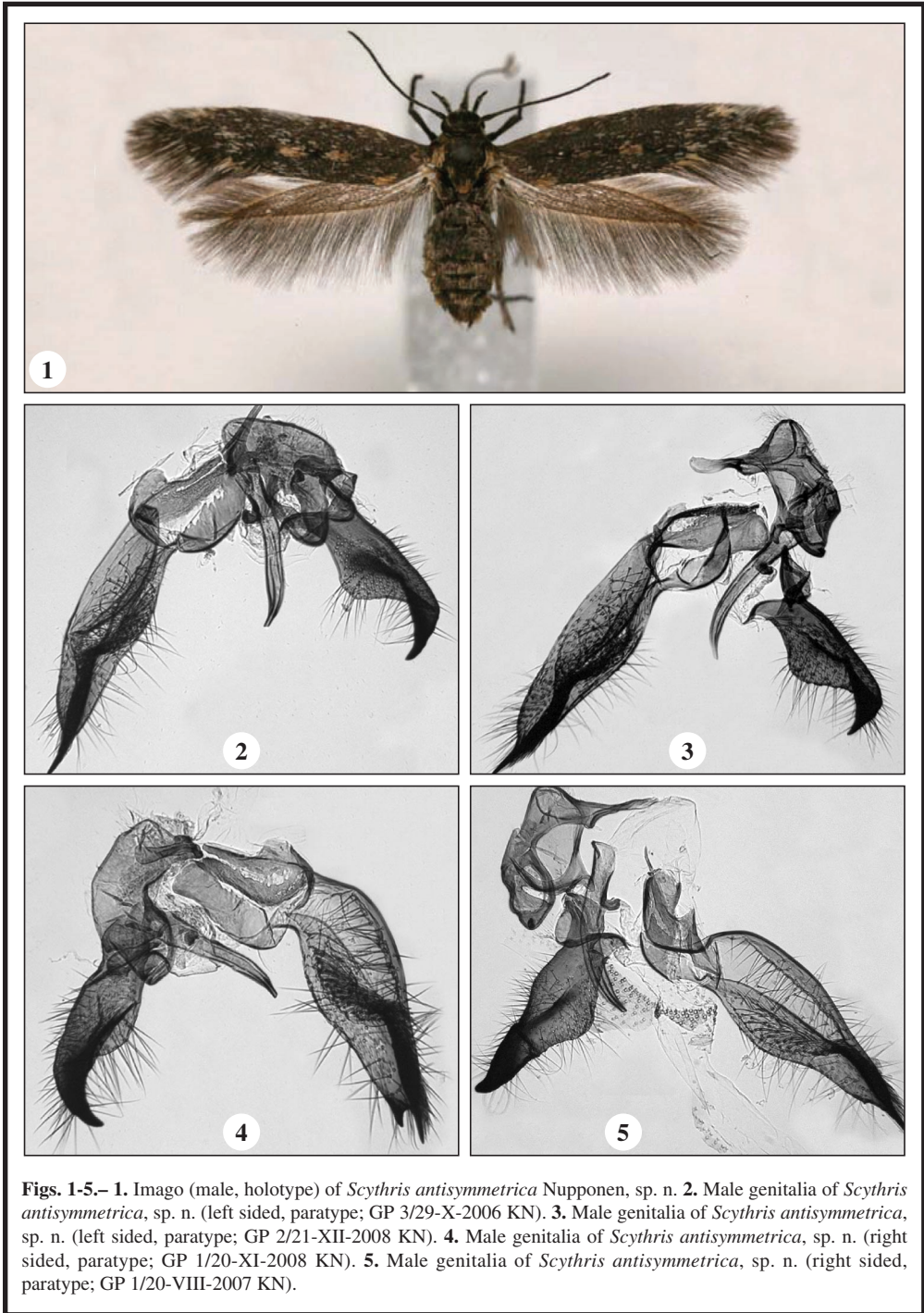
NUPPONEN, K. & NUPPONEN, T., 2001.– Notes on the scythridid fauna of the Altai Mountains, with description of four new species (Lepidoptera: Scythrididae).– *Entomologica fenn.*, **12**: 81-93.

K. N.
Merenneidontie 19 D
FIN-02320 Espoo
FINLANDIA / FINLAND
E-mail: Kari.Nupponen@kolumbus.fi

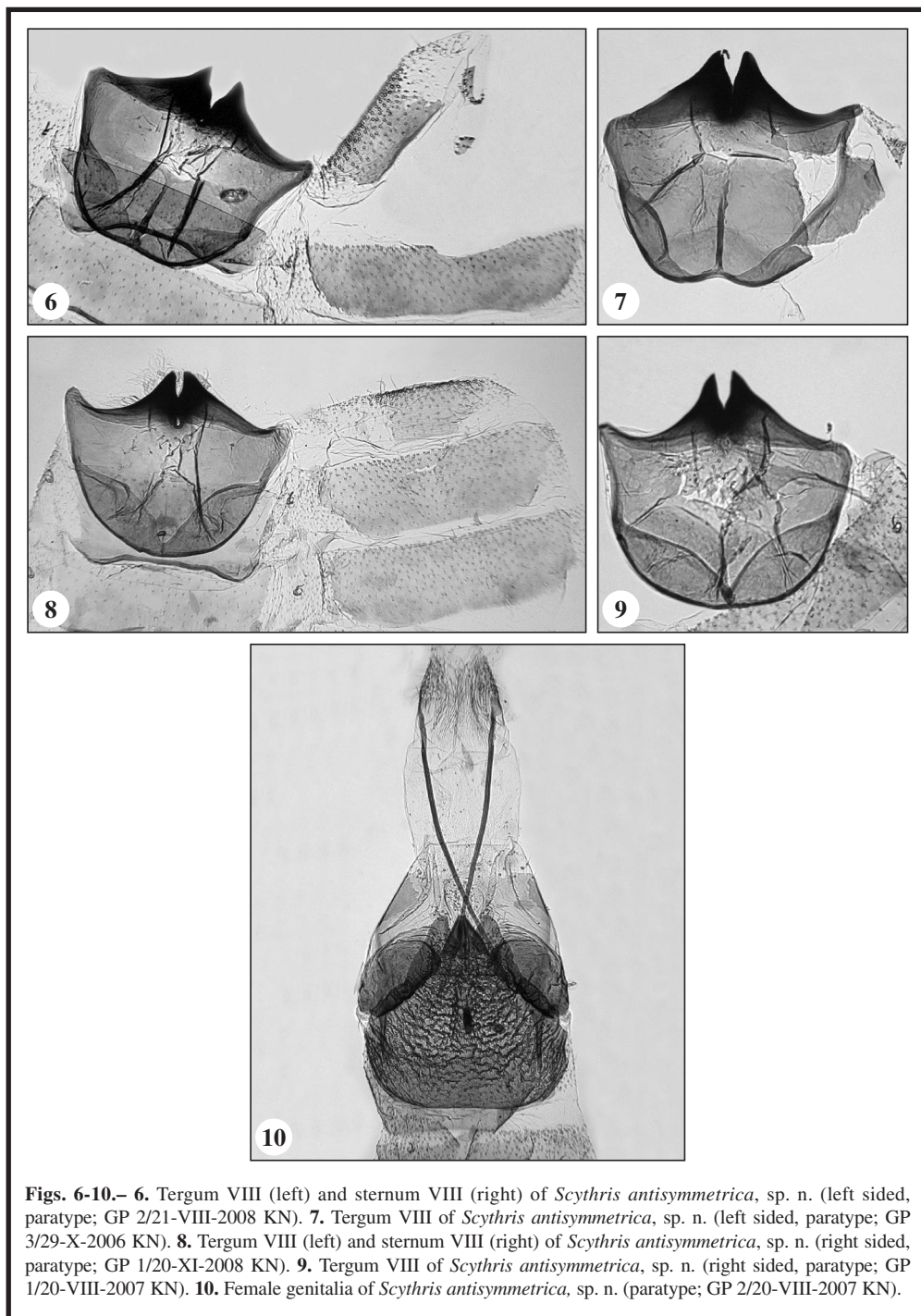
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Figs. 1-5.– 1. Imago (male, holotype) of *Scythris antisymmetrica* Nupponen, sp. n. 2. Male genitalia of *Scythris antisymmetrica*, sp. n. (left sided, paratype; GP 3/29-X-2006 KN). 3. Male genitalia of *Scythris antisymmetrica*, sp. n. (left sided, paratype; GP 2/21-XII-2008 KN). 4. Male genitalia of *Scythris antisymmetrica*, sp. n. (right sided, paratype; GP 1/20-XI-2008 KN). 5. Male genitalia of *Scythris antisymmetrica*, sp. n. (right sided, paratype; GP 1/20-VIII-2007 KN).



Figs. 6-10.– 6. Tergum VIII (left) and sternum VIII (right) of *Scythris antisymmetrica*, sp. n. (left sided, paratype; GP 2/21-VIII-2008 KN). 7. Tergum VIII of *Scythris antisymmetrica*, sp. n. (left sided, paratype; GP 3/29-X-2006 KN). 8. Tergum VIII (left) and sternum VIII (right) of *Scythris antisymmetrica*, sp. n. (right sided, paratype; GP 1/20-XI-2008 KN). 9. Tergum VIII of *Scythris antisymmetrica*, sp. n. (right sided, paratype; GP 1/20-VIII-2007 KN). 10. Female genitalia of *Scythris antisymmetrica*, sp. n. (paratype; GP 2/20-VIII-2007 KN).