

# Records of interesting scythridids from Morocco, with description of *Scythris scutulella* Nupponen, sp. n. (Lepidoptera: Scythrididae)

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Recent records of eight little known species of the family Scythrididae from Morocco are presented. The material was collected during two trips in mid-May 2010 and 2011. *Scythris scutulella* Nupponen, sp. n. is described. The previously unknown female genitalia of *S. maculosa* Bengtsson, 1997 are illustrated and described, and four species are reported as new to the Maghreb area. The known distribution range of each species is given.

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## 1. Introduction

The fauna of the family Scythrididae in the Maghreb area is rich but generally rather poorly known. Several species were described from the region in the beginning of the 20th century mainly by Walsingham and Chrétien, and some further species recently from the old materials preserved in museum collections (Bengtsson 1997, 2005, Passerin d'Entrèves & Roggero 2004). In the 1980's, the Danish expeditions to Tunisia and Morocco produced rich material of Scythrididae including several new species, which were described by Bengtsson (1997). Two further new species were discovered from Tunisia in May, 2000 (Nupponen 2001), but since then nobody has concentrated on searching for scythridids from the Maghreb area by modern methods. During 2010–2011, two expeditions to Morocco were organized by the University of

Helsinki. The aim of the trips was to obtain material for a long-term research of the Glanville Fritillary (*Melitaea cinxia* (Linnaeus, 1758)) by the Metapopulation Research Group of Prof. Ilkka Hanski. At the same time the second author had an opportunity to collect material of other insects for the Finnish Museum of Natural History. The material comprised some interesting Scythrididae as well, and the results of the studies of them are summarized in the present paper.

## 2. Material and methods

The present material originates from the Middle Atlas and northern part of the Anti-Atlas Mountains. The specimens were collected during two trips in mid-May 2010 and 2011, the first one made by Jaakko Kullberg and Zdravko Kolev, and the second one by Jaakko and Anssi

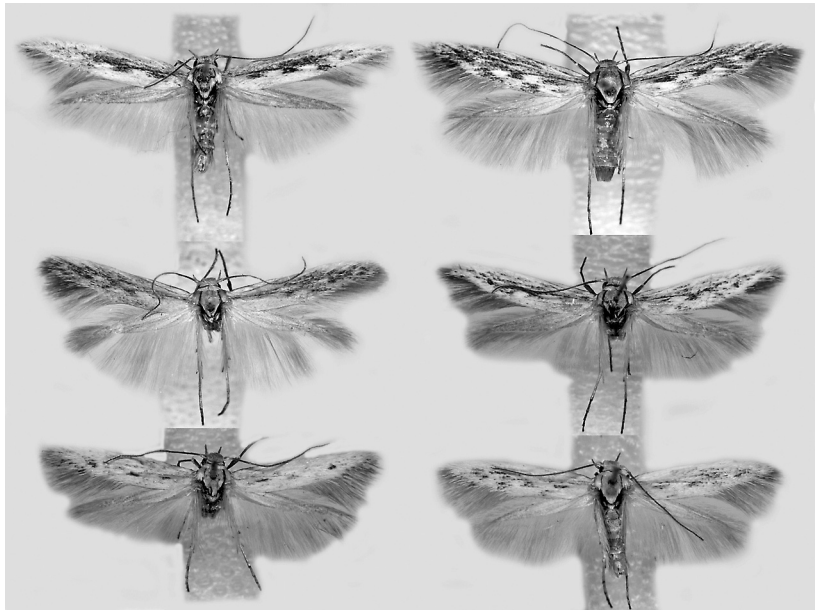


Fig. 1. Adults (different forms) of *Scythris maculosa* Bengtsson, 1997.

Kullberg. The scythridids were collected both at daylight by netting and by artificial light at night. The habitats are various kinds of gravelly and grassy slopes at the medium altitudes between 1,140 m and 2,195 m a.s.l. The collected material is generally deposited in the collection of the Finnish Museum of Natural History, Zoological Museum, University of Helsinki, Finland (MZH).

### 3. Taxonomic accounts and new records

The species are listed alphabetically in generic and specific order. The known distribution of each species is given.

#### 3.1. *Episcythris albiflua* (Meyrick, 1928)

*Material.* Morocco, Anti-Atlas, 32°47'42"N, 6°45'34"W, 1,330 m, Ouarzazate Prov., 13.5 km NW Ait Saoun, semidesert, 2 ♂♂ 13.V.2010, J. Kullberg & Z. Kolev leg.; Morocco, 30°50'N, 6°49'W, 1,140 m, Souss-Massa-Draa, Ouarzazate Prov., 2 ♂♂ 1 ♀ 11.V.2011, Jaakko & Anssi Kullberg leg. Genitalia slides: K. Nupponen prep. no. 2./6.III.2013 (♀), 3./6.III.2013 (♂), 1./5.III.2013 (♂).

*Distribution.* Libya, Morocco.

#### 3.2. *Scythris cupreella* (Staudinger, 1859)

*Material.* Morocco, Middle Atlas, 33°27'21"N, 5°2'18"W, 1,920 m, Ifrane Prov., 11 km SE Ifrane, steppe hill near road pass, 2 ♂♂ 8.V.2010, J. Kullberg & Z. Kolev leg. Genitalia slide: K. Nupponen prep. no. 3./7.III.2013.

*Distribution.* France, Morocco, Romania, Spain, Turkey.

*Remarks.* Distal processes of tergum VIII are very long in the Moroccan specimen, compared to those in specimens that originate from S Spain. Further material, including females, is needed to solve whether the difference has taxonomical value. For the present it is considered an individual variation. New to Morocco, and first record from the Maghreb area. The collecting place is a small limestone hill in the *Cedrus libani* ssp. *atlantica* zone where the most Lepidoptera species are common with SW Europe.

#### 3.3. *Scythris ericetella* (Heinemann, 1872)

*Material.* Morocco, Middle Atlas, 33°27'21"N, 5°2'18"W, 1,920 m, Ifrane Prov., 11 km SE Ifrane, steppe hill near road gorge, 1 ♂ 8.V.2010, J. Kullberg & Z. Kolev leg. Genitalia slide: K. Nupponen prep. no. 2./7.III.2013.

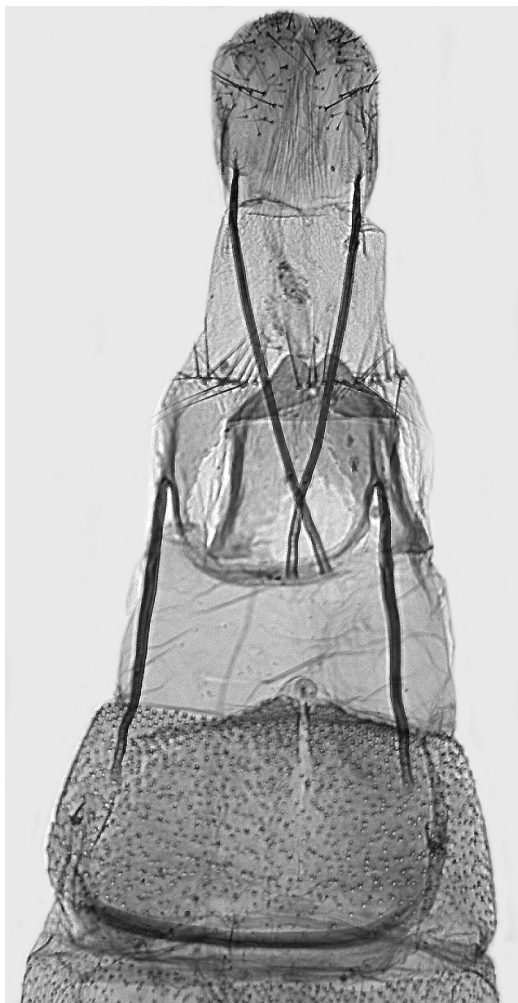


Fig. 2. Female genitalia of *Scythris maculosa* Bengtsson, 1997 (Morocco; GP 2./5.III.2013 KN).

*Distribution.* Morocco, Spain, C & W Europe, Russia (S Ural).

*Remarks.* New to Morocco, and first record from the Maghreb area. See the previous species for the comments of the locality.

#### 3.4. *Scythris friedeli* Bengtsson, 1997

*Material.* Morocco, Middle Atlas, 33°27'21"N, 5°2'18" W, 1,920 m, Ifrane Prov., 11 km SE Ifrane, steppe hill near road gorge, 2 ♂♂ 8.V.2010, J. Kullberg & Z. Kolev leg. Genitalia slide: K. Nupponen prep. no. 5./7.III.2013.

*Distribution.* Morocco, Iran.

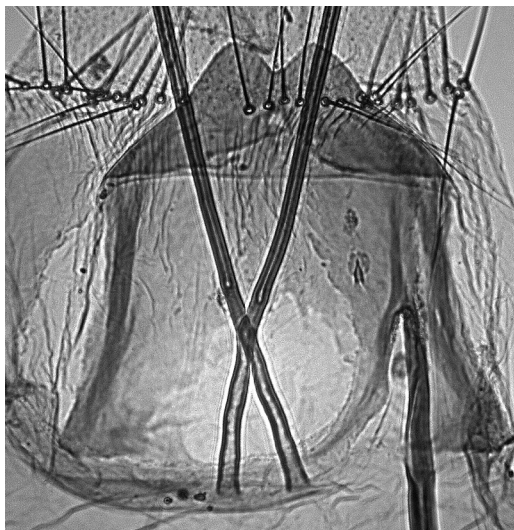


Fig. 3. Sterigma of *Scythris maculosa* Bengtsson, 1997 (Morocco; GP 2./5.III.2013 KN).

*Remarks.* See *S. cupreella* for the comments of the locality.

#### 3.5. *Scythris thommei* Bengtsson & Passerin d'Entrèves, 1988

*Material.* Morocco, Middle Atlas, 32°11'30"N, 5°38'08"W, 2,270 m, Er Rachidia Prov., Lake Tislit, steppe hill 4 km N Imichil, 1 ♂ 1 ♀ 11.V.2010, J. Kullberg & Z. Kolev leg. Genitalia (♂) preserved in glycerol.

*Distribution.* France, Morocco, Spain.

*Remarks.* New to Morocco, and first record from the Maghreb area. The locality is situated in an arid and overgrazed mountain area. However, most plant and Lepidoptera species on the locality were the same as in the gorge 11 km SE Ifrane.

#### 3.6. *Scythris maculosa* Bengtsson, 1997 with description of previously unknown female genitalia

*Material.* Morocco, Anti-Atlas, 32°47'42"N, 6°45'34"W, 1,330 m, Ouarzazate Prov., 13.5 km NW Ait Saoun, semidesert, 16 ♂♂ 5 ♀♀ 13.V.2010, J. Kullberg & Z. Kolev leg.; Morocco, 30°50'N, 6°49'W, 1,140 m, Souss-Massa-Draa, Ouarzazate Prov., 1 ♀ 11.V.2011, Jaakko & Anssi

Kullberg leg. Genitalia slide: K. Nupponen prep. no. 2./5.III.2013 (♀). Seven genitalia (6 ♂♂, 1 ♀) preserved in glycerol.

*Description of female genitalia* (Figs. 2–3). Sterigma large, subpentagonal, anteriorly largely hollow, inner part membranous, lateral margins reinforced; posterior tip sclerotized, subtrapezoid and medioposteriorly incised. Ostium small, situated at middle of posterior tip. Sternum VII rectangular; medioposteriorly a small and membranous semicircular process. Apophyses anteriores  $0.75 \times$  length of apophyses posteriores.

*Distribution.* Morocco, Tunisia.

*Remarks.* The species exhibits rather large variation in the forewing pattern, by both width of dark areas and sharpness of the pattern (Fig. 1). The species was abundant on the locality.

### 3.7. *Scythris scutulella* Nupponen, sp. n.

*Type material.* Holotype (♂): Morocco,  $33^{\circ}1'48''N$ ,  $5^{\circ}4'14''W$ , 2,145 m, Meknès-Tafilalet, Ifrane Prov., Tiguelmamine, 9.V.2011, Jaakko & Anssi Kullberg leg. Genitalia slide: K. Nupponen prep. no. 1./7.III.2013. In coll. MZH. Paratype: 1 ♀ with the same collecting data as the holotype; Genitalia slide: K. Nupponen prep. no. 1./6.III.2013. In coll. MZH.

*Diagnosis.* Externally *S. scutulella* sp. n. is easily confused with several species of the *grandipennis* species-group, e.g. *S. salviella* (Meess, 1910), *S. cupreella* (Staudinger, 1859), *S. nevadensis* Passerin d'Entrèves, 1990 and *S. maroccensis* Jäckh, 1977. Examination of the genitalia is required for strict determination. The male genitalia of *S. scutulella* sp. n. are typical for the *grandipennis*-group, but readily separated from the other species by a large and conspicuous uncus with a large dorso-basal process and a posterior shield-like extension. The uncus of *S. salviella* is large too, but it is a straight, spatular plate without processes and extensions. The uncus of the other species of the *grandipennis*-group is very small and easily separated from that of *S. scutulella* sp. n. and *S. salviella*. The female genitalia of *S. scutulella* sp. n. most resemble those of *S. salviella*, but differ by an antero-laterally elongated sterigma with a characteristic tetrahedral posterior sclerotization, as well as by



Fig. 4. Adults of *Scythris scutulella* Nupponen, sp. n. (top: male, holotype; bottom: female, paratype).

details in segment VI (sternum large and laterally extended, tergum rectangular and very small). The sterigma of *S. maroccensis* is a very small curved sclerotization without attached large plate, and the segment VI is very different. The male of *S. maroccensis* is unknown.

*Description* (Fig. 4). Wingspan: ♂ 18 mm, ♀ 16 mm. Head, collar, neck tuft, tegula, haustellum, scape and thorax dark olive grey, haustellum and collar laterally mixed with white. Flagellum  $0.7 \times$  length of forewing. Labial palp: segment I white; segments II and III dark olive grey, upper surface mixed with white. Legs dark olive grey, tibia and tarsus slightly paler, femur with sparsely scattered white scales. Abdomen dorsally fuscous, ventrally dirty cream. Forewing dark olive grey, apical area slightly paler; narrow but rather distinct white longitudinal streak above fold from subbasal area to  $2/3$ ; streak then widens and continues indistinctly along termen to apex; a few white scales subapically near costa. Hindwing fuscous.

Male genitalia (Figs. 5–7). Uncus large and conspicuous, basically spatulate; anterior  $1/3$  dorsally divided forming a dipper-shaped process; dorsal margin posteriorly extended to a shield-like plate; anteromedially a rectangular and medially incised sclerotized process. Gnathos arm rather slender; tip large, anvil-shaped. Phallus small, bottle-shaped. Valvae reduced setose folds, posteriorly with small triangular ex-

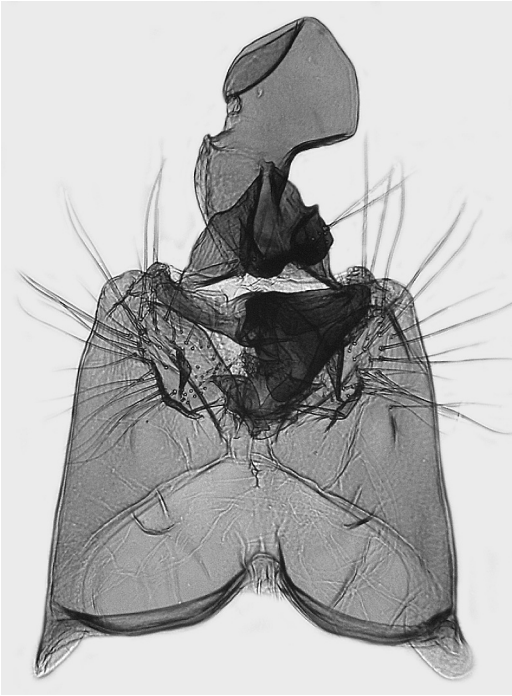


Fig. 5. Male genitalia of *Scythris scutulella* Nupponen, **sp. n.** (holotype; GP 1./7.III.2013 KN).

tension. Sternum VIII two subbasally fused plates; posterior processes tapered, bent inwards, tip blunt. Tergum VIII subtrapezoid, anterolaterally elongate, lateral and posterior borders sclerotized, anteriorly and medially membranous; posterior bifurcation wide, prongs almost parallel, rather stout but slenderer than in *S. salviella*, posteriorly bent and somewhat elongate, tip blunt.

Female genitalia (Fig. 8). Sterigma subtriangular, anterior corners conspicuously elon-



Fig. 6. Uncus of *Scythris scutulella* Nupponen, **sp. n.**, dorso-lateral view (holotype; GP 1./7.III.2013 KN).

gate, anterior margin concave; medioposteriorly a tetrahedral sclerotized process; ostium small, round, situated subapically at process. Segments VII and VI subcylindrical with a ventral opening, wide in sternum VII and narrow in sternum VII. Apophyses posteriores twice longer than apophyses anteriores.

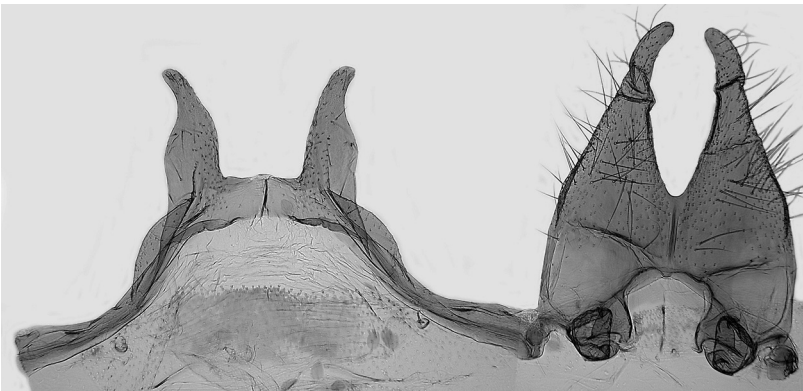


Fig. 7. Tergum VIII (left) and sternum VIII (right) of *Scythris scutulella* Nupponen, **sp. n.** (holotype; GP 1./7.III.2013 KN).

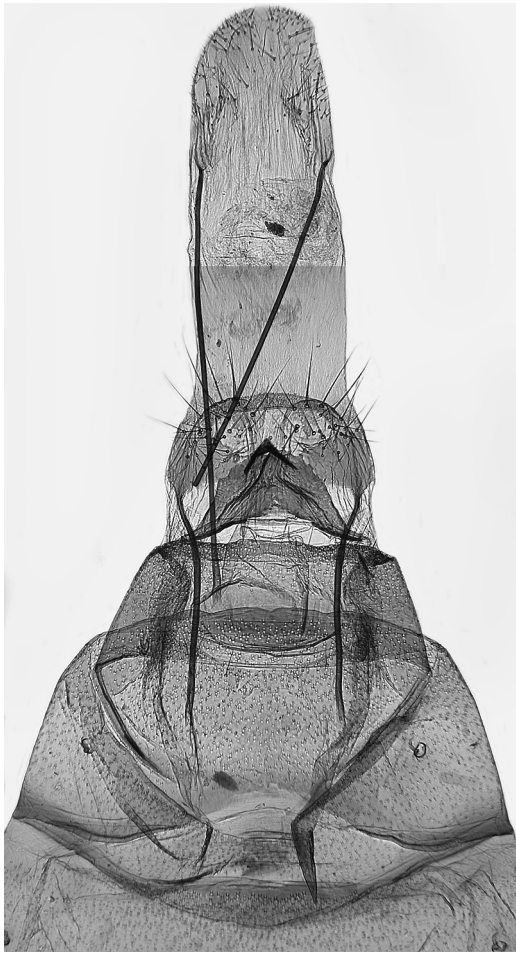


Fig. 8. Female genitalia of *Scythris scutulella* Nupponen, **sp. n.** (paratype; GP 1./6.III.2013 KN).

*Bionomy.* Both specimens were collected by netting and beating *Erinacea anthyllis* (Link, 1829) at sunshine in a scree slope along a road side (Fig. 9). Immature stages remain unknown.

*Distribution.* Morocco. Only known from the type locality.

*Etymology.* Lat. *scutulum* = a small shield. The species name alludes to a shield-like posterior extension at dorsal margin of the uncus in the male genitalia.

*Remarks.* *Scythris scutulella* **sp. n.** belongs to the *grandipennis* species-group.

### 3.8. *Scythris subfasciata* (Staudinger, 1880)

*Material.* Morocco, 33°24'31"N, 5°6'8"W, 1,930 m, Meknès-Tafilalet, Ifrane Prov., 6.–7.V. 2011, Jaakko & Anssi Kullberg leg. Genitalia preserved in glycerol.

*Distribution.* Morocco, Spain, Turkey.

*Remarks.* New to Morocco, and first record from the Maghreb area.

## 4. Discussion

Altogether 76 species of the family Scythrididae are known from the Atlas range of the Maghreb area to date. Of those, 35 species have been recorded from Morocco, 32 species from Algeria and 37 species from Tunisia. The fauna is clearly



Fig. 9. Scree slope with plenty of *Erinacea anthyllis* in the Anti-Atlas Mts., Morocco. Habitat of *Scythris scutulella* Nupponen **sp. n.**

Palearctic. About 25% of species are distributed in Europe, and another 25% are eremic species with more or less wide range eastwards along arid regions of N Africa, Near and Middle East and the Arabian Peninsula. However, not less than 37 species (49%) are known only from the Atlas range. Some of them may be more widely distributed, but we presume that about 1/3 of the species are endemic. Particularly species of the *canescens* species-group *s.l.* and the genus *Episcythis* are well represented. About 44% of the species have been described during the last 25 years, which indicates that there still remain numerous undescribed species to be discovered in the region.

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