New Scythrididae (Lepidoptera, Gelechioidea) from Middle and Far East

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Abstract

Four new scythridid species – *Scythris acusella* n. sp., *Scythris ampullella* n. sp., *Scythris brummanae* n. sp., and *Scythris kolachii* n. sp. – are described from Eastern Palearctic region. We assigned *S. brummanae* to the *S. aerariella* species-group, according to its genital features. At present *S. acusella, S. ampullella* and *S. kolachii* instead could not be included in any known species group on the basis of the characters of genitalia.

Keywords: *Scythrididae, Eastern Palearctic, taxonomy, new species*

Introduction

The family Scythrididae comprises small lepidopteran species with sober features, and is characterized by a worldwide distribution, being abundant chiefly in the arid regions. The most remarkable characteristic of the family is the genitalia extreme diversification that allows an easy identification at specific level. The supraspecific classification is instead far more troublesome, and the relationships among these taxa (both genera and species-groups) cannot be wholly clarified on the basis of the present knowledge.

Insight on scythridid systematics is still elementary, and the major part of the scythridid species is probably unknown right up to the present, stated that only 16 species are recorded from Neotropical region and no more than 30 from Australian region (Passerin d'Entrèves & Roggero 2007a). Only the Palearctic fauna has been relatively well studied till now: the number of known scythridids from Palearctic is greater than the one from all the other regions together (for the full list of references, see Passerin d'Entrèves & Roggero 2007a).

As for the Palearctic fauna, the greater part of the species from Western Palearctic have been described for many years (Bengtsson 1997), but the Eastern Palearctic scythridids have been less studied so far. Besides, an increasing number of species are being recorded from the latter region (Passerin d'Entrèves & Roggero 2007a), after the findings of some scientific expeditions that succeeded in the area till the present time, have been examined.

At the beginning, from the second half of 19th century the Scythrididae studies centred mainly on the fauna of Caucasus, Middle East and Transcaspian region, and relatively few species were described. Subsequently, in the second half of 20th century the researches were focused on fauna of the northern part of Eastern Palearctic (Falkovitsh

1969, 1972, 1979, 1981, 1986) and Iran (Amsel 1950, 1951, 1953, 1955, 1959a, 1959b, 1961, 1974), although also species from other areas have been recorded (for the full list of references, see Passerin d'Entrèves & Roggero 2007a). Later, the faunas of Mongolia (Bengtsson & Sutter 1996; Sinev 2001a; Passerin d'Entrèves & Roggero 2006) and mainly Eastern Russia (Sinev 1993, 2001a,b; Nupponen & Junnilainen 1995; Sachkov 1995, 2000, 2002; Bengtsson & Liška 1996; Nupponen & Nupponen 2001; Nupponen et al. 2000; Sachkov& Sinev 2001; Nupponen 2003, 2005, 2009, 2010a; Passerin d'Entrèves & Roggero 2007b; Nupponen & Ivinskis 2008) have been surveyed. The most recent studies (Nupponen 2010b; Bengtsson & Huemer 2003; Passerin d'Entrèves & Roggero 2003, 2004, 2008, 2009, 2010, 2011; Nupponen et al. 2005) have dealt with the extremely diverse and utmost interesting scythridid fauna of the southern part of the Irano-Turanian region (chiefly, Iran and Afghanistan, but also Iraq and Kazakhstan).

The many newly described species from the E Palearctic in the last few years have confirmed the hypothesis of Landry (1991) about the family's worldwide diversity, suggesting as well as that further research in the too numerous areas of the world yet unexplored would lead to a better, more thorough knowledge of the phylogenetic relationships and biogeographic patterns of Scythrididae.

Also knowledge about the scythridid biology is relatively scarce, as up till now no complete and comprehensive study on this subject has been achieved. So far as is known, many Scythrididae species have diurnal habits, although a large part of the Nearctic species is known to be nocturnal (Landry 1991). On these topics, the major source of information remain authors that have sometimes provided a few data about the life cycle and the host plants together with the species description.

As previously pointed out, scythridids are being found in any geographical area of the world, but the much scattered data does not permit us to carry on a full biogeographycal analysis. The present known data could hardly be employed to obtain a clear explanation of the underlying factors that have affected the current distribution pattern of the scythridids. Due to this lack of information, up to now our studies on this family have focused mainly on definite and circumscribed areas. As far as it is known, the scythridid fauna from any region shows a relatively high degree of endemism, together with species characterized by a more or less wide distribution. Some few species actually have a worldwide distribution, being thus found in more than a region (Passerin d'Entrèves & Roggero 2007a). On the basis of the present knowledge, the scythridid fauna from Eastern Palearctic fits exactly to the hypothesized model of distribution.

The aim of the present study is to contribute to the systematics of the Palearctic Scythrididae, adding new basic data to the present knowledge of the biodiversity of this family.

Material and methods

We have examined material from the following institutions:

BMNH - Natural History Museum of London (UK)

NMW - Naturhistorisches Museum of Wien (Austria)

ZMHB - Museum für Naturkunde der Humboldt-Universität of Berlin (Germany)

Our research was focused on the species recognition through the genital features, which are the most reliable diagnostic characters in Scythrididae, as has been usually suggested in literature (Bengtsson 1997). The preparation of genitalia slides was

conducted according to the standard procedures usually employed (Passerin d'Entrèves 1976; Landry 1991; Bengtsson 1997).

Specimens and genitalia slides were photographed with a Leica® DFC320 digital camera connected to a Leica® Z16APO zoom system. Forewing lengths were measured with the LAS (Leica® Application Suite) software.

For the description of genitalia we used the glossary as proposed by Knots (1956), with modifications by Landry (1991), Bengtsson (1997) and Hodges (1998).

In the *Typical locality* section we reported for each species the present-day English name of the holotype collection locality, with the geographic coordinates of Google Maps taken from http://maps.google.com in April 2011.

Taxonomic Accounts

The specimens were collected from different localities in Eastern Palearctic region (Figure 1). After a careful examination we identified four new species that are here described. The taxonomic position of each new taxa within Scythrididae is discussed, and the related taxa are listed and compared.

Superfamily **GELECHIOIDEA** Fracker, 1915

Family **SCYTHRIDIDAE** Rebel, 1901

Genus ***Scythris*** Hübner, [1825]

***Scythris acusella* n. sp.**

(Figures 2A and 3)

Typical locality

AFGHANISTAN: Kabul province, Khvord-Kabul [Lat 34° 23' N, Long 69° 23' E].

Material examined

Holotype.1 ♂, AFGHANISTAN, Khurd-Kabul, SW of Kabul, 1900 m, 23.vii.1965, Kasy & Vartian legit (Genital slide 9574 PdE) [NMW].

Paratypes. 3 ♂♂ and 2 ♀♀, Khurd-Kabul, SW of Kabul, 1900 m, 23.vii.1965, Kasy & Vartian legit (Genital slides 9575, 9576, 9577, 9578, and 9579 PdE) [NMW].

Diagnosis

Scythris acusella is characterized by external features resembling those of many other light scythridids, with dark marks on the forewing, thus the species recognition must rely on genitalia of both sexes. The main characters that can be employed for the identification of males are: 1) the uncus well-developed, shaped like rabbit ears; 2) the symmetrical and rectilinear valvae, carrying a tuft of setae apically and a sparse pubescence along the distal two thirds; 3) the subrectangular sternum 8 (S8) with the hind angles rounded and a thickened base. The females too are easily identified, mainly on the basis of the features of henia, which is needle-shaped and elongate, as in *S. albiangulella* Bengtsson, 2002 and *S. sanae* Bengtsson, 2002, both from Yemen. Moreover, the latter ones have a shorter henia and external features totally dissimilar, thus the three species cannot be misidentified. It is also noteworthy that the genitalia of the males are very different, hence *S. acusella* cannot belong to the same species-group of *S. albiangulella* or *S. sanae*.

Description

Forewing length 9-10 mm.

Male (Figure 2A). Forewing upper surface ground colour white, with cream coloured spots, two brown spots along the midline, and a smaller brown one near the wing base; fringe yellowish cream. Hindwing upper surface glossy, evenly light brown; fringe yellowish cream. Forewing lower surface evenly yellow, hindwing lower surface light brown, with a metallic hue. Head, thorax and abdomen dorsally evenly cream-coloured, ventrally white. Antenna brown, almost as long as the forewing. Palpi white, proboscis light brown. Legs whitish grey, with darker tarsi.

Male genitalia (Figure 3A). Uncus oval, largely rounded distally, almost as long as the tegumen, constituted by two symmetrical, almond-shaped parts, with a sparse pubescence on distal part. Gnathos symmetrical, the proximal arms enlarged and short, narrowing toward the joining arm, which is narrow, tapering at the apex, rectilinear, sharp, and twice as long as the proximal arms. Tegumen oval, elongate, hook-shaped. Valvae symmetrical, rectilinear and spatulate, as long as the complex tegumen-uncus, carrying a long pubescence on distal two thirds, and a tuft of long and thick setae at the inner apex. Vinculum reduced, largely U-shaped, one fifth as long as the valvae, with an outward turned, rectangular, well developed projection at base near the joining point to tegumen. Phallus two thirds as long as the valvae and narrow, tapering to the apex, sharp and downward curved. Juxta short, rod-like. Sternum 8 rectangular, concave inwardly, with a hind margin slightly notched, the base with a notch deeply arched and surrounded by a thickened, ribbon-like membrane. Tergum 8 (T8) membranous, thin, crescent-shaped with the horns downturned.

Female. External features are almost identical to the male ones, the species thus showing no sexual dimorphism.

Female genitalia (Figure 3B). Apophyses posteriores twice as long as the apophyses anteriores, with papillae anales membranous and oval. Segment 8 modified, sterigma on the ventral side triangular-shaped, carrying a henia very elongate and needle-shaped. Ductus bursae membranous, almost invisible.

Biology

The larval instars are unknown. The host plant is unknown.

Distribution

The species is known only from the typical locality, Khord Kabul, a mountain pass (1900 m) on the road that links Kabul and Jalalabad.

Remarks

The species does not belong to any known species-group. The male genitalia are unmistakeable, and markedly different from any other known species. Some affinities were found instead in the female genitalia, the well-developed henia being similar to *S. albiangulella* and *S. sanae* (see *Diagnosis* above), although the male genitalia of these species are very different from *S. acusella* ones.

Etymology

The species is named after the characteristic shape of female genitalia, with the henia needle-shaped (from the Latin *acus*).

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185

186 ***Scythris brummanae* n. sp.**

187 (Figures 2B, 4A)

188

189 *Typical locality*

190 LEBANON: Mont-Liban, Brummana [Lat 33° 52' N, Long 35° 37' E].

191

192 *Material examined*

193 Holotype. 1 ♂, Brumana, Beirut, 29.iv.1934 E. P. Wiltshire (Genital slide 1012 PdE),

194 [BMNH].

195 Paratypes. 1 ♂, Beirut 1886 crem. (Genital slide 9606 PdE) [ZMHB]; 1 ♂ Beirut

196 (Genital slide 9931 JA) [ZMHB].

197

198 *Diagnosis*

199 The external features of *S. brummanae* are similar to those of many other dark

200 scythridids, hence the facies cannot be employed for the taxonomic identification. On

201 the basis of genital features, the species definitively belongs to the *S. aerariella* species

202 group that includes at present 19 species. The diagnostic characters of the *S. aerariella*

203 species-group are listed in Bengtsson (1997): the hood-shaped uncus, the medium-sized

204 and tapered on apex phallus, the absent gnathos, the S8 with a long projection often

205 carrying laminar processes. Although these species share many distinctive characters,

206 they can be easily distinguished according to unique characters of the male genitalia,

207 mainly the shape of the valvae and S8. *Scythris brummanae* can be identified from the

208 other species belonging to the *S. aerariella* species-group, by its broad valvae, spatulate,
209 rounded on apex and only slightly arched at base, carrying inward two triangular
210 processes at distal third. Also *S. dorycniella* (Millière, 1864) and *S. carboniella* Jäckh,
211 1978 have spatulate valvae, but they are far more arched, and the S8 is clearly different
212 from the *S. brummanae* one. The other species of the *S. aerariella* species-group have
213 very differently-shaped valvae and S8, making misidentification impossible.
214
215 *Description*
216 Forewing length 15-16 mm.
217 Male (Figure 2B). Forewing upper surface evenly golden with the apex brown and a
218 very light brown, thick line on first third of the margin, lower surface evenly light gold;
219 fringe brown. Hindwing upper surface light brown with a golden hue; lower surface
220 light brown, with a white thick line anteriorly on proximal third; fringe reddish brown.
221 Head brown; upper part of palpi white and lower part light brown; proboscis light
222 brown. Thorax and abdomen brown. Legs light brown with a golden hue, and a white
223 dot on proximal margin of tibia. Antenna brown, two thirds as long as the forewings.
224 Male genitalia (Figure 4A). Uncus laminar, quadrangular. Gnathos absent. Tegumen
225 elongate, hood-shaped. Valvae symmetrical, spatulate, and slightly arched, carrying on
226 the inner side a short triangular projection, with a diffuse pubescence on the distal half.
227 Vinculum quadrangular and very short. Phallus almost as long as the complex uncus-
228 tegumen, rectilinear on most of its length, down-turned and tapering only at the apex.
229 Juxta short, ribbon-shaped. Sternum 8 oval-shaped, with a narrow and deep notch in the
230 middle at base, and a projection almost as long as the base, carrying a quadrangular

lamina on apex and two short triangular protrusion on the midline. Tergum 8 oval, small and membranous, with a rounded, large notch at base.

Female. Unknown.

Female genitalia. Unknown.

Biology

The larval instars are unknown. The host plant is unknown.

Distribution

At present the species is known only from the localities of the typical material in Lebanon (7-800 m).

Remarks

The species belongs to the *S. aerariella* species-group, comprising at present 19 species: *S. adustella* Jäckh, 1978; *S. aerariella* (Herrich-Schäffer, 1855); *S. anomaloptera* (Staudinger, 1880); *S. binotiferella* (Ragonot, 1881); *S. carboniella* Jäckh, 1978, *S. corsa* Passerin d'Entrèves 1986; *S. dorycniella* (Millière, 1864); *S. flaviventrella* (Herrich-Schäffer, 1855); *S. hungaricella* Rebel, 1917; *S. imperiella* Jäckh, 1978; *S. jaeckhi* Bengtsson, 1989; *S. lhommei* Bengtsson & Passerin d'Entrèves, 1988; *S. parachalca* Meyrick, 1916; *S. parnassiae* Bengtsson, 1997; *S. popescugorji* Passerin d'Entrèves, 1984; *S. ridiculella* Caradja, 1920; *S. subparachalca* Bengtsson, 2002; *S. tergestinella* (Zeller, 1855); *S. valvaearcella* Bengtsson, 2002. The species-group is characterized by a wide distribution extending from Portugal to Hungary, Turkey and Armenia eastwards, and Morocco, Saudi Arabia and Yemen southwards.

Etymology

The species is named after the locality of the holotype, the small town of Brummana in Lebanon.

***Scythris kolachii* n. sp.**

(Figures 2C, 4B and 4C)

Typical locality

PAKISTAN: Karachi Airport surroundings [Lat 24° 54' N, Long 67° 9' E].

Material examined

Holotype.1 ♂, Pakistan, Umgbg. Flughafen Karachi, 23.ii - 9.iii.1961, E & A. Vartian leg. (Genital slide 9614 PdE) [ZMHB].

Diagnosis

The species is easily identified on the basis of the features of the male genitalia, that are fused and reduced. The uncus is well-developed, pointed, cap shaped, the phallus is short, large and bottle-shaped. The S8 and T8 are quite unmistakable, too, and very complex.

Description

Forewing length 15 mm.

Male (Figure 2C). Forewing upper surface very light brown, with a zigzag white line along the midline; fringe yellowish brown. Hindwing upper surface very light brown; fringe yellowish brown. Forewing and hindwing lower surface evenly light brown and glossy. Head light brown, proboscis light brown, palpi whitish light brown. Thorax dorsally light brown, ventrally white. Abdomen light brown. Legs dorsally very light brown, with the tarsi darker, and ventrally white. Antenna light brown, two thirds as long as the forewing.

Male genitalia (Figures 4B, C). Uncus triangular and elongate, carrying a long and thick pubescence on the sides. Gnathos with proximal arms ribbon-shaped, and joining arm short and clavate at apex. Tegumen subtriangular, as long as the complex uncus-gnathos. Valvae symmetrical, reduced, short and fused; the joints' projections are laminar and wide. Vinculum fused to valvae. Phallus very large, almost as long as the uncus, globose at proximal two thirds. Sternum 8 asymmetrical, laminar, apically pointed, carrying asymmetrical projections. Tergum 8 very complex and asymmetrical, carrying variously sinuate apophyses.

Female. Unknown.

Female genitalia. Unknown.

Biology

The larval instars are unknown. The host plant is unknown.

Distribution

The species is known only from type locality in Pakistan.

Remarks

The species does not belong to any known species-group. Moreover, the complicated S8 and T8 vaguely resemble those of *S. arachnodes* Walsingham, 1908 and *S. petrella* Walsingham, 1908 (both from Tenerife), although the very different shape of phallus, uncus and valvae did not allow us to include *S. kolachii* in the *S. petrella* species-group (Bengtsson 1997).

Etymology

The species is named after the ancient name of typical locality, the town of Karachi.

***Scythris ampullella* n. sp.**

(Figures 5A-D)

Typical locality

IRAN: Fars, Yasuj [Lat 29° 16' N, Long 52° 41' E].

Material examined

Holotype.1 ♂, Tasoh, 22.5 (Genital slide 9607 PdE) [ZMHB].

Paratype. 1 ♀ Schahroud, 10.6 (Genital slide 9608 PdE) [ZMHB].

Diagnosis

The external features and genital armures could not allow us to assign *S. ampullella* to any known group. Besides, the male is partly similar to some species of the *S. pascuella* species-group, as *S. pascuella* (Zeller, 1855), *S. pudorinella* (Möschler, 1866), *S.*

tabescentella (Staudinger, 1880) and *S. kantarae* Bengtsson, 1997. The valvae, the gnathos and the sternum 8 are the main diagnostic characters of male genitalia that can be used to distinguish *S. ampullella* from the latter species. The valvae are almost alike in these species, although are more arched and sharp at the apex in *S. ampullella* than in the other species. The segment 8 instead is very different, the bifid apex being far more shorter in *S. ampullella* than in the other species. The shape of the female genitalia is also very characteristic and can be easily employed to differentiate *S. ampullella* from the other species, although the presence of an ampullar structure at segment 7 is shared with some of the species of the *S. pascuella* species-group (Bengtsson 1997).

Description

Forewing length 10-12 mm.

Male (Figure 5A). Forewing upper surface light brown with a golden hue, and two white transversal bands, one apically and the other medially; fringe reddish brown. Hindwing upper surface variegated with white and brown; fringe reddish brown. Forewing and hindwing lower surface evenly whitish cream, with a golden hue. Head brown, palpi white with apices dark, and proboscis brown. Thorax brown with a golden hue. Abdomen light brown with a golden hue, carrying a large white spot dorsally in the proximal half. Legs white, the tibia carrying a large, light brown spot dorsally on distal part, and tarsi white, each tarsomere with a dark circular line distally. Antenna dorsally golden, and ventrally white, almost as long as the forewing, with antennifer white.

Male genitalia (Figures 5B and C). Uncus as long as the valvae, symmetrical, with two long, rectilinear projections, spatulate at apex. Gnathos with the proximal arms ribbon-

shaped, and the joining arm tapering to apex, down-arched. Tegumen dome-shaped, half as long as the uncus. Valvae rectilinear and broad, distally inward arched, with sharp apex. Vinculum as long as the valvae and rounded. Phallus as long as the complex uncus-tegumen, tapering to apex, downward curved at distal third, sharp. Juxta rectilinear, bifid at base. Sternum 8 triangular-shaped, with a deep, triangular notch at base and the angles up-turned, and two symmetrical, rounded and small protuberances at apex. Tergum 8 elongate, the apex triangular, the base with a narrow notch in the middle, and sides truncated.

Female. On the whole, the external features are almost identical to the males ones, the two sexes only differing for the abdominal segments 1-6, which are black on the upper surface, while the penultimate segment is light brown and the ultimate is white.

Female genitalia (Figure 5D). Apophyses anteriores half as long as the apophyses posteriores, with a joining arched sclerotization. Lamella antevaginalis barely sclerotized, almost inapparent. Lamella postvaginalis arched, dome-shaped. Ampulla-like sclerotized structure on segment 7. Ductus bursae membranous and wrinkled. Ostium bursae large, oval-shaped. Segment 7 carrying a thickening longitudinal sclerotization in the middle, and an arcuate, very thick structure at base.

Biology

The larval instars are unknown. The host plant is unknown.

Distribution

The species is known only from Tasooj and Shahrood, the localities in Iran where the type specimens were collected.

375

376 *Remarks*

377 The species is closely related to the very complicated *Scythris pascuella* species-group,
378 whose diagnostic characters are not yet defined. At present in the species-group 15
379 species are included, namely: *S. aegrella* Nupponen, 2000; *S. bifissella* Hofmann, 1889;
380 *S. claudiae* Passerin d'Entrèves & Roggero, 2011; *S. divergens* Bengtsson, 2005; *S.*
381 *flavidella* Preissecker, 1911; *S. hemicycliella* Nupponen, 2005; *S. immaculatella*
382 (Chambers, 1875); *S. lagunae* Jäckh, 1978; *S. minorella* Sinev, 2001; *S. orientella*
383 Sinev, 2001; *S. pascuella* (Zeller, 1855); *S. paulella* (Herrich-Schäffer, 1855); *S.*
384 *pudorinella* (Möschler, 1866); *S. sibirella* Sinev, 2001; *S. tabescentella* (Staudinger,
385 1880). Instead, the taxonomic position of *S. aciella* Bengtsson, 1997; *S. albidella*
386 (Stainton, 1867); *S. complexa* Sinev, 2001; *S. cornuella* Bengtsson, 1997; *S. kantarae*
387 Bengtsson, 1997; *S. subaerariella* (Stainton, 1867) must still be verified. Furthermore,
388 Nupponen (2010b) included in the *S. pascuella* species-group also the well-defined
389 complex of species comprehending *S. caroxylella* Falkovitsh, 1969, *S. cremella*
390 Nupponen, 2010b, *S. fluxilis* Falkovitsh, 1982 and *S. rotundella* Nupponen, 2010b. The
391 valvae of some species of the *S. pascuella* species-group, as S. *bifissella* and *S.*
392 *pascuella*, have a vague resemblance to those of the *S. caroxylella* complex, but the
393 uncus, the vinculum and the phallus are entirely different, as well as the sternite 8 and
394 the tergite 8. The female genitalia of these species too are very different from the *S.*
395 *pascuella* species-group ones, lacking the characteristic, well-sclerotized, nail-shaped
396 structure at the base of segment 7. Furthermore, the four species enlisted in Nupponen
397 (2010), together with S. *pallidella* Passerin d'Entrèves & Roggero 2006 and *S.*

parafluxilis Passerin d'Entrèves & Roggero 2008, have very similar features, and must be definitely considered a complex of species on its own.

Etymology

The species was named after the latin term ampulla, since the sclerotized structure in the abdominal segment 7 of the female resembles an ancient roman lacrimatory.

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Legends of illustrations

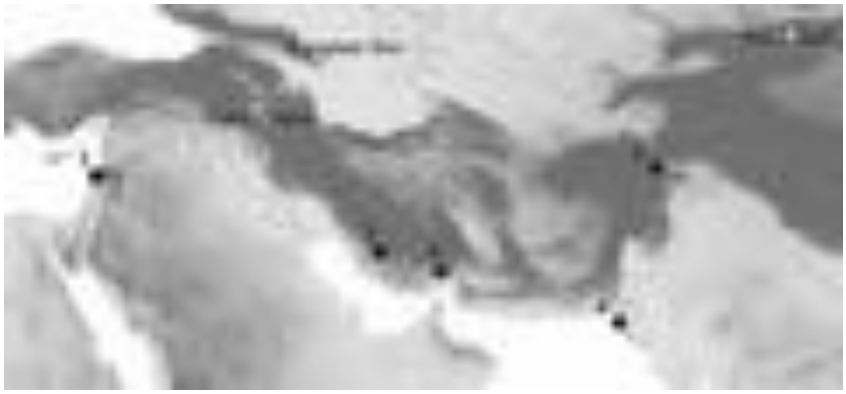

Figure 1. Map of the collection localities of the new species. 1. LEBANON: Mont-Liban, Brummana; 2. LEBANON: Beirut; 3. IRAN: Tasooj, Fars; 4. IRAN: Sharood; 5. AFGHANISTAN: Khvord-Kabul; 6. PAKISTAN: Karachi Airport surroundings.

Figure 2. Facies. A, *Scythris acusella*; B, *S. brummanae*; C, *S. kolachii*. Scale bars: A, 1 mm. B, 2 mm. C, 2 mm.

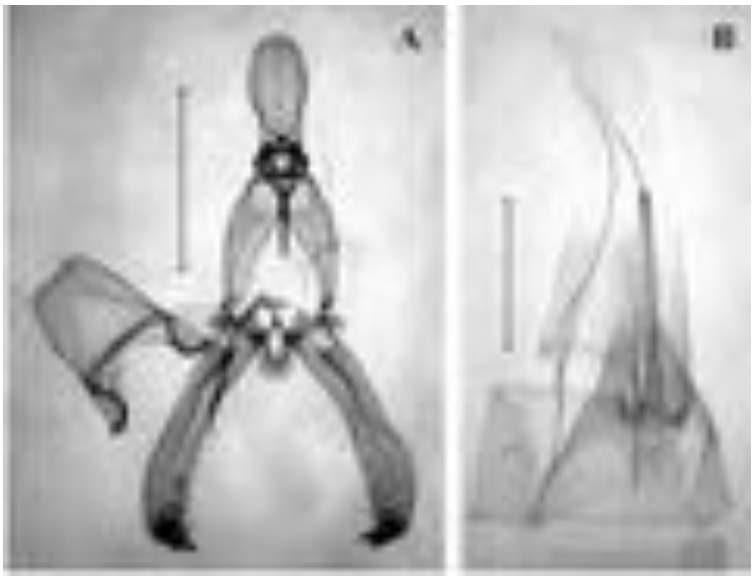

Figure 3. *S. acusella*. A, Male genitalia. B, Female genitalia. Scale bars = 0.5 mm.

Figure 4. *S. brummanae*: A, male genitalia. *S. kolachii*, male: B, complex uncus-gnathos-tegumen-phallus-valvae; C, sternum 8 and tergum 8. Scale bars = 0.5 mm.

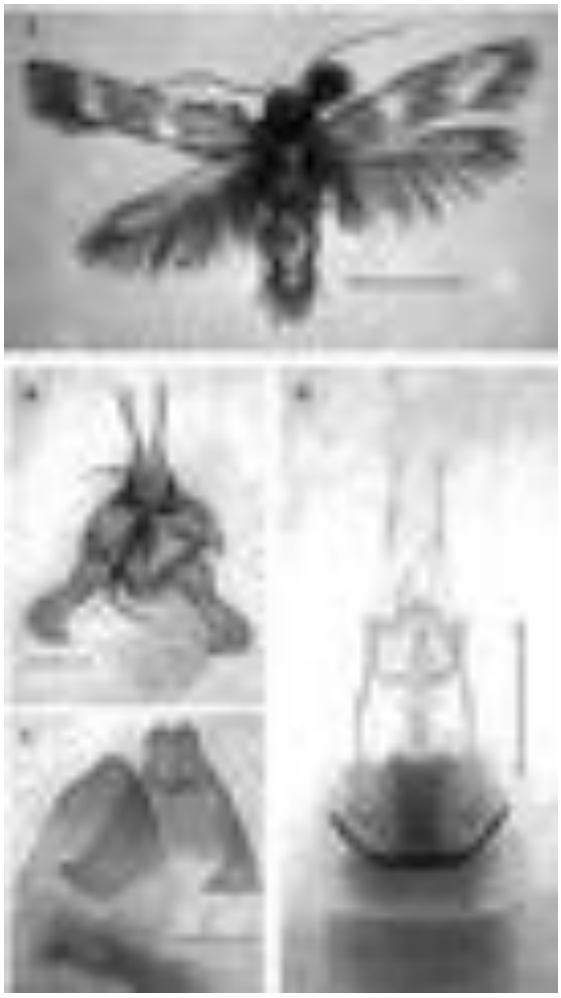

Figure 5. *S. ampullella*: A. Facies of male. B. Male genitalia, complex uncus-gnathos-tegumen-phallus-valvae. C. Male genitalia, sternum 8 and tergum 8. D. Female genitalia. Scale bars: A, 2 mm. B, 0.5 mm. C, 0.5 mm. D, 1 mm.