Four new species, a new synonymy and some new records of *Scythris* Hübner, [1825] (Gelechioidea: Scythrididae)

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Abstract. Four new species of Scythrididae are described: *Scythris tauromeniella* **sp. n.** from southern Italy, *S. landryi* **sp. n.** from Tunisia, and *S. herati* **sp. n.** and S. *nielseni* **sp. n.**, both from northern Afghanistan. A brief account of all the new Palaearctic species recently added to the family is provided. *S. koskjuki* Sinev is synonymized with *S. immaculatella* (Chambers) which was beforehand known from the Nearctic region only. New records of some other recently described and little-known species from the Arabian Peninsula are added.

Key words. Lepidoptera, *Scythris*, Palaearctic, New species, Beringia, Nearctic, Afrotropical, Arabian Peninsula.

Introduction

In the last ten years, investigations on Scythrididae have been carried out by numerous authors, chiefly on the fauna of the Middle and Far East. More than a hundred new species were described and new records were reported for many known species. For some of the new species the species-group was already known, and some new groups were proposed, but, at present, most of these species cannot be assigned to any known species-group.

In 1997 Bengtsson described six new species in the material collected by Hacker in Pakistan and in India. The data reported by the author (Bengtsson 1997a) are very interesting since most of the scythridid fauna of the Indian subcontinent is not yet known.

The scythridid fauna of the Arabian Peninsula is also almost unknown. Since the work by Passerin d'Entrèves in 1986, nobody else treated the Arabian scythridids till Bengtsson described six new species from Northern Oman (2002a) and thirty-nine from Yemen (2002b). As reported by the same Bengtsson (2002a), within the Oman species only *S. elachistoides* constitutes a new species-group along with at least four species described from Yemen (Bengtsson 2002b). As for Yemen, Bengtsson (2002b) described one species of *Enolmis*, thirty-eight species belonging to the genus *Scythris*, and he reported new data for some of the species previously described from Oman. Only a few of the species from Yemen could be assigned to known species-groups. Seemingly the new species described from Oman and Yemen have relationships with the Palaearctic, Oriental and Afrotropical faunas.

Lately, Passerin d'Entrèves & Roggero (2003) described two new species of *Apostibes* belonging to the Middle Asian fauna: *Apostibes afghana* from Northern Afghanistan and *A. dhahrani* from Saudi Arabia. At present, eight species of *Apostibes* are known, but the three Nearctic ones almost surely do not belong to this genus (Landry 1991).

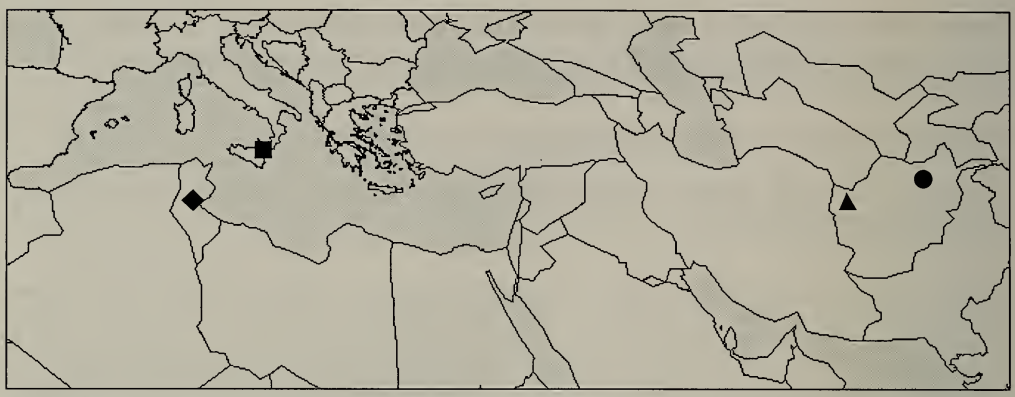

Fig. 1. Map of the type localities of the four new species *Scythris landryi* (◆), *S. tauromeniella* (■), *S. herati* (▲), and *S. nielseni* (●).

As for the fauna of the Middle East, Junnilainen (2002) described three new species from central Turkey, many years after Staudinger's (1880) contribution. Seven more species have been described between 1880 and 2002 with Turkey as type locality.

The Eastern Palaearctic is a region more widely studied in the last years, and many new species have been described from central Asia, mainly from Russia, but also from Mongolia and Korea. After several works by Falkovitsh (1969, 1972, 1979, 1981, 1986) on the scythridid fauna of Eastern Russia, Sinev in 1993 described two new species from SW Altai.

Bengtsson & Liška (1996) described four new species, two from the Baikal area (Russia), and two from North Korea. In the same year, *S. felixi* was described (Bengtsson & Sutter 1996) as the first known species of *Scythris* from Mongolia, but was later reported also from the Altai Mountains (Nupponen & Nupponen 2001); the species belongs to the *laminella*-group like some of the species later described by Sinev (2001).

Bengtsson described (1997c) other species from the Russian area, two from Kazakhstan, three from the Tuva republic, and one from the Primorskij territory.

Nupponen travelled in unexplored regions of Russia, and found several unknown scythridids. In 2000 (Nupponen et al.) the descriptions of fourteen new species from Ural Mountains were published, and in 2001 Nupponen & Nupponen described four other new species from the Altai Mountains.

Moreover, in the same year (2001) Nupponen described two new species from Tunisia, *S. kefensis* and *S. spectatorella*, both belonging to the *subfasciata* species-group.

Finally, Sachkov and Sinev worked occasionally on the Scythrididae of Eastern Russia (Sachkov 1995, 2000; Sachkov & Sinev 2001; Sinev 1993, 2001).

For the almost completed Scythrididae part of Lepidopterorum Catalogus, we examined 200–300 specimens, which are preserved in various Museums and Collections. The specimens came mostly from Afghanistan, Iran, Tunisia, Algeria, and Morocco. More entomological material from other Palaearctic areas was studied in order to enlarge our knowledge on the widespread distribution of this microlepidopteran family, and some specimens within the material are identified as being undescribed species (Fig. 1), while others belong to recently described species.

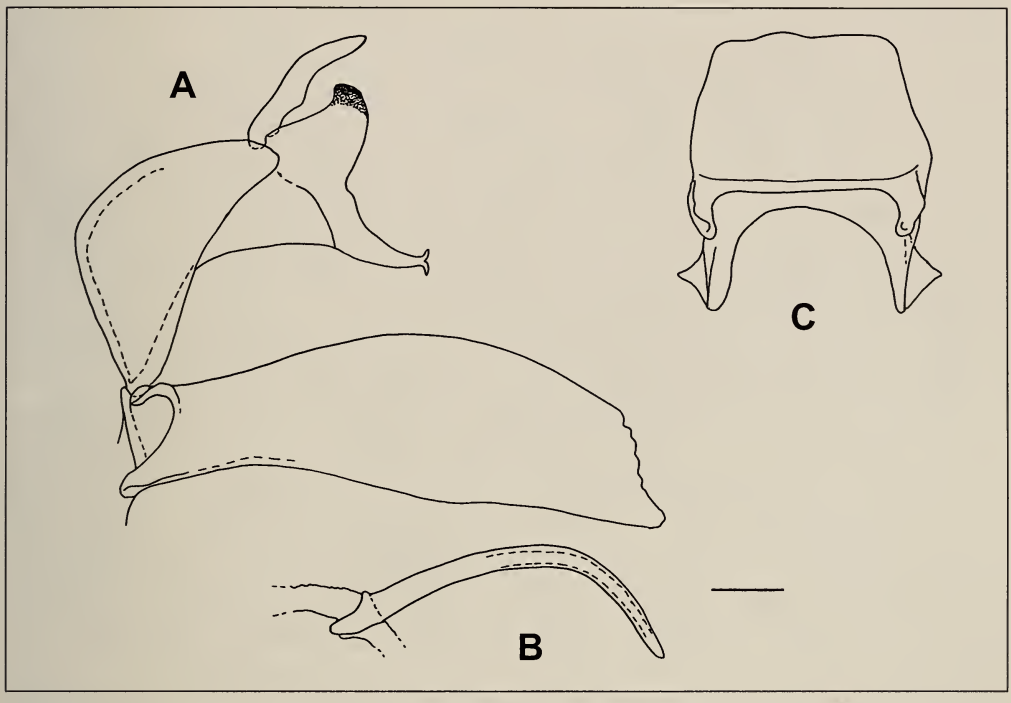

Fig. 2. Male genitalia of *S. tauromeniella*. **A**: Uncus-tegumen-gnathos-right valva complex. **B**: Aedeagus. **C**: VIII sternite. (Scale bar for all Figs. 0.1 mm).

Results

Scythris tauromeniella sp. n.

Material. Holotype, ♂: "**Sicilia** orient. Taormina 200 m, LT 7.X.1950 Htg. E Grshm. leg."; "Holotypus Scythris tauromeniella sp. n. Passerin d'E. & Roggero 2003"; "Genital slide no. 820 Passerin d'E."; Passerin d'Entrèves Collection, Torino, Italy.

Description. Male with wingspan of 10 mm. Head, thorax and abdomen light brown. Fore and hindwings bright white, fringe whitish. Antennae brown-whitish, half as long as forewing. Female unknown.

Male genitalia (Fig. 2 A, B, C). Uncus lamina-shaped, tegumen subtriangular in lateral view; gnathos well developed, the joining zone between the two arms is protruding, while the median process is bent downward and backward, with a bifid extremity. Valvae symmetrical, with enlarged distal two thirds, truncate at apex. Aedeagus tubular, slightly longer than half the length of the valva, strongly curved downwards. S8 laminar, truncated at apex, deeply incurvated on proximal edge.

Distribution. *S. tauromeniella* sp. n. is known only from the Southeastern Sicily.

Life history. The host plant and early stages are unknown. The adult specimen was collected in October.

Remarks. *S. tauromeniella* sp. n. cannot be assigned to any known species-group, but might be a member of the *pascuella*-group.

Derivatio nominis. The species is named after Tauromenium, the ancient Latin name of Taormina.

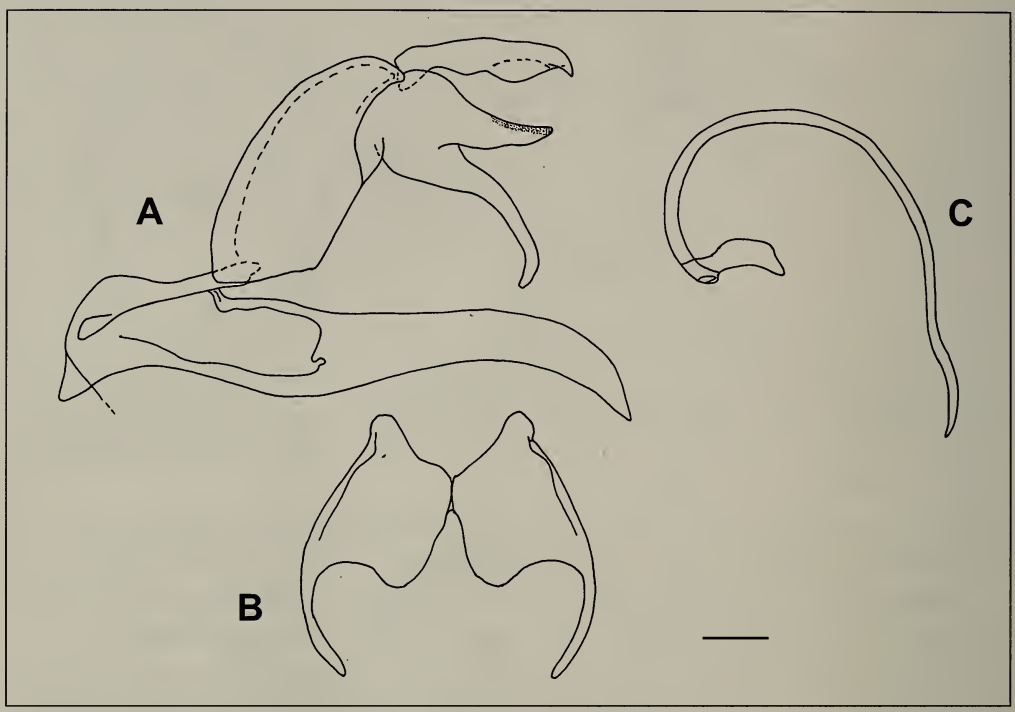

Fig. 3. Male genitalia of *S. landryi*. **A**: Uncus-tegumen-gnathos-right valva complex. **B**: VIII sternite. **C**: Aedeagus. (Scale bar for Fig. A 0.1 mm, Figs. B and C 0.2 mm).

Scythris landryi sp. n.

Material. Holotype, ♂: "**Tunisie** mérid. Bou-Hedma, 2-IX-1929, coll. Dumont"; "Holotypus Scythris landryi sp. n. Passerin d'E. & Roggero 2003"; "Genital slide no. 916 ♂ Passerin d'E."; Passerin d'Entrèves Collection, Torino, Italy.

Description. Male with wingspan of 9.5 mm. Head, thorax and abdomen dark brown. Forewings bright dark brown with a longitudinal light brown stria following the median fold, with a whitish dot at apex, arch-shaped outwards. Hindwings, fringes and antennae brown. Female unknown.

Male genitalia (Fig. 3 A, B, C). Uncus laminar; tegumen elongate; gnathos elongate, with arms prolonged backwards and median process long, and turned backwards. Valvae symmetrical, elongated, slightly downward curved, pointed at apex; aedeagus tubular, elongate, the proximal part strongly curved downwards; S8 two symmetrical plates united only along a short distance medio-anteriorly; each plate with curved, slender, posterolateral extension.

Distribution. *S. landryi* sp. n. is known only from central Tunisia.

Life history. The host plant and early stages are unknown. The adult specimen was collected in September.

Remarks. *S. landryi* sp. n. belongs to the *punctivittella*-group, as established by Bengtsson (1997b), in accordance with the male genitalia features.

Derivatio nominis. The species is named after Jean-François Landry, well-known Canadian lepidopterist.

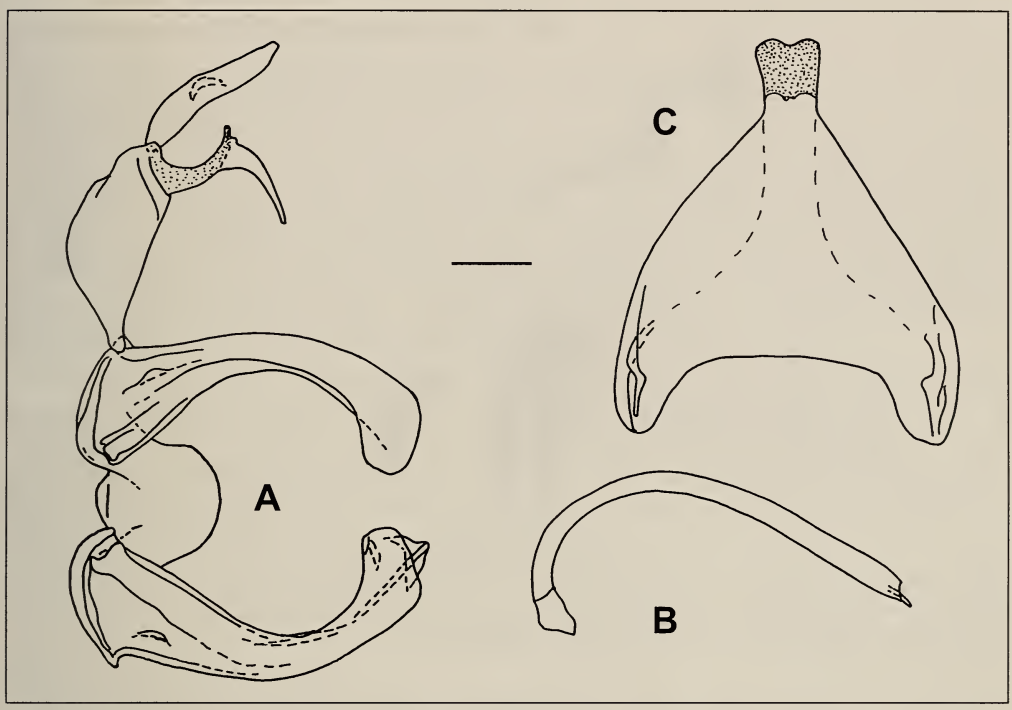

Fig. 4. Male genitalia of *S. herati*. **A**: Uncus-tegumen-gnathos-right valva complex. **B**: Aedeagus. **C**: VIII. sternite. (Scale bar for all Figs. 0.2 mm).

Scythris herati sp. n.

Material. Holotype, ♂: "**Afghanistan**, Herat 970 m, 15.5.1956, H.G. Amsel leg."; "Holotypus Scythris herati sp. n. Passerin d'E. & Roggero 2003"; "Genital slide no. 818 ♂ Passerin d'E."; Amsel Collection, Landessammlungen für Naturkunde, Karlsruhe, Germany. Paratype, 1♂: "Afghanistan, Herat 970 m, 5.5.1956, H.G. Amsel leg."; "Genital slide no. 853 ♂ Passerin d'E."; Amsel Collection, Landessammlungen für Naturkunde, Karlsruhe, Germany.

Description. Males with wingspans of 16–17 mm. Head, thorax and abdomen brown with many scattered, whitish scales. Whitish surface of the forewings unevenly covered by brown scales. Hindwings light brown. Antennae brown, slightly longer than forewing. Female unknown.

Male genitalia (Fig. 4 A, B, C). Uncus laminar, bilobate and elongate. Gnathos well developed, lateral arms strongly curved, with a sharp straight process extending downwards. Tegumen elongate; valvae curved ventrally, slightly asymmetrical, and rounded at apex, the left one with apical flap. Aedeagus slightly longer than valvae, tubular, slightly enlarged distally, curved ventrally; S8 subtriangular, concave at base.

Distribution. *S. herati* sp. n. is known only from northern Afghanistan.

Life history. The host plant and early stages are unknown. The adult specimens were collected in May.

Remarks. *S. herati* sp. n. cannot be attributed to any known species-group, but may belong to the *pascuella*-group.

Derivatio nominis. The species is named after Herat, the type locality in Afghanistan.

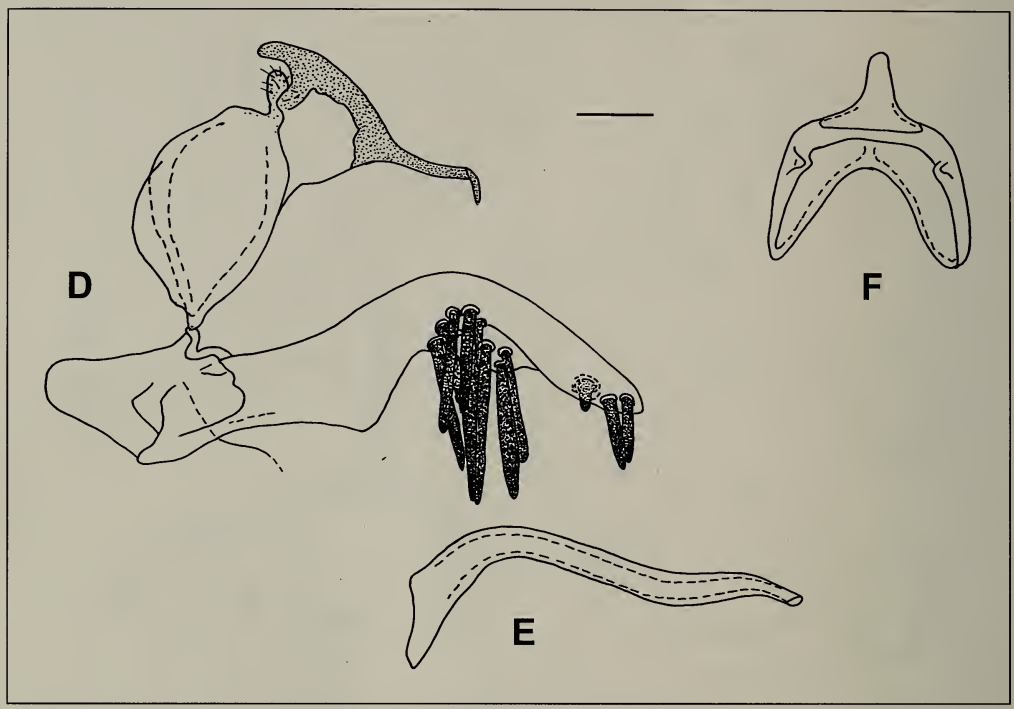

Fig. 5. Male genitalia of *S. nielseni*. **A**: Uncus-tegumen-gnathos-right valva complex. **B**: Aedeagus. **C**: VIII. sternite. (Scale bar for Figs. A and B 0.1 mm, C 0.2 mm).

Scythris nielseni sp. n.

Material. Holotype, ♂: "N.-**Afghanistan** Polichomri 700 m, 5.6.1956 H. G. Amsel leg."; "Holotypus Scythris nielseni sp. n. Passerin d'E. & Roggero 2003"; "Genital slide no. 807 ♂ Passerin d'E."; Passerin d'Entrèves Collection, Torino, Italy. Paratype, 1♂: same label data as holotype.

Description. Male with wingspan of 11.3 mm. Head, thorax, and abdomen covered by white-xanthous scales. Forewings whitish with small and chequered yellow spots. Apex of the forewings brown-yellow. Fringes yellowish. Antennae brown, two thirds as long as the forewing; pedicel whitish. Female unknown.

Male genitalia (Fig. 5 A, B, C). Uncus short and bilobate, gnathos well-developed, tegumen globose, valvae symmetrical, elongate, showing a tuft of about ten stout and elongated bristles in a ventral concavity at two third from valva-base, and three other bristles near apex, two elongated and one shorter. Aedeagus tubular, sinuate, almost four fifths as long as valvae; S8 deeply emarginate anteriorly, shows a cone-shaped and distinct caudal process.

Distribution. *S. nielseni* sp. n. is known only from Northern Afghanistan.

Life history. The host plant and early stages are unknown. The adult specimens were collected in June.

Remarks. *S. nielseni* sp. n. shows a vague resemblance with *S. productella*, mainly in appearance of valvae and S8.

Derivatio nominis. The species is named in honour of the late Ebbe Schmidt Nielsen, eminent Danish lepidopterist who suddenly died in 2001.

***Scythris immaculatella* (Chambers, 1875: 10)**

Type locality: USA, Waco and Basque Co., Texas.
S. pacifica McDunnough, 1927: 275 (synonymized by Landry 1991: 117).
S. kostjuki Sinev, 2001: 21. syn. n.

Description. Adults medium sized, usually with almost entirely unicolorous grey or dark grey body. Upper surface of forewings grey or beige, sometimes darkened by olive-brown suffusion, with brassy lustre and greenish hue. Hindwings elongate-lanceolate, apex pointed, upper surface beige or pale olive-brown with same lustre and hue as forewings' upper surface; cilia grey or beige. Antenna extended to about two thirds length of forewings, ventrally densely ciliated (Landry 1991).

Male genitalia. Symmetrical. Tegumen elongate, with deep V-shaped emargination on anterior margin, apex bilobate. Uncus with a medioventral blunt tooth on each arm, apex broad and slightly upcurved. Gnathos relatively thick, thorn-like and pointed downwards. Vinculum large and convex. Valvae moderately incurved, broadly spatulate. Juxta elongate, fused to base of aedeagus. Aedeagus tubular, thin, almost as long as valvae (Landry 1991).

Female genitalia. Sterigma an oval, concave plate at caudal margin of S8. Ductus bursae membranous; corpus bursae oblong, slightly curved. Anterior apophyses straight, slightly divergent. Posterior apophyses thinner then anterior ones; ovipositor short (Landry 1991).

Distribution. From Russia to North America (Fig. 6).

Life history. See Landry (1991).

Remarks. *S. immaculatella* was regarded as a junior synonym of *Scythris impositella* (Zeller), now under the combination *Asymmetrura impositella*, by Chambers, 1878, and subsequent authors. Landry (1991:117) revised its status as valid after studying the type. In 1927, McDunnough described *S. pacifica*, which was synonymized with *S. immaculatella* by Landry (1991).

The new synonymy was assessed by comparing the drawings of the genitalia of the male and female of *S. koskjuki* Sinev 2001 with those published by McDunnough in 1927 (as *S. pacifica*) and Landry in 1991 (as *S. immaculatella*).

At present, the species is known from Canada (British Columbia, Alberta, Quebec, and Ontario) and USA (Alaska, Montana, Wyoming, South Dakota, Colorado, Kentucky, North Carolina, Texas, and Michigan) (Landry, *pers. comm.*), and Siberia (Russia: Nizhniy Tsasuchey, Dauria). The distribution of *S. immaculatella* is very interesting, since it represents one of the few records in the Scythrididae of a disjunct transberingian distribution extending from central Siberia to most of the Nearctic region. This peculiar distribution can be explained by the many climatic and geological changes, which succeeded in the Tertiary and Quaternary in the so-called Beringia.

In the Tertiary, the conditions prevalent in the Arctic were very different than today and, recently, an isthmus between Asia and America was hypothesized to have occurred so biotic exchanges were possible. Many vascular plants of northeastern America show affinities with the East Asian and European floras. Continuity was across the northern part of the world, and the highland and steppe components of the Arcto-Tertiary Flora extended in eastern and far-eastern North America and in eastern Asia (Weber 2003).

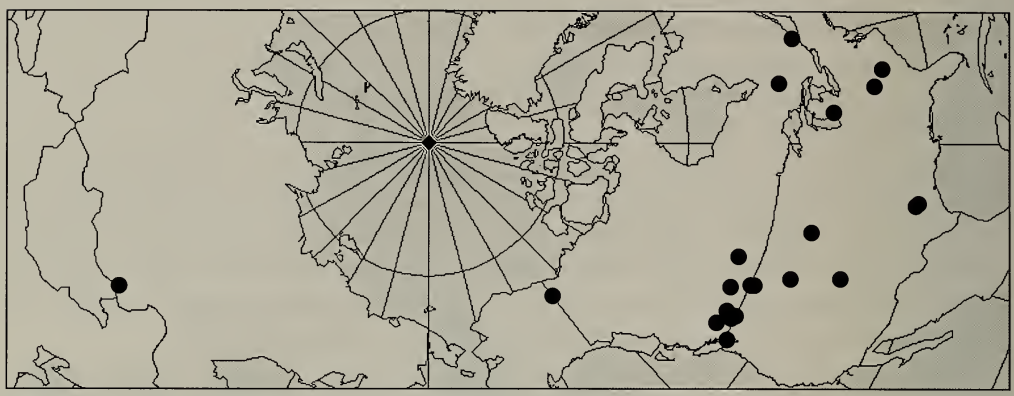

Fig. 6. Map of the distribution of *S. immaculatella* (Chambers, 1875).

On the other hand, Beringia played a key role as a refugium during the glaciations of the Pleistocene since vast lowland regions of Eastern Siberia, Alaska, and the Yukon territories remained essentially ice-free, even during times of maximum ice extent. The Beringian land bridge served as the only land connection between Asia and North America during much of the Pleistocene (Hopkins et al. 1982; Hamilton et al. 1986; Elias et al. 2000; Brigham-Grette 2001). The most substantial evidence for the Bering land bridge was provided in 1937 by Hultén (Elias et al. 2000). Hultén argued against the up-to-that-time accepted belief of an entire ice covering of northern areas during the glacial periods. On the basis of his studies of the modern floras of Alaska and Siberia, he hypothesized that most of Northeast Russia and Northwest America remained ice-free during the Quaternary glaciations. Therefore, they served as a massive northern refugium for arctic and boreal biota, which did not have to migrate southwards of the advancing ice-sheets to survive in southern refugia (Abbott & Brochmann 2003). At present three refugia are identified, as usual, by fossil and climatological evidences: the Beringia Refugium, the Northwest Coast Refugium and the Southern Refugium (Cox & Moore 1993; Trembley & Schoen 1999; Stone et al. 2002).

Various examples of this distribution are found, in the flora and fauna of Siberia and North America (Hopkins et al. 1982; Greenberg 1987; Beaudoin et al. 1996; Cox 2000; Stone et al. 2002; MacDougall 2003; Weber 2003).

The distributional gap of *S. immaculatella* in Northern Siberia can be explained by the climatic alterations during the Quaternary as well as by modern climatic regimes, as proved by many studies on climatic changes. There are essential differences between the insect faunas of Eastern and Western Beringia, both modern and ancient; these differences have been shaped by the past and present climatic regimes of these regions (Dawson 1992). Due to peculiarities of atmospheric circulation, the climates of the boreal zone in these two regions are rather different. The main differences in climate between the two regions include several aspects that unavoidably have direct effects on the invertebrate faunas (Elias 1994, 2000; Elias et al. 2000; Felzer 2001).

The succession of geological and climatic alterations that occurred in the area, could surely explain both the wide and peculiar distribution of *S. immaculatella* as could also the lack of collecting in Northern Siberia. Certainly, the discovery of the host-plants of this *Scythris* species would bring new light to this mystery.

S. albocanella Bengtsson 2002b: 65

Material. 3♀ (Genital slides no. 2232, 2251 and 2253 Passerin d'Entrèves), **Saudia Arabia**, SW-Arabien, Asirgebirge, 2350 m, 5 km s. Namas, 17–21.iv.1979, Amsel leg.; 1♀ (Genital slide no. 2252 Passerin d'Entrèves), same data, but 2000 m, Wadi Morah, 81 km s. Biljurshi, 24.iv.1979, H. G. Amsel leg.; 1♀ (Genital slide no. 2256 Passerin d'Entrèves), same data, but 22.iv.1979, H. G. Amsel leg.; 1♀ (Genital slide no. 3319 Passerin d'Entrèves), same data, but 29.iv.–2.v.1979, H. G. Amsel leg.

Distribution. Yemen, Saudi Arabia.

Remarks. The area of distribution is extended to the Asir region, in southern Saudi Arabia. The new records from Saudi Arabia all refer to the Asir region, which is characterized, as reported by Hegazy et al. (1998), by a temperate climate and elevations above 2000 m a.s.l. It is also close to the Tihama coastal plains which have elevations ranging from 0 to 500 m. The transition zone between the arid environments, which characterize the Tihama area, and the Asir temperate environments has a complex topography, and distinctive vegetational zones along the altitudinal gradient. Furthermore, the southwestern territory of the Arabian peninsula is interesting from a phytogeographic point of view because of its relation to the neighbouring regions of Africa and Asia. However, these connections are very little studied due to the rugged topography of the region (Hegazy et al. 1998).

S. badiella Bengtsson 2002b: 66

Material. 3♂, 2♀ **Congo**, Ht. Katanga, Kyala, 18.vii., 1., 9., 23.viii.[19]29, J. Romieux (Genitalia slides no. 3152, 3153, 3682, 3684, 3690 Passerin d'Entrèves).

Distribution. Yemen, Congo (Katanga province).

Remarks. The species shows a clear Sudano-Zambesian distribution (Hegazy et al. 1998). The peculiar geographical position of Arabia, which lies between the Afrotropical, Palaeactic, and Oriental Regions, makes it of great importance from a biogeographical point of view. Indeed, the EastAfrotropical-SouthArabian distributions represent 40.5% of the whole afrotropical fauna (Franz & Beier 1970). In Arabia the afrotropical elements are dominant in the foothills and mountains of Hajiaz, Asir, Yemen, including the Aden hinterland, and to a lesser degree in the Hadramaut and Qara Mountains (Büttiker 1979; Abo-Khatwa et al. 1980), while the central and SE areas belong to the Palaearctic Region, and the E and NE areas have influences of the Oriental Region (Büttiker & Wittmer 1979).

S. biacutella Bengtsson 2002b: 68

Material. 1♂ (Genital slide no. 2219 Passerin d'Entrèves), 1♀ (Genital slide no. 2237 Passerin d'Entrèves), **Saudi Arabia**, SW-Arabien, Asirgebirge, 2350 m, 5 km s. Namas 17., 21.iv.1979, Amsel leg.

Distribution. Yemen, Saudi Arabia.

Remarks. The area of distribution is extended to Saudi Arabia. See also *S. albocanella*.

S. strabella Bengtsson 2002b: 88

Material. 3♂ (Genital slides no. 2221, 2255 and 3318 Passerin d'Entrèves), **Saudi Arabia**, SW-Arabien, Asirgebirge, 2000 m, Wadi Morah, 81 km s. Biljurshi, 26./27.iv.1979, H. G. Amsel leg.; 1♂ (Genital slide no. 2254 Passerin d'Entrèves), same data, but 29.iv.–2.v.1979, H. G. Amsel leg.

Distribution. Yemen, Saudi Arabia.

Remarks. The area of distribution is extended to Saudi Arabia. See also *S. albocanella*.

S. valvaearcella Bengtsson 2002b: 92

Material. 1♂ (Genital slide no. 2233 Passerin d'Entrèves), 1♀ (Genital slide no. 2234 Passerin d'Entrèves), **Saudi Arabia**, SW-Arabien, Wadi Tihama 850 m, 23.iv.1979, Asirgebirge, H. G. Amsel leg.

Distribution. Yemen, Saudi Arabia.

Remarks. The area of distribution is extended to Saudi Arabia. See also *S. albocanella*.

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