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Lehmannodes gen. nov., a new genus of Larentiinae from Turkey and Iran (Lepidoptera, Geometridae)

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ABSTRACT

A new genus, *Lehmannodes* gen. nov., is described for *Aplocera guneyi* Riemis, 1992, and the morphological characters of the single included species are compared with those of the (type-) species of probably related Chesiadini genera like *Amygdaloptera*, *Chesias*, *Chesistege*, *Lithostege*, *Odezia*, *Schistostege*, *Carsia* and true *Aplocera*. Adults of the discussed species and their male and female genitalia are figured. In addition, the available COI DNA barcoding data of selected species of the tribe Chesiadini and other genera of Palaearctic Larentiinae are studied and compared. Both, morphological and molecular aspects indicate that *guneyi* in fact deserves a genus of its own which is most closely related to *Amygdaloptera* (morphological data only), *Odezia* and *Schistostege*. The so far known geographic distribution of *Lehmannodes guneyi* is shown on a map.

1. Introduction

In the course of a recent review of the genus *Lithostege* Hübner, [1825] (Rajaei et al., 2011), we also discovered two specimens of a species at first unknown to us. They were associated with the genus *Lithostege* in the "Kuhna collection", which was donated to the Lepidoptera collection of the Zoologisches Forschungsmuseum Alexander Koenig, Bonn a few years ago. Their size and shape of wings were reminiscent of those in the genus *Lithostege*, but the genitalia of both sexes showed numerous differences. Likewise some typical external characters of the genus *Lithostege* (e.g. thickened fore-legs, extremely short fore-tibia with forked projection etc. (Rajaei et al., 2011)) were absent in these specimens. Similar results were found when comparing them to species of other genera of Chesiadini Pierce, 1914 (see Viidalepp 2011). At that time we got a hint (A. Hausmann, Munich, pers. comm.) that this taxon may be described already as *Aplocera guneyi* Riemis, 1992. We were able to confirm this by help of the original description, but the association with *Aplocera* Stephens, 1827 obviously was not correct. In addition, hoping to assure its taxonomic position more precisely, two more recently (2009) collected specimens were sent to the Canadian Centre of Barcoding at the University of Guelph, Canada.

The aim of the present study is to demonstrate the necessity of describing a new genus for "*Aplocera*" *guneyi* Riemis by comparing mainly morphological characters of this taxon with those of the (type-) species of all other genera of the Chesiadini and to describe this genus. The relationship between the genera is discussed only tentatively.

2. Materials and methods

2.1. Morphological studies

The specimens used in this study are mainly taken from the Lepidoptera collection of Zoologisches Forschungsmuseum Alexander Koenig (ZFMK) and from the private collection of Hossein Rajaei,

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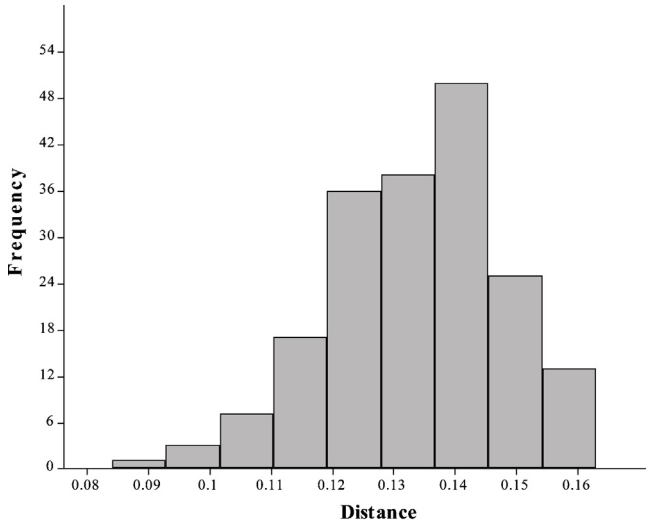

Fig. 1. Pairwise distances between individuals belonging to congeneric and non-congeneric species of Larentiinae (based on COI 5′ mt-DNA gene fragments, calculated using the Kimura 2-parameter model with MEGA 5 (Tamura et al. 2011)).

both Bonn, Germany. Additional specimens were borrowed from the following institutional or private collections (acronyms, as far as included, after Evenhuis and Samuelson 2007): SMNK – Staatliches Museum für Naturkunde, Karlsruhe, Germany; ZSM – Zoologische Staatssammlung München (Munich), Germany; NHRS – Naturhistoriska Riksmuseet, Stockholm, Sweden; PCBM – private collection of Bernd Müller, Berlin, Germany; PCJM – private collection of Dr. Jörg-Uwe Meineke, Kippenheim, Germany.

For morphological studies, the specimens were photographed by an Olympus E3 digital camera prior to dissection. Specimens were dissected following standard methods (e.g. Robinson 1976). Genitalia slides were studied and photographed by a digital stereo-microscope (ZEISS-SteREO: Discovery.V20). Adobe Photoshop (CS2) was used for editing and balancing the sharpness and brightness of the images. For tracing the geographical coordinates of the localities the 'Google Earth' portal was used.

Specimens of the following genera and species have been studied for comparison:

Amygdaloptera testaria (Fabricius, 1794) (N. Africa); *Schistostege* nubilaria (Hübner, 1799) (Caucasus); *Odezia atrata* (Linnaeus, 1758) (Armenia); *Chesias legatella* ([Denis & Schiffermüller], 1775) (Spain); *Chesistege korbi* (Bohatsch, 1910) (Turkey); *Lithostege coassata* (Hübner, [1825]) (Iran); *Aplocera uniformata* (Urbahn, 1971) (Caucasus); *Docirava dervenaria* (Mentzer, 1981) (Derven; Macedonia); *Carsia lythoxylata* (Hübner, [1799]) (Turkey); *Carsia sororiata* (Hübner, [1813]) (Germany).

2.2. DNA-barcoding

COI mt-DNA barcodes of the new taxon were successfully sequenced at the Canadian Centre for DNA Barcoding, University of Guelph, Canada, in the course of the "All Leps" project (www.lepbarcoding.org). For calculation of genetic distances, 654 bp of COI mt-DNA barcodes of 38 individuals (of 34 selected Larentiinae species and 20 different genera) were also retrieved from already published projects, available on the Barcode of Life Data Systems website (www.boldsystems.org). List of specimens for DNA-analysis and their GenBank accession numbers find in Table 2. Sequences were aligned using BOLD portal. Pairwise distances under K2P (Kimura 2-Parameter; Kimura 1980) were calculated. Pairwise distances between individuals (20 species belonging to 20 different genera) are used to get a first estimation of genetic distances between genera studied (see Fig. 1 and Table 1). These

Table 1
Comparison of pairwise genetic distances between individuals of *Lehmannodes* gen. nov. and those of 19 other genera of the subfamily Larentiinae (COI mt-DNA barcodes, 654 bp; specimens used for analysis and their data see Table 2).

	Photoscotosia	*Nebula*	*Colostygia*	*Eupithecia*	*Xanthorhoe*	*Pomasia*	*Euphyia*	*Rheumaptera*	*Anticlea*	***Lithostege***	***Aplocera***	*Perizoma*	*Scotopteryx*	*Catarhoe*	***Chesias***	*Cataclysme*	***Schistostege***	***Docirava***	***Odezia***
Nebula	0.12																		
Colostygia	0.11	0.13																	
Eupithecia	0.14	0.14	0.14																
Xanthorhoe	0.12	0.13	0.11	0.11															
Pomasia	0.12	0.13	0.12	0.13	0.12														
Euphyia	0.12	0.12	0.14	0.15	0.10	0.14													
Rheumaptera	0.12	0.14	0.12	0.14	0.11	0.12	0.13												
Anticlea	0.10	0.14	0.13	0.15	0.12	0.13	0.14	0.11											
Lithostege	0.13	0.14	0.13	0.14	0.12	0.14	0.13	0.15	0.11										
Aplocera	0.12	0.12	0.13	0.14	0.11	0.14	0.13	0.15	0.13	0.12									
Perizoma	0.11	0.12	0.13	0.15	0.12	0.15	0.12	0.14	0.13	0.14	0.11								
Scotopteryx	0.16	0.16	0.16	0.17	0.15	0.18	0.15	0.18	0.16	0.16	0.15	0.16							
Catarhoe	0.11	0.13	0.13	0.12	0.11	0.13	0.12	0.12	0.12	0.12	0.12	0.14	0.16						
Chesias	0.12	0.13	0.12	0.15	0.11	0.14	0.14	0.14	0.13	0.10	0.12	0.12	0.16	0.13					
Cataclysme	0.13	0.13	0.14	0.13	0.11	0.14	0.13	0.11	0.14	0.12	0.12	0.15	0.16	0.12	0.13				
Schistostege	0.11	0.14	0.12	0.15	0.12	0.13	0.13	0.13	0.11	0.10	0.12	0.13	0.16	0.11	0.11	0.12			
Docirava	0.12	0.13	0.13	0.16	0.13	0.12	0.14	0.13	0.14	0.12	0.12	0.16	0.18	0.12	0.13	0.14	0.12		
Odezia	0.12	0.13	0.14	0.15	0.13	0.15	0.14	0.14	0.11	0.09	0.12	0.14	0.17	0.11	0.10	0.13	0.08	0.11	
Lehmannodes	0.13	0.14	0.13	0.14	0.13	0.14	0.15	0.16	0.12	**0.10**	0.13	0.15	0.17	0.12	0.12	0.13	**0.10**	0.12	**0.09**

distances should help to support (or contradict) our morphological conclusions. We are aware that this study, based on mt-DNA genes only, which are of doubtful suitability for taxonomic studies at genus level, can only give a first approximative idea of the relationship of the studied genera. Other shortcomings are the low number of species and specimens per species which makes the calculation of intragenetic variation and intergenetic distances highly arbitrary.

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jcz.2012.11.006.

3. Results and discussion

3.1. Generic description

***Lehmannodes* gen. nov.**

Type species: *Aplocera guneyi* Riemis, 1992, *Phegea*, **20** (2): 75.

Wingspan 22–28 mm, forewing length 13–15 mm. Antennae filiform, segments finely pubescent and slightly flattened laterally in males, rounded, longer than in males and with a few larger bristles only in females. Eyes rather small, in females even smaller than in males; frons broad, rounded in lateral view, protruding about one-half of the eye diameter, smoothly scaled light yellowish-brown. The chitinous surface of frons shows a shallow depression with a rounded projection in the middle, both surrounded by a circular ridge (only visible when scales are removed). Vertex scaled like frons; large chaetosemata present, both broadly extending towards middle of head, but not touching. Palpi rather small and narrow, just reaching beyond frons, scales concolorous with frons. Haustellum developed. Tibia of foreleg 1.2 mm long, with a short inner tooth-like projection distally. Epiphysis about half the size of fore-tibia (Fig. 2E and F). Middle tibia with one, hind-tibia with two pairs of short spurs.

Fore wings elongate. Apex angled, termen and tornus smoothly rounded. Fore wing light brownish-ochre; postmedial and submarginal lines most prominent, both whitish, smooth and parallel to termen, postmedial accompanied by a dark shade inside. Antemedial line faint, angled in cell, with a dark costal part, the posterior part dentate. Basal line hardly visible, sharply angled in cell. A weak, streak-like discal dot present. Hindwings oval and narrow, elongate, light brownish-cream, with darker veins and slightly darker submarginal area. Discal dot absent. Underside of both wings light brownish-cream, postmedial line on fore wing visible, wing surface distal to the latter line lighter than proximal to it. Hind wings with indistinct, dark postmedial and submarginal lines, streak-like discal dots very faintly visible on both wings. Venation: fore wing with two areoles, R1, R5 and the common stalk of R2–R4 originate from distal areole. On hindwing, Rs and M1 from a long, common stalk. Hindwing in male and female with a short anal vein (Fig. 2C).

Abdomen smooth-scaled, coloured like forewings. Tergites and sternites 1+2 more strongly sclerotized than remaining sternites, no modifications at terminal tergite or sternite.

Male genitalia (Fig. 4A) Valva short and broad, not sclerotized along costal part, distally rounded; sacculus slightly sclerotized to about one half of ventral part, tending to get turned up when mounted. Uncus relatively long, elongate-triangular, broader more basally, with a narrow neck. Gnathos ribbon-form, arms tapering, not connected at middle. Saccus large, extended triangularly. Juxta a rounded plate, with a dorsal incision. Aedeagus about 0.8 mm long, curved in lateral view, with a subapical projection. Vesica without cornuti.

Female genitalia (Fig. 6A) Ovipositor short, lobes large, rather truncate than evenly rounded, with crinkled margins. Posterior apophyses strong, stout, distally rounded. Anterior apophyses reduced to a minute point. Antrum short, simple, V-shaped posteriorly, opening near posterior margin of 8th segment. The latter narrow ventrally, broading laterally, rather membranous and setous dorsally. Ductus and corpus bursae membranous, very small, both not reaching beyond the 7th abdominal segment. Corpus bursae pear-shaped, but more straight on ventral and roundly extended on dorsal side. Signum absent (Fig. 6A).

Diagnosis.

I general appearance, *Lehmannodes guneyi* agrees with species of other genera in the tribe Chesiadini (Fig. 3), which share – as most important characters (Viidalepp, 1990a,b) – two areoles in the fore wing venation, a short anal vein in the male hind wings (Fig. 2C), a distal projection from the foreleg tibia and –in the male genitalia– a "rib-like sclerite" connecting the uncus with the hemitranstillae. The latter character most probably denotes the lateral gnathos arms which are medially not connected. Viidalepp (2011: 11) redefines the tribe more detailed and proposes to separate the tribe into the subtribes Chesiadina and Aplocerina, the latter comprising the genera *Aplocera* and *Carsia* (Figs. 3, 5 and 6) only. *Lehmannodes* has to be attributed to the subtribe Chesiadina (Fig. 4).

Lehmannodes guneyi, described as member of ***Aplocera***, can be distinguished from the latter genus by means of genitalia structures: males of *Aplocera* always have the sacculus sclerotized and elongated (extremely long in *A. plagiata* (Linnaeus, 1758)), often decorated with thorn-like processes. Moreover, the aedeagus is extremely long, narrow and distinctly curved (see Fig. 5J). In the female genitalia, *Aplocera* is characterized by a long and narrow, sclerotized, often strongly curved, elongated antrum, fitting to the shape of the aedeagus and called "ductus bursae" by most other authors (e.g. Viidalepp, 1988; Xue and Zhu, 1999) (see Fig. 6J). A globular, membranous corpus bursae – in some species with a large, accessory bursa – and a very peculiar sclerite at the transition between antrum and bursa are also distinctive. This sclerite consists of a posterior, tubular part and a double claw-like part reaching into the corpus bursae (see Fig. 6J). The tubular part represents the short ductus bursae, as indicated by the fact that the ductus seminalis arises from its posterior end. *Lehmannodes guneyi* has a short and simple valva without any modification of the sacculus and a short, slightly curved aedeagus in the male genitalia, a simple, membranous bursa with a very short ductus in the female genitalia.

Carsia shares with *Aplocera* the very apomorphic female genitalia character (Fig. 6H and J) which separates it from *Lehmannodes* as well. Also the male genitalia are distinctly different (e.g. elongated valva with sclerotized costa, the latter with ventral spine in *Carsia*, both traits missing in *Lehmannodes*; for other differences see Fig. 5H).

Lehmannodes is separated from ***Lithostege*** by the strongly bulbed femora of fore legs (long and slender in *Lehmannodes*, *Chesistege* and the other genera of Chesiadini; see Fig. 2E–H).

Also unlike *Lithostege* (with very small epiphysis), the other genera have the epiphysis larger than half the length of fore-tibia. In *Lithostege* and *Chesistege* the foreleg tibia is extremely short, with a massive, distal, forked projection, consisting of a long internal and a much shorter external tooth. In other genera, including *Lehmannodes*, the foreleg tibia is long and slender, with one short distal tooth.

Lehmannodes can be separated from ***Chesistege*** also by the following characters: female with strongly sclerotized ductus bursae (short and not sclerotized in *Lehmannodes*); corpus bursae densely *covered* with tiny spines (membranous, without spines in *Lehmannodes*) (Fig. 6F), male genitalia with strongly sclerotized costal area and a free costal arm, a dentate process on lamina, elongated uncus and a large saccus (Fig. 5F) (simple valva, triangular uncus and a shorter triangular saccus in *Lehmannodes*).

Chesias has female genitalia (Fig. 6E) with a large, globular corpus bursae, strongly covered with spines internally at distal two thirds, a long, narrow ductus bursae and long posterior apophyses (Fig. 6E) (corpus bursae small, without spines, ductus bursae

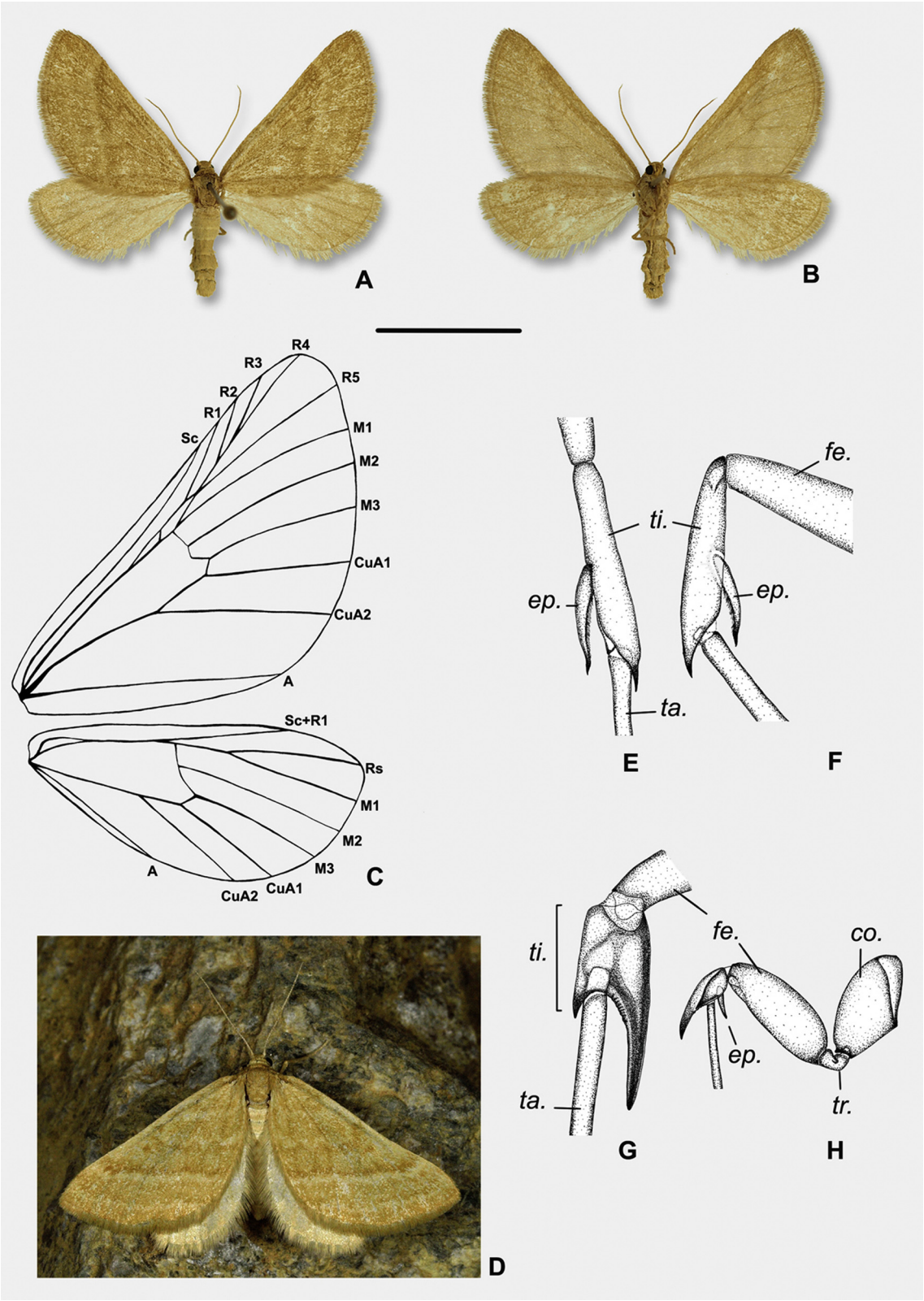

Fig. 2. Moths, venation and foreleg structure. (A–F) *Lehmannodes guneyi*. (A) female, upperside, (B) underside; (C) venation; (D) resting position (Photo by: H. Rajaei); (E–H) structure of forelegs; (E and F) *Lehmannodes guneyi*, (G and H) *Lithostege coassata*. Abbreviations: *co.* – coxa, *ep.* – epiphysis, *fe.* – femur; *ta.* – tarsus, *ti.* – tibia; *tr.* – trochanter. Scale bar: 10 mm.

and apophyses short in *Lehmannodes*). Male genitalia in *Chesias* (see Fig. 4E) with a short, broad, distally rounded valva, but with a strongly sclerotized and curved costa, a triangular or conical process at the centre of the valva and a long, spine-like process from juxta (juxta without such process, costa not sclerotized and not curved in *Lehmannodes*).

Amygdaloptera, with only one species distributed in N. Africa and very locally in Spain, has male genitalia similar to those of

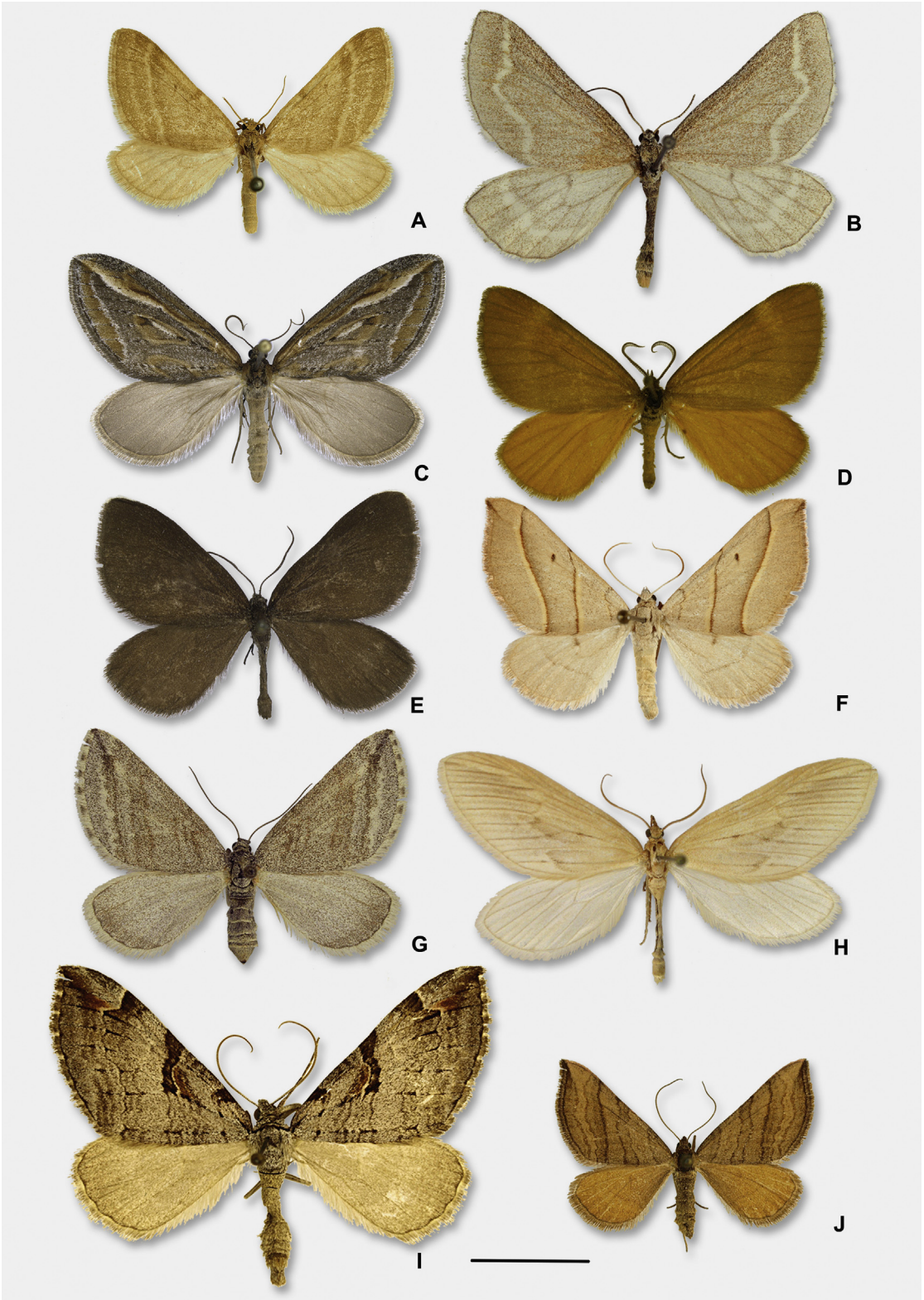

Fig. 3. Wing pattern of species studied. (A) *Lehmannodes guneyi*, ♂ (E Turkey); (B) *Schistostege* nubilaria, ♂ (Caucasus); (C) *Chesias legatella* (Germany); (D) *Amygdaloptera testaria* (N. Africa); (E) *Odezia atrata* (Armenia); (F) *Docirava dervenaria*, paratype ♂ (Macedonia); (G) *Lithostege coassata*, ♀ (N Iran); (H) *Chesistege korbi*, ♂ (Turkey); (I) *Aplocera uniformata*, ♂ (Caucasus); (J) *Carsia lythoxylata*, ♀ (Turkey). Scale bar: 10 mm.

Chesias, with a roundly elongated valva, a broad, sclerotized costa and triangular processes at the centre. Also the small, stick-like aedeagus is similar (Fig. 4D). The female genitalia of *Amygdaloptera* (Fig. 6D) are small and simple, ductus and corpus bursae membranous, the latter without signum. Ductus rather broad, tubular, corpus oval. Antrum narrow, tubular, with a v-shaped opening. 8th Segment not modified otherwise, papillae anales irregularly truncate (Hausmann, 2012, fig. 227 shows, by error, the large gland appendages confused with corpus bursae). *Amygdaloptera* is also unique in having unipectinate antennae in male, a character not

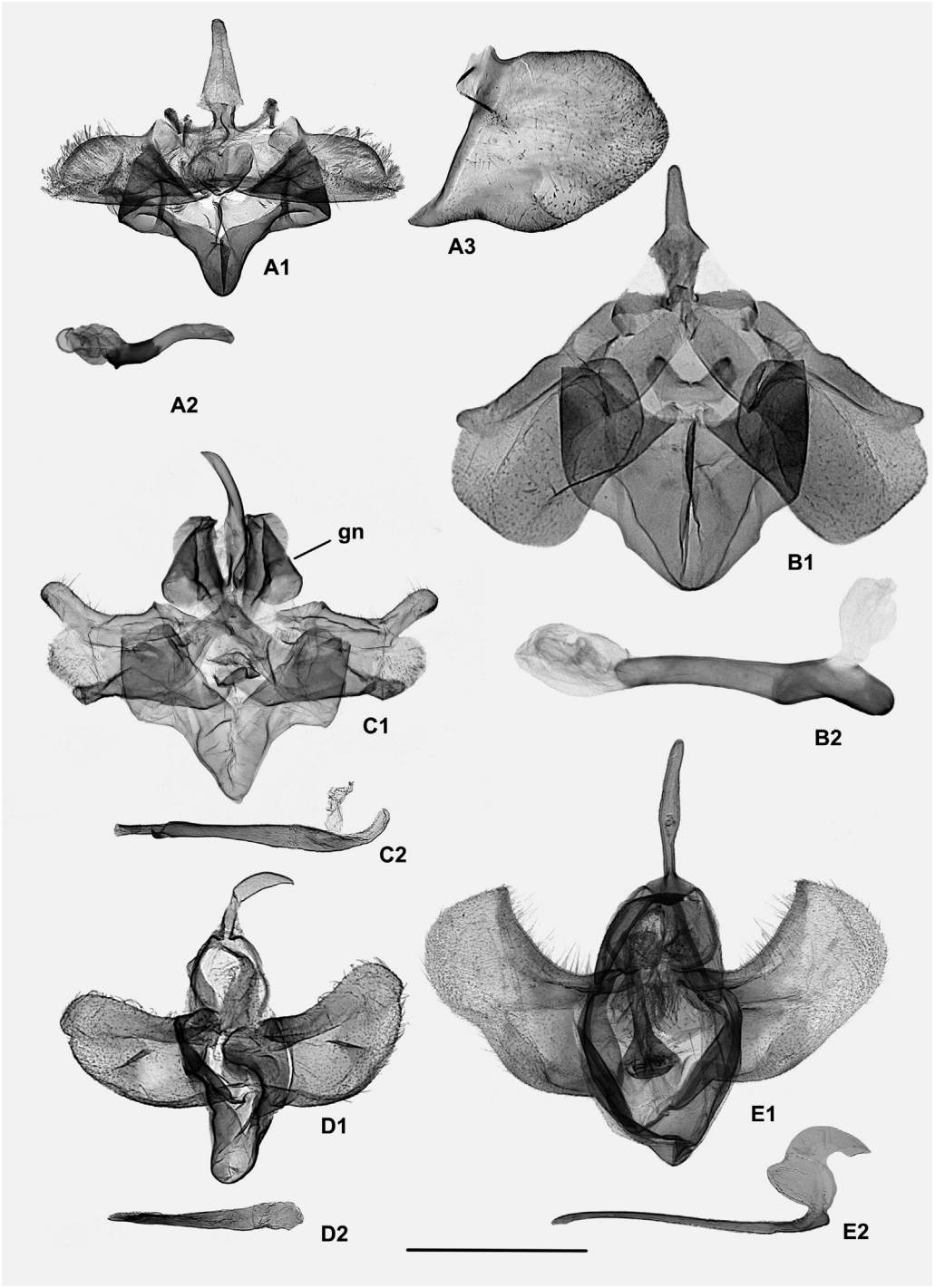

Fig. 4. Male genitalia (A) *Lehmannodes guneyi*, (A1, 2: gen. prep. 1649 H. R.; A3: gen. prep. 1624 H. R.; A3 (enlarged) illustrates the normal shape of valva, in A1 the sacculus is folded); (B) *Schistostege* nubilaria (gen. prep. 1336 H. R.); (C) *Odezia atrata* (gen. prep. 1846 H. R.; gn. gnathos); (D) *Amygdaloptera testaria* (gen. prep. 1848 H. R.); (E) *Chesias legatella* (gen. prep. 1850 H. R.). Scale bar: 1 mm.

found in any other genus of Old World Larentiinae (Prout, 1914: 167). With *Lehmannodes* it shares the rather simple, rounded valva, but in *Lehmannodes* the latter is not sclerotized at costa and a central process is absent. Moreover, the shape of the uncus differs (elongate-triangular with rounded tip in *Lehmannodes*, curved ventrad, laterally flattened, pointed at tip in *Amygdaloptera*). The tegumen is largely reduced in *Lehmannodes*, well developed in *Amygdaloptera*, the aedeagus is curved, with a subapical tooth in *Lehmannodes*, straight and without tooth in *Amygdaloptera*. The female genitalia are similar in having irregularly truncate papillae anales, simple, membranous ductus and corpus bursae, the latter without signum, and a similar antrum, but in *Lehmannodes* the ductus is very short, the corpus bursae larger and the ventral part of the 8th segment is reduced to a narrow band.

Odezia, with also only one, but widely distributed species, is unique by appearance, with almost black ground colour without pattern elements except a narrow white streak at margin around apex of forewings (see Fig. 3E). Its male genitalia (Fig. 4C) are distinctive and very different compared to *Lehmannodes*: gnathus enlarged and very unusual in shape; valva with a broadly

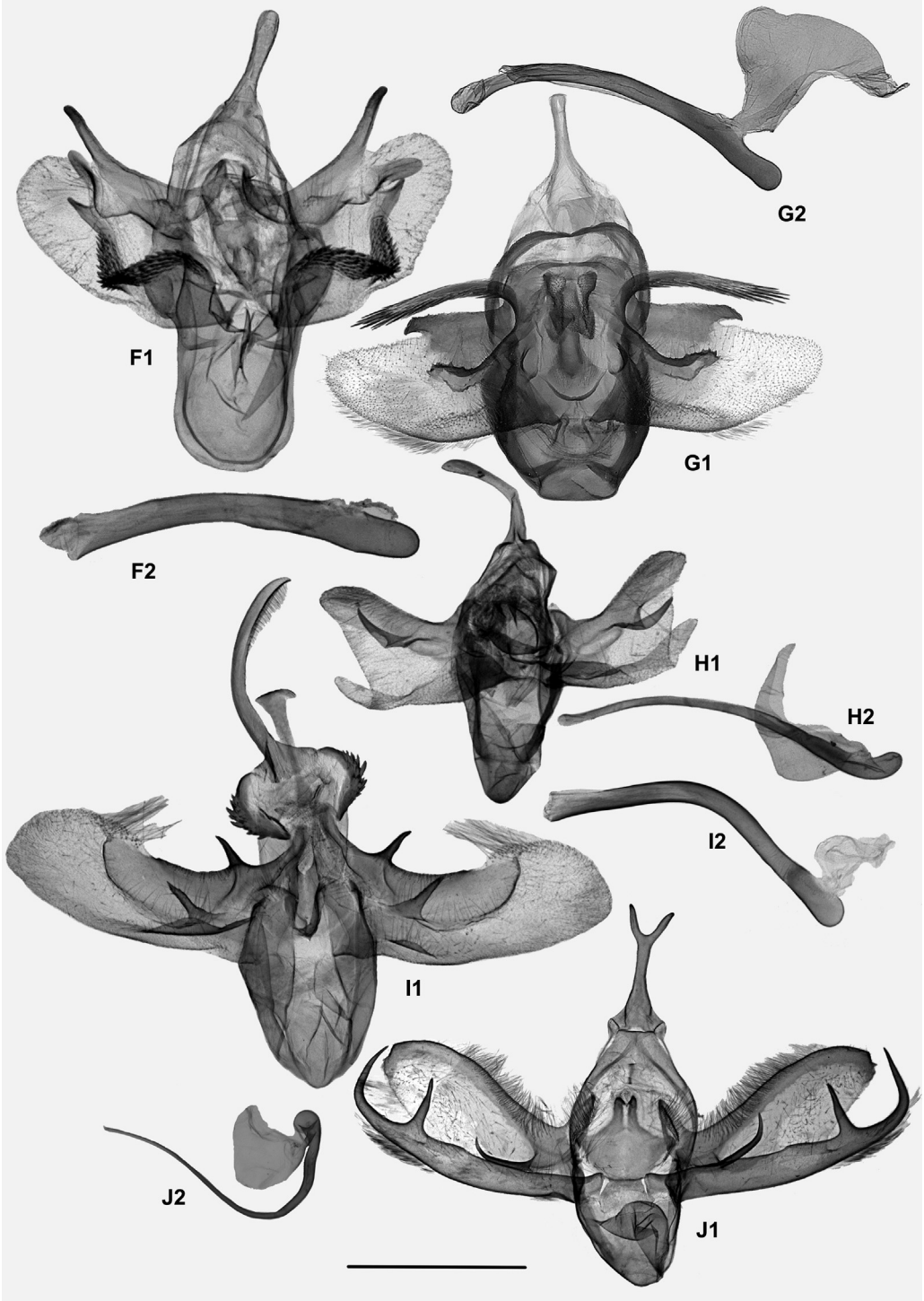

Fig. 5. Male genitalia (F) *Chesistege korbi*, ♂ (gen. prep. 774 H. R.); (G) *Lithostege coassata* (gen. prep. 1041 H. R.); (H) *Carsia lythoxylata* (gen. prep. 1477 H. R.); (I) *Docirava dervenaria*, paratype (gen. prep. 10847 H. R.); (J) *Aplocera uniformata* (gen. prep. 1599 H. R.). Scale bar: 1 mm (2 mm for *A. uniformata*).

sclerotized costa, with a free distal end; sacculus broad at base, strongly sclerotized, with a ventral arm; aedeagus long and straight, with a subapical claw. In the female genitalia (Fig. 6C), the large, globular bursa is membranous, without a signum, the ductus has a short proximal membranous part and a sclerotized distal part. The antrum is wide and shallow. All these characters are different compared to *Lehmannodes*, however, the genetic distance of 9% is the lowest observed.

Male and female genitalia of ***Schistostege*** show some similarities with *Lehmannodes*: e.g. shape of ovipositor, ductus and corpus bursae (the latter membranous, without internal spines) in female (Fig. 6B) and the very similar, elongate-triangular uncus with a narrow neck, the narrow gnathos-arms (not fused in the middle), the similar form of juxta and a short aedeagus (Fig. 4B). However, the rather quadrate valva, with a strongly sclerotized costa with short, free apices, the enlarged saccus and the well developed tegumen

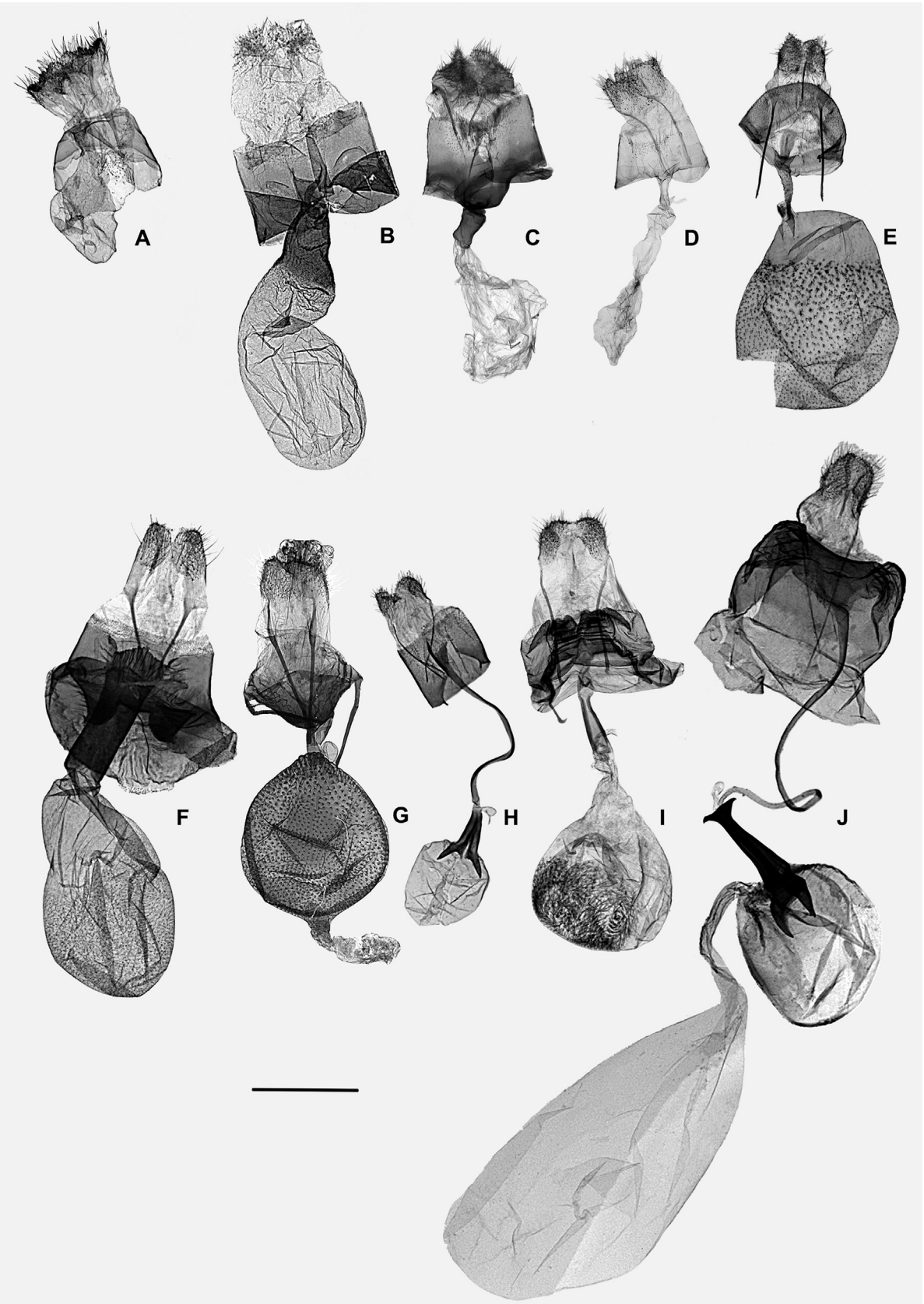

Fig. 6. Female genitalia (A) *Lehmannodes guneyi*, (gen. prep. 2226-DS); (B) *Schistostege* nubilaria (gen. prep. 1337 H. R.); (C) *Odezia atrata* (gen. prep. 1852 H. R.); (D) *Amygdaloptera testaria* (gen. prep. 2234-DS.); (E) *Chesias legatella* (gen. prep. 1849 H. R.); (F) *Chesistege korbi*, (gen. prep. 1493 H. R.); (G) *Lithostege coassata*, ♀, (gen. prep. 1043 H. R.); (H) *Carsia sororiata* (gen. prep. 1818 H. R.); (I) *Docirava dervenaria*, paratype (gen. prep. 10848 H. R.); (J) *Aplocera uniformata* (gen. prep. 1600 H. R.). Scale bar: 1 mm.

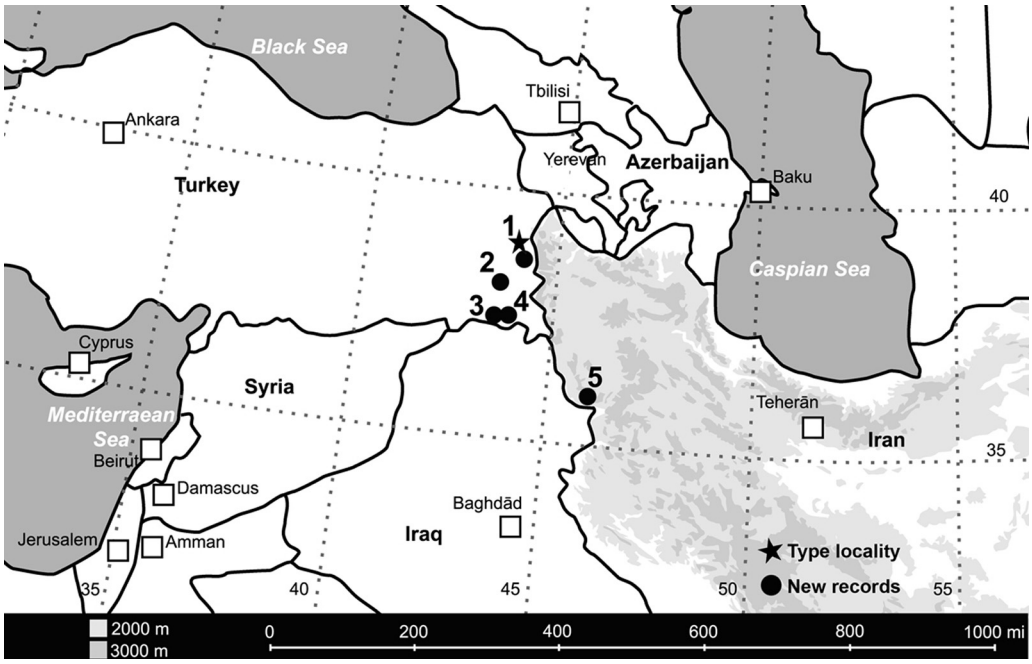

Fig. 7. Type locality and additional collecting sites of *Lehmannodes guneyi* in Turkey and Iran; (1) Kuzgunkiran Geçidi; (2) Kurubas Geçidi; (3) Hakkari (Altin Doglari); (4) Hakkari (Ogul); (5) Gardaneh-Khan (Kordestan).

in *Schistostege* are differences not allowing to include *A. guneyi* in *Schistostege*. Moreover, the high genetic distance (10%) between both taxa supports this view.

Taxonomic notes. Riemis (1992) assigned *guneyi* to the genus *Aplocera* Fletcher (sic!) and compared his new species with three species at that time generally treated as members of *Aplocera* (*A. annexata* (Freyer, 1830), *A. dervenaria* Mentzer, 1981, *A. palumbata* Mentzer, 1981). He described several important differences between *guneyi* and the other species of *Aplocera* (e.g. shape of antenna segments, valves, uncus, aedeagus etc.), but still treated the new taxon as a member of *Aplocera*. The Fig. 2(2) he gives for the antenna segments, shows –concerning the proportions– segments of female antennae, but densely pubescent like male antennal segments. The male segments are shorter and broader, more like those shown for *A. palumbata* (Fig. 2(1) of Riemis). The genitalia of a female collected by him unfortunately have not been studied.

Two of the species mentioned above, *A. dervenaria* Mentzer, 1981 (Fig. 3F), and *A. palumbata* Mentzer, 1981, in fact do not belong to *Aplocera* s. str. and have been assigned to the East Asian genus *Docirava* Walker [1863] 1862 recently (Leraut, 2009; Hausmann et al., 2011; Hausmann and Viidalepp, 2012). To our opinion, this combination is also not satisfactory. A detailed taxonomic revision of these groups is under preparation by the authors.

Etymology. The name of the new genus is dedicated to Lutz Lehmann (14.01.1963 – 14.10.2011), Eisenhüttenstadt, Germany, who passed away much too early through a terrible car accident in the desert of Oman, at the end of a collecting trip (Bittner et al., 2012). He was an enthusiastic collector of butterflies and moths since his childhood and later he became an excellent specialist mainly of Noctuidae and Geometridae. His passion was to collect rare species in remote countries and he did this numerous times in Poland, Russia, Bulgaria, Albania, Greece, Turkey, Cyprus, in the Middle East, Iran, Central Asia, N. & E. Africa and N. America. He published more than thirty faunistic and taxonomic papers.

3.2. Species account

Lehmannodes guneyi (Riemis, 1992), **comb. nov.** Figs. 3A–F, 4A, 5A, 7A, 8, 9.

Fig. 8. Habitats of *Lehmannodes guneyi*. (A) East Turkey: above Ogul, southern Hakkari region. Photo by Ludwig Weigert. (B) West Iran: Gardaneh-Khan, Saghez-Baneh road, Kordestan prov. W Iran, Alt. 1976 m. *Astragalus*, *Amygdalus* and *Eryngium* are the most common species in this habitat. Photo by Hossein Rajaei.

Type material: Holotype ♂ (Institute of Taxonomic Zoology, University of Amsterdam: not examined); paratypes 3 ♂, 1 ♀, coll. A. Riemis, E.v. Mentzer.

Type locality: Kuzgunkiran Geçidi, 2200–2300 m (Bitlis, Turkey); paratypes collected at type-locality and (1♀) at Van, Kurubas Geçidi, 2100 m.

Description. See generic description
Additional material examined.

1. 1 ♂, 1 ♀: Ost Türkei, Vansee, 2300 m, Kuzgunkiran Pass, 19.6.1985, leg. P. Kuhna, gen. prep. ♀ 1622, ♂ 1624/2011 H. Rajaei, in coll. ZFMK.
2. 2 ♀: Iran, Kordestan, Baneh, 15 km NE Gharawol-Khaneh, 2000 m, 26./27.6.2009, [leg.] A. Hofmann, J.-U. Meineke, H. Rayai [Rajaei], gen. prep. 1623/2011 H. Rajaei, Barcode ID: BC ZFMK Lep 00940; in coll. PCJM.
3. 3 ♀: Iran, prov. Kordestan, Saghez-Baneh road, 10 km to Baneh, Gardaneh-Khan, N 36°04′13″, E 045°59′31″, Alt. 1976 m, 26.-27.6.2009, leg. H. Rajaei, J.-U. Meineke & A. Hofmann, Barcode ID: BC ZFMK Lep 00941, gen. prep. 2226-DS; in coll. PCHR.
4. 4 ♂, Türkei, Prov. Hakkari, 16 km S Hakkari, oberhalb Ogul, 2100 m, 29.6.1984, LF, leg. Weigert, coll. ZSM, Barcode ID: BC ZSM Lep 22740, gen. prep. 1649/2011 H. Rajaei; 1 ♂, Türkei, Prov. Hakkari, Altin Doglari, O-Seite, Süvarihalil Gecidi, 2400 m, 40 km SW Hakkari 27.6.1984, LF, leg. Weigert; in coll. ZSM.

Bionomics and distribution. Larval stages and foodplant are unknown. The few specimens recorded have been collected at last decade of June, at altitudes roughly between 2000 and 2500 m in East Turkey and West Iran (see Fig. 7). Habitat and possible foodplant(s) see in Fig. 8A and B.

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