

ON THE TAXONOMY OF THE GENUS *DIARSIA* HÜBNER,  
[1821] 1816 (LEPIDOPTERA: NOCTUIDAE):  
THE HOLARCTIC SPECIES-GROUPS OF THE GENUS

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The phylogenetic position of the genus *Diarsia* and the taxonomic and phylogenetic significance of male and female genital structures of *Diarsia* species are discussed; certain lock-and-key characters are described. Based on the genital structures, monophyletic species groups and some major biogeographical trends within the genus are outlined. Six new species (*D. gozmanyi*, *D. scotodichroa*, *D. metadichroa*, *D. taidactyla*, *D. metatorva*, *D. protodahlia* spp. n.) are described. With 161 figures.

Key words: *Diarsia*, monophyletic species groups, plesiomorphic and apomorphic characters, phylogenetic trends, new species

## INTRODUCTION

The genus *Diarsia* HÜBNER, [1821] 1816 belongs to one of the largest but formerly often misidentified genera of the subfamily Noctuinae. The history of the generic classification has been started with the monolith of HAMPSON who has synonymised the HÜBNER's *Diarsia* with *Agrotis* OCHSENHEIMER, 1816 (see HAMPSON 1903: 303), and most of its species were placed by him into the rather heterogeneous 5th section of this genus, characterised by the ciliate antennae of the male. HAMPSON has designated *Noctua dahlia* HÜBNER, [1813] as the type species of *Diarsia*. The other famous lepidopterist of that age, WARREN (1913) continued essentially the same tradition in the Palearctic Noctuidae volume of the monographic series called "SEITZ", and lumped nearly all Noctuinae having smooth frons in the "common genus" *Rhyacia* as opposed to the other large "collective" genus *Euxoa* HÜBNER, [1822] comprising the species having frontal protuberance. The species of *Diarsia* were placed by WARREN also in the "Sektion V." using the same diagnostic character. CORTI and DRAUDT (1933) virtually maintained this classification, unifying several clades of the subfamily Noctuinae under the genus *Rhyacia* but distinguishing a few subgenera including also *Diarsia*. Their definition is, however, rather far from the recent concept of the genus although the contemporary experts, MCDUNNOUGH (1929) and mostly, KOZHANCHIKOV (1937) already

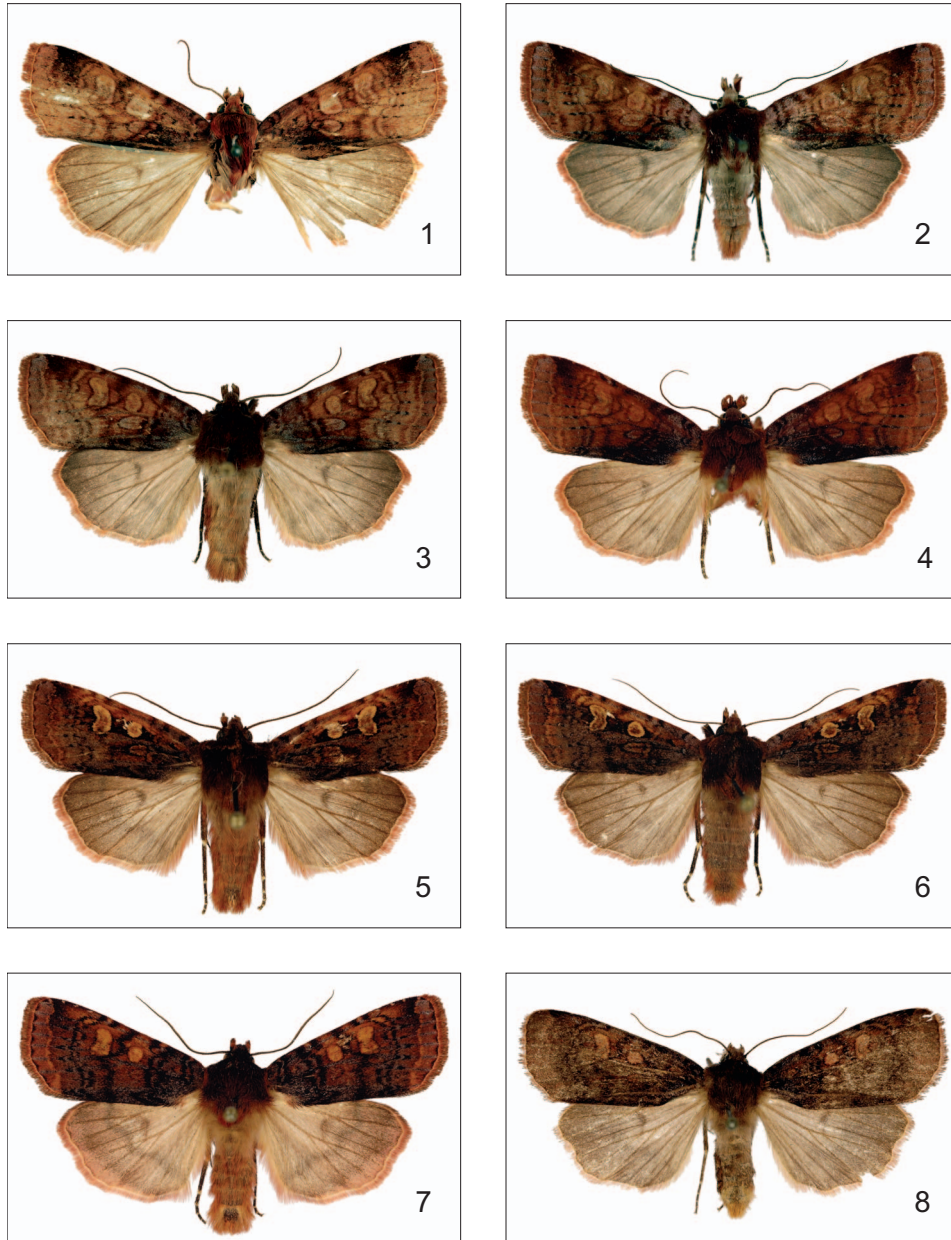
correctly outlined the basic characters of the genus. Moreover, KOZHANCHIKOV recognised that the species richness of *Diarsia* is concentrated principally to the south-eastern part of the Palaearctic region including the northern parts of India, the southern and south-eastern edges of Tibet and the eastern half of China. Thus, *Diarsia* sensu CORTI and DRAUDT comprises most (but far not all!) species of the true *Diarsia* (e.g. the *albipennis*-lineage and its relatives are excluded) but includes also several lineages of the *Xestia* s.l. generic complex, based on the virtual external similarity of their leg spining and palpal tufting (see: LAFONTAINE 1998: 30).

Essential advances were achieved by BOURSIN who published two comprehensive papers on this subject. In his first work (BOURSIN 1948) he revised several types of BUTLER, LEECH and MOORE, and described three new *Diarsia* species from China and Taiwan. This second article is even more important, as the monographic treatment of the *Diarsia* material of the HÖNE collection (1954) is the real fundament of the recent interpretation of the genus. This monography of the Chinese *Diarsia* fauna covers also the revision of several types of CORTI and contains the description of 18 new species from different parts of China (although some of them were already named and figured in 1948). According to his zoogeographic subdivision, most species belong obviously to the “western Chinese” faunal type (21 spp.) while the “W Chinese-Himalayan” (8 spp.) and “Pacific-Palaearctic” (7 spp.) groups are nearly equally numerous.

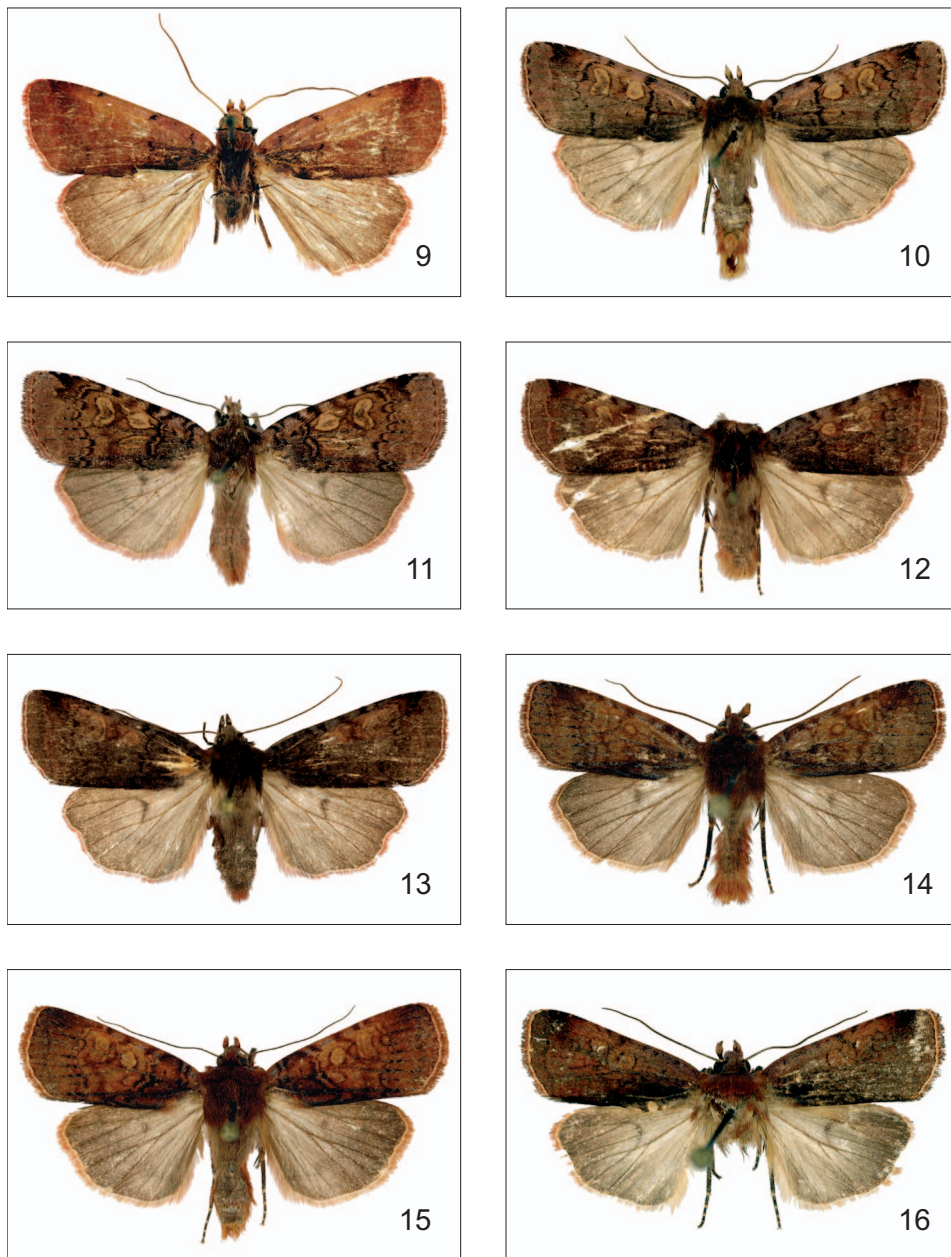
As a result of the recent exploration of the Himalayan-Sino-Pacific area (Pakistan, Nepal, Tibet, Taiwan, Korea, Thailand and Vietnam) a considerable number of new species were discovered and (partly) described (CHANG 1991, HREBLAY *et al.* 1999, HREBLAY & RONKAY 1998), and a rather large stock of recognised but undescribed species is harboured in the collections. Thus, the total number of species (about 85) given by LAFONTAINE (1998) is surely underestimated. Present paper comprises the information of about one hundred described and cca a dozen of undescribed species. Since, with the exception of the Nearctic monograph of LAFONTAINE (1998), the female genital structures of the majority of the species remained unstudied or at least unpublished, we faced to a twofold task: the revision of the taxonomic position of the formerly described species based on the study of the external and genital features of both sexes and the description of several new species from SE Asia.

Present paper is the first attempt to outline the main species-groups of the genus based on the phylogenetic evaluation of the genital structures.

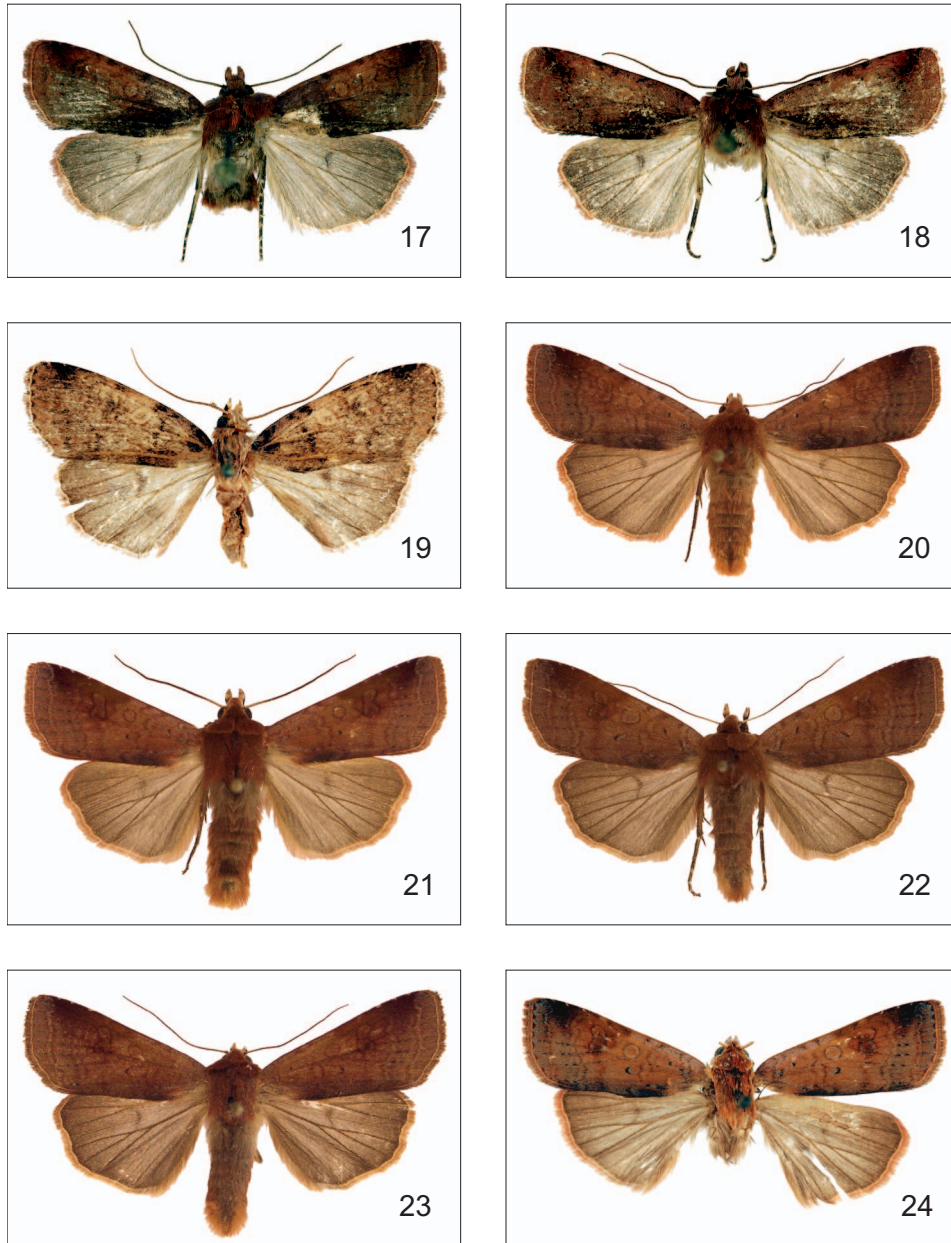
Abbreviation used: HNHM – Hungarian Natural History Museum (Budapest, Hungary); Hö – slide of CH. BOURSIN, dissected HÖNE material; NMNS – National Museum of Natural Sciences (Taichung, Taiwan); RL – slide of L. RONKAY (HNHM), TFRI – Taiwan Forestry Research Institute, Taipei, Taiwan; VZ – slide of Z. VARGA (University of Debrecen, Hungary).



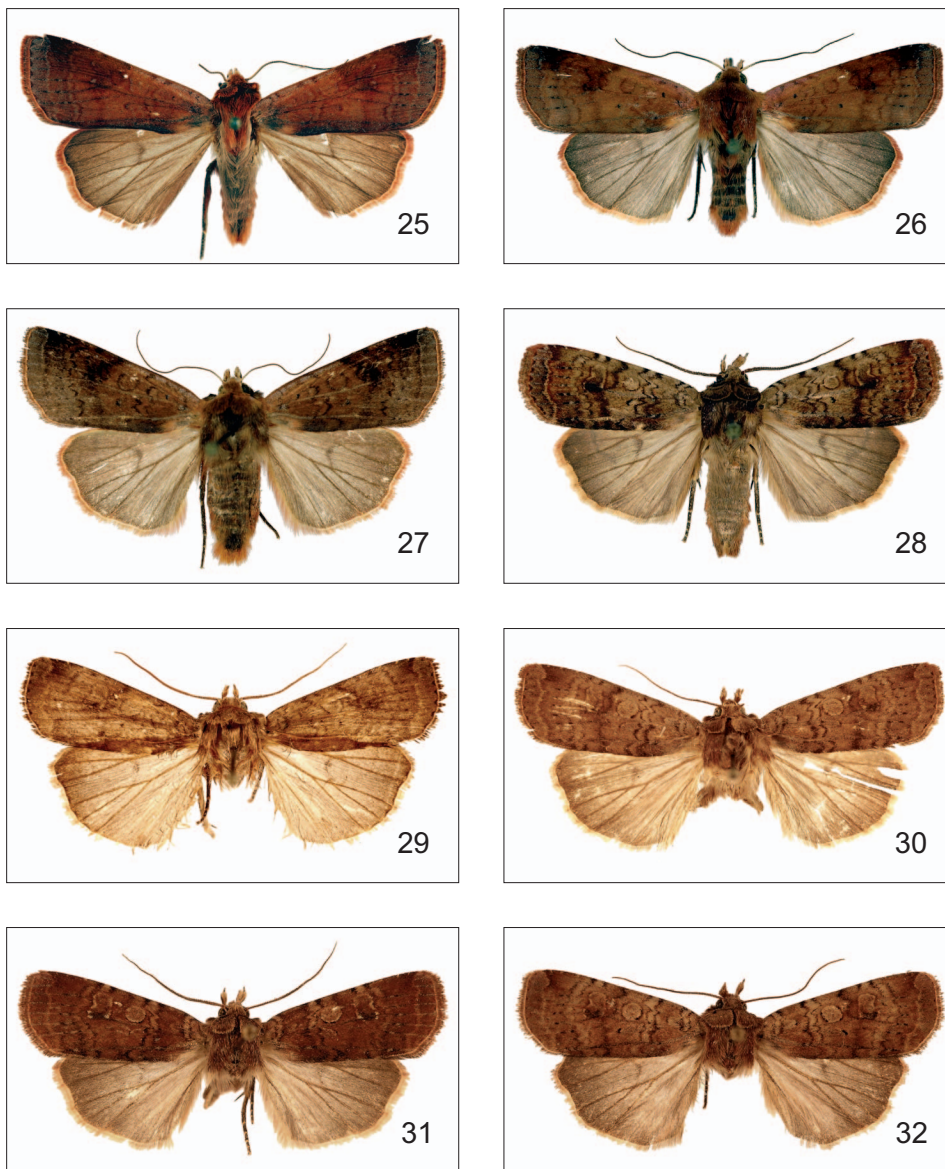
**Figs 1–8.** 1–4 = *Diarsia chalcea* BOURSIN, 1954: 1 = holotype, male, China, 2 = female, China, Sichuan, 3 = male, Nepal, 4 = female, Nepal. 5–6 = *D. cia* STRAND, 1919: 5 = male, 6 = female, both from Taiwan. 7–8 = *D. copria* HREBLAY et PLANTE, 1995: 7 = paratype, male, 8 = paratype, female, both from Nepal



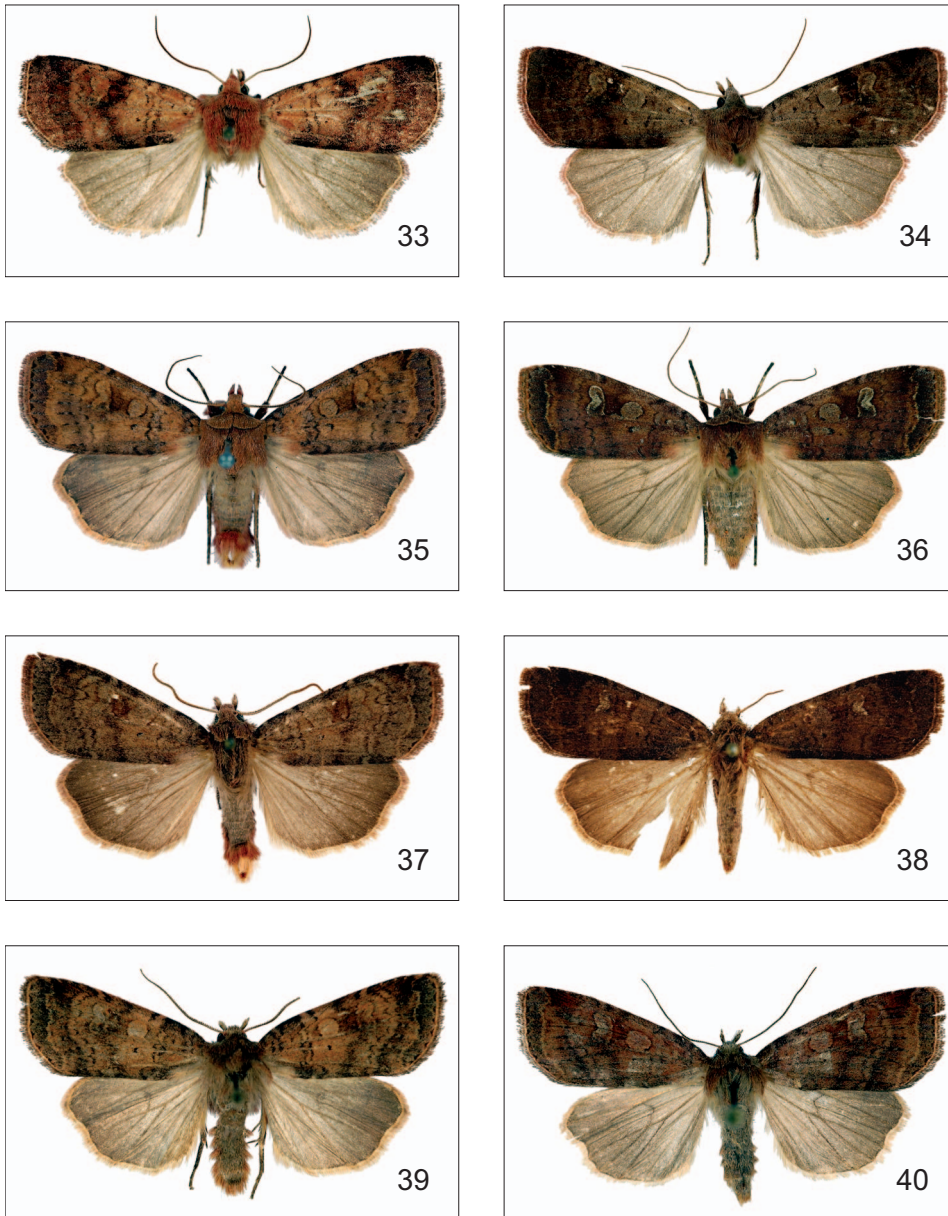
**Figs 9–16.** 9–11 = *Diarsia dichroa* BOURSIN, 1954: 9 = holotype, male, 10 = male, China, Sichuan, 11 = female, China, Sichuan. 12–13 = *D. scotodichroa* sp. n., 12 = holotype, male, 13 = paratype, female; both from China, Sichuan. 14–15 = *D. metadichroa* sp. n., 14 = holotype, male, 15 = paratype, female; both from Vietnam, Fan-si-pan Mts. 16 = *D. gozmanyi* sp. n., holotype, male, Vietnam, Fan-si-pan Mts



**Figs 17–24.** 17–18 = *Diarsia gozmanyi* sp. n., paratype, males, Vietnam, Fan-si-pan Mts. 19 = *D. mandarinella* HAMPSON, 1903, male, China, Sichuan. 20–23 = *D. taidactyla* sp. n.: 20 = holotype, male, 21 = paratype, male, 22–23 = paratype, females, all from Taiwan. 24 = *D. macrodactyla* BOURSIN, 1954, holotype, male, China, Guangdong



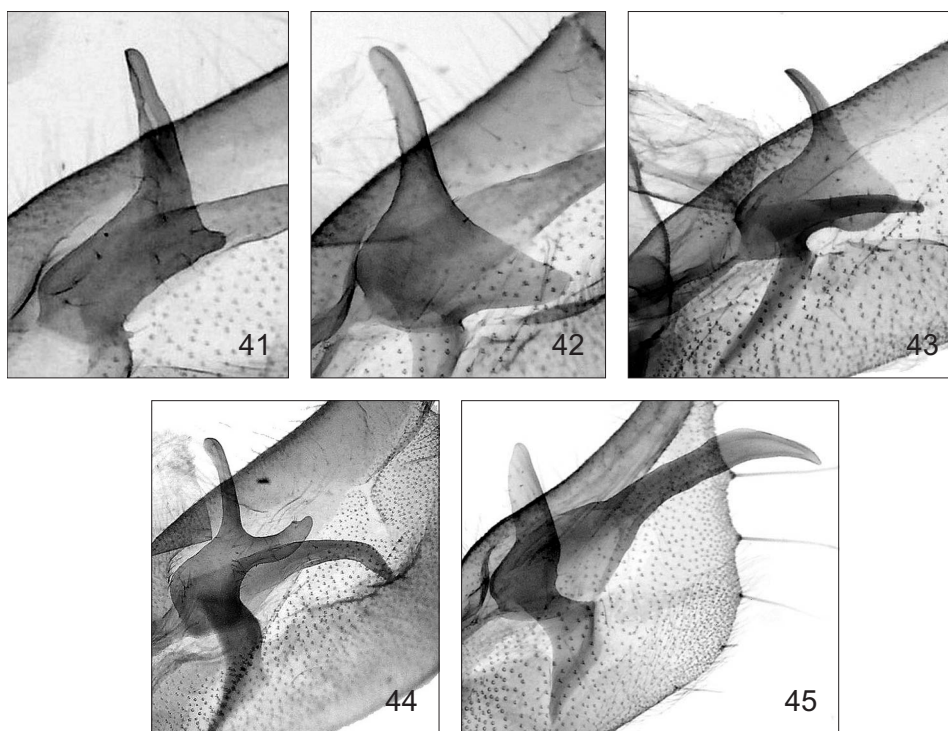
**Figs 25–32.** 25–27 = *Diarsia macrodactyla* BOURSIN, 1954: 25 = paratype, female, China, Linping, 26 = male, China, Sichuan, 27 = female, China, Sichuan. 28–30 = *D. metatorva* sp. n.: 28 = holotype, male, 29 = paratype, male, 30 = paratype, female, all from China, Shaanxi. 31–32 = *D. torva* (CORTI et DRAUDT, 1933): 31 = male, 32 = female, both from China, Sichuan



**Figs 33–40.** 33–34 = *Diarsia protodahlia* sp. n.: 33 = holotype, male, 34 = paratype, female, both from China, Sichuan. 35–36 = *D. dahlia dahlia* (HÜBNER, 1813): 35 = male, 36 = female, both from Germany. 37–38 = *D. dahlia tibetica* BOURSIN, 1954: 37 = holotype, male, 38 = paratype, female, both from China, Yunnan. 39–40 = *D. dahlia nana* (STAUDINGER, 1892): 39 = male, 40 = female, both from Mongolia

TAXONOMIC CHARACTERS OF THE GENUS *DIARSIA*

The genus *Diarsia* belongs to the basal groups of the subfamily *Noctuinae*. The completely symmetric genital capsula, the presence of cucullus and corona, the free arm of the harpe (called as “clasper” by FIBIGER 1997 and LAFONTAINE 1998) and the presence of ampulla (see BOURSIN 1954: 225; called as “digitus” by the authors cited above, although the digitus usually is a strongly sclerotised ventro-lateral extension of the costa) are considered by LAFONTAINE (1998) and also here as plesiomorphic characters (Figs 41–45). Other characters show several trends of specialisation and reduction. The clavus is present in several species groups as a plesiomorphic character, and it is fused to the basal part of the sacculus, contrasting with the statement of LAFONTAINE (1998) who mentioned the absence of a sclerotised clavus as one of the generic characters of *Diarsia*. The configuration of the juxta belongs to the most typical characters of the clasping apparatus, a distinc-

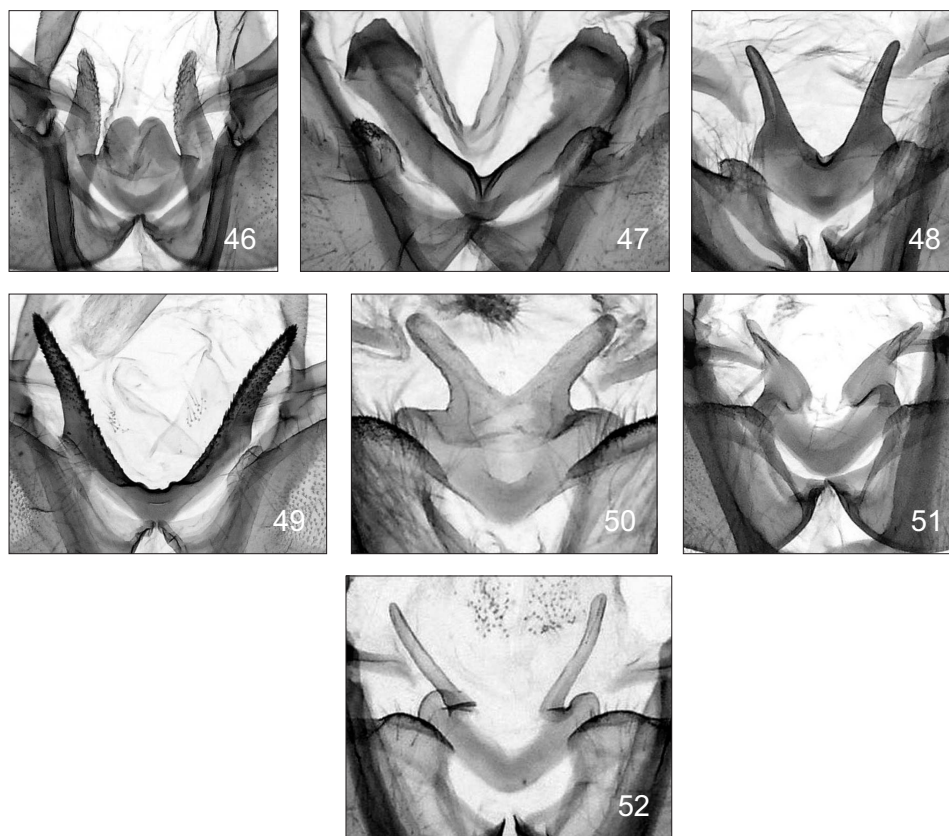


**Figs 41–45.** The harpe–ampulla complex of five *Diarsia* species: 41 = *D. cia* (STRAND, 1919), 42 = *D. formosensis* HAMPSON, 1909, 43 = *D. gozmanyi* sp. n., 44 = *D. griseithorax* WARREN, 1912, 45 = *D. taidactyla* sp. n.



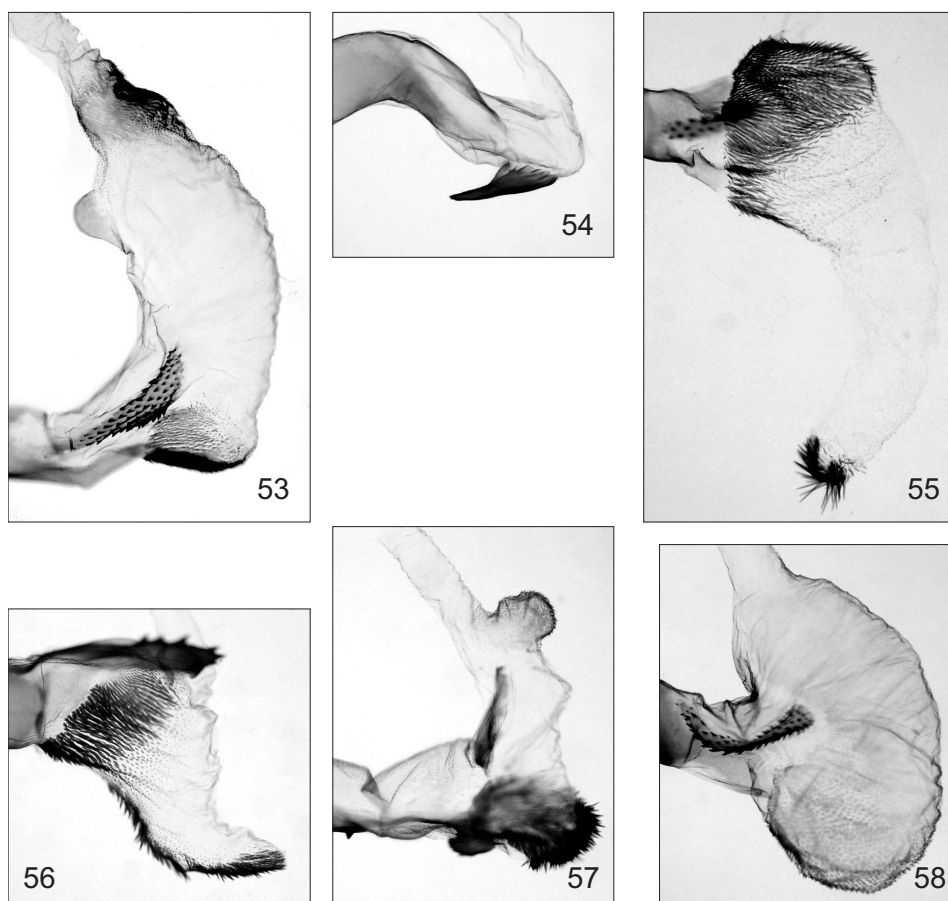
tive specific feature of practically all known species. It is originally broad, shield-shaped, but it usually shows different specialisations: broadly V-shaped with a dorso-medial incision or appearing as a pair of enlarged dorso-lateral extensions sitting on a small basal (ventral) plate (see Figs 46–52).

One of the most important characters of the genus *Diarsia*, and also of most related genera of the tribe Noctuini, is the strongly sclerotised dentate bar extending from the apex of the aedeagus (i.e. carina penis) onto the basal part of the vesica. This sclerotisation has an important role during the eversion of the vesica, strengthening and orientating the projecting vesica; moreover, it represents one of the interlocking surfaces during the copulation process. In several species groups this bar is modified into a sclerotised, dentated (or serrated) plate or a smaller or larger tooth but its stepwise reduction can be also observed. The vesica is generally

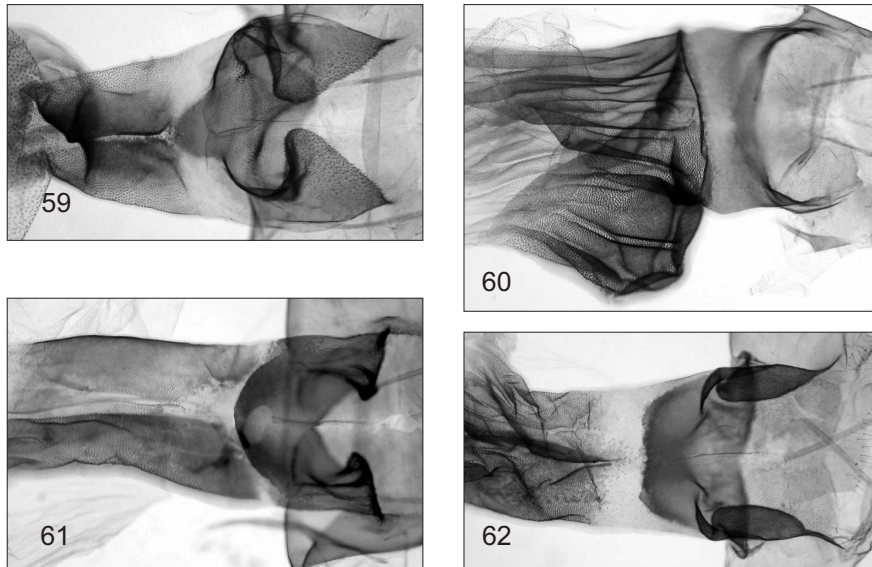


**Figs 46–52.** Clavus and juxta of seven *Diarsia* species: 46 = *D. canescens* (BUTLER, 1878), 47 = *D. erythroptis* BOURSIN, 1954, 48 = *D. nipponica* OGATA, 1957, 49 = *D. orophila* BOURSIN, 1954, 50 = *D. subtineta* B. S. CHANG, 1991, 51 = *D. tineta* (LEECH, 1900), 52 = *D. taidactyla* sp. n.

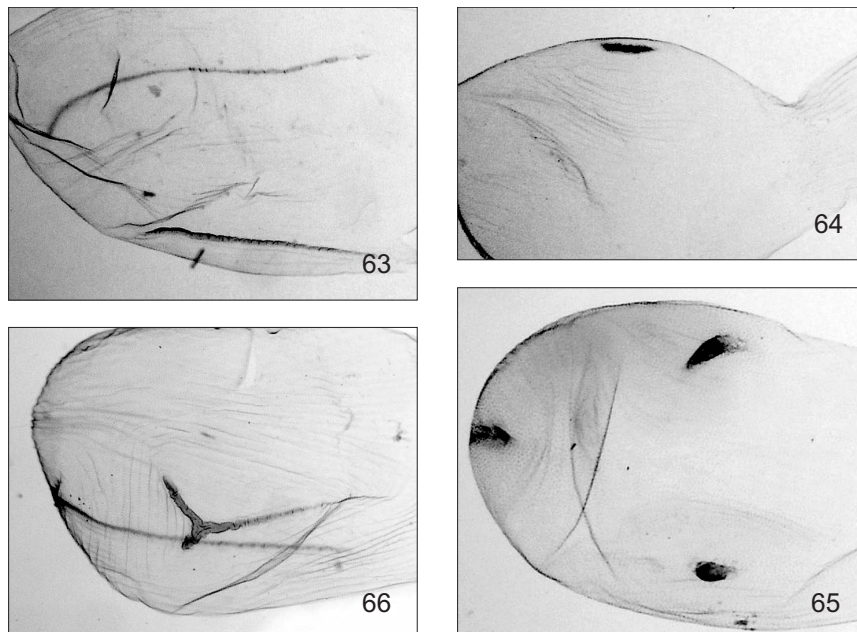
short, saccate (*D. ruficauda*) or globular (*D. erubescens*, *D. beckeri*, *D. formosana*, *D. rubicilia*, *D. pacifica*, *D. arenosoides*), often with semiglobular diverticula (e.g. *D. canescens*, *D. sinuosa*, *D. albipennis*) or recurved (*D. odontophora*, *D. eleuthera*, *D. ypsiloidea*), partly inflated and diverticuled (e.g. *D. formosensis*, *D. dewitzi*). In some species-groups (*D. hoenei*-group, *D. acharista*-group) the tendency of the “T-shaped” formation of the vesica has been also observed. The sclerotised structures of the vesica also show different modifications: a dentate plate, one or two larger cornuti, a large number of thin, spiculiform cornuti, and in other cases, smaller or larger fields with hair-shaped surface structures may be present (see Figs 53–58 showing the variations of the basic structure of the vesica).



**Figs 53–58.** Vesica of six *Diarsia* species: 53 = *D. albipennis* (BUTLER, 1889), 54 = *D. fannyi* (CORTI et DRAUDT, 1933), 55 = *D. rubicilia* (MOORE, 1867), 56 = *D. ruficauda* (WARREN, 1909), 57 = *D. sinuosa* (WILEMAN, 1911), 58 = *D. ypsiloidea* HREBLAY, PEREGOVITS et RONKAY, 1999

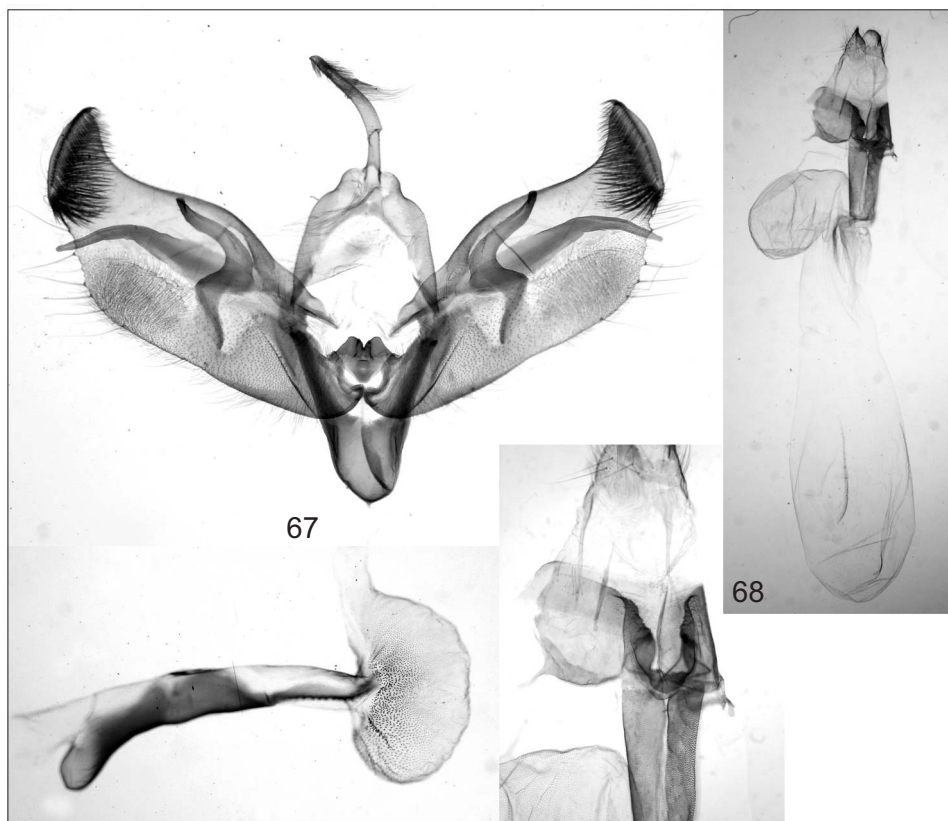


**Figs 59–62.** Antrum of four *Diarsia* species: 59 = *D. cia* (STRAND, 1919), 60 = *D. ruficauda* (WARREN, 1909), 61 = *D. subtincta* B. S. CHANG, 1991, 62 = *D. yoshimotoi* PLANTE, 1995



**Figs 63–66.** Signa of four *Diarsia* species: 63 = *D. fletcheri* BOURSIN, 1969, 64 = *D. subtincta* B. S. CHANG, 1991, 65 = *D. cia* (STRAND, 1919), 66 = *D. ypsiloidea* HREBLAY, PEREGOVITS et RONKAY, 1999

In the female copulatory organ the ovipositor is generally weakly sclerotised, covered with thin hairs. The antrum often bears specialised, symmetrical postero-lateral sclerotisations, with broadly V- or U-shaped, sometimes lobate postero-medial incision. These characters of the antrum are best expressed in the species the males of which have specialised bifid juxta. The ductus bursae is generally broad, sclerotised. The presence of longitudinal signa in the corpus bursae is considered as a plesiomorphic character, while their specialisations, e.g. the Y-shaped signa (*acharista*-group) or the reduction of the signa (*D. tincta*-group, *D. nigrosigna*-group) are species-group synapomorphies. The females of several species groups display specialised, strongly sclerotised interlocking surfaces on the last sternite (*D. acharista*-group, *D. odontophora*, *D. orophila*), close to or fused with the edges of the antrum (see Figs 59–62) and the signa (Figs 63–66).



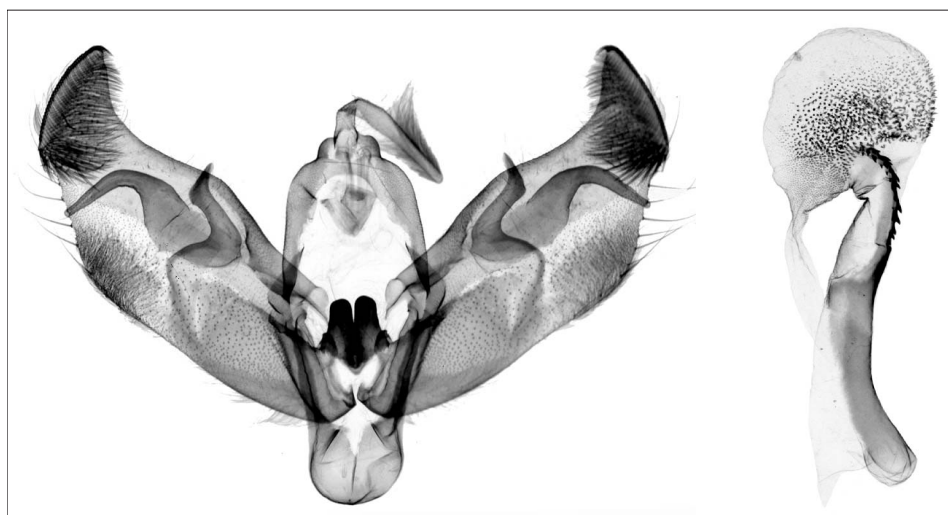
**Figs 67–68.** *D. claudia* BOURSIN, 1963, genitalia: 67 = male, 68 = female

HOLARCTIC SPECIES-GROUPS OF THE GENUS *DIARSIA*

As a preliminary survey to the monographic revision of the genus *Diarsia*, the characterisation of the groups of the known Holarctic species is presented here. This is an attempt to the phylogenetic evaluation of the genitalia characters used, although our review is obviously insufficient as phylogenetic analysis of the whole genus, since the supposedly basal species-groups occur, at least partly, in the temperate mountain habitats of the Indo-Australian region (including the Australian continent and New Guinea).

*The hoenei-group*

A basically plesiomorphic group: uncus strong, pointed, not spatulate; valvae broad, cucullus with broad “neck”, free arm of harpe strong, pointed; ampulla strong, straight or falciform, juxta broad, shield-like, clavus developed, fused with basal part of sacculus, carina with strong, broad dentate bar, vesica simple, spacious with scobinate but without spinulose surface structures, antrum U-shaped with strongly sclerotised lateral branches, ductus bursae long, straight, strongly sclerotised, corpus bursae huge, spacious with two spot-like and one longitudinal, ribbon-shaped signa. The species-group is distributed from southern China and Taiwan through the entire Himalayan chain towards the northern Himalayas and the Hindukush Mts. The species *D. caradjai*, known by two females, has been



**Fig. 69.** *D. fletcheri* BOURSIN, 1969, male genitalia

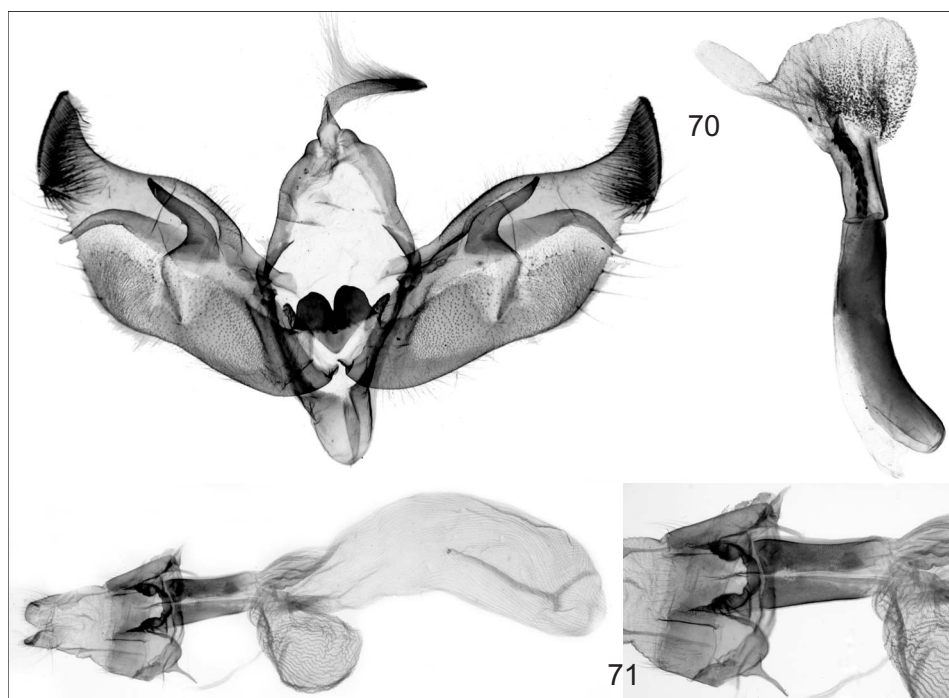
placed tentatively into this group, according to the structure of the antrum, and the spacious, sac-like corpus bursae having two spot-like signa (see Figs 67–71, 139–141, 160).

The relic-like, strictly endemic western Palearctic species *D. gadarramensis* can be provisorically allied to this species group, too, since its all essential genital structures correspond with the characters of this group.

The *hoenei*-group contains the following taxa: *D. hoenei* BOURSIN, 1954 (with *D. hoenei nepalensis* HREBLAY et RONKAY, 1998), *D. nyei* BOURSIN, 1969 (with *D. nyei ferruginea* CHEN, 1984, **stat. n.**), *D. fletcheri* BOURSIN, 1969 (with *D. fletcheri afghana* BOURSIN, 1969), *D. vulpina* (MOORE, 1882), *D. excelsa* HREBLAY et RONKAY, 1998, *D. caradjai* BOURSIN, 1954, *D. acutipennis* BOURSIN, 1954, *D. robusta* BOURSIN, 1954, *D. claudia* BOURSIN, 1963, *D. gadarramensis* (BOURSIN, 1928).

#### *The canescens-group*

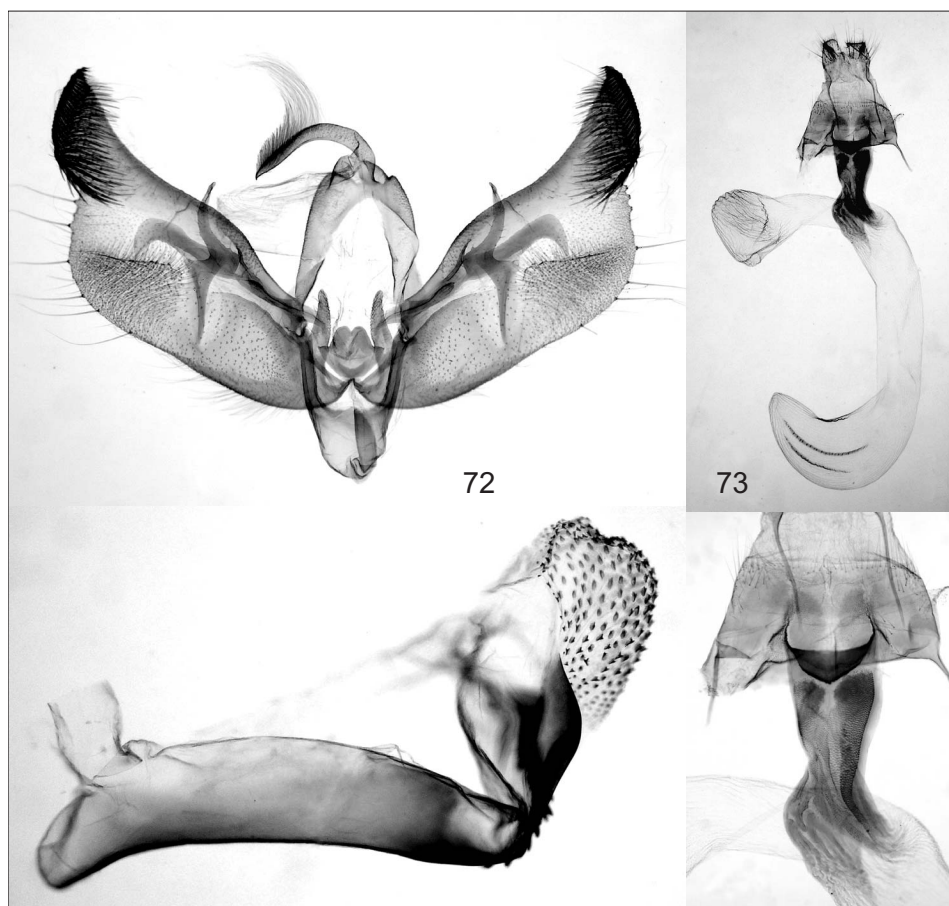
This monotypic group is closely related to the former one. It can be considered as a single expansive derived species of the former group with certain



**Figs 70–71.** *D. excelsa* HREBLAY et RONKAY, 1998, genitalia: 70 = male, 71 = female

autapomorphic characters. Uncus is simple, not spatulate, cucullus with broad “neck”, harpe with small, rectangular basal extension, ampulla strong, falcate, juxta broad, shield-like, clavus huge, fused with basal part of sacculus, carina with strong dentate rib, vesica short with a semiglobular diverticulum, covered by tiny acute superficial structures. antrum U-shaped, corpus bursae elongated-saccate with long, sacculiform appendix bursae and with two long and one spot-like signa (see Figs 72–73).

The single species of the group, *D. canescens* (BUTLER, 1878), represents to the most widely distributed Asian species of the genus, occurring from southern Siberia and Mongolia to the Ussuri region and Sachalin to the east and from the Kurili Islands through China to the southern Himalayas, Taiwan and northern

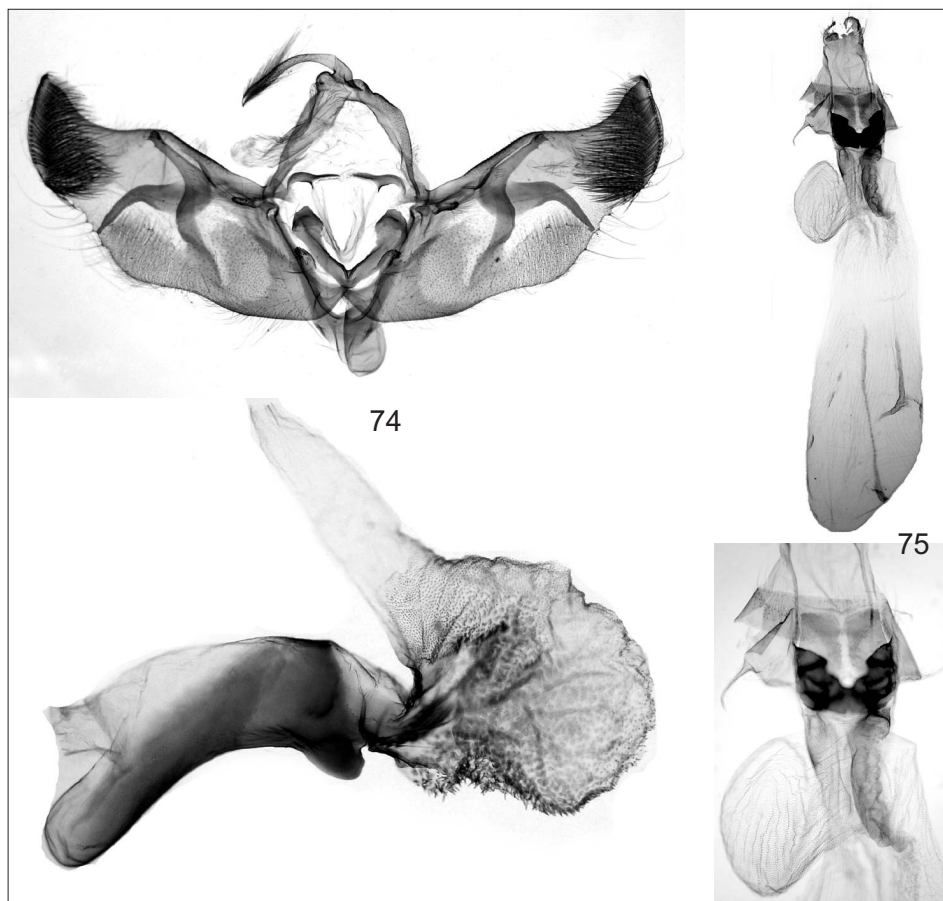


**Figs 72–73.** *D. canescens* (BUTLER, 1878), genitalia: 72 = male, 73 = female

Indochina to the south; surprisingly, a single female specimen was recently found in Syria (GYULAI & RONKAY 2006).

*The acharista-group*

The group consists of four subgroups from which the subgroups 1–2 and 3–4 are more closely related to each other. The shared male genital characters of the *acharista*-group are as follows: uncus simple, pointed, not spatulate; valvae broad, bulged ventrally; cucullus broad with broad neck; ampulla strong, falcate; juxta bifid or bifurcate; clavus well-developed, conical or semiglobular, scabrous or smooth; carina with strongly sclerotised dentate bar; vesica ample, without cornuti



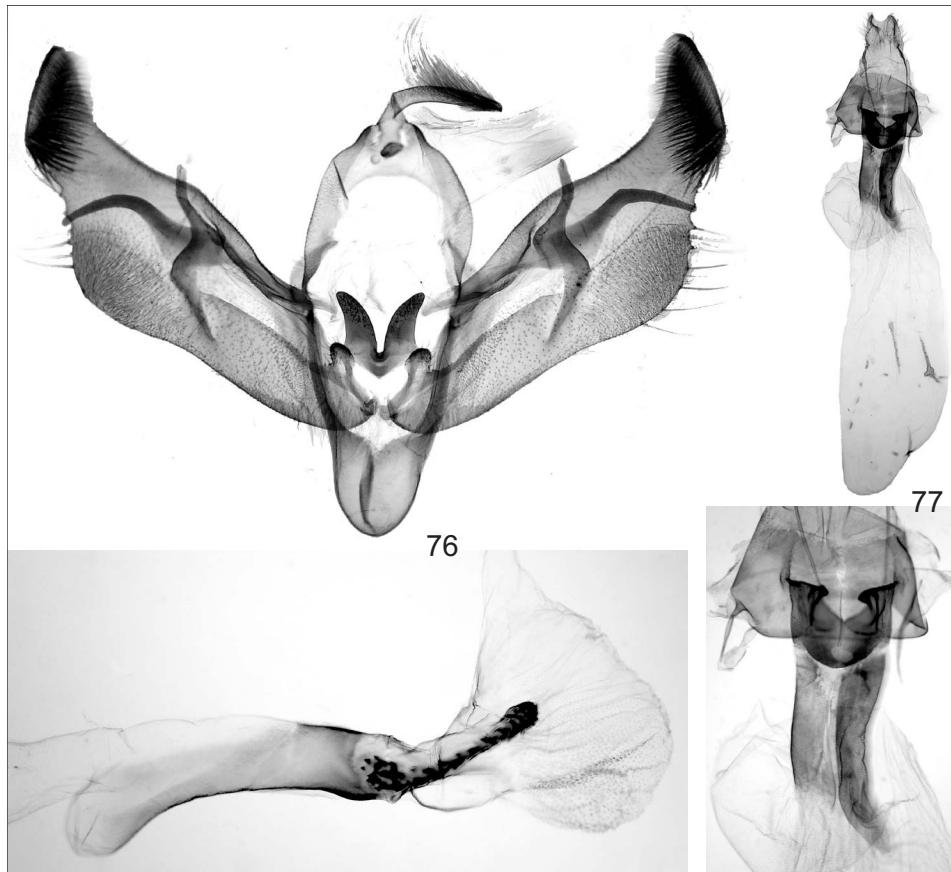
**Figs 74–75.** *Diarsia* genitalia: 74 = *D. erythropis* BOURSIN, 1954, male, 75 = *D. odontophora* BOURSIN, 1954, female



or specialised surface structures. The female genitalia can be characterised by the U-shaped antrum with deep or lobate incision, elongate-saccate corpus bursae with Y-shaped signa; and the short, ample, globular appendix bursae; the sternite VIII usually has specialised interlocking surfaces.

In the (*i-iii*) subgroups the juxta is a bifid plate with acute or obtuse immobile extensions while, however, the (*iv*) subgroup has long, acute mobile bilateral extensions of the juxta functioning like a forceps. All species are relatively rare and they are confined to SW China, Taiwan and the northernmost part of Vietnam.

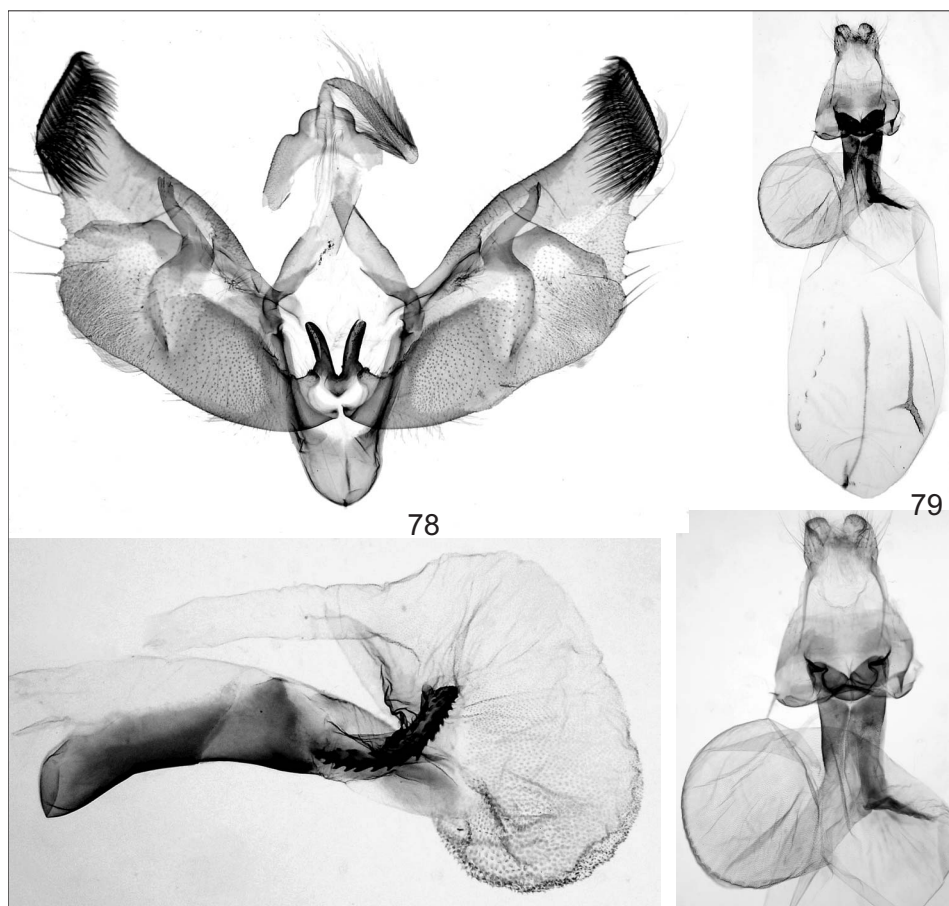
(*i*) subgroup: clavus small, acute; juxta with deep, V shaped incision; antrum with U-shaped incision. The subgroup comprises only two, apparently local and rare species, known only from SE China (Yunnan, Likiang [= Lijiang]): *D. acharista* BOURSIN, 1954 and *D. pseudacharista* BOURSIN, 1954 (Figs 142–145).



Figs 76–77. *Diarsia yoshimotoi* PLANTE, 1995, genitalia: 76 = male, 77 = female

(ii) *subgroup*: clavus short, thick or acute with rugulose surface, juxta bifid with dorso-lateral acute edges, carina with obtuse dental process, antrum with lobate incision. The subgroup contains three closely related species, *D. erythropis* BOURSIN, 1954, *D. hypographa* BOURSIN, 1954, and *D. odontophora* BOURSIN, 1954 (Figs 74–75, 146, 147, 161).

(iii) *subgroup*: Ampulla long, falcate and pointed, clavus strong, thick with scabrous dorsal surface; juxta with long dorso-lateral extensions; carina with strong, thick dentate bar, vesica short, ample, semiglobular, slightly retroflexing, without cornuti or specialised interlocking surfaces. Antrum with lobate (*yoshimotoi*) or V-shaped (*unica*) incision; bursa huge, ample; appendix bursae short, semiglobular. The subgroup is based on two species endemic for Taiwan, *D. yoshimotoi*



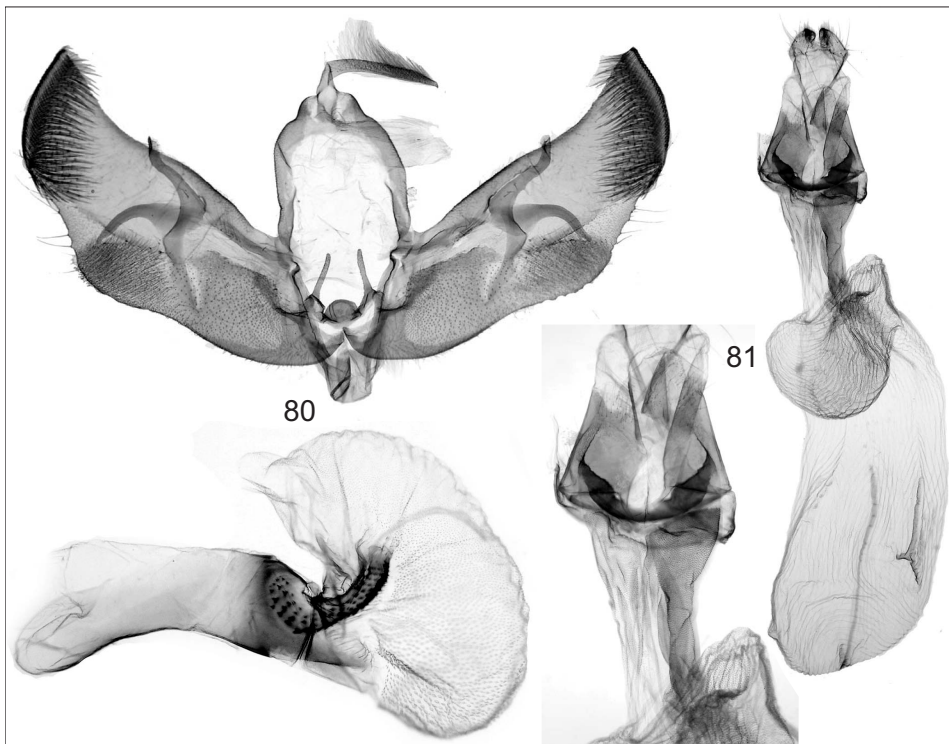
**Figs 78–79.** *Diarsia unica* PLANTE, 1995, genitalia: 78 = male, 79 = female

PLANTE, 1994 and *D. unica* PLANTE, 1995; further two species, the Japanese *D. nipponica* OGATA, 1957 and the SE Tibetan *D. flavibrunnea* LEECH, 1910 are placed provisionally in this subgroup (Figs 76–81).

(iv) *subgroup*: ampulla long, falcate or waved; clavus short, acute; juxta with long, acute, forceps-like dorso-lateral processi, carina with strong dentate bar, vesica ample, slightly retroflexing dorso-laterally, with tiny spiculiform superficial structures ventrally. Antrum with broad U- or V-shaped incision; bursa ample, appendix short, semiglobular. Two species belong to this subgroup, the Chinese *D. eleuthera* BOURSIN, 1954 and the northern Vietnamese *D. ypsiloidea* HREBLAY, PEREGOVITS et RONKAY, 1999 (Figs 82, 83, 148, 149).

#### The *polytaenia*-group

Small group with only two known species, *D. polytaenia* BOURSIN, 1954 and *D. coenostola* BOURSIN, 1954. Uncus simple or slightly spatulate, cucullus large

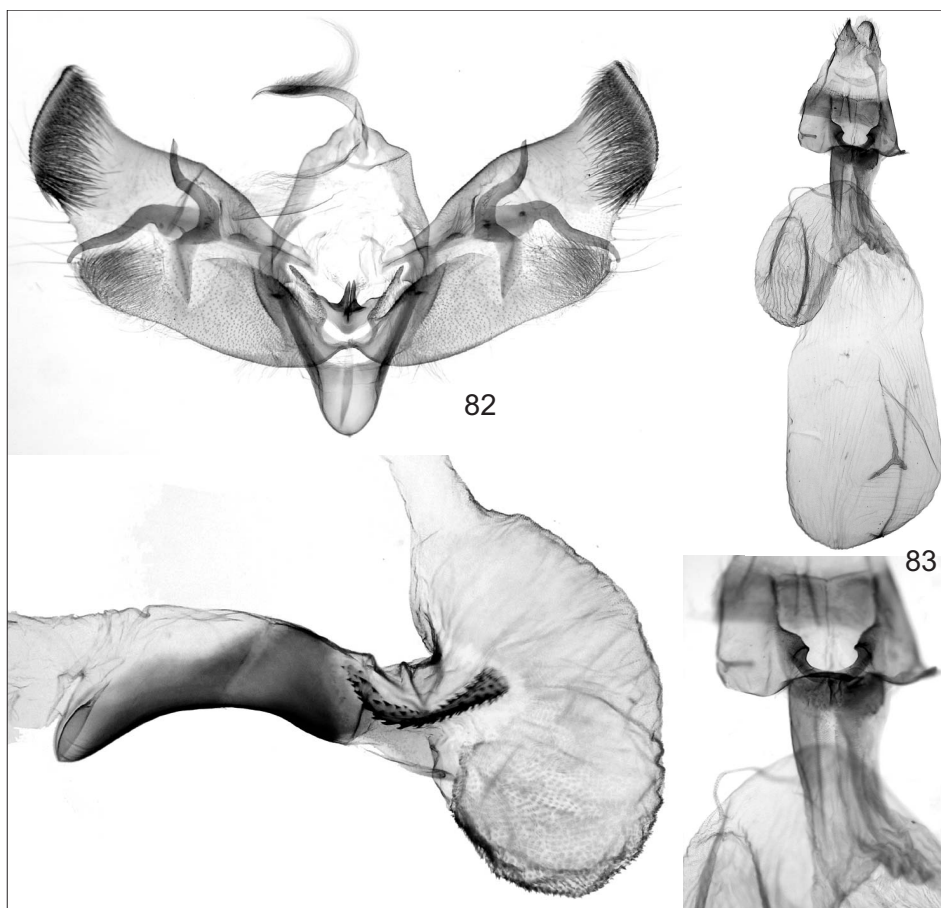


**Figs 80–81.** *Diarsia flavibrunnea* (LEECH, 1900), genitalia: 80 = male, 81 = female

with rather broad neck, ampulla strong, falcate, clavus short, semiglobular, juxta small with two short, obtuse appendages. Carina with broad, strongly sclerotised dentate bar, vesica without cornuti or specialised surface structures (Figs 150–151). Female genitalia not yet studied. Both species are known from Sichuan and Yunnan and they are represented only by a few type specimens (all are males).

#### The *axiologa*-group

Uncus simple, valva strongly convex, cucullus broad with broad neck, harpe strong, ampulla long, curved or falcate, clavus reduced, juxta with long, often spe-



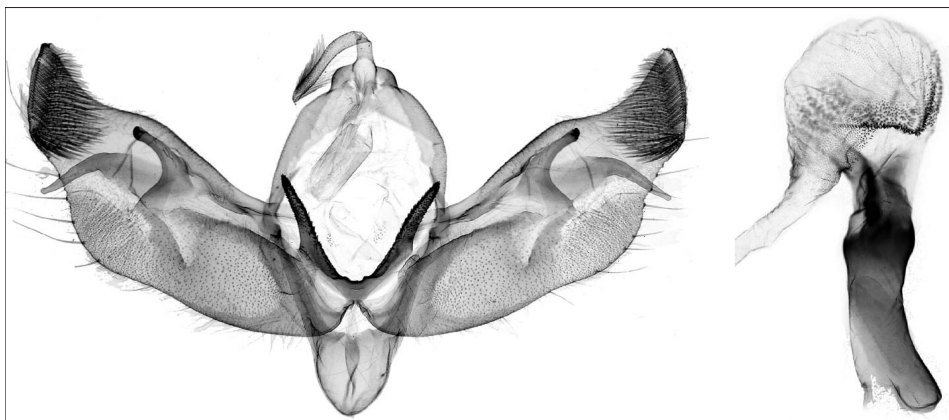
**Figs 82–83.** *Diarsia ypsiloidea* HREBLAY, PEREGOVITS et RONKAY, 1999, genitalia: 82 = male, 83 = female

cialised, bifurcate dorso-lateral appendages (in most extreme form in *D. orophila*). Dentate bar of carina very strongly sclerotised, vesica with tiny spiculiform superficial structures. Antrum strongly sclerotised, with lobate bilateral structures. 8th sternite with sclerotised bilateral interlocking surfaces. Ductus rugulose longitudinally, strongly sclerotised unilaterally (Figs 84, 152–154).

The group consists of four stenochorous species, all are restricted to the mountainous areas of Central China and the south-eastern borders of the Tibetan plateau, and are represented only by a few type specimens. The members of the group are as follows: *D. axiologa* BOURSIN, 1954, *D. nebula* BOURSIN, 1954, *D. poliophaea* BOURSIN, 1954 and *D. orophila* BOURSIN, 1954.

#### The *chalcea*-group

Relatively large, compact group, with eight described and a number of as yet undescribed species, restricted to the southern Himalayan region including southern China and Taiwan, and northern Indochina (northern Thailand and northern Vietnam). Uncus simple, cucullus small with slender neck, clavus reduced, harpe short, acute, ampulla falcate or nearly straight, acute; juxta huge, broad shield-shaped, dorsally bilobate or with a shallow incision dorsally. Carina with dentate bar and most often with a strong, acute tooth-shaped process ventrally. Vesica relatively long, its basal part usually saccate (in some species diverticulate, e.g. *D. formosensis*, *D. dewitzi*), covered by a large number of small fasciculate spiculi and armed with variably strong, dentated subbasal plate, a crispate postero-lateral ribbon may be present. Antrum has a very specialised structure, shows bilateral,



**Fig. 84.** *Diarsia orophila* BOURSIN, 1954, male genitalia

sometimes asymmetrical, strongly sclerotised lobi, ductus bursae long, rugulose, bursa spacious with 3 variably large, longitudinal (or spot-like) signa (Figs 85–98).

All but two taxa (*D. formosensis* and *D. sinuosa*) are rare and practically all continental (mainly Chinese) species are represented only by a few specimens. The members of the group are as follows: *D. chalcea* BOURSIN, 1954, *D. cia* (STRAND, 1919), *D. copria* HREBLAY et PLANTE, 1995, *D. mandarinella* (HAMPSON, 1903), *D. dichroa* BOURSIN, 1954, *D. scotodichroa* **sp. n.**, *D. metadichroa* **sp. n.**, *D. gozmanyi* **sp. n.** (Vietnam), *D. formosensis* HAMPSON, 1909 (= *moltrechti* BOURSIN, 1948), *D. dewitzi* (GRAESER, 1888) (= *tarda* LEECH, 1889), and *D. sinuosa* (WILMAN, 1912).

#### The *basistriga-cerastioides-tincta*-group

The group unites three phyletic lineages which are considered here as subgroups. The group shares the following characters: uncus strong, thickened or spatulate; harpe bifurcate; ampulla thin; clavus reduced; juxta with deep medial incision; and the dentate bar of the carina is most often broad, shield-shaped, strongly dentate and sclerotised. The vesica is with different sclerotisations in the three subgroups. The group is distributed from the southern Himalayan area to SW China and northern Indochina (N Thailand and N Vietnam).

(i) *subgroup*: uncus robust, distally thickened, harpe with digitiform lateral extension, ampulla falcate, carina with tiny horn-shaped extension, vesica short, “bilobate”, densely covered by spinulose structures. Juxta broad shield-shaped with deep but narrow medial incision (Figs 99, 100). The subgroup contains two closely related, twin species, *D. basistriga* (MOORE, 1867) and *D. griseithorax* WARREN, 1912 (**stat. rev.**).

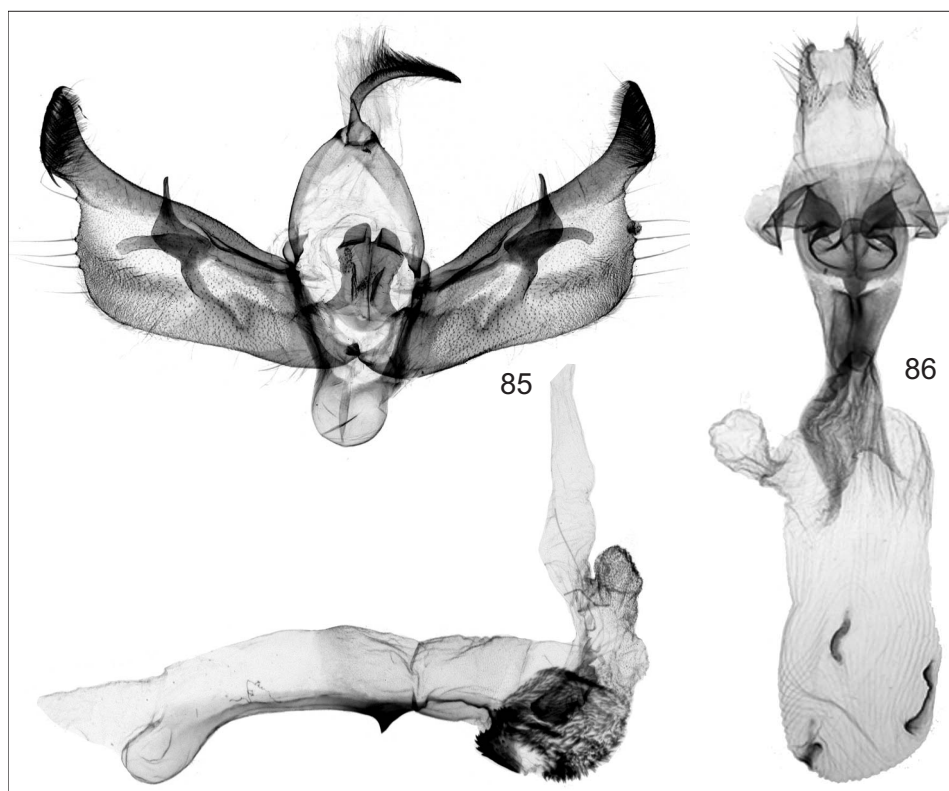
(ii) *subgroup*: uncus strongly spatulate, harpe with digitiform lateral extension acute apically, ampulla falcate, carina with strongly sclerotised dentate bar, vesica with a field of spiculiform surface structures. Juxta shield-shaped with deep and broad, V-shaped medial incision. Antrum with acute triangular bilateral sclerotisations, ductus long, straight, bursa long, saccate terminally. This phyletic lineage comprises the members of the *D. cerastioides* (MOORE, 1867) species-complex, the majority of which is still undescribed (Figs 101, 102).

(iii) *subgroup*: uncus strong, only slightly spatulate, harpe robust, with knee-shaped obtuse extension laterally, ampulla longer, juxta with bifurcate digitiform appendages, carina with broad dentate plate, vesica T-shaped with large, thorn-shaped cornutus and with a field of dense spiculiform surface structures. Antrum very broad, strongly sclerotised, with bilateral, strongly sclerotised acute

branches, bursa with only one small, longitudinal signum. This subgroup contains the taxa of the *D. tincta* species-complex, *D. tincta* (LEECH, 1900) and *D. subtincta* CHANG, 1991, and a number of still undescribed species occurring in Pakistan, Nepal, Thailand and Vietnam (Figs 103–106).

#### The *erubescens*-group

Uncus spatulate, valva strongly convex ventro-laterally, cucullus relatively small with thin neck, harpe thick, digitiform or triangular, clavus reduced, juxta with digitiform bilateral processes. vesica with a very large number of spiculiform structures. Ductus bursae very short and broad, antrum with extremely broad U-shaped incision. The species of the group occur in the southern Himalayas (from the Kaghan valley in Pakistan to Sikkim), China, Taiwan, Japan and the northern

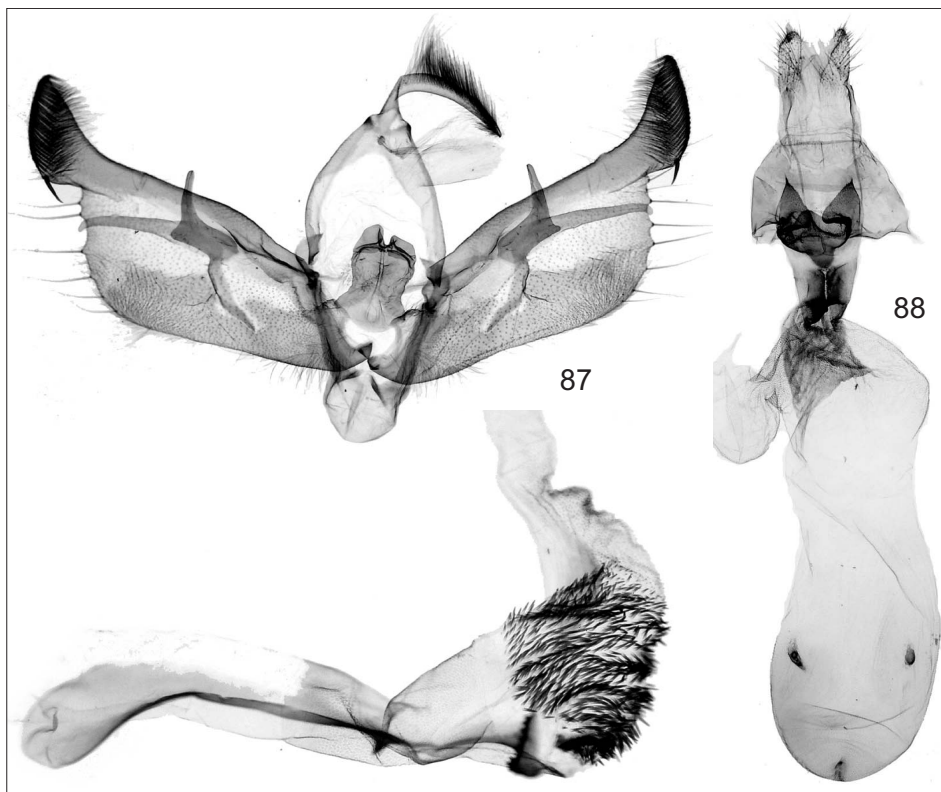


**Figs 85–86.** *Diarsia chalcea* BOURSIN, 1954, genitalia: 85 = male, 86 = female

parts of Indochina (Myanmar, Laos, Thailand and Vietnam). The group consists of three subgroups, the *erubescens*-, the *pacifica*-, and the *ruficauda*-lines.

(i) *subgroup*: harpe short digitiform or triangular, ampulla short, weakly sclerotised. Carina weakly sclerotised, with more or less sclerotised dentate bar, vesica short, globular, with a large number of long, spiculiform cornuti (“hedgehog-ball”; in *D. rubicilia* with a long diverticulum terminated in semiglobular field densely covered by thin spiculi). Antrum very broad with U-shaped postero-medial incision and with bilateral sclerotised, acute “arms”, ductus bursae subdivided transversally. The taxa belonging to this subgroup are as follows: *D. erubescens* (BUTLER, 1880) and its close, as yet undescribed, relatives; *D. beckeri* BOURSIN, 1948, *D. formosana* BOURSIN, 1948; *D. rubicilia* (MOORE, 1967) and an undescribed species resembling externally to *D. pacifica* (Figs 107–109, 155).

(ii) *subgroup*: uncus slightly spatulate, harpe strong, ampulla very long, slightly falcate; juxta with acute, divergent bilateral appendages. Proximal part of the vesica strongly sclerotised dorsally, forming a firm tube ending a small globu-

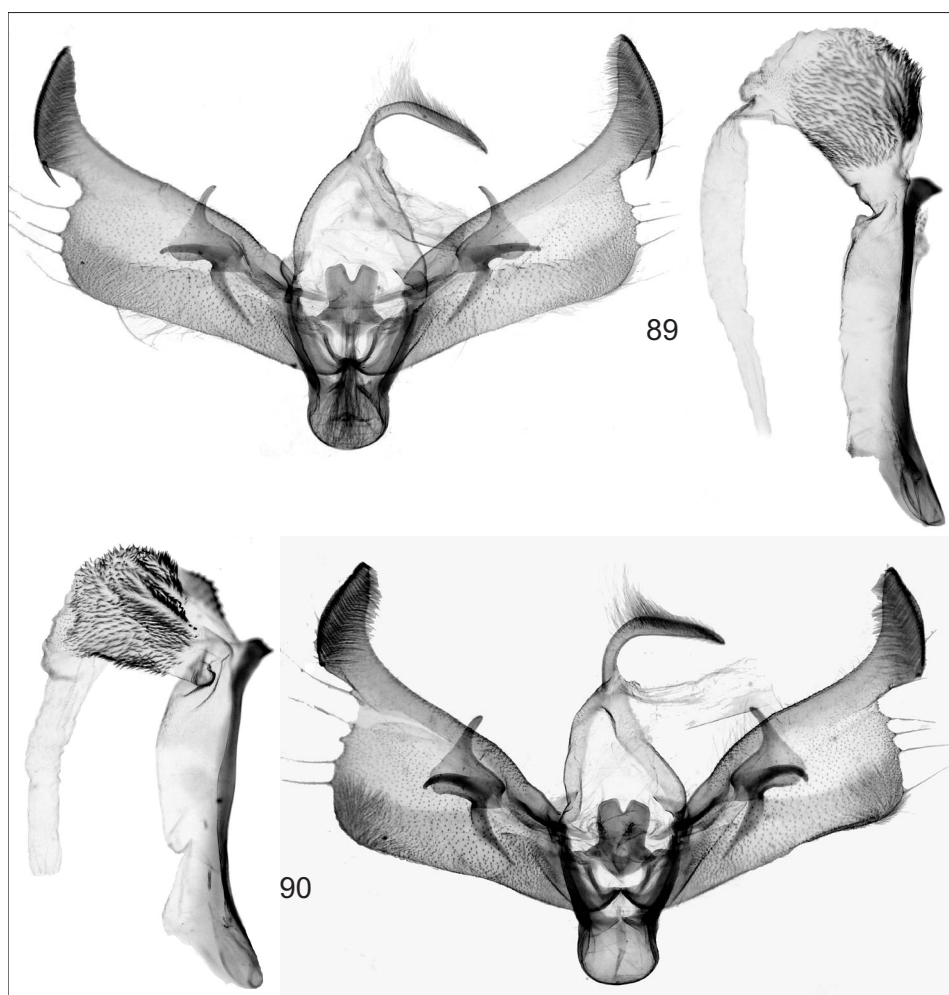


**Figs 87–88** *Diarsia cia* (STRAND, 1919), genitalia: 87 = male, 88 = female



lar diverticulum densely covered with short, acute cornuti. Antrum extremely broad, ductus bursae short. The subgroup comprises three closely related, rather long-winged species, *D. macrodactyla* BOURSIN, 1954, *D. taidactyla* **sp. n.** (Taiwan) and *D. pacifica* BOURSIN, 1943 (Figs 110–113, 156–158).

(iii) *subgroup*: harpe very broad, triangular, ampulla strong, acute, carina very strongly sclerotised, with a thick, dentate and acute protuberance, vesica short, saccate and diverticulate, with a large number of short, spiculiform cornuti. Antrum extremely broad, very strongly sclerotised, ductus bursae very short,

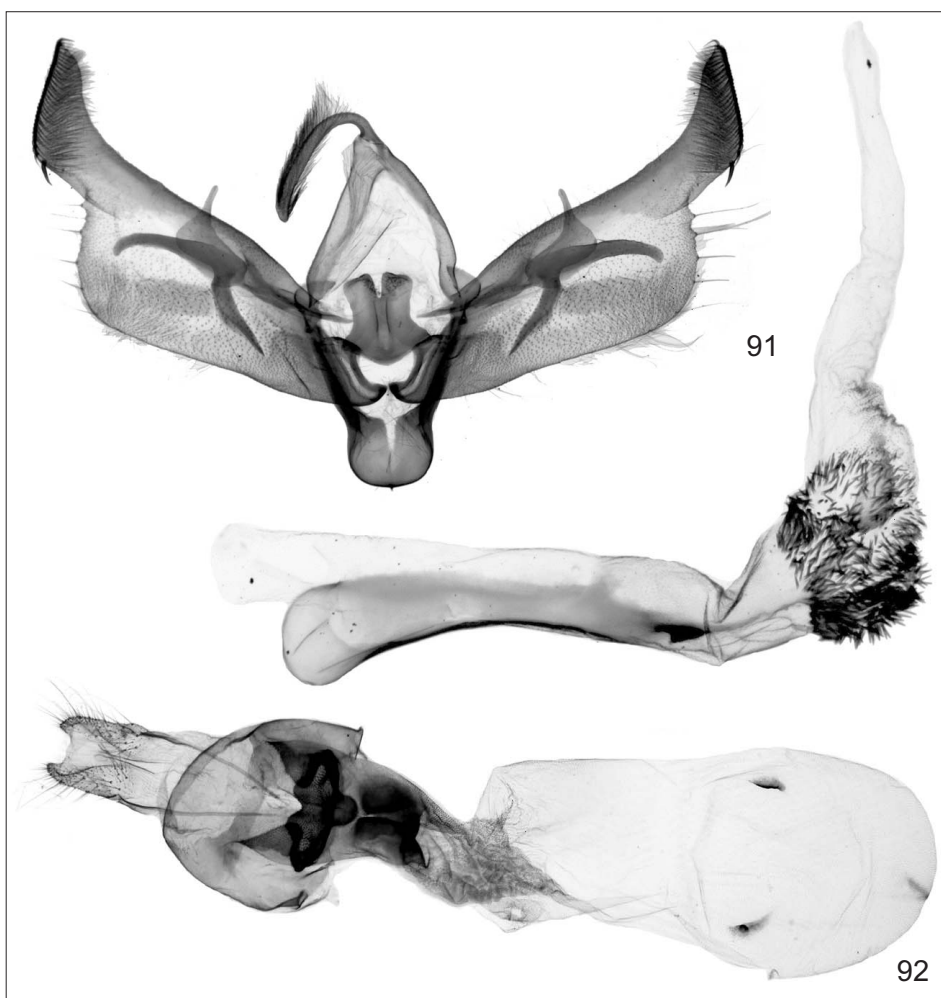


Figs 89–90. *Diarsia gozmanyi* sp. n., male genitalia: 89 = holotype, 90 = paratype

sclerotised and strongly ribbed longitudinally. This lineage is monotypical, containing a Manchurian-Pacific species, *D. ruficauda* (WARREN, 1909) (Figs 114, 115, 159).

#### The *stictica*-group

The unical character of this species-group is the pectinated antennae of the males. The group is closely related with the former one, the diagnostic features are

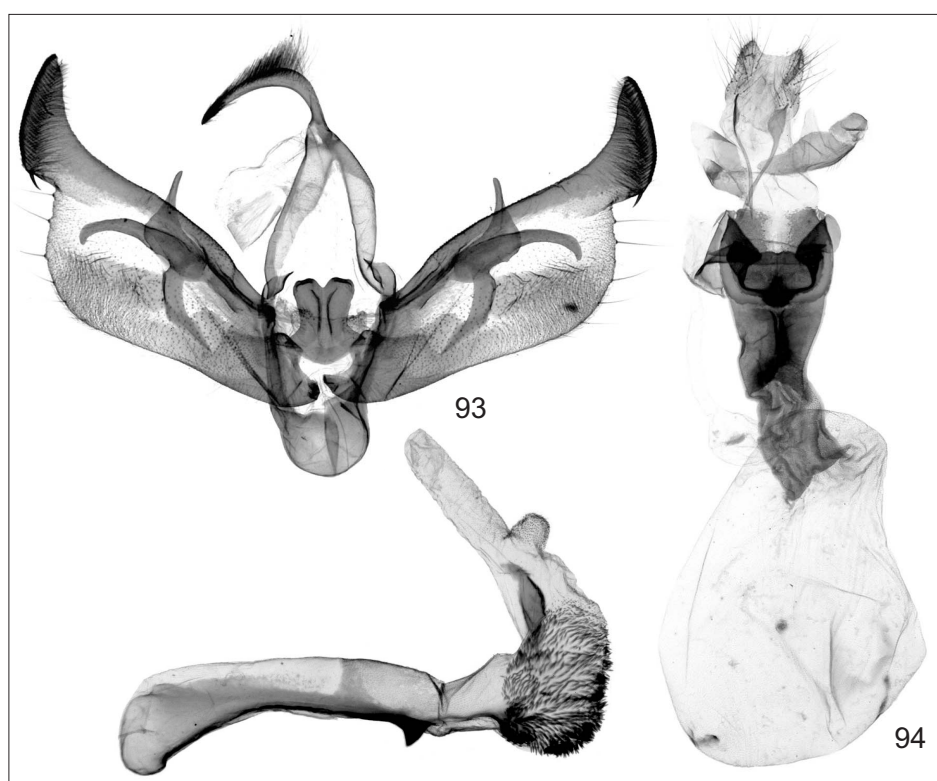


**Figs 91–92.** *Diarsia metadichroa* sp. n., paratypes, genitalia: 91 = male, 92 = female

as follows: uncus “normal” or spatulate, cucullus with broad and elongate neck, harpe falcate, ampulla relatively thin, clavus reduced, juxta relatively small, shield-like. Carina with dentate rib, vesica globular with a semiglobular field covered by spinulose superficial structures. Female genitalia not yet studied. The group is based on the *stictica-carnipennis* species-pair, *D. stictica* (POUJADE, 1887) and *D. carnipennis* B. S. CHANG, 1991; the continental species is widespread from Kashmir to SW China, while its sister-species is endemic to Taiwan (Figs 116–119).

#### The *arenosoides*-group

Uncus strong, spatulate. Valvae elongate apically, cucullus narrow, acute apically, sitting on elongate neck. Harpe rounded, club-like terminally, ampulla moderately sclerotised, relatively short, falcate; juxta relatively small, pentagonal,



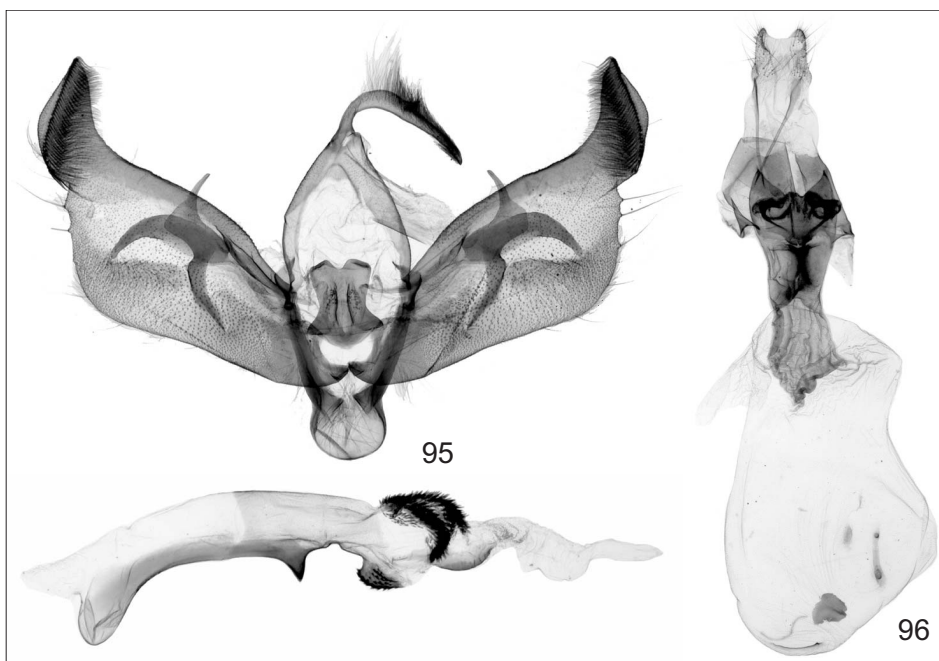
**Figs 93–94.** *Diarsia dichroa* BOURSIN, 1954, genitalia: 93 = male, 94 = female

with triangular dorsal incision. Carina with ribbon-like dentate bar; vesica globular with scobinate surface basally. Antrum with bilateral acute extensions, ductus medially tapering, proximal part rugulose; bursa with two spot-like and two longitudinal signa. A monobasic group, containing *D. arenosoides* (POOLE, 1989) only (Figs 120, 121).

#### The *nigrosigna*-group

Uncus elongate, thin, slightly spatulate, cucullus with very short neck, ventral side of valva strongly convex with a characteristic stripe of strong setae, neck of cucullus vanishing, harpe short, triangular or thin, ampulla straight, acute, clavus reduced, juxta small with bilateral digitiform processes. Carina strongly modified, dentate plate-shaped, vesica saccate, in *nigrosigna* also diverticulate, with a large field of thin, spiculiform cornuti. Antrum with very broad, U-shaped incision, ductus bursae long, strongly sclerotised, corpus bursae large, saccate, with short, spot-like signa.

A south-east Asian, rather subtropical group with Oriental dominance, the most expansive species of the group, *D. nigrosigna* is widely distributed from

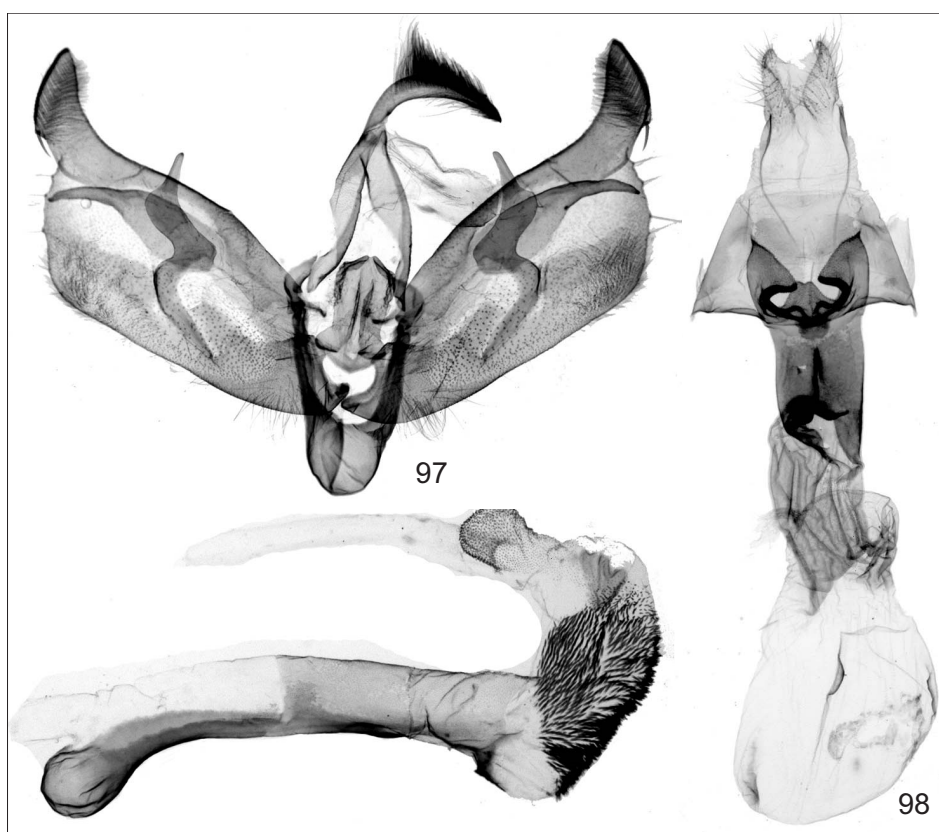


**Figs 95–96.** *Diarsia scotodichroa* sp. n., genitalia: 95 = male, holotype, 96 = female, paratype

Kashmir and W China to the subtropical Indochina and the Philippines. The members of the group are *D. nigrosigna* (MOORE, 1881), the Oriental-subtropical *D. postpallida* (PROUT, 1928) **stat. n.** and the Manchurian-Pacific *D. deparca* (BUTLER, 1879) (= *takamukui* MATSUMURA, 1926) (Figs 122, 123).

#### The *albipennis*-group

Uncus long, slightly spatulate, Lateral margin of the valva convex, cucullus with a wide, short neck. Harpe digitiform, ampulla short, straight, acute. Juxta with two rounded processes. Carina moderately sclerotised, with a well-developed, broad, dentate bar, vesica elongate, projecting dorsally, with a proximal and a smaller distal field covered by short setae and with a sclerotised, small subterminal



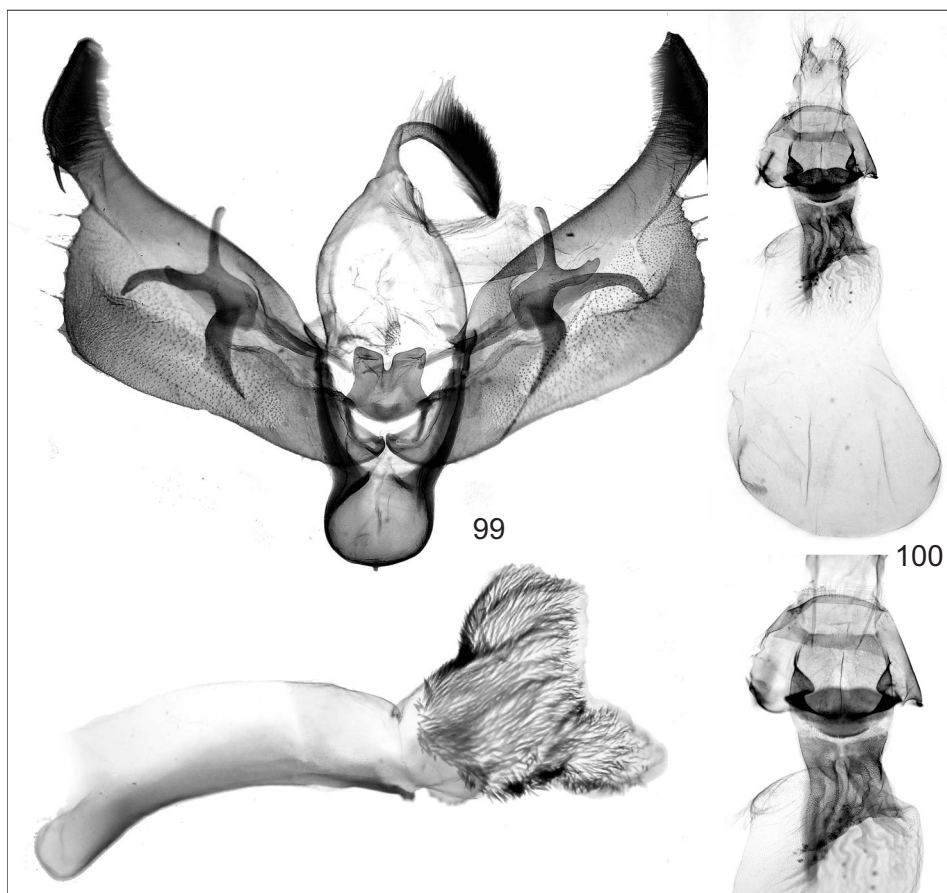
**Figs 97–98.** *Diarsia copria* HREBLAY et PLANTE, 1995, genitalia: 97 = male, 98 = female

diverticulum. Antrum with lobate incision; ductus bursae subdivided transversally, moderately sclerotised and slightly ribbed longitudinally; corpus bursae with two long ribbon-like signa.

The group contains three recognised species, two of them, *D. albipennis* (BUTLER, 1889) and *D. nigrafasciata* B. S. CHANG, 1991, are described, the third, yet unnamed species is known from the Philippines (Figs 124–127).

#### The *mendica*-group

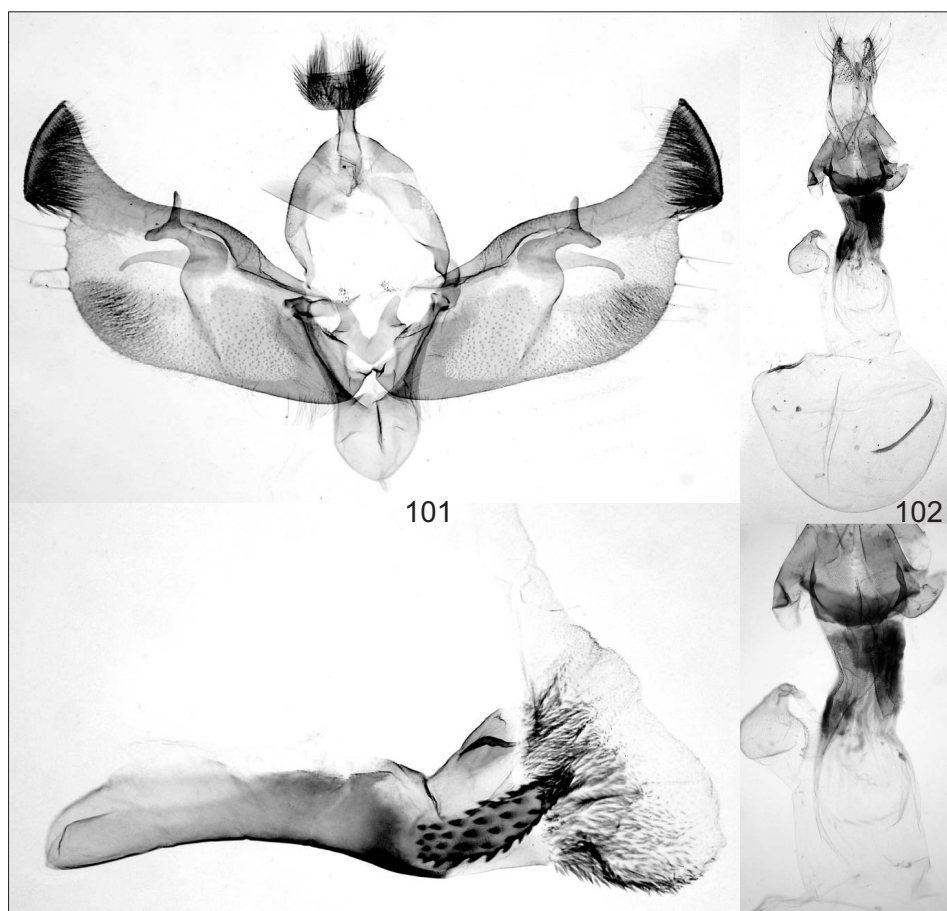
Uncus normal, valva narrow or hollowed laterally, cucullus with short neck, ampulla small, straight or falcate, basal plate of harpe with well-developed lateral



**Figs 99–100.** *Diarsia griseithorax* WARREN, 1912, genitalia: 99 = male, 100 = female

process; juxta small, with short apical extension or with V-shaped incision. Carina with reduced dentate bar, continued in a dentate triangular plate (probably a homologous structure in the *D. rubi*- and the *D. torva* groups), vesica short, simple or with a large, semiglobular subbasal field covered by fine spiculiform cornuti and with a large tooth of serrated edges. Antrum broad with U-shaped sclerotisation, corpus bursae with 3 ribbon-like signa.

This, and the next three species groups are probably forming a category of a higher monophyletic unit with a circum-boreal Holarctic distribution. The *D. mendica*-group is Holarctic, with boreo-montane (subalpine) distribution. It contains altogether six species, none of them is Holarctic in fact: three of them occur in Eurasia, the other three are exclusively Nearctic. The Palaeartic species are *D.*



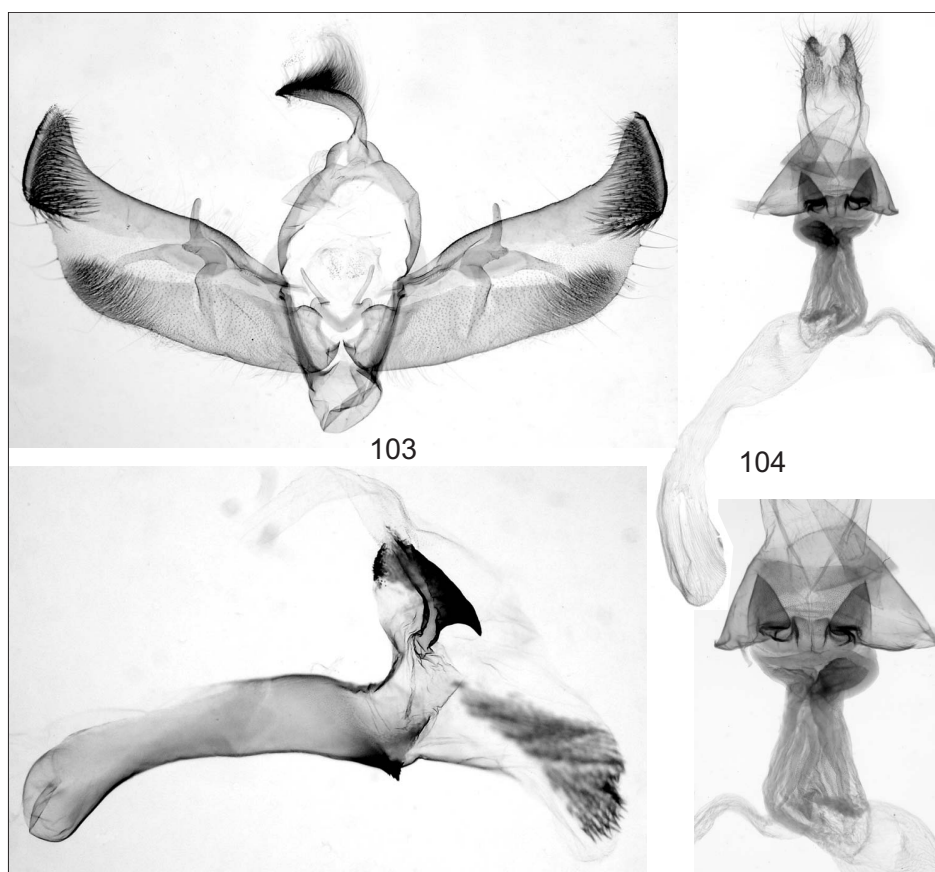
**Figs 101–102.** *Diarsia cerastioides* (MOORE, 1867), genitalia: 101 = male, 102 = female

*mendica* (FABRICIUS, 1775), *D. obuncula* HAMPSON, 1903 (Figs 132, 133) and *D. henrici* (CORTI et DRAUDT, 1933) (= *diorismena* BOURSIN, 1948); while *D. rubifera* (GROTE, 1875), *D. dislocata* (SMITH, 1904) and *D. jucunda* (WALKER, 1857) live in the North America.

#### The *esurialis*-group

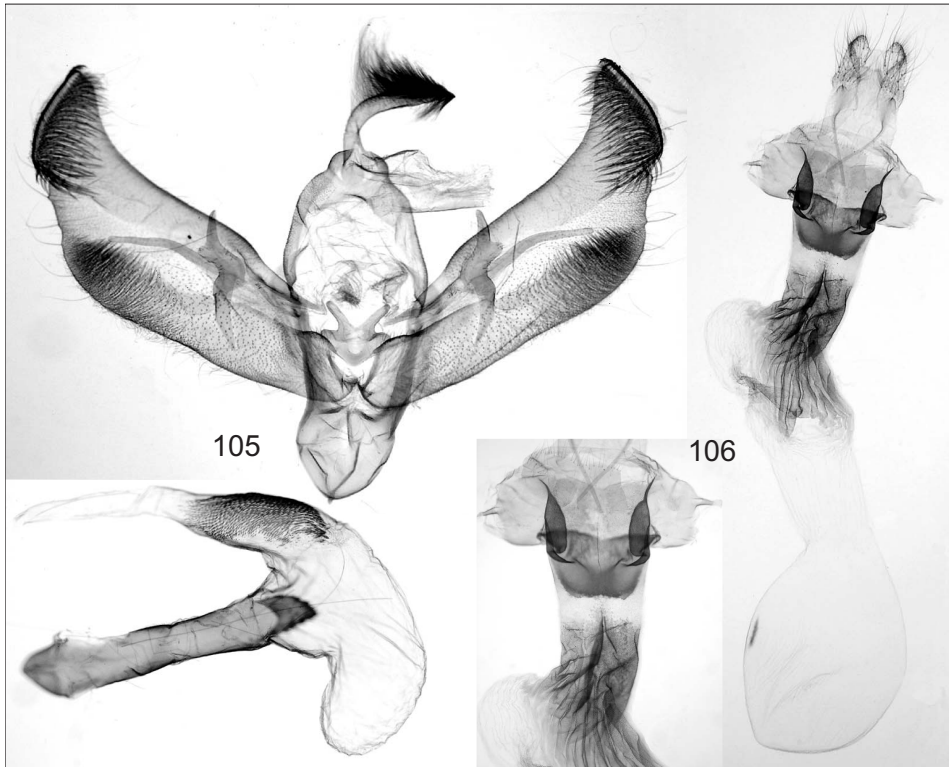
The most important genitalia characters are as follows: carina with reduced dentate bar, vesica globular with two thorn-shaped cornuti and with a field of spinulose superficial structures.

The group includes two closely related Nearctic species, *D. esurialis* (GROTE, 1881) and *D. calgary* (SMITH, 1898).



**Figs 103–104.** *Diarsia tincta* (LEECH, 1900), genitalia: 103 = male, 104 = female





Figs 105–106. *Diarsia subtinctoria* B. S. CHANG, 1991, genitalia: 105 = male, 106 = female

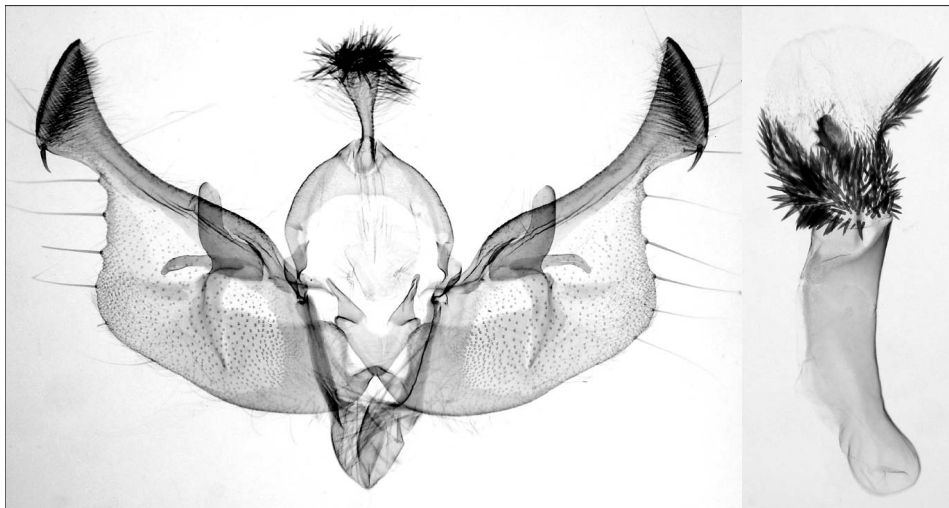
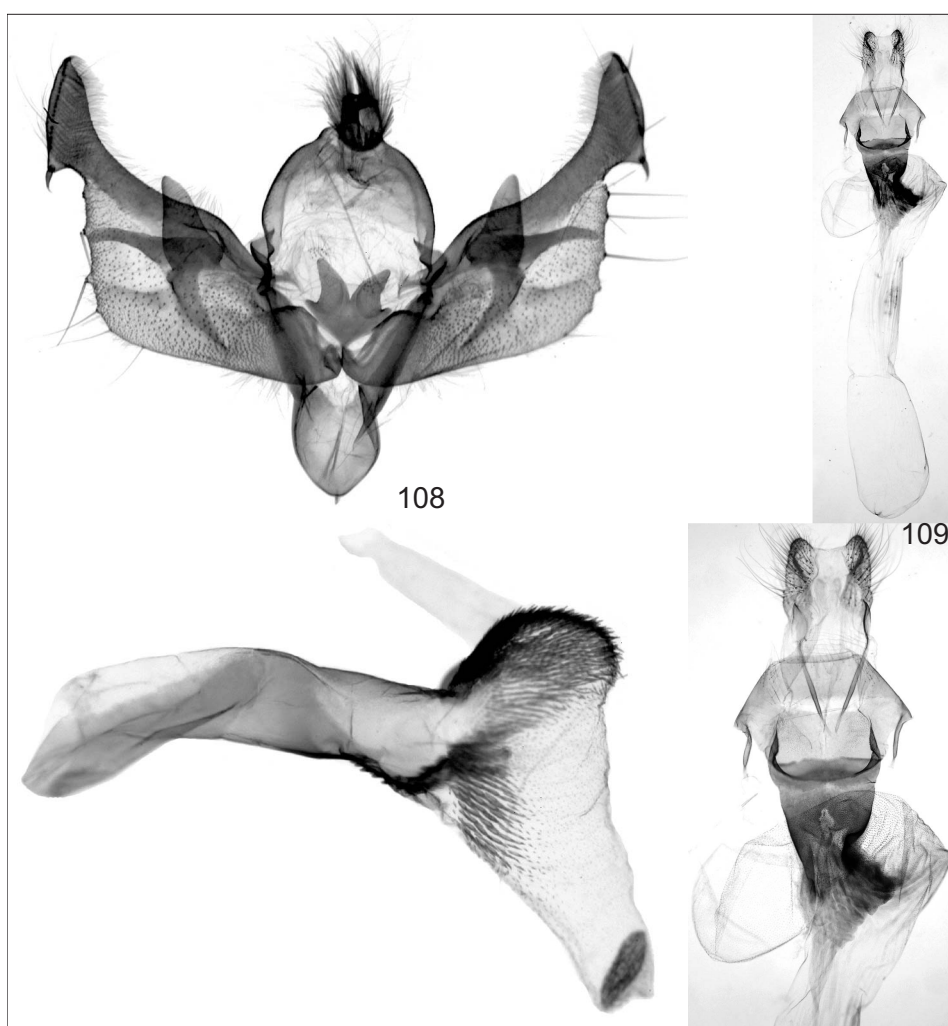


Fig. 107. *Diarsia erubescens* (BUTLER, 1880), male genitalia

The *rubi*-group

Uncus spatulate, cucullus relatively small, harpe short, ampulla directed laterally, strong, long, concave terminally, clavus reduced, juxta shield-shaped. Carina with weak dentate bar, continued in a dentate triangular plate (a supposed synapomorphy with the *D. mendica* and the *D. torva* species-groups), vesica short, with a large, semiglobular field covered by fine spiculiform cornuti. Antrum with broad U-shaped sclerotisation.

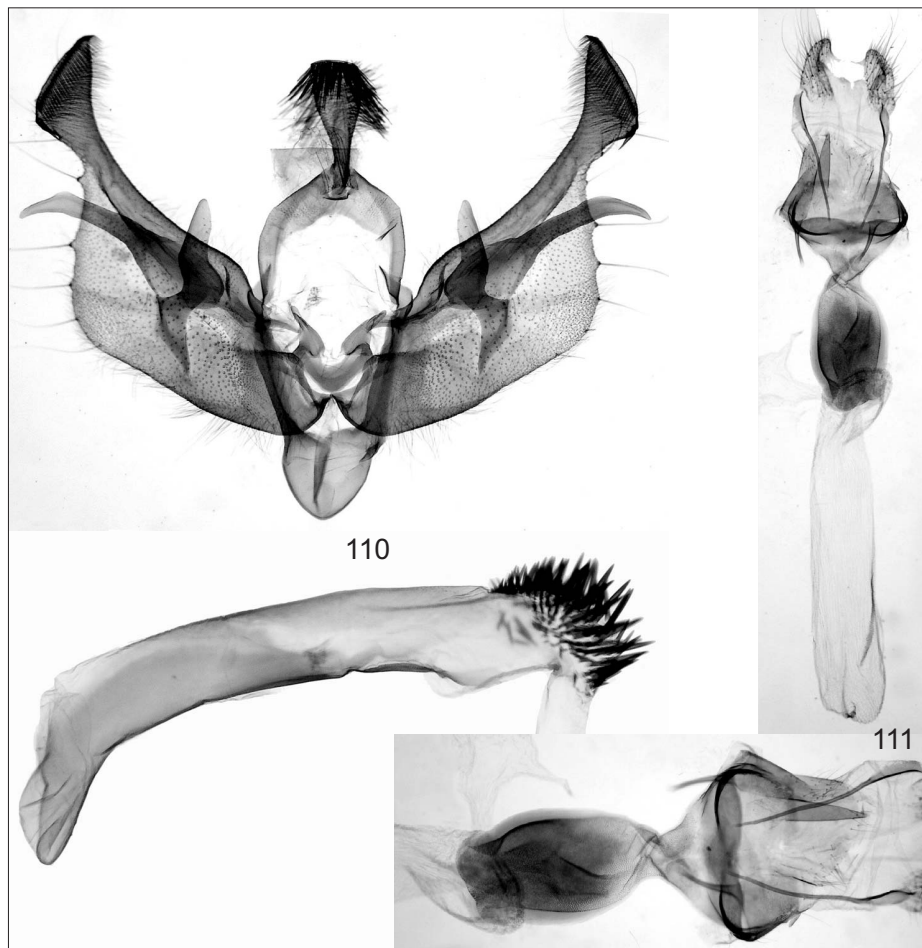


**Figs 108–109.** *Diarsia formosana* BOURSIN, 1947, genitalia: 108 = male, 109 = female

A Holarctic group, two closely related species are widely distributed in temperate Eurasia: *D. rubi* (VIEWEG, 1790) and *Diarsia florida* (SCHMIDT, 1859); the third species *D. rosaria* (GROTE, 1878) is Nearctic while a fourth, still undescribed species lives in Kashmir.

#### The *torva*-group

Uncus normal, elongate, cucullus relatively small, harpe broad, with digitiform basal process laterally, ampulla small, thin, clavus reduced, juxta shield-like.



**Figs 110–111.** *Diarsia taidactyla* sp. n., genitalia: 110 = male, paratype, 111 = female, paratype

Carina weakly sclerotised, vesica rather short with a triangular dentate plate (probably modified form of the dentate bar, similar structure occurring also in the former group) and in the second species also with a small group of spiculiform cornuti. Antrum with broad, U-shaped margin and with two bilateral acute processes, ductus bursae short, strongly hollowed laterally ("lock" of the dentate plate of the male), corpus bursae elongate-saccate, with rib-shaped signa; 8th sternite with sclerotised interlocking surface.

Small group, consisting only of two species both occurring in China: *D. torva* (CORTI et DRAUDT, 1933) (= *stenoptera* BOURSIN, 1948) and *D. metatorva* **sp. n.** (Figs 128–131).

#### The *dahlii*-group

Valva with large ventro-medial, densely hairy lobe, juxta small, triangular or cordiform, with small medio-apical process, clavus reduced; harpe with well-developed lateral process at base, ampulla with weakly sclerotised basal and stronger apical part. Carina simple or with dentated dorsal plate, vesica short, globular with a single, large cornutus or with long subapical diverticulum armed by long, helicoid and serrated sclerotised ribbon. Antrum calyculate with variably strongly sclerotised lateral edges and posterior incision, ductus bursae medium-long and flattened, partly or fully sclerotised, corpus bursae elongated-sacculiform, appendix bursae may be ribbed.

The group consists of two closely related species: *Diarsia dahlii* (HÜBNER, 1813) and *D. protodahlii* **sp. n.** (Figs 135–138). It has a supposedly monsoonic SE Tibetan origin as the more ancient member of the group, *D. protodahlii*, is known only by two specimens from a single locality of Sichuan, while *D. dahlii* is a widely distributed Euro-Siberian species (mostly boreo-continental, with a subspecies *D. dahlii nana* (STAUDINGER, 1896) in southern-eastern Siberia and northern Mongolia), and an isolated race, *D. dahlii tibetica* BOURSIN, 1954, on the Tibetan plateau.

#### The *fannyi*-group

Male genitalia: Uncus very thin, cucullus with very broad neck, harpe very broad, convex, ampulla short, thick, clavus transposed costo-basally, juxta broad shield-shaped. Aedeagus curved terminally, carina weakly sclerotised, vesica short, with a strong, thorn-shaped cornutus. Female genitalia not studied yet.

Monotypic group, its nominate species, *D. fannyi* (CORTI et DRAUDT, 1933) is known only from China (Fig. 134).

#### The *brunnea*-group

This group is monotypic and is formed by the widely distributed *Diarsia brunnea* ([DENIS et SCHIFFERMÜLLER], 1775).

Male genitalia: Valva large, broad, ventrally dilated at medial third, cucullus small, sitting on very thin neck, harpe strong, ampulla elongate and curved, clavus reduced. Carina simple, vesica membranous without specific surface structures, with one huge cornutus. Female genitalia: antrum broadly cup-shaped with relatively weak marginal sclerotisation, ductus bursae long, flattened, sclerotised, corpus bursae elongate-sacculiform, with a bar-shaped signum.

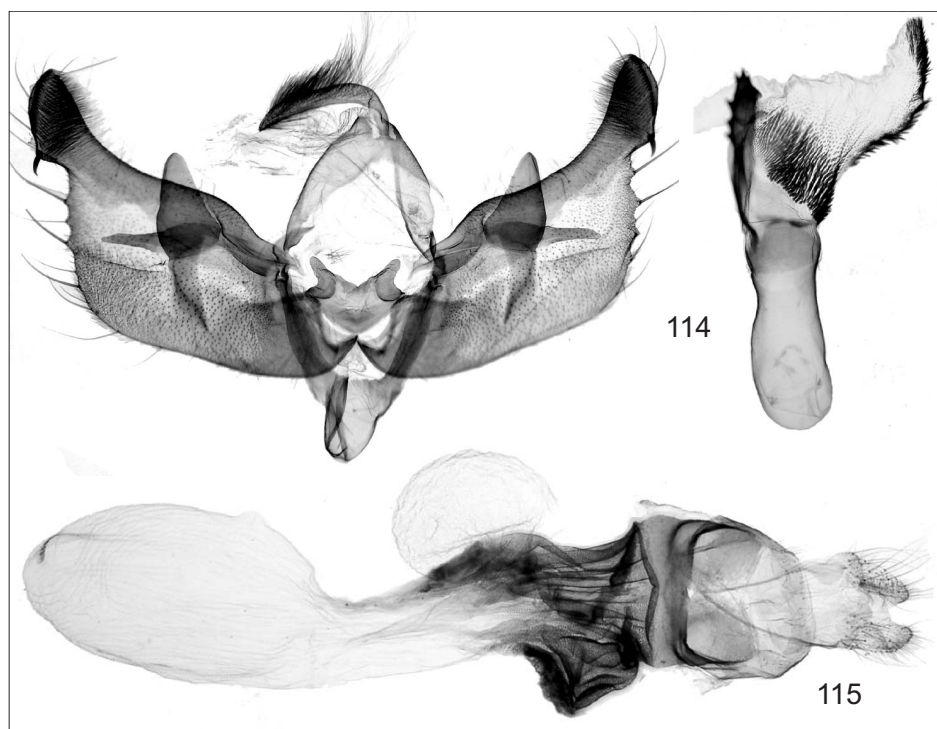


Figs. 112–113. *Diarsia pacifica* BOURSIN, 1943, genitalia: 112 = male, 113 = female

*Unassociated species*

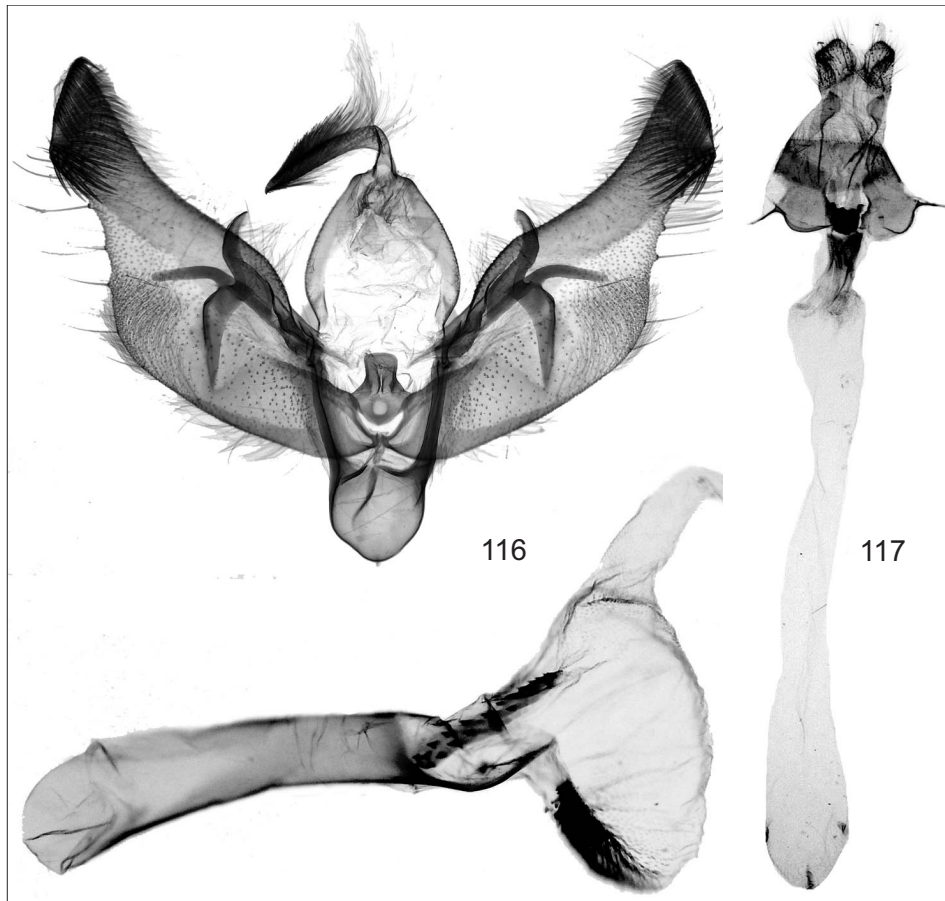
The unassociated species can be separated into two main groups. The first group contains those taxa the available information (description, illustrations) about them is insufficient for the proper analysis and the authors had no opportunity to study any specimen. We had to place into this group three Chinese species described by CHEN (*D. pallens* CHEN, 1993, *D. sciera* CHEN, 1993, *D. tibetica* CHEN, 1994), the published line drawings with the vesica uneverted and the published black and white pictures about the moths (CHEN, 1999) cannot provide enough information for our purposes. Another species, "*D. latimacula*" KOZHAN-CHIKOV, 1937 had to be considered as *incertae sedis*.

The species occurring only in the Oriental region are also not studied in detail, the number of such taxa is about one-fifth of the total number of the species distributed in the temperate Eurasia. The entirely Oriental species of the genus are as follows: *D. banksi* HOLLOWAY, 1976 (Borneo), *D. barlowi* HOLLOWAY, 1976 (Borneo), *D. borneochracea* HOLLOWAY, 1989 (Borneo), *D. dimorpha* (WILMAN et WEST, 1929) (Philippines, Luzon), *D. flavostigma* HOLLOWAY, 1976



**Figs 114–115.** *Diarsia ruficauda* (WARREN, 1909), genitalia: 114 = male, 115 = female

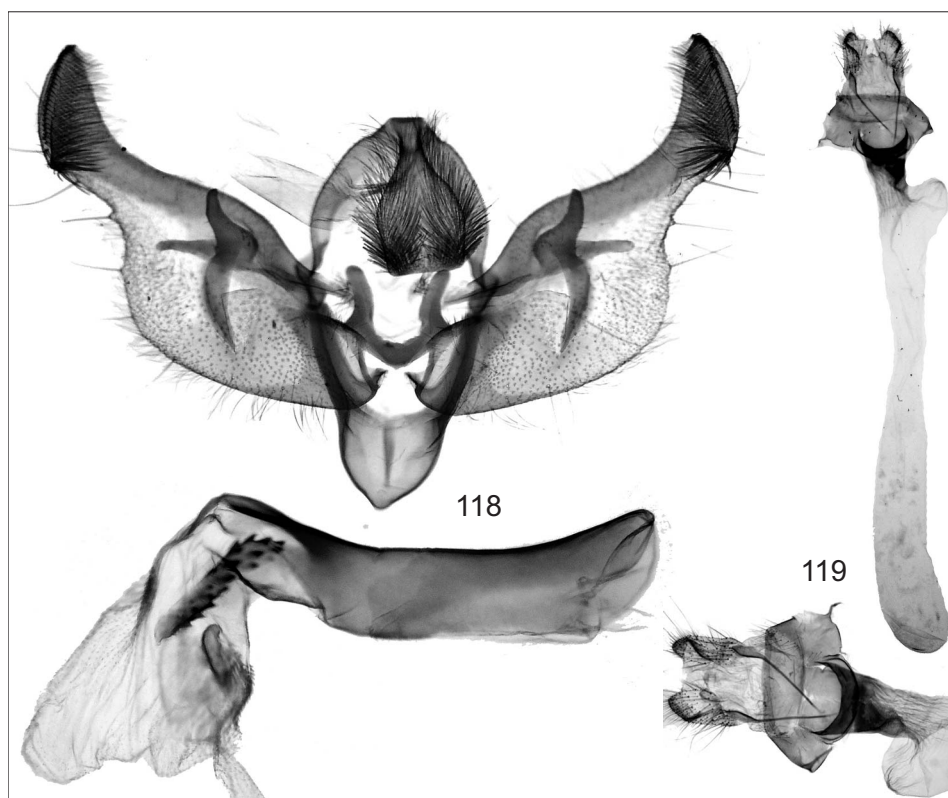
(Borneo), *D. gaudens* (HAMPSON, 1904) (Java), *D. intermixta* (GUENÉE, 1852), *D. javanica* BOURSIN, 1959 (Java), *D. kebea* (WALKER, 1908) (New Guinea), *D. magnisigna* (PROUT, 1922) (Ceram), *D. magnisigna angusta* (PROUT, 1922) (Ceram), *D. ochracea* (WALKER, 1865) (Ceylon), *D. olivacea* (PROUT, 1922) (Ceram), *D. owgarra* (WALKER, 1908) (New Guinea), *D. pallidimargo* (PROUT, 1922) (Ceram), *D. pallidisigna* (PROUT, 1922) (Buru), *D. pediciliata* (PROUT, 1924) (New Guinea), *D. pediciliata melanomma* (PROUT, 1926), *D. pseudobarlowi* HOLLOWAY, 1989, *D. ruptistriga* (WALKER, 1858), *D. serrata* HOLLOWAY, 1976 (Borneo); and *D. stigmatias* (PROUT, 1924) (New Guinea).



**Figs 116–117.** *Diarsia stictica* (POUJADE, 1887), genitalia: 116 = male, 117 = female

PHYLOGENETIC AND BIOGEOGRAPHIC CONNECTIONS  
OF THE GENUS *DIARSIA*: CONCLUSIONS

Our studies confirmed that *Diarsia* belongs to the basal genera of Noctuidae characterised by the simultaneous presence of numerous plesiomorphic characters and characteristic trends of specialisations, typifying several monophyletic species groups. However, as opposed to other basal Noctuidae, which occur mostly in southern Africa (e.g. *Mabilleana* FLETCHER et VIETTE and *Amazonides* FLETCHER, see LAFONTAINE, 1998), *Diarsia* is rather rich in species. We consider that this richness has evolved as a consequence of the divergent specialisations and formation of allopatric species pairs and groups. Since numerous species occur also in the temperate arboreal habitats of Australia and New Guinea (LAFONTAINE 1998), we suppose that they have reached the Indo-Malaysian region at the uppermost Tertiary, after the formation of the connection of northernmost Australia and New



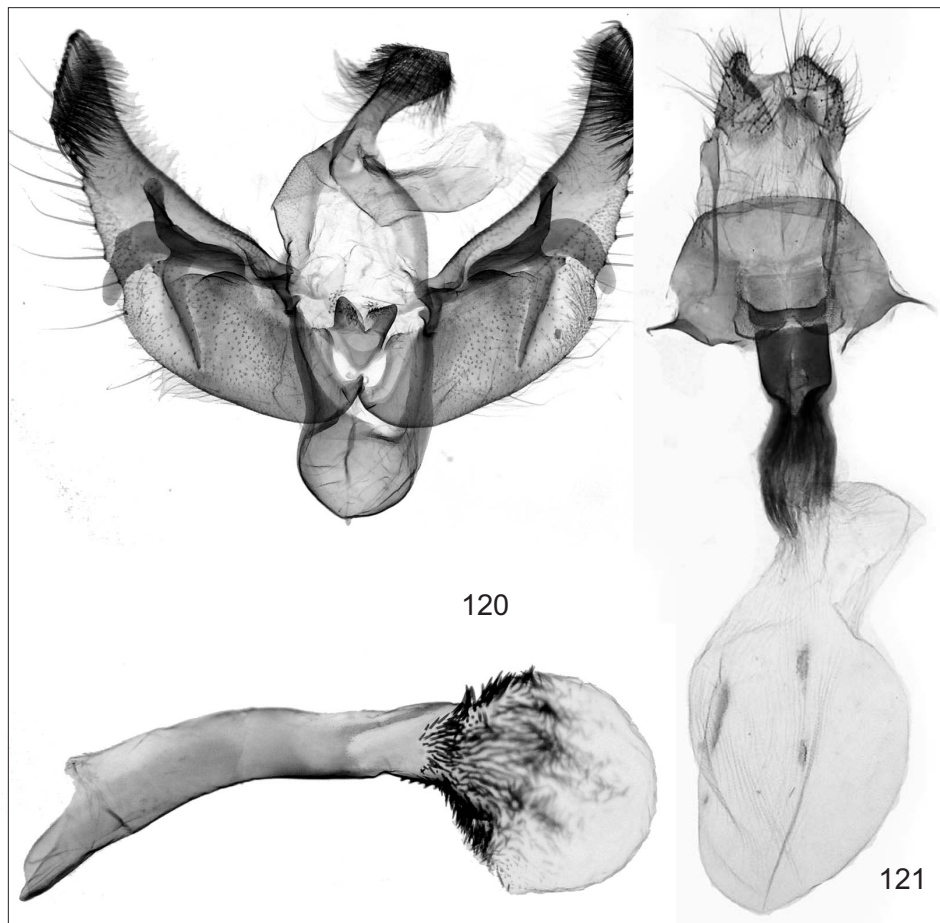
**Figs 118–119.** *Diarsia carnipennis* B. S. CHANG, 1991, genitalia: 118 = male, 119 = female



Guinea at the end of the Miocene, as demonstrated by the geographical history of the genus *Nothofagus* (HUMPHRIES, 1983) from this direction.

The species richness of the genus evolved mostly in the monsoonic high mountains of south-eastern Asia from N Vietnam, Thailand, southern China and Taiwan, surrounding the southern Himalaya to Nepal and northern Pakistan. We observed the largest number of species in the quite “monolithic” *D. chalcea*-species group, with the most interesting variations of the antrum in almost exclusively allopatric species, and also, as “flocks” of undescribed sibling taxa, in the *D. ceras-tioides-tincta* and *D. erubescens-macrodactyla* groups.

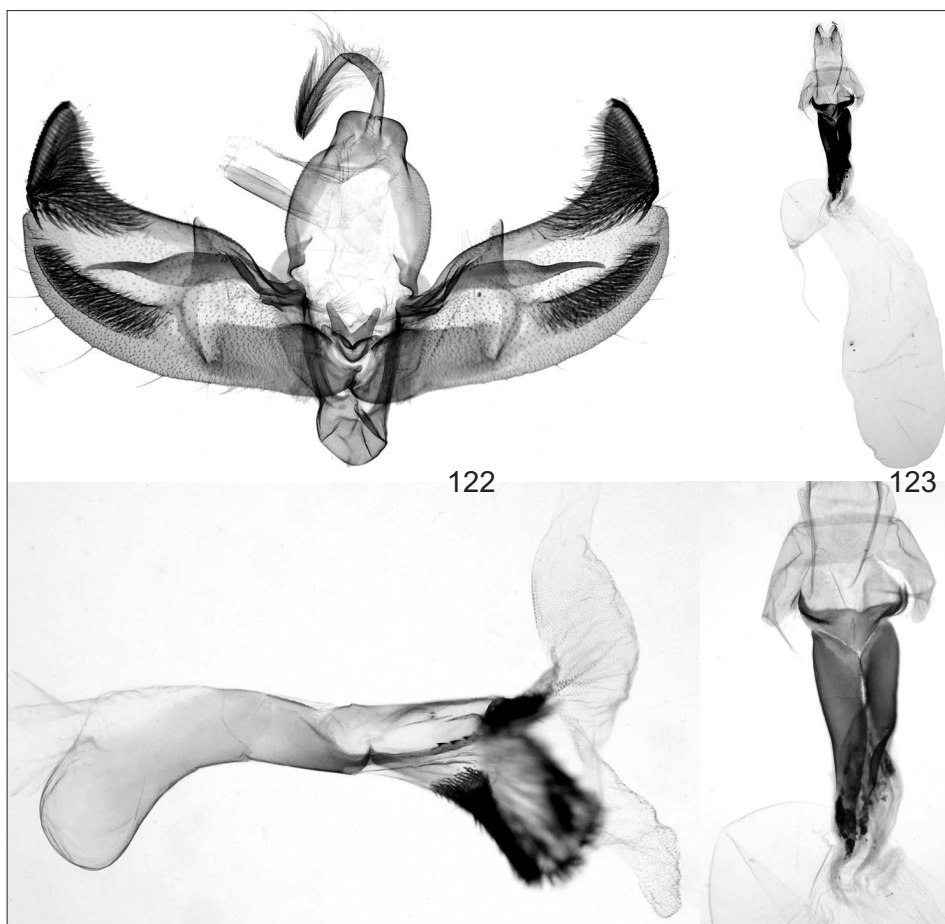
We know only a few species occurring in the continental high mountains of Central Asia and southern Siberia. The taxonomically rather isolated *D. canescens*



Figs 120–121. *Diarsia arenosoides* POOLE, 1989, genitalia: 120 = male, 121 = female

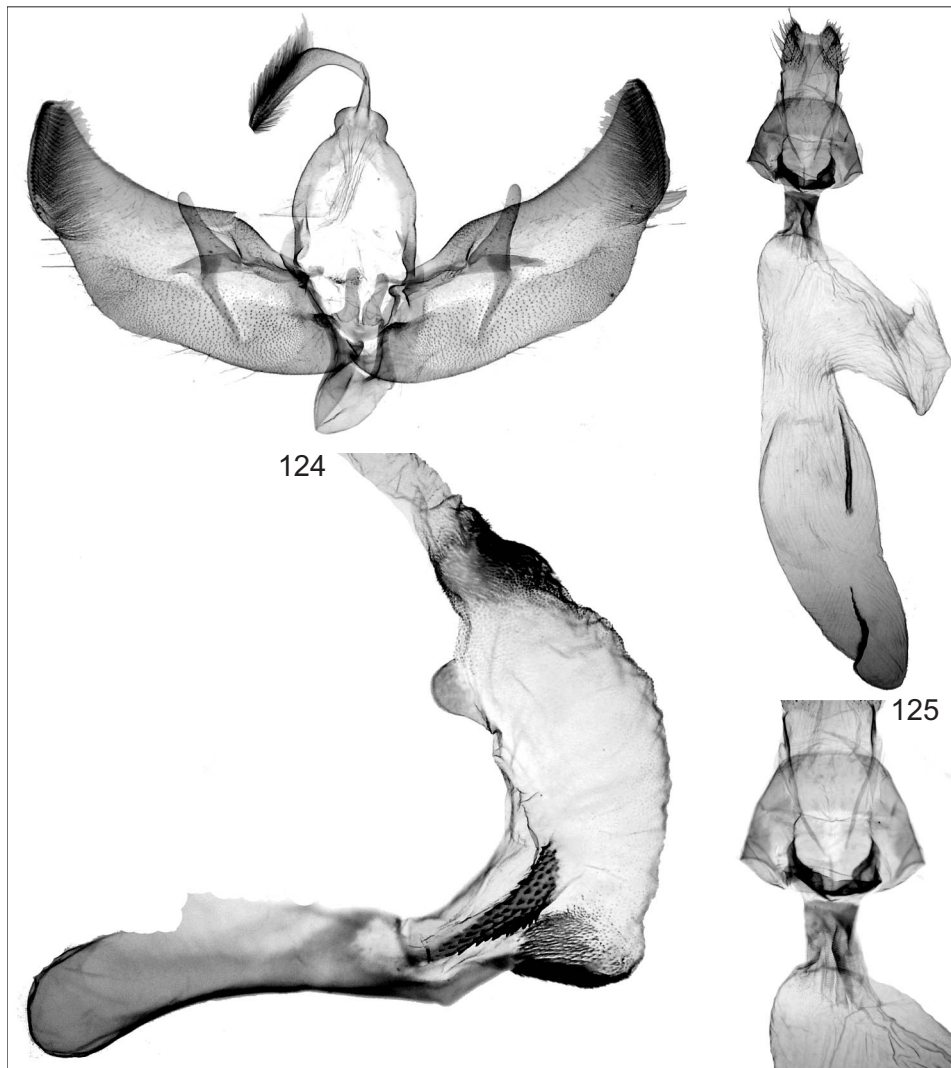
belongs to the widest distributed species of the genus, while other ones occur only in a rather limited area as *D. obuncula* (from W Himalaya to the Pamirs), *D. henrici* (Kuku-noor) and an undescribed species of the *D. rubi*-group in the Indian side of Kashmir. A few species could reach the boreal forest zone, (*D. mendica*, *D. rubi*, *D. florida*, *D. dahlii*, *D. brunnea*), and some of them have crossed the Beringia. Therefore, in North America six species of the three “boreo-montane” species groups occur only.

The core areas and the secondary centres of speciation and/or dispersion of *Diarsia* rather precisely follow some “generalised tracks” outlined by RONKAY *et al.* (2005) as the “direct Himalayan”, “great S-type”, “Himalayan combined”, “small S-type”, “Himalayan forceps”, “Manchurian-Pacific” and “northern tem-



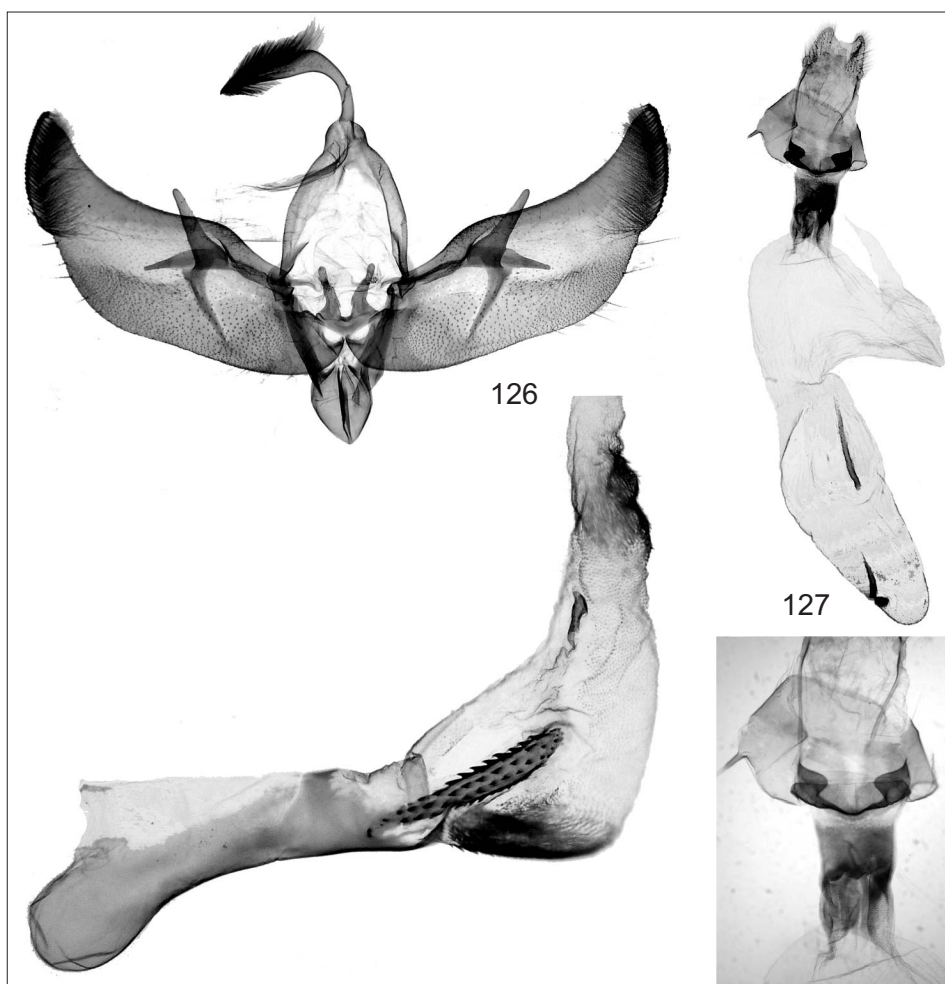
**Figs 122–123.** *Diarsia nigrosigna* (MOORE, 1881), genitalia: 122 = male, 123 = female

perate” routes. These repetitive patterns also indicate important bionomic properties of the given groups (e.g. the potential of spreading, ecological plasticity) as well as the supposed time of their origin and the location of the “missing links”. The core areas and expansion of these faunal types have a great importance in the process of the population of practically the entire northern temperate zone, especially the monsoonic forest habitats and the temperate arboreal biomes. The direct



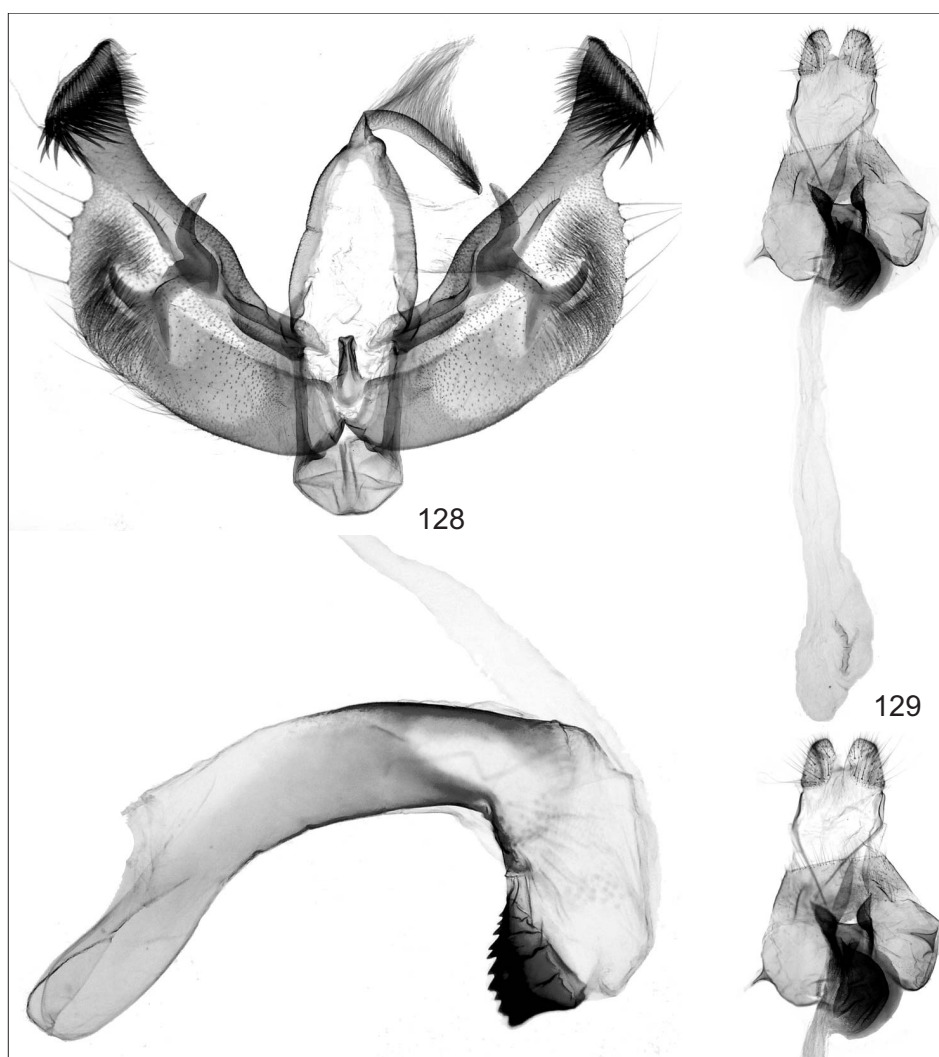
**Figs 124–125.** *Diarsia albipennis* (BUTLER, 1889), genitalia: 124 = male, 125 = female

effect (the occurrence of the most expansive taxa of their direct descendants) in the western Palaearctic and the Nearctic is restricted mostly to the groups belonging to the “Himalayan forceps” (e.g. the *D. hoenei*-group), “Manchurian-Pacific” (*D. ruficauda*, *D. pacifica*) and “Northern temperate” (*D. mendica*- and *D. rubi*-groups) types, while the others regularly typify the wide sense Himalayan–W-Chinese region. The number of the species is decreasing with the distance from the main Himalayan chain but local (secondary or even tertiary) centres of speciation with species outbreaks may appear in all major types and in different parts of the Eurasian mountain system.



**Figs 126–127.** *Diarsia nigrafasciata* B. S. CHANG, 1991, genitalia: 126 = male, 127 = female

Europe, as a “western peninsula” of the huge Eurasiatic continent from a faunal historic point of view, contains only a limited number of *Diarsia* species, too. Surprisingly, *D. guadarramensis*, a unique European endemic, belongs to the plesiomorphic *D. hoenei* group, with several – not very closely – related species in the Himalayan region and W China. This relic-like species does not have any closer relationship to the other European species of the genus. The other European species belong to three different groups from which the *D. mendica*- and *D. rubi*-



**Figs 128–129.** *Diarsia torva* (CORTI et DRAUDT, 1933), genitalia: 128 = male, 129 = female

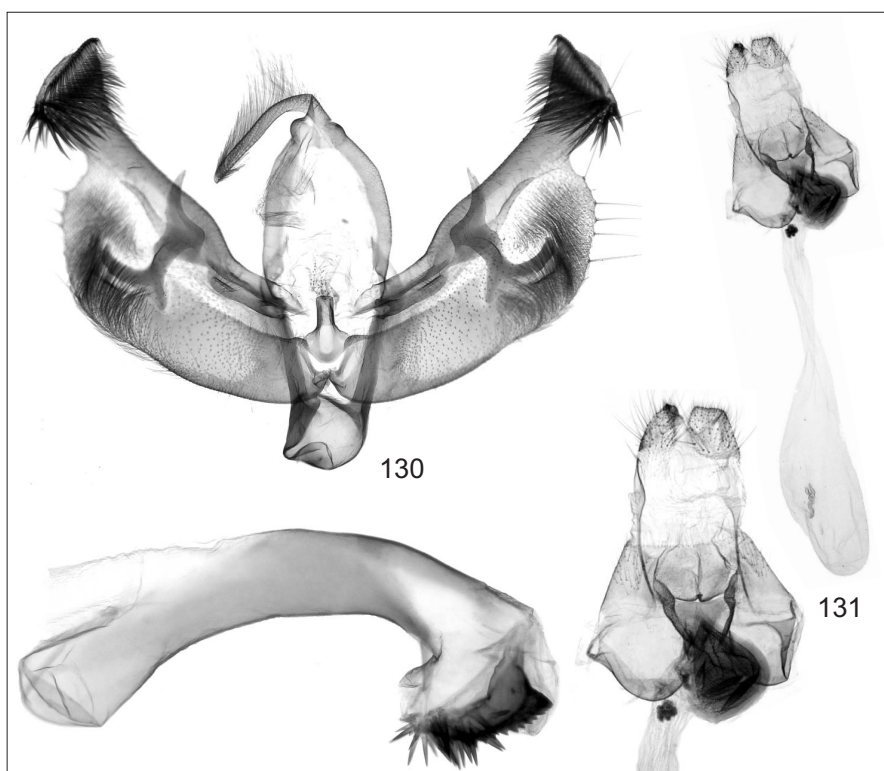
groups are Holarctic, while the *D. brunnea* and the *D. dahlii* groups are Palae-arctic, mostly Euro-Siberian. It means that Europe probably was populated by a more ancient wave of *Diarsia* pre-glacially, from which only *D. guadarramensis* could survive in an Atlanto-Mediterranean core area, while the other, generally widely distributed Euro-Siberian species are members of a rather recent, inter- or post-glacial “invasion fauna”.

#### DESCRIPTION OF THE NEW SPECIES

##### ***Diarsia scotodichroa* sp. n.**

(Figs 12, 13, 95, 96)

Holotype: Male, China, Sichuan, Daxue Shan, Gongga Shan, NW Moxi, 2850 m, 101°58'E, 29°41'N, 14–19.VII.1999, leg. SINIAEV & PLUTENKO, slide No. RL8855m (coll. G. RONKAY, preserved in the HHNM Budapest).

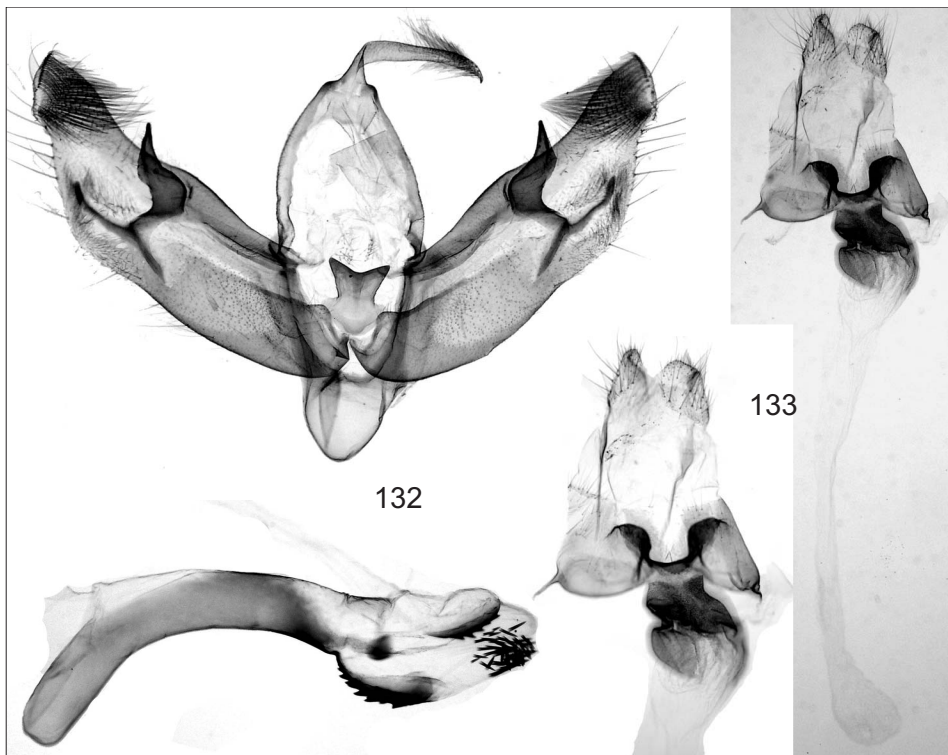


**Figs 130–131.** *D. metatorva* sp. n., paratypes, genitalia: 130 = male, 131 = female

Paratype. Female, with the same data as the holotype, slide No. RL8860f (coll. G. RONKAY).

**Diagnosis:** The new species is the sister species of *D. dichroa*. The known specimens of *D. scotodichroa* are similar externally to the dark form of *D. dichroa* (see the Figs 9–13) but *D. scotodichroa* has more uniformly darkened wings with less conspicuously defined and smaller orbicular and reniform stigmata, and the crosslines are also less prominent than in *D. dichroa*. The new species resembles also to *D. cia* and *D. copria* (Figs 5–8) differing from the former by its far less vivid colouration and less intense ochreous-yellowish filled orbicular and reniform stigmata, from the latter mainly by its more uniformly darkened hindwing with more sharply marked discal spot.

The male genitalia of *D. scotodichroa* differs from those of *D. dichroa* in almost all details (Figs 93, 95), the best visible distinctive features are the much broader valva with broader cucullus having more convex outer margin, much thicker but shorter, strongly curved ampulla, the medially broader juxta having deeper apical incision and more angular dorso-lateral edges, and the much stronger

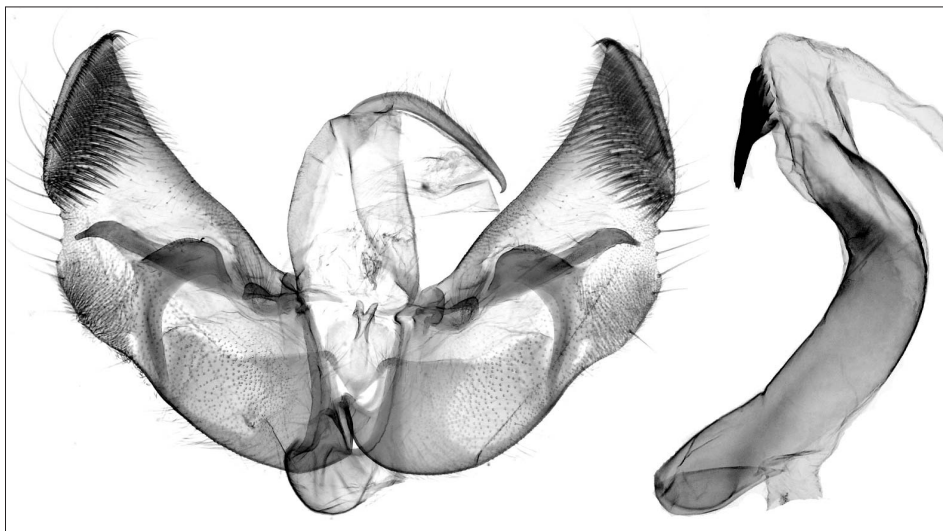


**Figs 132–133.** *Diarsia obuncula* HAMPSON, 1903, genitalia: 132 = male, 133 = female

serrated-dentated subbasal plate of the vesica. In addition, the uncus is more straight, the apical process of the harpe is shorter, more oblique and more arched, and the carinal tooth is longer and stronger than in the sister species. The male genitalia of *D. copria* (Fig. 97) show the close relationship of the species with *D. mandarinella* by the reduction of the carinal tooth and the robust, rather claw-like ampulla while the structure of the juxta, similarly to that of *D. cia* (Fig. 87) is identical in type with that of *D. chalcea* (Fig. 85) but a shallow medio-apical incision may be present.

The female genitalia of *D. scotodichroa* and *D. dichroa* have the same ground plan (Figs 94, 96), the differences can be found in the configuration of the antrum, the ductus bursae and the shape and size of the signa. The ventral plate of the antrum of *D. scotodichroa* has more prominent postero-medial double lobe and much broader antero-medial ligula, the sclerotised distal part of the ductus is shorter, with shorter dorsal fissure and the less sclerotised proximal part of the ductus bursae is remarkably broader at middle and, finally, all three signa are somewhat longer than in *D. dichroa*. The comparison of the genitalia of *D. scotodichroa* with the other related species, *D. metadichroa*, is given under the diagnosis of the latter taxon.

Description. Wingspan 39–40 mm, length of forewing 15–16 mm. Male. The upperside pattern and colouration is as illustrated in Fig. 12. Underside of wings shining, pale pinkish suffused ochreous white, inner part of wing with variably strong blackish grey suffusion, traces of postmedial line and reniform stigma diffuse, indistinct; hindwing with broad rosy-brown costal suffusion, dif-



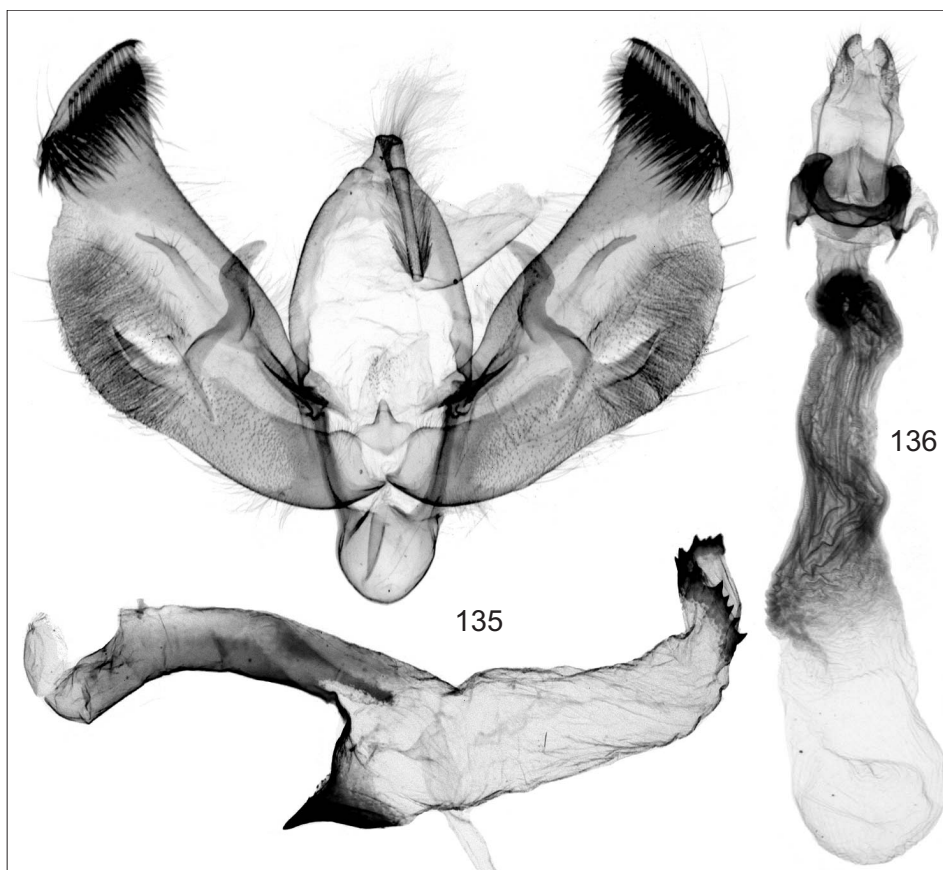
**Fig. 134.** *Diarsia fannyi* (CORTI et DRAUDT, 1933), male genitalia



fuse transverse line and large, prominent, lunulate discal spot. Female (Fig. 13): as male, with somewhat broader forewings and more darkened hindwing.

Male genitalia (Fig. 95). Uncus long, slender, curved at base, apically pointed. Tegumen long, narrow; juxta large, broadly sand-clock-shaped with convex ventral margin and shallow apical (dorsal) incision; vinculum strong, U-shaped, saccus broad. Valva elongated but rather broad; cucullus relatively large, acutely triangular with markedly convex outer margin and short, broad neck; corona long. Sacculus short, weak, clavus small, lobate. Harpe large, its basal bar narrow, more or less straight, erect part flattened, more or less drop-shaped with rectangular proximo-lateral lobe and straight posterior process. Ampulla long, broad-based, distally strongly curved ventrad, apically pointed. Aedeagus cylindrical, slightly arcuate, carinal plate with huge, smooth ventral tooth. Vesica everted forward, distally bent dorsally; proximal two-thirds inflated; subbasal plate very strong, serrate-dentated; distal sclerotised bar almost smooth; distal part of vesica densely spiculate.

Female genitalia (Fig. 96). Ovipositor rather long, conical, papillae anales long, narrow, apically pointed; posterior gonapophyses slender, long. Ventral part of penultimate segment broad, sclerotised, anterior gonapophyses short. Antrum calyculate-lyriform, sclerotised, posterior margin



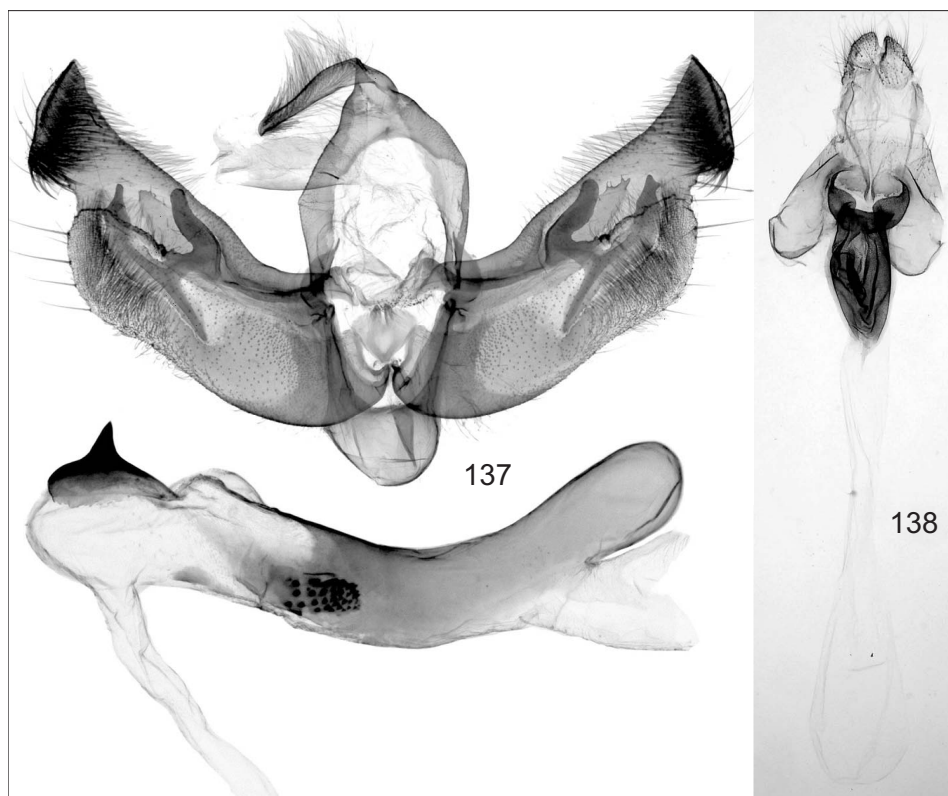
**Figs 135–136.** *Diarsia dahlia* (HÜBNER, 1813), genitalia: 135 = male, 136 = female

with deep V-shaped incision; ventral plate with prominent postero-medial double lobe, and with broad antero-medial ligula. Distal part of ductus bursae sclerotised, flattened, broadly infundibular, with strong medial fissure, proximal part of ductus bursae strongly rugose-wrinkled, less sclerotised. Appendix bursae membranous, flattened-lobate, with stronger ribs at base; corpus bursae spacious, elliptical-ovoid with subconical lateral portion at fundus; with three unequal, more or less ribbon-like signa.

Bionomics. *Diarsia scotodichroa* is found in the medium-high forested region of the Gongga Shan massif where the original vegetation forms a shrubby and mixed deciduous forest belt. The two type specimens were collected at light, in the midsummer period. The early stages and the foodplant are unknown.

Distribution. The new species is known from the Gongga Shan area (China, Sichuan) only.

Etymology: The specific name refers to the similarity of the new species with *D. dichroa* and the darkened forewing colouration.



**Figs 137–138.** *Diarsia protodahlia* sp. n., genitalia: 137 = male, holotype, 138 = female, paratype

***Diarsia metadichroa* sp. n.**  
(Figs 14, 15, 91, 92)

Holotype: Male, "Vietnam, Prov. Lao Cai, Fan-si-pan Mts, Frontier Satellite Camp, 2240 m, 103°47'30,9"E, 22°19'17,7"N, 18–22.VIII.1998, leg. A. Kun" (coll. HNHM Budapest).

Paratypes. Vietnam, Prov. Lao Cai: 4 males, 1 female, with the same data as the holotype; 1 male, Fan-si-pan Mts, Frontier Satellite Camp FTO, 22°16' 86,6"N, 103°16'81,7 "E, 1890 m, 11–13.VIII.1998, leg. A. KUN; 2 males, 2 females, Fan-si-pan Mts, old Frontier Vietnam Base Camp Site (Sin Chai – Sky Gate), 22°20' 91,7"N, 103°46' 44,5"E, 1900 m, 29–30.VIII.1998, leg. A. KUN. The paratypes are deposited in the collections of the HNHM, P. GYULAI and G. RONKAY. Slide Nos RL6309m, RL6416m, RL8852m (males), RL8847f (female).

Diagnosis: The new species is one of the smallest members of the *D. chalcea* lineage, it is only slightly larger than *D. gozmanyi* with its wingspan 31–36 mm. It differs from the related species (*D. chalcea*, the dark form of *D. dichroa* and *D. scotodichroa*) by its paler forewing ground colour with diffuse markings consisting of less prominent crosslines and stigmata except sinuous, double postmedial line with blackish tips on veins and long, dark blackish-grey suffusion running along anal veins and inner margin from subbasal line to tornus.

The male genital capsula of *D. metadichroa* is very similar to that of *D. dichroa*, the main differences are as follows: *D. metadichroa* has broader, medially

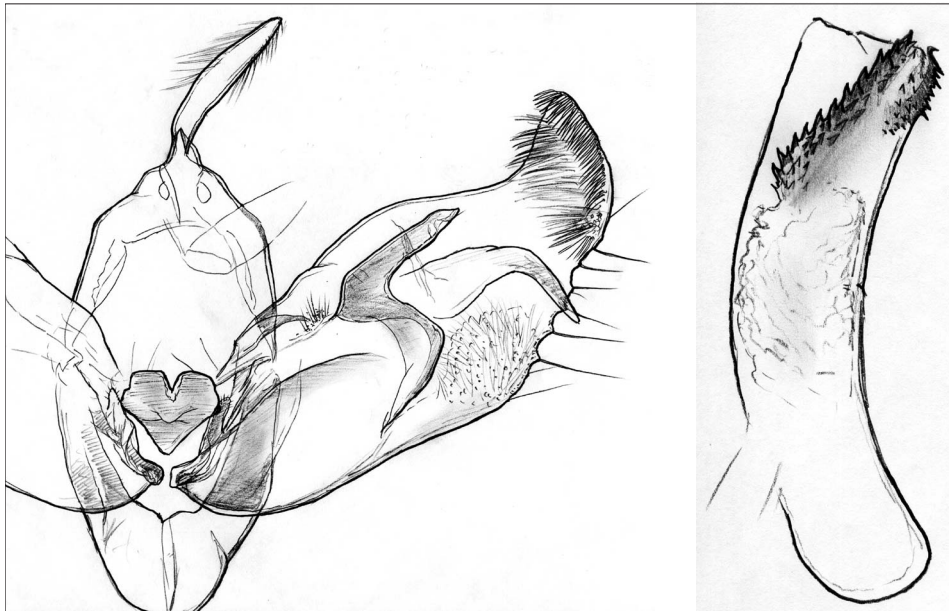
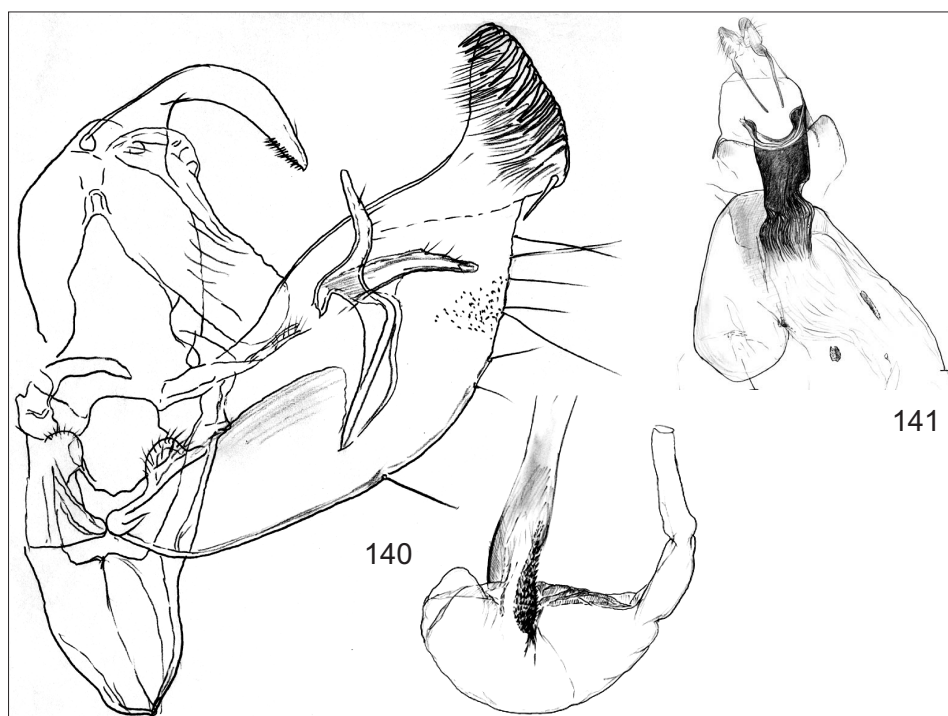


Fig. 139. *Diarsia hoenei* BOURSIN, 1954, male genitalia, paratype (Hö66)

much less constricted juxta with significantly deeper apical (dorsal) incision, basally more curved uncus, more straight outer margin of cucullus, broader harpe with more rounded proximo-lateral lobe, longer, distally less curved ampulla. The structure of the carina penis and the vesica are very characteristic of each species of the species-group, *D. metadichroa* has broad but short, serrated tooth, it is shorter and broader than those of *D. dichroa* and *D. scotodichroa* and the surface of this tooth is smooth in these latter two species. The female genitalia of *D. metadichroa* differ from those of *D. dichroa* and *D. scotodichroa* by its ventral sclerotised plate of antrum having no postero-lateral arms but having the largest postero-medial crest (see the Figs 92, 94, 96) and the largest antero-medial ligula, the weakest sclerotised ductus bursae with strongly angled and only slightly broadened proximal half and the three more or less equal, medium-long signa.

Description. Sexually remarkably dimorphic. Wingspan 31–36 mm, length of forewing 12–14,5 mm. Male. Antenna thin, shortly ciliate. The upperside pattern and colouration is as illustrated in Fig. 14. Underside of wings shining, pale ochreous white, costal and apical areas of forewing covered with rosy-pinkish scales, inner part of wing with variably strong blackish grey suffusion,

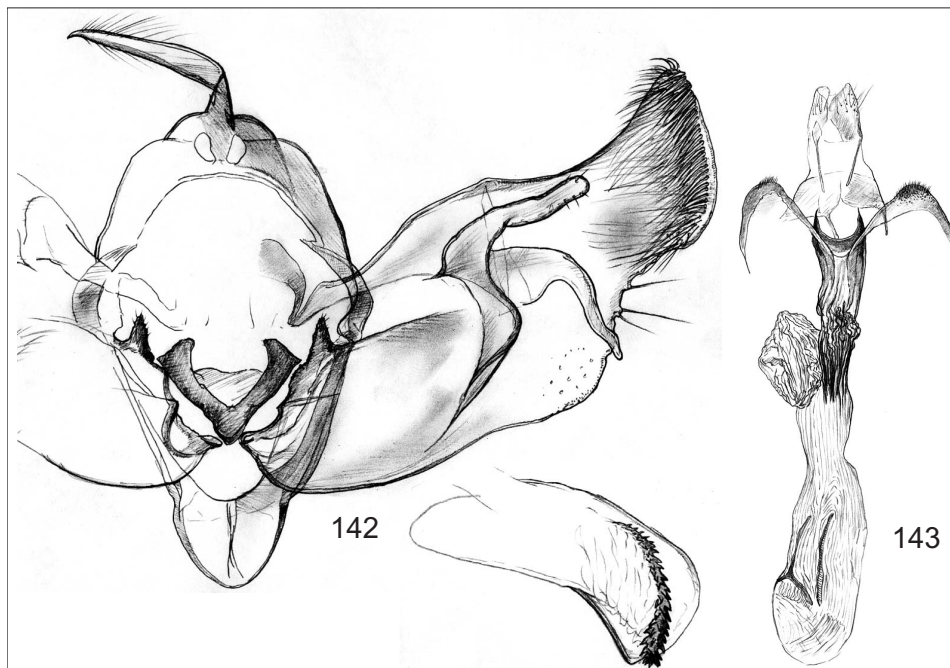


**Figs 140–141.** *Diarsia acutipennis* BOURSIN, 1954, genitalia: 140 = male, paratype (6692VZ), 141 = female, paratype (6700VZ)

traces of postmedial line and reniform stigma usually recognisable; hindwing with broad rosy-brown costal suffusion, diffuse transverse line and small but prominent dark brown discal spot. Female (Fig. 15) larger in size, having broader forewings and darker ground colour of both wings; wing pattern more distinct than in male.

Male genitalia (Fig. 91). Uncus long, slender, curved strongly at base, apically finely pointed. Tegumen long, narrow; juxta large, broad, more or less sand-clock-shaped with shallowly V-shaped ventral margin and deep apical (dorsal) incision. Valva elongated, narrow; cucullus long, slender, acutely triangular with rather straight outer margin and long, narrow neck; corona long. Saccus short, weak, clavus small, lobate. Harpe large, erect part flattened, more or less drop-shaped with rounded proximo-lateral lobe and straight posterior process. Ampulla long, narrow, medial part slender, almost straight, distal end finely curved downwards, apex slightly pointed. Aedeagus cylindrical, carinal plate with broad but short, serrated tooth. Vesica everted forward, upturned dorsally; medium-long, inflated, proximal two-thirds more or less globular, covered with a large amount of small spinules; subbasal plate strongly sclerotised, only sparsely serrated; terminal plate short, strongly crisate; terminal part of vesica verrucose, more or less tubular, with small subterminal diverticulum.

Female genitalia (Fig. 92). Ovipositor rather long, conical, papillae anales and posterior gonapophyses long. Penultimate segment broad, sclerotised, anterior gonapophyses short. Antrum broad, calyculate-lyriform, sclerotised, posterior part broadly and deeply incised, ventral plate with prominent postero-medial, apically conspicuously incised lobe, and with broad and long, U-shaped antero-medial ligula. Distal section of ductus bursae sclerotised, flattened, infundibular with fine medial curve, dorsal plate with strong medial fissure. Proximal half less sclerotised, medially strongly



**Figs 142–143.** *Diarsia acharista* BOURSIN, 1954, genitalia: 142 = male, holotype (Hö23), 143 = female, paratype (6720VZ)

angled and only slightly dilated, its walls strongly rugose-wrinkled. Appendix bursae small, membranous, subconical, corpus bursae elliptical-saccate; with three more or less equal, shortly ribbon-like signa.

**Bionomics.** *Diarsia metadichroa* occurs in the montane forest regions of the Fan-si-pan Mts between 1900–2300 m altitudes, it was found in the untouched primary forest belt below the elfin forest zone. The short series of specimens was collected (at light) at the second half of August when the females were still fresh but the males were already slightly or more strongly worn. Thus, the supposed flight period is the late summer (from the end of July to the end of August). The early stages and the foodplant are unknown.

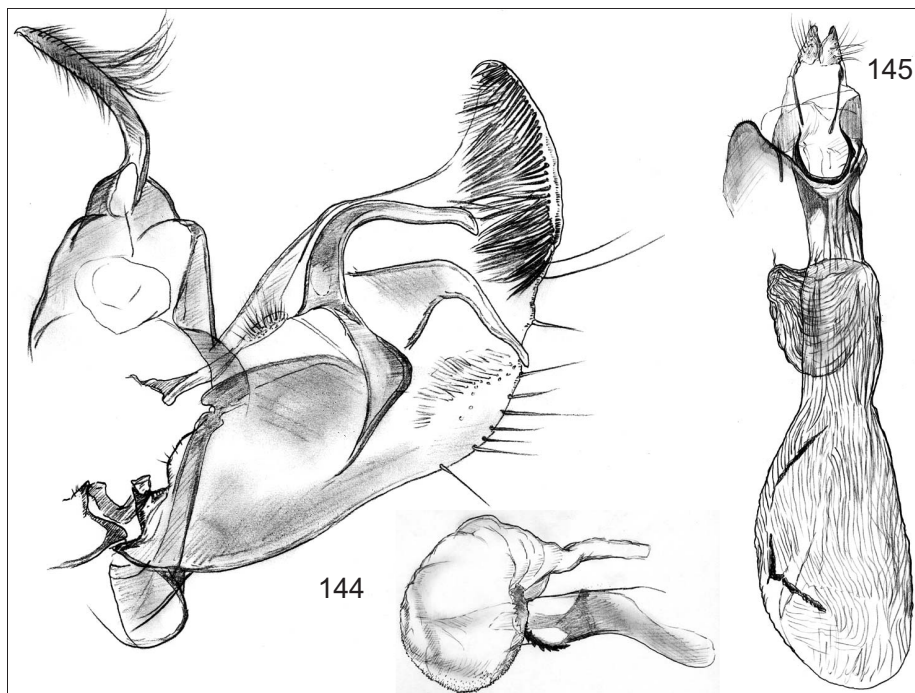
**Distribution.** The new species is known from the Fan-si-pan Mts (Northern Vietnam) only.

**Etymology.** The specific name refers to the similarity of the genitalia of the new species and *D. dichroa*.

### ***Diarsia gozmanyi* sp. n.**

(Figs 16–18, 89, 90)

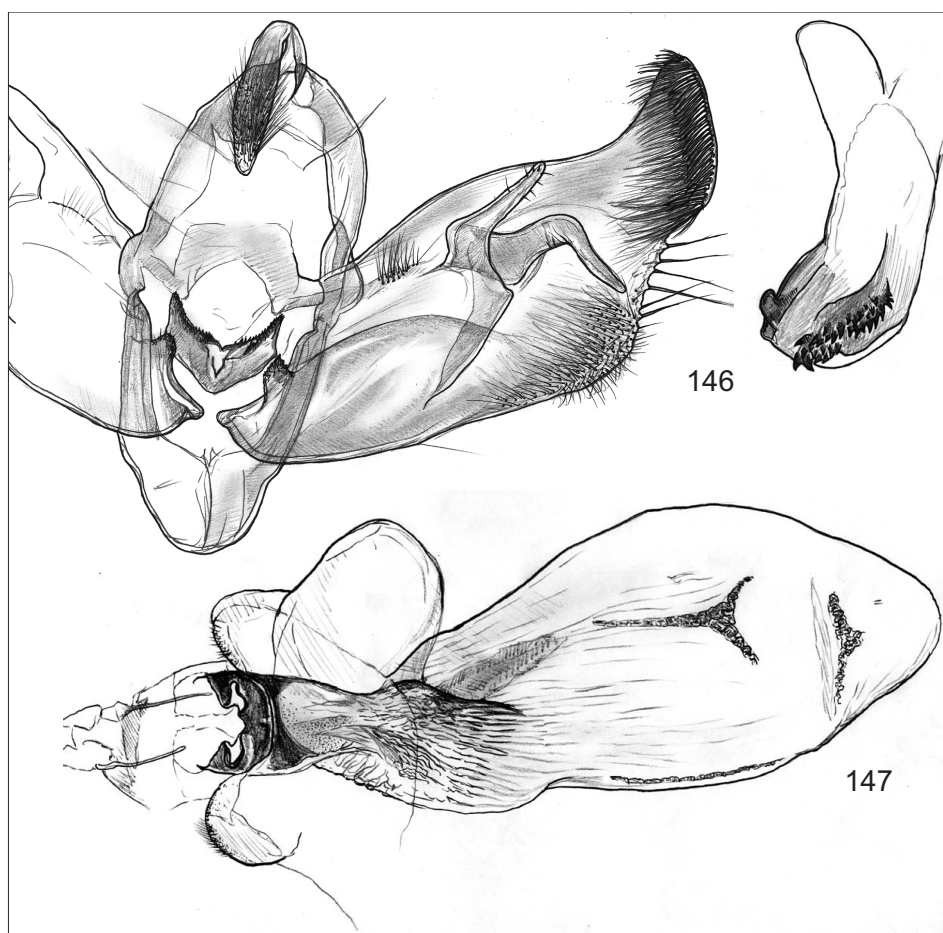
**Holotype:** Male, “Vietnam, Prov. Lao Cai, Fan-si-pan Mts, Frontier Vietnam Satellite Camp FTS, 22°20′48,1″N, 103°47′45,2″E, 1690 m, 24–25.VIII.1998, leg. A. Kun”; slide No RL8601m (coll. HNHM Budapest).



**Figs 144–145.** *Diarsia pseudacharista* BOURSIN, 1954, genitalia: 144 = male, paratype (6709VZ), 145 = female, paratype (6717VZ)

Paratypes. Vietnam, Prov. Lao Cai: 3 males, Fan-si-pan Mts, Frontier Satellite Camp, 2240 m, 103°47'30,9"E, 22°19'17,7"N, 18–22.VIII.1998, leg. A. KUN; slide Nos RL6304m, RL8179m, RL8180m (coll. HNHM and G. RONKAY).

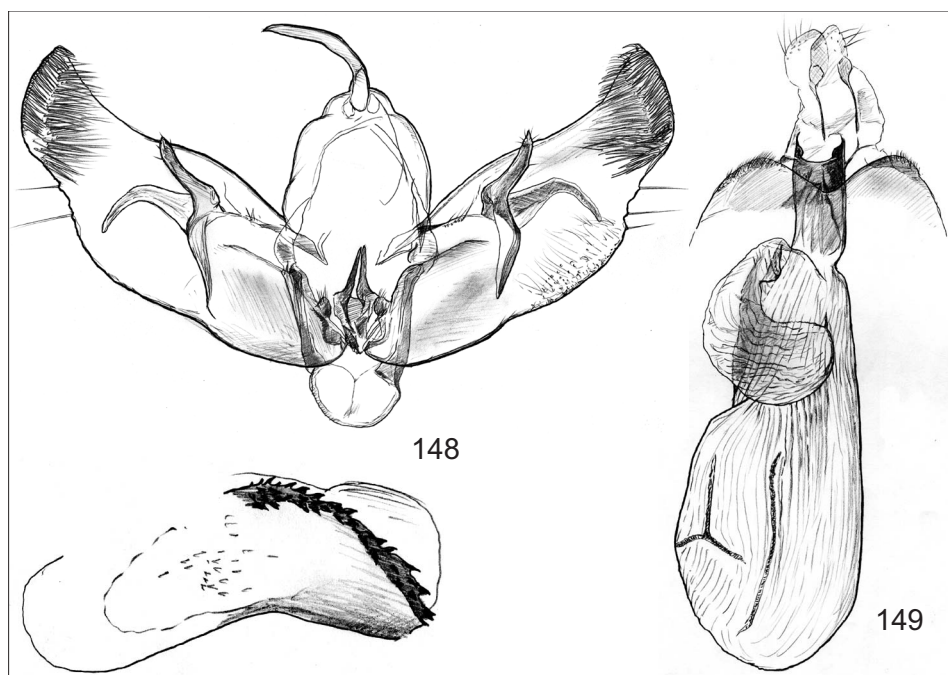
Diagnosis: The new species externally resembles the continental members of the *D. chalcea* species-group (see the Figs 1–19) but it is smaller in size, it is one of the smallest known *Diarsia* with its wingspan 28–29 mm. It differs from the related species (see the characterisation of the species-group) by its more unicolorous forewings with diffuse crosslines and small and less sharply defined orbicular and reniform stigmata having no bright ochreous or yellow filling.



**Figs 146–147.** *Diarsia odontophora* BOURSIN, 1954, male genitalia: 146 = male, paratypes (Hö170), (6691VZ), 147 = female, paratype (6699VZ)

The male genital capsula of *D. gozmanyi* (Figs 89, 90) differs from those of the other members of the *chalcea*-group by their broadest basal lobe and shortest, arcuate distal process of the harpe, the shortest, spiniform, straight or apically only slightly arched ampulla, and the apically more deeply incised juxta. The structure of the carina penis and the vesica are very characteristic of each species of the species-group. The carina penis of *D. gozmanyi* differs from those of *D. chalcea*, *D. cia*, *D. copria*, *D. dichroa*, *D. scotodichroa* and *D. metadichroa* (Figs 85, 87, 93, 95 and 97) by its smallest and weakest, flattened and rather crest-like than tooth-like postero-ventral process (this process is almost entirely reduced in *D. mandarinella*); the vesica of the new species is the most simplified structure within the *D. chalcea*-line by its small and weak dentated subbasal plate and by the absence of the crispate postero-lateral ribbon which is present in the other related taxa. The female of *D. gozmanyi* is, as yet, unknown.

Description. Wingspan 28–29 mm, length of forewing 11.5–13 mm. Male. Antenna thin, shortly ciliate. The upperside pattern and colouration is as illustrated in Figs 16–18. Underside of wings shining, pale ochreous white, costal and apical areas of forewing covered with rosy-pinkish scales, inner part of wing with variably strong blackish grey suffusion, traces of postmedial line and



**Figs 148–149.** *Diarsia eleuthera* BOURSIN, 1954, genitalia: 148 = male, holotype, 149 = female, paratype (6718VZ)



reniform stigma usually recognisable; hindwing with broad rosy-brown costal suffusion, diffuse transverse line and small but prominent dark brown discal spot. Female unknown.

Male genitalia (Figs 89, 90). Uncus rather long, slender, curved at base, apically pointed. Tegumen long, narrow; juxta large, shield-like with subdeltoidal basal and quadrangular apical (dorsal) portion, apical incision V-shaped, relatively deep. Vinculum strong, saccus long and broad, U-shaped. Valva elongate, rather narrow, dilated at medial third, having small, rounded and hairy ventral lobe. Cucullus small, acutely triangular, sitting on short, narrow neck; corona long, outer corner of cucullus with long, strong bristle. Sacculus short, weak, clavus a small, hump only. Harpe large, its basal bar narrow, straight, erect part flattened, more or less drop-shaped with rounded proximo-lateral lobe and arcuate posterior process. Ampulla relatively short, straight, fine and apically pointed. Aedeagus cylindrical, slightly arcuate, ventral edge with strong sclerotised bar continued distally in a prominent, flattened and finely serrate tooth-crest at ventral edge of carina. Vesica everted forward and upturned dorsad; medium-long, inflated, proximal two-thirds inflated, more or less globular, covered with a large amount of small spinules and armed by a small, serrated, sclerotised subbasal plate. Distal part of vesica verrucose, more or less tubular, with small subterminal diverticulum.

Bionomics. The four known specimens of *Diarsia gozmanyi* were found together with the type series of *D. metadichroa*, they live supposedly in the same habitats. All four specimens were collected at light and are slightly worn; no female specimen is recorded. The early stages and the foodplant are unknown.

Distribution. The new species is known from the Fan-si-pan Mts (Northern Vietnam) only.

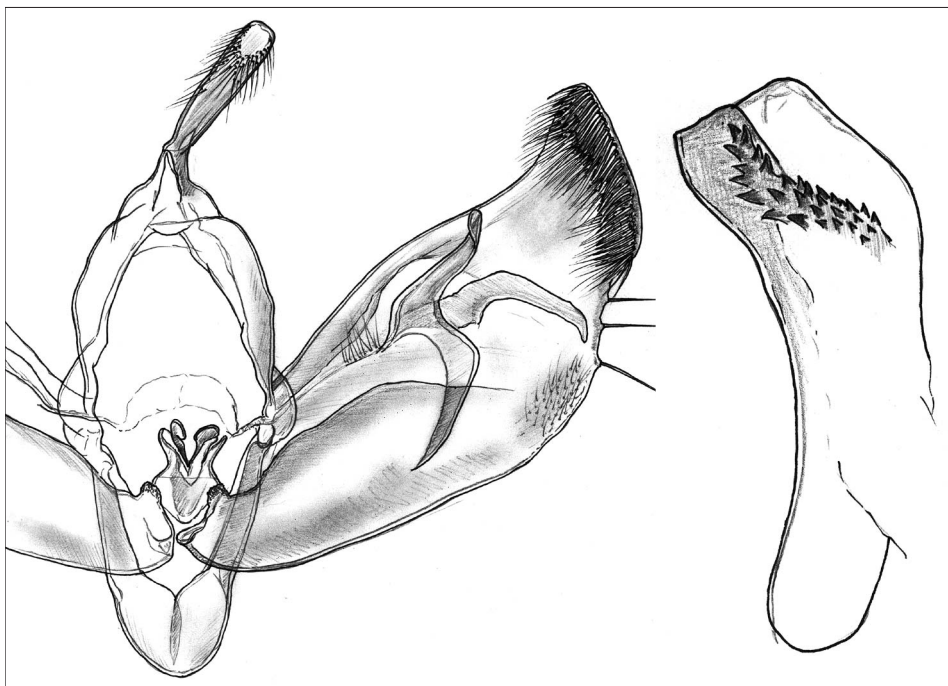


Fig. 150. *Diarsia polytaenia* BOURSIN, 1954, male genitalia, holotype (Hö26)

Etymology. The species is dedicated to Dr LÁSZLÓ A. GOZMÁNY, the doyen of the Hungarian Lepidopterology, renowned expert of several Microlepidoptera families of the Gelechioidea and Tineoidea.

***Diarsia taidactyla* sp. n.**

(Figs 20–23, 110, 111)

Holotype: Male, “Taiwan, Nantou County, Yuanfeng, SW to Hohuan Mountain on the road No. 14, 2760 m, 24°07'24"N, 121°14'55"E, 1.IV.2000, leg. A. Kun & L. Peregovits” (coll. HNHM Budapest).

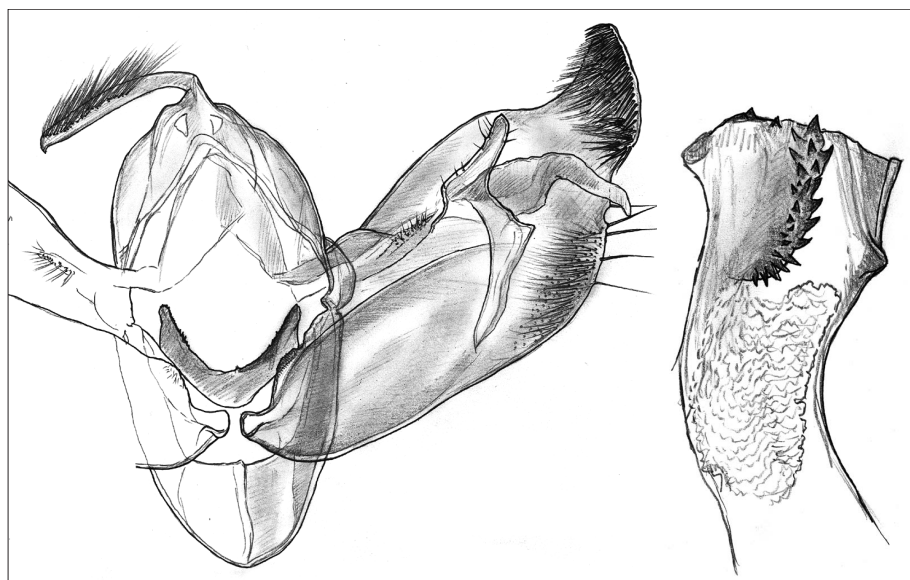
Paratypes. Taiwan. Nantou County: 19 males, 13 females, from the same site, 1–2.IV.2000, leg. A. KUN & L. PEREGOVITS; 8 males, 1 female, Hohuanshan, Experimental Station, 3100 m, 121°17'E, 24°09'N, 23–24.IX. and 26–28.IX.1999, leg. G. CSORBA & B. HERCZIG, slide Nos RL8177m, RL8183f; 3 males, 1 female, Yuanfeng, SW to Hohuan Mountain on the road No. 14, 2760m, 24°07'24"N, 121°14'55"E, 29.XI.1999, leg. A. KUN, L. PEREGOVITS & L. RONKAY, slide No. 7103m; 4 males, 3 females, Yuanfeng, 2750 m, 20.X.2006, leg. H. R. TZUOO; 6 males, 4 females, 5 km SW of Tayuling, 2900 m, 7–8.XI.1996, 121°17'E, 24°09'N, leg. T. CSÓVÁRI & Cs. SZABÓKY; 8 males, 4 females, from the same site, 19.X.1995, leg. T. CSÓVÁRI & P. STÉGER; 1 male, Hohuachi, between Lishan and Tayuling, at the road No. 8, 1950 m, 24°13'N, 121°16'E, 31.III.–1.IV.2000, leg. A. KUN & L. PEREGOVITS, slide No. 7104m; 6 specimens, Hohuanshan, 22.IX.2006, leg. H. R. TZUOO; 1 female, Rinnei Nature Conservation Area, between Meifeng and Tsuifeng, 2100 m, 24°05'N, 121°10'E, light trap, 20.XI.2004, leg. L. RONKAY & H. R. TZUOO; 3 males, 2 females, 3 km SW of Tsuifeng, 2100 m, 20.X.1995, 26–27.X.1995, 11.X.1995, and 1–2.IV.1996, 121°10'E, 24°06'N, leg. T. CSÓVÁRI & P. STÉGER; 5 males, 1 female, 1 km W of Tatachia peak, 2520 m, 13.X.1995, 120°53'E, 23°33'N, leg. T. CSÓVÁRI & P. STÉGER; 1 male, 2 females, 1 km W of Tatachia peak, 2520



**Fig. 151.** *Diarsia coenostola* BOURSIN, 1954, male genitalia, holotype (Hö20)

m, 28. III.1996 and 3.XI.1996, 120°53'E, 23°33'N, leg. T. CSÓVÁRI & Cs. SZABÓKY; 1 male, 10 km SE of Shenmu, 2200 m, 14.III.1996, leg. Gy. FÁBIÁN & L. NÉMETH. Taoyuan County: 2 males, 16 km E of Fuhsing, 870 m, 20.XI.1996, 121°24'E, 24°50'N, leg. T. CSÓVÁRI & Cs. SZABÓKY. Taichung County: 6 males, 3 females, Anmashan Mts, 2650 m, 22.X.2000, 16.III.2001 and 30.III.2001, leg. C.M. FU, L. PEREGOVITS & L. RONKAY, slide No. RL8152m; 1 male, 4 females, Anmashan Mts, 49 km E of Tungshih, 2490 m, 23.III.1996, 4.IV.1996, and 28.X.1996, 121°03'E, 24°19'N, leg. T. CSÓVÁRI & Cs. SZABÓKY. Taitung County: 1 male, 3 females, Yushan Mts, Hsiangyang, 2200 m, 10.IV.1997, leg. G. CSORBA & L. RONKAY, slide No. RL8153f; 1 female, Chihpen, 390 m, 9.IV.1997, leg. G. CSORBA & L. RONKAY; 1 male, 1 female, 2 km E of Hsiangyang, 2200 m, 11–13.III.1996, leg. Gy. FÁBIÁN & L. NÉMETH. Ilan County: 2 males, near Pinan on the Road 7/1, 1550 m, 29.III.1997, leg. G. CSORBA and L. RONKAY; 4 males, 1 female, Chihtuan, Ming-Chyr Forest Recreation Area, 1200 m, 30–31.III.1997, leg. G. CSORBA and L. RONKAY. Hualien County: 2 males, Kuanyuan, 2400 m, 4.IV.1997, leg. G. CSORBA and L. RONKAY; 7 males, 3 females, Hohuan Pass, 3000 m, 3.IV.1997, leg. G. CSORBA and L. RONKAY. Pingtung County: 1 male, 1 female, 10 km NW of Ssulín, 350 m, 21.III.1996, 120°46'E, 22°05'N, leg. T. CSÓVÁRI & P. STÉGER. Kaoshiung County: 1 male, 15 km NE of Taoyuan, 1850 m, 12.III.1996, leg. Gy. FÁBIÁN & L. NÉMETH. The paratypes are deposited in the collections of the HNHM, TFRI, NMNS (Taichung), T. CSÓVÁRI, Gy. FÁBIÁN, C. M. FU, P. GYULAI, B. HERCZIG, S. T. KOVÁCS, G. RONKAY, H. R. TZUOO).

**Diagnosis.** The new species is the insular sister species of the continental Chinese *D. macrodactyla*. They differ externally (Figs 20–27) by the more vivid deep red-brownish colouration of the new species having fine violet sheen and the less prominent forewing markings (but it should be noted that the available specimens of *D. macrodactyla* – the type series – are rather old and possibly faded ones!).



**Fig. 152.** *Diarsia nebula* (LEECH, 1900), male genitalia, Hö6, Atuntse

The male genitalia of *D. taidactyla* (Fig. 110) can be distinguished from those of its twin species (Fig. 156) by their broader uncus, broader, medially much deeply incised juxta, thinner, distally remarkably curved and more acute ampulla and the slenderer, medially more curved harpe (the vesica of *D. macrodactyla* is not studied as the slide of the holotype is uneverted). The female genitalia of the two species (Figs 111, 157) are very similar but the signa of the new species are much longer and stronger and the antrum is somewhat longer, proximally less tapering.

Description. Wingspan 27–32 mm, length of forewing 13–15 mm. Sexes similar. Male antenna rather thin, with very short fasciculate cilia; that of female filiform. The upperside pattern and colouration is as illustrated in Figs 20–23. Underside of both wings shining whitish-ochreous, forewing with pinkish or rosy-brown costal and apical stripes and darkened inner area, postmedial line diffuse, brownish-grey, subterminal line a fine whitish shadow; reniform stigma usually hardly recognisable. Costal suffusion of hindwing broad, pinkish or rosy mixed with grey and brown scales, transverse line and discal spot diffuse, greyish brown.

Male genitalia (Fig. 110). Uncus short, spatulate, distally dilated, dorsally densely setose. Tegumen short, relatively broad; juxta more or less lyriform with wedge-shaped dorso-lateral arms and deep dorso-medial incision; vinculum strong, with U-shaped, broad saccus. Valva relatively short, its proximal two-thirds broad, with parallel costal and ventral margins; cucullus small, triangular, sitting on short, narrow neck; corona long, strong. Sacculus short, weak, clavus represented by a rounded, setose surface. Harpe broad-based, erect part thick, flattened, medially curved, apically pointed. Ampulla very long (extending far over ventral margin of valva), strong, horn-like, its distal third curved downwards (ventrad), tapering into acute tip. Aedeagus long, cylindrical-tubular, curved at base, then straight, carina with long, smooth dorsal and ventral sclerotised plates. Vesica very short, membranous, covered by numerous strong, spiniform cornuti; ductus ejaculatorius projected ventrad from distal end of vesica.



**Fig. 153.** *Diarsia poliophaia* BOURSIN, 1954, male genitalia, holotype (Hö175)

Female genitalia (Fig. 111). Ovipositor weak, conical, medium-long, papillae anales short, apically pointed; posterior gonapophyses slender, fine. Ventral part of penultimate segment broad, sclerotised, anterior gonapophyses short. Antrum infundibular, sclerotised, posterior part very broad, with short postero-lateral arms, anterior part strongly tapering. Ductus bursae medium-long, flattened, more or less quadrangular and smoothly sclerotised. Appendix bursae very small, membranous, rounded conical; corpus bursae long, narrow sacculiform with somewhat dilated fundus and with two thin but strong, prominent signum-stripes.

Bionomics. The species inhabits mostly the higher montane forest regions (between 2000–3100 m) but it was found also in much lower altitudes (400–1500 m a.s.l.) in humid and rather cool valleys and dense forest areas. It has a spring and an autumn generation, the adults are on the wing in March–April and September–November. The early stages and the foodplants are unknown.

Distribution. Endemic to Taiwan. The species was found as widespread in the higher mountain regions.

Etymology. The specific name is an acronym derived from “Taiwan”, the name of the homeland of the new taxon and “*macroductyla*”, the name of the sister species of the new taxon.

### ***Diarsia metatorva* sp. n.**

(Figs 28–30, 130, 131)

Holotype: Male, “China, Prov. Shaanxi, 1400 m, Tsinling Mts, South Taibaishan Mt., Houzhenzi, 1400 m, 107°49'E, 33°51'N, IX.1999, leg. SINIAEV & PLUTENKO” (coll. G. RONKAY; deposited in coll. HNHM, Budapest).

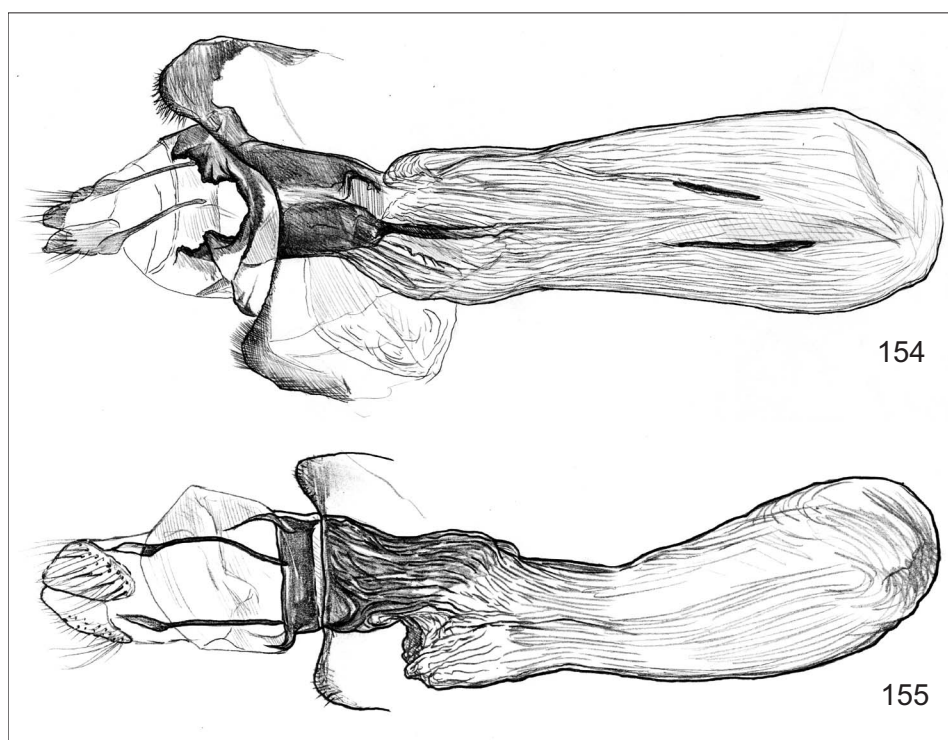
Paratypes. China. Prov. Shaanxi: 2 males, 1 female, with the same data as the holotype; slide Nos RL8192m, RL8246m (males), RL8245f (female); 34 males, 36 females, Taibaishan area, Tsinling Mts, Dudamen vill., 2600 m, 33°55' N, 107°44' E; 20–30.VI.2005, leg. SINIAEV & local collector; 35 males, 27 females, Tsinling Mts, Fopin Mt., 1900 m, 33°45' N, 107°38' E; 1–30.VI.2004, leg. SINIAEV & local collector. Prov. Hunan: 14 males, 9 females, Nanling Mts, Shikenkong Mt., 1500 m, 112°57'E, 24°54'N, 15–30.XI.2003, SINIAEV and local collector leg., slide No. RL8862m (male). The paratypes are deposited in coll. HNHM, P. GYULAI and G. RONKAY.

Diagnosis. The new species is very similar externally to its twin species, *D. torva* (see the Figs 28–32). They differ in the first look by their wingshape: the new species has recognisably longer and narrower wings. There are some other little differences between them (the crosslines of *D. metatorva* are somewhat more sinuous, the reniform stigma is less defined and narrower and the hindwing is paler in colouration) but these latter characteristics would be insufficient for the satisfactory separation of the two taxa.

The genitalia of the two species show easily recognisable differences in both sexes (see the Figs 128–131). Comparing the male genital capsula of the two species, *D. metatorva* (Fig. 130) has larger, broader juxta with stronger apical part, larger harpe with broader, more quadrangular base of the erect part and stronger, longer outer extension of the basal plate and somewhat longer, stronger ampulla.

The most conspicuous difference between the male genitalia of the two sister species can be found in the armature of the vesica: the otherwise larger, more dilated vesica of *D. metatorva* is armed with a huge, rather quadrangular, strongly serrate cornutus (Fig. 130) and a group of pointed, long spines while the cornutus of *D. torva* is shorter but distally much broader, rather axe-shaped and the additional group of cornuti is completely missing (Fig. 128). In the female genitalia the antrum of *D. metatorva* is much broader distally, its lateral margins less broadened posteriorly, the ductus bursae is remarkably broader and more subtriangular than that of *D. torva*; in addition, the signum is stronger and less Y-shaped than in its close relative.

Description. Wingspan 36–39 mm, length of forewing 16–17 mm. Sexes similar. Male antenna relatively thick, shortly fasciculate, dorsum of antenna covered with large, dark brown scales; female antenna filiform. The upperside pattern and colouration is as illustrated in Figs 28–30. Under-side of both wings pale ochreous with greasy shining, forewing inner area suffused with brownish grey, termen finely irrorated with pinkish. Upper part of postmedial line sharply defined, blackish, lower part diffuse, brownish-grey, subterminal line rather straight, whitish or ochreous; reniform



**Figs 154–155.** Female genitalia: 154 = *Diarsia orophila* BOURSIN, 1954, paratype (6715VZ), 155 = *D. erubescens* (BUTLER, 1889) (6706VZ)

stigma a fine grey arch. Costal area of hindwing sparsely irrorated with pinkish and grey-brown scales, apex suffused with rosy-brown; transverse line and discal spot rather sharp, dark greyish brown.

Male genitalia (Fig. 130). Uncus medium-long, curved at base, distal part straight and flattened, apically rounded. Tegumen long, very narrow; juxta small, subdeltoidal, with cylindrical dorsal (apical) part; vinculum strong, saccus broad, rounded, U-shaped. Valva broad, elongate, medially dilated, ventral part forming elongated, densely hairy lobe; cucullus sitting on short, narrow neck. Cucullus small, acutely triangular, densely hairy; corona long, outer corner of cucullus with longer, stronger bristles. Sacculus short, weak, clavus a small, sclerotised and rounded lobe. Harpe-ampulla complex forming a trifold structure: erect part of harpe falcate, sharply acute, basal plate of harpe with relatively long, arcuate outer process; ampulla long, fine, pointed. Aedeagus cylindrical, curved, carina with smooth dorsal and ventral sclerotised plates. Vesica short, membranous, inflated, more or less semiglobular, with large, quadrangular, heavily sclerotised and ventrally strongly serrated plate ("cornutus") and a group of strong, pointed spines.

Female genitalia (Fig. 131). Ovipositor weakly sclerotised, conical, medium-long, papillae anales short, apically obtuse; posterior gonapophyses long, slender, fine. Penultimate segment narrow with large, rounded antero-lateral lobes, anterior gonapophyses very short. Antrum rather infundibular, sclerotised, with spiculate-granulose lateral margins. Ductus bursae short, semi-discoidal, flattened, projected dorsad, rather strongly sclerotised with verrucose-scobinate surfaces and inner crests. Appendix bursae very small, membranous; distal part of corpus bursae long, tubular, fundus bursae elliptical-ovoid, finely wrinkled; signum long, cristate-ribbed, slightly Y-shaped.

Bionomics. The specimens representing the type series were collected in medium-high forested areas where it appears as relatively frequent. The specimens of the Shaanxi population were found at the early autumn while the freshly emerged moths in Hunan have been observed in November in larger numbers. The early stages are unknown.

Distribution. China: Shaanxi, Taibaishan Mts; Hunan: Nanling Mts.

Etymology. The specific name refers to the close relationship of the new species with *D. torva*.

### ***Diarsia protodahlia* sp. n.**

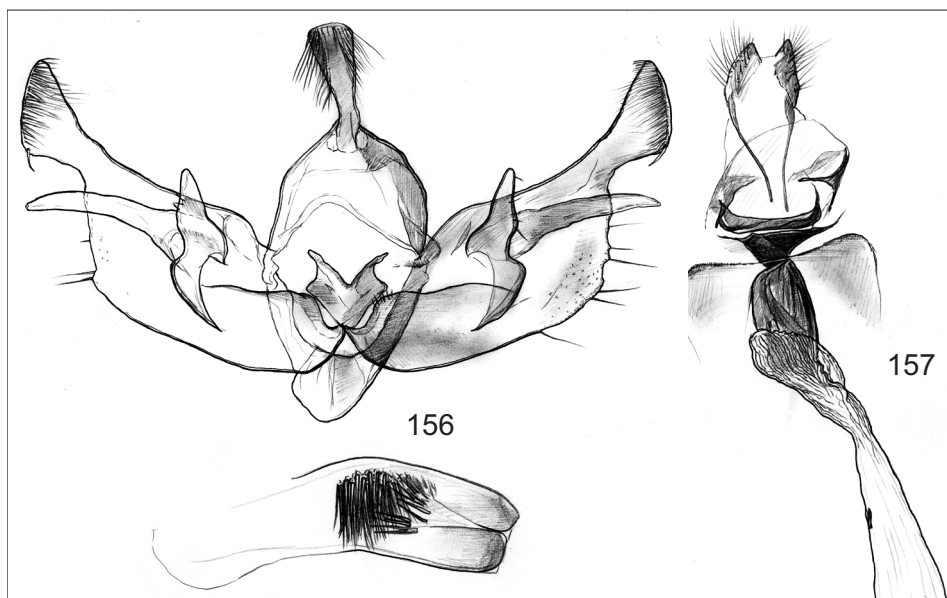
(Figs 33, 34, 137, 138)

Holotype: Male, "China, Sichuan, Daxue Shan, 80 km W Kangding, 3800 m, 101°40'E, 30°02'N, 27–29.VII.1999, leg. Siniaev & Plutenko", slide No. RL8184m (coll. G. RONKAY, deposited in the HNHM, Budapest).

Paratypes. 2 males, 1 female, China, Sichuan, Daxue Shan, 80 km W Kangding, 3800 m, 101°40'E, 30°02'N, 27–29.VII.1999, leg. SINIAEV & PLUTENKO, slide Nos RL8903m, RL8259f (coll. P. GYULAI and G. RONKAY).

Diagnosis. The new species is very similar externally to certain well-patterned and deep red-brownish specimens of the typical western Palearctic *D. dahlia* (and not the eastern Siberian-Mongolian *D. dahlia nana* (STAUDINGER, 1896) or the SE Tibetan *D. dahlia tibetica* BOURSIN, 1956), see the Figs 33–40. No distinctive external features are recognised due to the large individual variation of *D. dahlia* while the two species are easily distinguished by their genitalia.

The genitalia of the two species are different in almost all details (see the Figs 135–138), some of these differences are really conspicuous. The major differences between the genital capsule of *D. protodahlia* and *D. dahlia* are the following: *D. protodahlia* (Fig. 137) has the outer process of the harpe-base much larger and broader (ca twice as large) than that of *D. dahlia* (Fig. 135), the sclerotised part of the ampulla weaker, more bar-shaped and apically less acute, and the juxta is broader, trapezoidal-cordiform, with small dorsal process (that of *D. dahlia* is triangular with longer, narrower dorsal process). In addition, the neck of the valva of *D. protodahlia* is narrower, and the erect part of the harpe is shorter, less pointed. The configuration of the vesica shows essential differences: the vesica of *D. protodahlia* (Fig. 137) is much shorter, semiglobular, with drawing-pin-like subbasal cornutus and upturned, membranous distal part, without sclerotised structure, the ductus ejaculatorius is the direct continuation of the distal part, projected dorsad. The vesica of *D. dahlia* (Fig. 135) is much larger, having long, tubular posterior diverticulum armed with long, strongly serrated and spiralised sclerotised ribbon, the subbasal diverticulum is larger, longer, conical with acute tip and the ductus ejaculatorius is projected laterad from the basal bulb of the vesica. The carina penis of the two species is also remarkably different as *D. protodahlia* has a large dorso-lateral dentated plate which is reduced in *D. dahlia*.

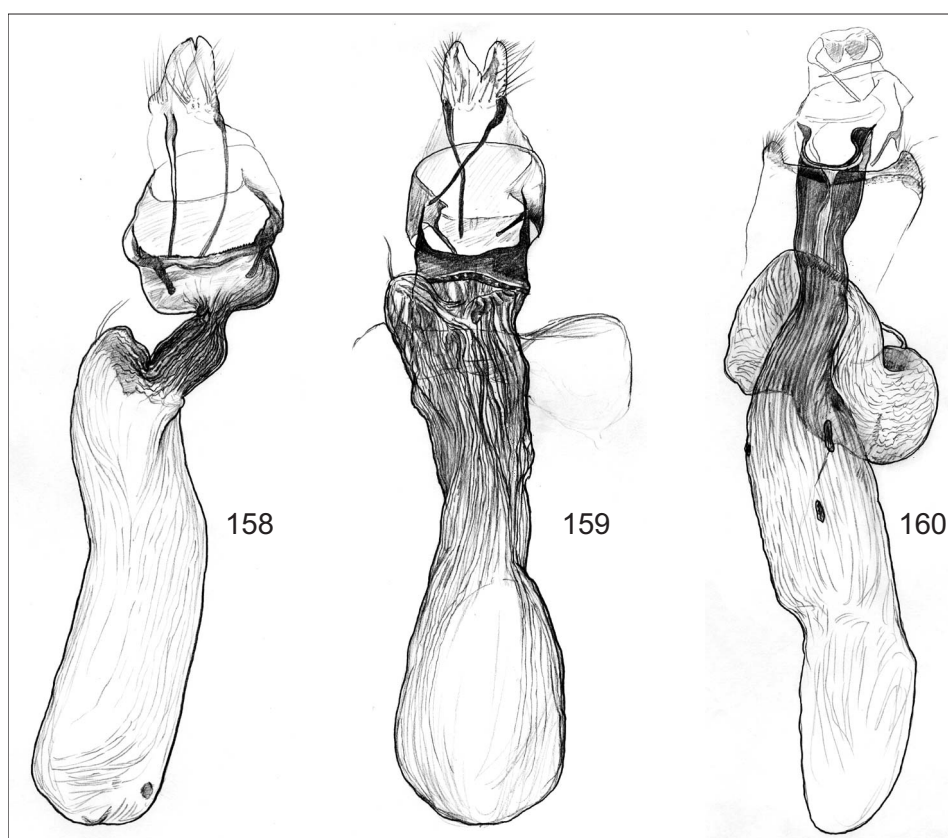


**Figs 156–157.** *Diarsia macrodactyla* BOURSIN, 1954, genitalia: 156 = male, holotype (Hö306), 157 = female, paratype (6719VZ)



The vesica of *D. protodahlia* is somewhat similar to those of *D. brunnea* (see e.g. FIBIGER, 1997, Fig. 203) but having no distal diverticulum which is present in the latter species and the ductus ejaculatorius is a dorsal continuation of the vesica while that of *D. brunnea* is opened from the ventro-lateral side of the basal bulb of the vesica.

The female genitalia of the two species of the *D. dahlia* group are easily distinguished by the shape and size of the penultimate segment, the antrum, the ductus bursae and the corpus bursae, as well. *Diarsia protodahlia* (Fig. 138) has large, ellipsoidal proximo-lateral lobes on the penultimate segment (the proximo-lateral lobes of the penultimate segment are reduced in the two related species into small, rather rounded plates), the antrum is cup-shaped with strongly sclerotised lateral



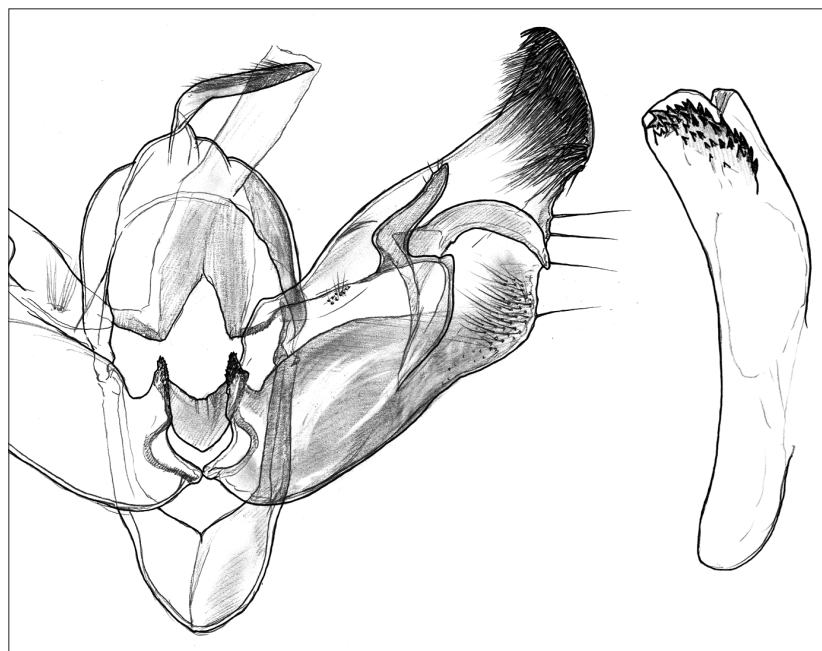
**Figs 158–160.** Female genitalia of three *Diarsia* species: 158 = *D. pacifica* BOURSIN, 1943, 159 = *D. ruficauda* (WARREN, 1909) (6704VZ), 160 = *D. caradjai* BOURSIN, 1954 (6722VZ)

margins, the ductus bursae is entirely sclerotised, flattened-ellipsoidal, cristate-ribbed, corpus bursae entirely membranous, long, narrow, with bulbed fundus.

The rather cup-shaped antrum of *D. dahlui* (Fig. 136) is much less incised posteriorly, the posterior part of the ductus bursae is infundibular, less sclerotised while the sclerotised anterior part is rather tubular, the appendix bursae is strongly ribbed and finely sclerotised and only the fundus is membranous.

The antrum of the other related species, *D. brunnea* is weaker in sclerotisation, having narrow sclerotised margins; the ductus bursae is longer, narrower than that of *D. protodahlui*, its posterior half more or less infundibular and smoothly sclerotised while the anterior part is semi-ellipsoidal; the membranous corpus bursae is somewhat shorter and broader than that of *D. protodahlui* and has a rather prominent signum-stripe.

Description. Wingspan 36–40 mm, length of forewing 15–17 mm. Sexually strongly dimorphic. Male antenna rather thin, with short ciliation, female antenna fine, filiform. The upperside pattern and colouration is as illustrated in Figs 33 and 34. Underside of both wings shining ochreous, forewing strongly, hindwing diffusely irrorated with dark brownish grey scales. Forewing costal and inner margins and narrow terminal field somewhat paler, wing pattern obsolescent. Costal area of hindwing and cilia with pinkish shade, discal spot diffuse but clearly recognisable, transverse line diffuse or obsolete.



**Fig. 161.** *Diarsia hypographa* BOURSIN, 1954, male genitalia, holotype (Hö1687)

Male genitalia (Fig. 137). Uncus short, curved at base, then more or less straight and flattened, apically rounded. Tegumen long, very narrow; juxta small, subdeltoidal, with two fine, short medio-apical bars; vinculum strong, with rounded, broadly U-shaped saccus. Valva broad, medially dilated with ventral margin forming elongated, densely hairy lobe. Cucullus relatively small, acutely triangular; corona divided into an apical row of strong setae and a group of longer, stronger bristles at outer corner, ventral surface of cucullus covered with fine hairs. Sacculus short, weak, clavus reduced to a fine, laced lobe. Harpe-ampulla complex show a sophisticated structure: erect part of harpe truncated S-shaped, with fine, serrated and setose bar at base, basal plate of harpe with huge, acute, sword-like outer process having sinuous-serrate margins. Ampullar plate reduced to rather weak basal and very short but strong, triangular-acute erect part. Aedeagus tubular, curved, with strong, dentate dorsal carinal plate and with weak sclerotised bar extending towards apical cornutus. Vesica short, membranous, basal portion inflated, semiglobular, subbasal cornutus large, broad-based, rather drawing-pin-like, laterally finely serrated; distal portion bent dorsad, narrowly tubular, membranous.

Female genitalia (Fig. 138). Ovipositor conical, medium-long, papillae anales short, rather weak, apically pointed; posterior gonapophyses relatively long, slender, with flattened posterior plate. Penultimate segment a narrow ring with large, elliptical antero-lateral lobes, anterior gonapophyses very short, located at middle of antero-lateral lobes. Ostium bursae rounded, with two circle-shaped sclerotised posterior plates; antrum deeply calyculate with enlarged proximo-lateral margins. Ductus bursae long, flattened and medially somewhat dilated, heavily sclerotised, with strong (more or less) longitudinal ribs and crests. Appendix bursae very small, membranous; corpus bursae also membranous, very long and tubular with rather narrowly ovoid fundus bursae; signum absent.

Bionomics. Poorly known; the species was found above the timberline.

Distribution. China: Sichuan.

Etymology. The specific name refers to the close relationship of the new species with *D. dahlii*.

\*

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